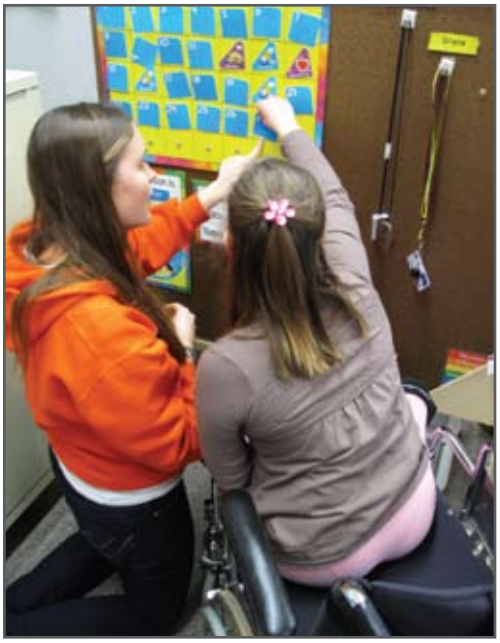
NEW LEARNING:

A Charter for Change in Education

Educators agree that the resources currently invested in education are **not sufficient** to produce satisfactory outcomes for today's economy, society, and for a large proportion of its citizenry. Economists agree that applying more private or public resources to education will provide **greater employment** and general economic multiplier effects than almost **any other investment.**



However, not all educational investments are the best educational investments. In this moment of **tremendous change**, investing in old ways of doing education may not be the best way to use hard-won personal and public resources.

Initiated by experts in the College of Education, at the University of Illinois, this Charter outlines a ten point plan for **doing things differently—and better—in education**. The document is both idealistic and pragmatic. Its vision is nothing less than a transformative one. However, for each of our agenda items, we suggest ways in which the transformations needed are **practicable and achievable**.

This Charter is a response to the momentous and turbulent changes of our time— a time when we need more education, everyone agrees, but as we argue here, **not more of the same.**

We recognize the role education plays in providing a **foundation for economic prosperity and social well-being.** There is an urgent need to revitalize the bricks and mortar infrastructure.

More broadly and deeply, we need to create the human capital needed for America's economic growth and broader development **in vastly different conditions to those of the twentieth century,** when our schools of today were created and our teachers of today were trained. Our education system requires **nothing less than a transformation** if it is to serve our social and economic needs into the future.

The University of Illinois has a proud history of **innovation** in education. In this spirit, we propose a set of strategies for this critically important moment. On the back of this overview we define **"Action Areas"** with specific steps to achieve the transformation.

To join the dialogue see: education.illinois.edu/newlearning

Or contact: Dr. Mary Kalantzis, Dean, College of Education, University of Illinois, marykalantzis@illinois.edu

AN INVITATION: PARTICIPATE IN SHAPING THE FUTURE

This Charter overview contains a brief description of proposed action areas. A full version details each action item and presents supporting evidence based on the College's intellectual and practical involvement in the life of schools, colleges, and universities: education.illinois.edu/newlearning

JOIN US AND MAKE A DIFFERENCE:

1 LAY THE FOUNDATIONS FOR A KNOWLEDGE SOCIETY

Our education system is not well-geared to the needs of a rapidly changing economy. We need to make it more relevant and produce the kinds of learners, workers, and citizens for today's education to shape tomorrow's world.

2 INCREASE THE SIZE AND EFFECTIVENESS OF LEARNING INVESTMENT

We don't just need more investment in education; we need new forms of investment, for new purposes and in new ways. We must change the way people are educated for knowledge economy jobs and the demands of today's complex workplace.

3 TRANSFORM THE EDUCATION PROFESSION

Teaching is often regarded as a low status profession. Pay is low, and conditions are challenging. We need to reinvigorate teaching and reposition it as a leading profession in the knowledge economy. Teacher education must take on a greater role for ongoing professional development.

4 ADAPT TO A UBIQUITOUS LEARNING ENVIRONMENT

Schools have failed to keep up with the technologies that have transformed home and working life. Today, when we can learn anywhere and anytime, our heritage forms of teaching appear increasingly anachronistic. We need to catch up and move ahead.

5 TEACH TO A NEW BASICS

Today's curricula are grounded in a 'basics' that has not changed for over a century. Our students need to acquire knowledge, capacities and sensibilities for the twenty-first century.

6 CREATE MORE RESPONSIVE LEARNING FEEDBACK SYSTEMS

Today's tests do not test the right things, nor do they test in ways that are as useful as they should be to learners, teachers, parents, and the broader community. We need to design more responsive, accurate, and transparent learning feedback systems.

7 MEET THE NEEDS OF DIVERSE LEARNERS

We still fail terribly to provide all learners equivalent educational opportunities. Creating opportunities for all will benefit society as a whole.

8 EDUCATE FOR GLOBAL CITIZENSHIP

Too often, learning is narrowly local. We need to teach for a world of global interconnectedness.

9 EDUCATE FOR SUSTAINABILITY

The careful use of scarce environmental resources needs to be an issue at the forefront of our working, public, and personal lives. However, this is an area that schools do not yet address as systematically as they should. We need to educate for sustainability.

10 REFORM EDUCATIONAL ORGANIZATION AND LEADERSHIP

Our structures of educational governance too often reflect old-fashioned bureaucratic approaches to the organization of people and the achievement of objectives. We need to renew schools so they become organizations that enable and energize teachers, students, and communities.

Fouad Abd-El-Khalick
Kern Alexander
James D. Anderson
Steven Aragon
Debra D. Bragg
Nick Burbules
Bill Cope
Dorothy Espelage
Susan Fowler
Georgia Earnest García
Donald G. Hackmann
Scott D. Johnson
Wayne Journell
Mary Kalantzis
Edward A. Kolodziej
Russell Korte
Peter Kuchinke
Christopher Lubienski
Cris Mayo
Sarah J. McCarthey
Walter W. McMahon
Michael Peters
Evangeline S. Pianfetti
Fazal Rizvi
Chris Roegge
Katherine E. Ryan
Jim Shriner
Chris Span
Sharon Tettegah
Tod Treat
Peter Weitzel
Arlette Willis

UNIVERSITY OF ILLINOIS

COLLEGE OF EDUCATION

New Learning: A Charter for Change in Education

Wherever we look, we see challenges in areas of critical concern for our future. The seemingly stable pillars of our economic system, from Wall Street to Detroit, have suddenly shown themselves to be less sturdy than we had thought. We face a crisis of sustainability in the way we use the earth's natural resources, from transportation to our food and water supplies, from industry to our homes. New technologies disrupt old ways of working and modes of life. They provide for changes that extend from the traditional culture and knowledge industries to our private and civic lives. Mass movements of people are crossing borders in search of work and a better life, movements that have accelerated in recent decades and show no signs of slowing down. The palpable forces of globalism challenge us to recognize threats and opportunities at the ends of the earth that are simultaneously local threats and opportunities. Human diversity becomes more insistent in every aspect of life, whether we are negotiating differences in our organizations, communities, or nations. These are just a few of the deep practical challenges facing today's generation and they must be addressed for the sake of future generations.

Education provides a foundation for economic prosperity and social well-being. While there is certainly an urgent need to revitalize our schools with highly qualified teachers, we also need to reinvent education to create the human capital needed for America's economic growth and prosperity. Our education system requires nothing less than a transformation if it is to serve our social and economic needs into the future. Looking at the lethargy of educational reform and the uneven performance of U.S. education in recent decades, even if business were to continue as usual, we would face enormous challenges. We face today an unprecedented urgency to act, reflected in the scope of the recovery and investment agenda of the Obama Administration.

New Learning: A Charter for Change in Education was written by educational researchers at the University of Illinois at Urbana-Champaign. The University of Illinois has a proud history of innovation in education—as the place where the world's first computer learning environment was created, where foundational approaches to mathematics, science and literacy teaching have been devised, and where the notion of special education was first developed. We stand in this tradition of bold but practical thinking. In this spirit, we propose a set of strategies for this critically important moment.

The charter outlines ten action areas that contain recommendations for doing things differently—and better—in education. It contains a description of each action area, a series of suggested action items, and overviews of supporting research evidence based on the College's deep intellectual and practical involvement in the life of schools, colleges, and universities. The document is idealistic, pragmatic, and transformative. Its bias is towards emerging imperatives and new areas of action, because the things we do already and do well, we will surely continue to do.

- ***Action Area 1: Lay the Foundations for a Knowledge Society***

Our educational system is not well geared to produce change. How do we make it more relevant? What kinds of learners, workers and citizens should today's education shape for tomorrow's world?

- ***Action Area 2: Increase the Size and Effectiveness of Learning Investment***

We don't simply need more investment in education; we need new forms of investment, and we need to aim at new goals. How do we put educational resources to better use?

- ***Action Area 3: Transform the Education Profession***

Teaching is often regarded as a low status profession. Its pay is low, the conditions extremely challenging. How do we reinvigorate teaching and reposition it as a leading profession in the knowledge economy? What is the role of teacher education and professional development?

- ***Action Area 4: Adapt to a Ubiquitous Learning Environment***

Schools have failed to keep up with the technologies that have transformed home and working life. Today, when we can learn anywhere and anytime, our old forms of teaching are increasingly anachronistic. How do we catch up, even get ahead?

- ***Action Area 5: Teach to a New Basics***

Today's curricula are grounded in 'basics', which have not changed much for over a century. What do our students need to learn today? What knowledge, capacities and sensibilities do twenty-first century learners need?

- ***Action Area 6: Create More Responsive Learning Feedback Systems***

Today's tests do not test the right things, or test in ways that are useful to learners, teachers, parents and the broader community. What would more responsive, accurate and transparent learning feedback systems be like?

- ***Action Area 7: Meet the Needs of Diverse Learners***

We still fail miserably to provide all learners with equivalent educational opportunities. How do we create opportunities for all, and what will be the benefits for the whole of society when we create these opportunities?

- ***Action Area 8: Educate for Global Citizenship***

Too often, our learning is narrowly local. How do we teach for a world of global interconnectedness?

- ***Action Area 9: Educate for Sustainability***

The careful use of precious environmental resources needs to be an issue at the forefront of our working, public and personal lives. However, this is an area that schools do not yet address in a systematic way. How can we educate for sustainability?

- ***Action Area 10: Reform Educational Organization and Leadership***

Our structures of educational governance all too often reflect old-fashioned bureaucratic approaches to the organization of people and the achievement of objectives. How do we renew schools so they become organizations that enable and energize teachers, students and communities?

For further information, please contact:

Dr. Mary Kalantzis
Dean, College of Education, University of Illinois
marykalantzis@illinois.edu

New Learning: A Charter for Change in Education

Educational researchers at the University of Illinois, Urbana-Champaign, have written this Charter. It is a response to the momentous and turbulent changes of our time—a time when we need more education, everyone agrees, but as we will argue here, not more of the same.

We recognize the role education plays in providing a foundation for economic prosperity and social well-being. There is certainly an urgent need to revitalize the bricks and mortar infrastructure. There is also a need for additional and highly qualified teachers. However, more broadly and deeply, we need to create the human capital needed for America's economic growth and broader development in vastly different conditions to those of the twentieth century, when our schools of today were created and our teachers of today were trained. Our education system requires nothing less than a transformation if it is to serve our social and economic needs into the future.

The University of Illinois has a proud history of innovation in education—as the place where the world's first computer learning environment was created, where foundational approaches to mathematics, science and literacy teaching have been devised, and where the notion of 'special education' was first developed. We stand in this tradition of bold but practical thinking. In this spirit, we want to propose a set of strategies for this critically important moment.

Dimensions of Change, and Our New Educational Responsibilities

Looking back at the lethargy of educational reform and uneven performance of U.S. education in recent decades, even if business were to continue as usual, we would face enormous challenges. However, we face today an unprecedented urgency to act, reflected in the scope of the recovery and investment agenda of the Obama Administration. This moment could be a decisive turning point and an unprecedented opportunity for education. Or it could be a moment that disappoints if institutional inertia and old habits of mind mean that we only do more of the same.

Whichever way we look, we see enormous challenges in areas of critical concern for our future. The seemingly stable pillars of our economic system, from Wall Street to Detroit, have suddenly shown themselves to be less sturdy than we had thought. We face a crisis of sustainability in the way we use the earth's natural resources, from transportation, to our food and water supplies, to industry, to our homes. New technologies profoundly disrupt old ways of working and modes of life, change that extends from the traditional culture and knowledge industries to our most intimate private and civic lives. Mass movements of people are crossing borders in search of work and a better life, movements that have accelerated in recent decades and show no signs of slowing down. The palpable forces of globalism challenge us to recognize threats and opportunities at the ends of the earth that are simultaneously local threats and opportunities. Human diversity becomes more insistent in every aspect of life, whether we are negotiating differences in our organizations, communities or nations. These are just a few of the deep practical challenges today's generations face and must address for the sake of future generations.

As educators, we are used to being responsive to such circumstances. In fact, we find ourselves adapting all the time. The challenges we face today, however, are so large that they demand more than an adaptive response. They require we take a role amongst and alongside society's leaders.

Why? Because knowledge and learning will be pivotal to the social and personal transformations required to address the peculiar challenges of our times. The transformed economic system emerging from the current crisis will require human capacities that only education can nurture, based on deep knowledge, practical imagination, creative participation, intellectual inquisitiveness and collaborative commitment—not just on the part of a knowledge elite whose members are deemed to be leaders, but of

the many in the labor force and in the broader society. The 'rescuing of the middle class' and extending opportunity to those marginalized by poverty and historic discrimination, over the longer run depends almost entirely on the education system solving such problems as including the reduction of high school drop out rates, increasing access of children of the middle class to college, and offering lifelong learning programs in community colleges for adults who have been displaced by globalization. Emerging digital information technologies already invite, indeed even at times demand, greater participation than the knowledge systems and cultural environments of our recent past, blurring as they do the boundaries between authors and audiences, creators and consumers, knowledge makers and knowledge users. Immigration, globalism and diversity require that we nurture civic impulses based on new paradigms of self-governance for groups and, amongst individuals, mutual responsibility despite vast variations in life experience and sensibility.

Where better to begin realizing the momentous opportunities of our times than in and through our learning environments? This is a transformational moment that needs transformational education.

Education is a process of self-transformation, which enables a person to negotiate the as-yet-indeterminate as well as the changes that must surely come. Historically, the simplest measure of personal transformation was intergenerational—succeeding generations doing better in economic or social terms than their predecessors. That fundamental role for education remains. In fact, it becomes all the more pressing in a time of economic turbulence and material distress.

As educators and in these times, we are obliged to participate in transformations in our learners, which are more than personal. Education is a laboratory of and for society. It is a 'sandpit' for exploring the range of possible thoughts and actions. This is where its most profoundly transformational possibilities lie, and where its constructive potentials in this moment of deep disruption can most ambitiously and most pragmatically be deployed.

The distance between our heritage practices in schools and the everyday lives of our children and families is growing larger by the day. We cannot transform the lives of learners unless we also radically and urgently transform our own practices with in the existing institutions of education. We need to reconsider the basics—from which we are to what we do, where we do it and with whom. We need to go back to the drawing boards to re-examine the design and delivery of educational programs, the relations amongst ourselves and our communities, our assessment and research methodologies, and the relationships of educational inputs to learning outputs.

In response to these great challenges of our times, this Charter builds an inventory of practical things we can do. Its bias is towards emerging imperatives and new areas of action, because the things we do already and do well, we will surely continue to do.

Educators can and should, take a lead as we...

- Action Area 1: Lay the Foundations for a Knowledge Society
- Action Area 2: Increase the Size and Effectiveness of Learning Investment
- Action Area 3: Transform the Education Profession
- Action Area 4: Adapt to a Ubiquitous Learning Environment
- Action Area 5: Teach to a New Basics
- Action Area 6: Create More Responsive Learning Feedback Systems
- Action Area 7: Meet the Needs of Diverse Learners
- Action Area 8: Educate for Global Citizenship
- Action Area 9: Educate for Sustainability

- Action Area 10: Reform Educational Organization and Leadership

In addressing these action areas in this charter, we attempt to strike a balance between reasoned pragmatism and bold imagination, resting our case simultaneously on grounded data and big picture ideas. This document is intended to stand in the great tradition of American pragmatism—facing challenges squarely, solving problems imaginatively, promoting experimentation and risk taking, supporting conceptual innovation and practical entrepreneurship, and after all this, acting to make small changes or take great strides.

Mary Kalantzis and Bill Cope

Action Area 1: Lay the Foundations for a Knowledge Society.

Two trends point to the emergence of what has been called a 'Knowledge Society'. The United States needs to deploy its extensive educational capacity to align its workforce and citizenry with these trends.

The first is a series of long-term structural shifts in the economy, reducing the relative need for unskilled labor and increasing the need and effective demands for those who are more highly educated, capable of adapting and using complex modern technologies. The evidence for this is substantial, and at times overwhelming.

An aspect of this involves reduction in the size of the agriculture and industry sectors compared to an increase in the size of knowledge-intensive service sectors. This pattern is worldwide, and can be seen in all rapidly growing economies such as the fastest growing economies on the Pacific Rim. 'Knowledge-intensive' means that intellectual labor is a primary part of both the work of the employee and the service provided to society.

Notwithstanding this shift in the relative size of sectors, we will always need food and products manufactured. Agriculture and industry are as important as always—however productivity levels in those sectors have increased, requiring less raw labor and more highly educated labor to create more products. The typical modern farmer for example is required to have many very advanced areas of expertise, ranging from agronomy and animal husbandry to accounting, management, and financing. Activities where advanced skills are not needed, with almost the sole exception of home health care, have been shifted offshore to lower wage economies. There are even demands for home health care persons to acquire more skill and become 'professionals'.

A related trend is the increasing economic significance of knowledge management systems. This includes services such as those applied to product design, service quality, reputation, brand, business systems, product or service aesthetics, customer loyalty, intellectual property, technology use, human resource management, and, from a organizational point of view, the capacities of the enterprise to capture, systematize, preserve and apply knowledge.

Together, these changes are variously called the information society, post-Fordist production, or the post-industrial economy. However, we cannot live by information alone. Far from becoming post-industrial, we still need and value made things. To an unprecedented extent, knowledge is now mixed with the making and using of things.

Of all the epithets that attempt to encapsulate the essence of our economic times, the ones that seem to work best are the 'knowledge society' and 'knowledge-based growth'. This concept rooted in the endogenous growth theory and research that has become the core of modern economic growth theory? 'Knowledge society' describes a transformation that is affecting every sector, every kind of work, every kind of relationship between producer and user—including transformations occurring in agricultural and industrial sectors. It is also a label that better highlights the connections between education, economic

growth, and endogenous development, which includes the wider benefits of learning and their impacts on broader development goals that permeate every aspect of our economic destiny.

In these difficult economic times, developing a knowledge advantage will be a key to recovery in every sector of the economy, and for individuals, workplaces, regions and nations. We need to infuse a spirit of knowledge and updated human capital skills into the middle class and into all sectors of human activity, both at home and in the workplace in all industries. This will increase productivity both at work and at home, and use knowledge to improve our international competitiveness.

For a long time, the U.S. has been falling behind in the global educational race. For the moment at least, this is less the case at the top end of the system where the U.S. still leads the world in so many fields of science, social science and technology. However, of major concern is the emergence of a long tail of underachievement that will block the pipeline to excellence and the new human capacities required of the workforce in order to compete in the world economy of the future. This has corresponded with slipping back in the global economic race. Today's economic crisis gives us reason to redouble our efforts to develop a renewed, knowledge-based economy, to take a leap in which knowledge-qualities of our people, products, services and productivity provide a decisive global-competitive edge.

To be concrete, moving from the general needs of a new economy to the specific impacts of education not just on earnings and employability, but also on development, what are the specific wider benefits of learning or ultimate outcomes of education? How can education best serve society's need for economic growth, broader development, and nurturing the whole person? What are the qualities of knowledge-ability that our schools should teach? Here are just a few: (needs rephrasing…and below)

- *making knowledge-making central* to work and everyday life. Re-design learning experiences that systematically apply knowledge to the products, markets and user groups with whom one works. Expand training so that it prepares all to be participant-researchers or action researchers—analyzing situations, anticipating and solving problems, thinking creatively, innovating and taking well-judged risks. This means adding a cognitive reflectivity, an intellectual recursiveness, to everything we do.
- *becoming transformative leaders of change* instead of finding ourselves in a state of 'future shock'. Support/invest in collaborate interdisciplinary teams to take a proactive stance in relation to the fundamental challenges of our time—of sustainability, technological change, economic viability, diversity or globalism. Invest in investigating the stuff of flexibility, initiative and innovation and how to negotiate indeterminacy.
- *being good citizens*—good corporate citizens, local citizens, national citizens, global citizens. Introduce competency based orientations to learning that encompass capacities to work autonomously and collaboratively in organizational and social environments of devolved responsibility, where personal agency must come with heightened senses of values, ethics and the importance of personal judgment.
- *contributing to a productive diversity*, not just to ensure the contribution of all involved as co-workers or network partners or clients, but also to draw the depth of personal experiences and the breadth of knowledge perspectives—different points of view, styles of communication, human network connections, ways of conceiving issues and methods for addressing challenges.
- *building capacities for innovation* enabling creativity, supporting well considered risk, and providing spaces for the inventive spirit to flourish.

These are deep shifts in human capacity, transformations that have barely begun. It is incumbent upon educators to rethink quality and expand the 'standards' and accountabilities that underpin a knowledge economy, and the kinds of learning required by the kinds of people who will be its most productive members at the same time as contributing to the quality of working and community life for all.

ACTION ITEMS

Action Item 1.1: Widen the Role of Educators in the Knowledge Economy

Educators—whose fundamental vocation is the business of how humans come to know—should take a leading role in framing the knowledge economy—in schools, human resource departments, in the theories and practices of the 'learning organizations'. Education needs to be cast more broadly than the mechanics of skills (literacy, numeracy and disciplines), encompassing these legacy concerns to be sure, but deepening and broadening their concerns to address the needs of the emerging knowledge society.

To this end, we recommend the formation of a *National Advisory Council of Educators for the Knowledge Economy,* involving stakeholders from across the educational sectors and States (like the business round tables) to consider ways in which key Local, State and Federal programs interface. This would include annual face-to-face conference sessions plus online capacities to kick-start a new, national conversation about change and reform in American education.

This also needs to be a bottom-up, process, with educators playing a key role and collaborating with learners and the community to redesign American education. Schools could establish *Community Knowledge Design Centers* in which teachers and students work with local businesses, government agencies and community organizations to survey needs, research opportunities and devise practical programs of action.

Action Item 1.2: Define the Core Elements of Competence

Educational 'standards' are often described in ways that are narrowly focused on disciplinary content far removed from the needs of the knowledge economy. However, attempts to define the human capacities needed in the next phase of social and economic development are often vague and untestable. It is our challenge as educators to be clearer about what we mean by core elements of productive and social competence. What can we mean by the following elements of competence? How can they be taught, learned and evaluated?

- representation and communication
- collaboration in shaping of necessarily collective intelligence
- issue identification and problem solving
- critical thinking
- innovation and creativity
- risk assessment and risk taking
- participation and responsibility
-

Or what about foundational knowledge processes?

- awareness of self and perspective
- observation, new experience and experimentation
- conceptualization and definition
- model-making and theorization
- causal analysis
- critical analysis
- appropriate application

- creative application and transfer to new contexts

To this end, we recommend the creation of a State Governors' or Education Secretaries' *Commission on National Standards for the Knowledge Society* to interrogate current State and Federal standards for their capacity to deliver for today's social needs, and their commensurability from State to State.

We also recommend classroom-grounded, teacher-initiated inquiries into *Community Knowledge Needs Audits* (employers, community organizations, families), highlighting points of alignment and non-alignment of educational programs and standards with current and emerging community needs.

Action Item 1.3: Transform Work-Facing and Work-Embedded Education

Education today must be lifelong and life-wide. Working people need their skills and capacities transformed to meet the demands of transformed employment demands. People out of work need education programs that will bridge them into new forms of employment. Vocational, professional and liberal arts education programs all need to be promoted at a level of substantive and cognitive generality to stay work-relevant to learners for longer. This will involve the development of non-traditional sites of learning and the transformation of curriculum in traditional sites.

We recommend support for higher education and school education partnerships, for example, *K-20 Pathways Councils* to review accreditation and certification procedures, to conceive and initiate multiple pathways, including flexible options such as work-based learning and to expand industry/higher education partnerships in the training and education of the workforce.

SUPPORTING EVIDENCE

Supporting Evidence 1.1: The Evolution of the Idea of the Knowledge Economy

It is important to distinguish a number of different readings of the knowledge economy because they provide a history of a policy idea and charts its ideological interpretations.[1] Early attempts by Friedrich von Hayek to define the relations between economics and knowledge[2] have been followed by the economic value of knowledge studies of the production and distribution of knowledge in the U.S. by Fritz Machlup;[3] Gary Becker analyzed of human capital with reference to education;[4] an emphasis on 'knowledge workers' by the management theorist Peter Drucker who coined the term in 1959 and founded 'knowledge management';[5] Daniel Bell's sociology of post industrialism that emphasized the centrality of theoretical knowledge and the new science-based industries[6] and Alain Touraine's *The Post-industrial Society* which hypothesized a 'programmed society';[7] Mark Granovetter theorized of the role of information in the market based on weak ties and social networks;[8] Marc Porat defined 'the information society';[9] Alvin Toffler talked of knowledge-based production in the 'Third Wave economy';[10] Jean-François Lyotard defined *The Postmodern Condition* as an age marked by the contingency, complexity and dispersal of knowledge;[11] David Harvey talked of the large-scale shifts from Fordist to flexible accumulation;[12] James Coleman analyzed how social capital creates human capital[13] and Pierre Bourdieu[14] and Robert Putnam[15] further developed the notion; Paul Romer argued that growth is driven by technological change arising from intentional investment decisions where technology as an input is a nonrival, partially excludable good;[16] the OECD's influential model based on endogenous growth theory uses the term 'knowledge-based economy';[17] Joseph Stiglitz developed the World Bank's *Knowledge for Development* and *Education for the Knowledge Economy* based on knowledge as a global public good;[18] employers calling for new workforce skill sets;[19] and public policy applications and developments of the 'knowledge economy' concept.[20]

Michael Peters

Supporting Evidence 1.2: The Economics of Knowledge

The modern conceptual framework for the "knowledge economy" is rooted in the endogenous growth models of Lucas[21] and his student Romer[22] who provided analytic proofs for the central role of human capital formation and education externalities in the economic growth process. A flood of empirical research establishing the empirical evidence consistent with this theoretical basis accompanied this. It now has arguably become the mainstream of modern economic growth theory, research, and the understanding of how longer run economic processes in modern economies work.[23] The theory and research are more recently moving to extend endogenous growth to rise from within the development. The latter encompasses household production of final outcomes and hence the effects of the non-market private and social benefits of education on broader development goals and human welfare.

Alfred Marshall's[24] and his dramatic statements about the key roles of education and also new knowledge created by leaders such as Newton, Darwin, and Beethoven, and revolutionary developments in economics and the economics of education beginning in about 1960 continue to have enormous implications for new research. These advances were due to largely to Gary Becker[25] and T.W.Schultz[26], both Nobel Prize winners, who conceived of educational including on-the-job training as the key means of creating human capital. This surged as Lucas, another Nobel Prize winner, and Romer developed endogenous growth theory, which, including the empirical evidence consistent with it became the main foundation for modern growth theory and knowledge-based growth. To incorporate the wider benefits of learning, Becker's analysis of the allocation of human time and the use of human capital in the household production of final outcomes has become the core element, and is consistent with empirical work tracing these non-market effects from education on development.[27] The result is the extension of endogenous growth to become endogenous development.

Recently Lucas has re-addressed the contribution of ideas to growth.[28] This encompasses both R&D and Schumpeterian innovation. The ideas are not exogenous 'manna from heaven', but instead are endogenously determined since they are the result of a large class of educated people spending their entire careers generating and exchanging ideas, solving problems, and generating new knowledge. Again education winds up with the central role essential to idea creation, innovation, and the success and sustained growth of modern capitalist economies.

The theoretical developments mentioned are the logical proofs of the effects of education. They are essential to inferring cause and effect. The empirical tests consistent with these then result in a scientific explanation. Without both there is no scientific basis for the knowledge economy or knowledge-based growth, or for what we are doing in education to foster development. Statistical regressions alone without the logic of the theory behind them are only empirical correlations.

Walter W. McMahon

Supporting Evidence 1.3: International Knowledge Economy Policies

Understanding based upon the concept of the knowledge economy has recently helped the shaping of national policy constructions in the West and the developing world. Knowledge was included by the World Bank as a theme in its 1998 *World Development Report* where in it acknowledged that 'knowledge has become perhaps the most important factor determining the standard of living'.[29] More than 50 per cent of Gross Domestic Product (GDP) in the major Organization for Economics Cooperation and Development (OECD) economies is now based on the production and distribution of knowledge. The growth of the Internet and other related new technologies has become the catalyst for the creation of 'knowledge economies.' Countries that have supported investment in education and life-long learning and by investing heavily in research and development (R&D) are well positioned to take advantage of these new global markets.

The U.S., Canada, Denmark and Finland have already identified the growing importance of knowledge and reflected this in their approaches to economic policy. Neo-classical economics does not specify how knowledge accumulation occurs and thus cannot acknowledge externalities while also failing to consider human capital or that education has a direct role. In contrast, new growth theory has highlighted the role of education in the creation of human capital and in the production of new knowledge.[30]

In one of the earliest policy applications, the UK white paper *Our Competitive Future: Building The Knowledge Driven Economy* defined the knowledge-based economy not only in terms of wealth creation but also effective use of knowledge.[31] 'Knowledge economies' are those economies directly based on the production, distribution and use of knowledge and information, reflecting the trend towards growth in high technology investments, high-technology industries, more highly-skilled labor and associated productivity gains. Knowledge has always been central to economic development but its relative importance is increasingly recognized as the basis of future growth.

In short, while the evidence is far from conclusive at this stage, there is a consensus emerging in economic theory that: i) education is important for successful research activities (e.g., by producing scientists and engineers), which in turn is important for productivity growth; and ii) education creates human capital, which directly affects knowledge accumulation and thus productivity growth. Not only do research and development expenditures provide a positive contribution to productivity growth, but also education is important in contributing to the growth of national income. Education-based policies of the knowledge economy become critical during the current deepening recession where the role of government as investor in long-term growth and productivity strategies can not only promote competition, stimulating enterprise, flexibility and innovation by opening new global markets, but also help shape the creation enterprise and encourage creative industry-education partnerships in the knowledge economy.[32]

Michael Peters

Supporting Evidence 1.4: The Knowledge Demands of Today's Workplaces

In contrast to Taylorist or Fordist modes of production, modern organizational charts are leaner and flatter, requiring more decision-making from front-line employees.[33] Supported by a host of information technologies, knowledge workers must synthesize complex information to provide increasingly customized products and services. The knowledge worker must be comfortable with abstraction and able to work effectively with a small team of professionals. Although specialized skills, particularly high tech skills, are often valuable, the knowledge worker particularly needs transferable skills that can be utilized in a wide variety of contexts. In older modes of production, front-line work was broken into discrete, repetitive tasks, but modern workers need to be able to identify and allocate resources, teach and collaborate with others, understand complex relationships in systems, and select, apply, and evaluate appropriate technology and information.[34] Also, as organizations have become leaner, the ability of their employees to efficiently link with a range of supporting suppliers and services has become increasingly important in production.[35] In these production arrangements, soft skills and applied skills are at least as important as hard skills and specific content mastery. Although there are some indications of basic skill deficiencies in low-skilled industries,[36] surveys of employers indicate that the greatest skill deficiencies are in employees' soft skills like self-organization, communication, work ethic, and ability to learn.[37] However, it is important to note that additional, more extensive data are badly needed, particularly on the skill needs of high-skilled and professional occupations.

Peter Weitzel

Supporting Evidence 1.5: Impacts of Technology and Globalization Fostering 'Knowledge Work' and the Plight of the Middle Class

The main reason both technical change and the international outsourcing of jobs adversely affect those with a high school education and less is that college graduates are in command of the more recent technologies in all fields. These are in higher demand by employers in the job markets. The same has occurred in agriculture as farming becomes more physical capital and human capital intensive, and lower skilled workers have moved to the cities. This embodiment of the new knowledge and technical skills in graduates through education creates an earnings advantage in the labor market as is well known and often studied since Bartel and Lichtenburg extensively documented it.[38]

In contrast the lack of growing demand of occupations requiring a high school education or less reflects the fact that this group is displaced by automation. This group is most adversely affected by imports and by international outsourcing. The result is an excess supply of persons with limited skills in the US. The pattern is similar in Britain and the EU. Although college enrollments have been increasing in the U.S. and in other industrialized OECD nations, numbers of graduates have not increased fast enough. The number of people without college also has diminished too slowly. So the excess supply of the lower skilled has grown. Immigrants from Mexico have increased this pool. The result is large numbers with skill deficits.

Since financial aids for lower income students are not commensurate with the size of this pool, and state support for institutions has fallen, the middle class suffers a major education policy gap.

There are exceptions to this pattern favoring the more highly educated. But most of it is anecdotal: unemployment of PhD's in Silicon Valley followed the bursting of the technology bubble, for example. But this was transitory. Another is the international outsourcing of some medical procedures (medical tourism) and some jobs requiring college-level skills in bookkeeping, publishing, or telephoning, where these can be channeled over the Internet. Even the college educated joined the unemployed during the 2008-9 recession. But those with a high school education or less are becoming unemployed in much larger numbers and much more as a percent of the labor force.

However, a few anomalies and transitory effects like this do not stand up against the overwhelming weight of the evidence produced by repeated nationwide surveys of the U.S. labor force and other systematic evidence. The comparative advantage of the United States has been due to its human capital (i.e. more highly educated and highly skilled workers). But this comparative advantage is rapidly diminishing.

Walter W. McMahon

Supporting Evidence 1.6: Increasing Demand for High-Skilled Workers

In the last 50 years, there have been significant shifts in the types of industries driving the U.S. economy and how production is managed within those industries. Both of these types of shifts have substantially increased the need for highly skilled workers. In 1960, 58% of employed civilians in the U.S. worked in service industries, and this figure increased to 79% by 2007.[39] By 2000, 75% of U.S. GDP came from services.[40] The increasingly specialized demands in affluent countries have played a key role in driving globalization[41] and have increased the importance of value-added production in the U.S. economy.[42] The increasing returns to skill and education since the 1960's suggest that employment has shifted toward industries and final services that demand more skilled workers. Some calculations suggest that there has been at least a 50% increase in the demand for the most skilled in comparison to demand for the least skilled.[43]

One of the main causes of this increase in demand is believed to be skill-biased technological change (SBTC). SBTCs are changes in the formula for production that disproportionately affect the overall productivity of certain types of workers over others. These technologies strongly complement the non-routine or abstract tasks handled by more skilled workers but may directly substitute for the more routine tasks handled by workers in the middle and bottom of the wage distribution.[44] In the last 20 years, computerization is of course the most substantial form of SBTC affecting worker productivity. Computer capital substitutes for some workers by performing or facilitating cognitive and manual tasks that involve following explicit rules[45]. Computers cannot substitute for non-routine tasks, but they can make such tasks more efficient by providing better routine inputs. In a sense, highly skilled workers can spend more time on high skilled work because the routine work they depend on is accomplished faster and more thoroughly due to computerization. Accordingly, these workers are freed up for more front-line problem solving, professional interaction, innovation, and other high-skill activities.

Peter Weitzel

Supporting Evidence 1.7: International Educational Comparisons

With a strong history of compulsory schooling, the United States has long been one of the leaders in educational attainment among industrialized countries. For decades, the U.S. enrolled a substantially greater proportion of its 18 to 29 year olds in post secondary education than most Organization for Economic Cooperation and Development (OECD) countries. However, we have failed to maintain that advantage, and many industrialized countries are rapidly catching up on this indicator.[46] The high school dropout rate in the U.S. has remained relatively stagnant for decades, although estimates of the exact dropout level vary considerably by methodology[47]. Moreover, the economic circumstances for workers lacking post secondary training have declined significantly during this time period[48].

Data from international achievement tests indicate that the U.S. is at or below the OECD average in many areas, particularly math and science achievement.[49] Although our reading scores tend to be slightly higher in comparison to OECD averages, these scores have remained basically stagnant while our math scores are trending upwards. Although the highest achieving students in the U.S. are very competitive internationally, U.S. average scores are weighed down by particularly poor performance toward the bottom end of score distributions. Severe stratification of this sort is also evident in high school dropout rates, where minorities in urban areas often have no better than a 50-50 chance of graduating high school.[50]

In short, the educational advantages that the U.S. has held for decades are rapidly eroding. Although we have not declined on achievement outcomes, other countries are making improvements at faster rates. Improving our overall outcomes on these measures will depend on improving educational services and opportunities for disadvantaged students and workers.

Peter Weitzel

Supporting Evidence 1.8: Rescuing the Middle Class

Demand for the highly skilled workers has been rising faster than the supply of college graduates in the U.S. and most other OECD countries. So as job growth in skilled occupations requiring 2-4 years of college has risen, real earnings for this group have risen 49.5% and 48% in the U.S. since 1980. Social rates of return that also take rising institutional costs into account have also risen significantly in the U.S. and continue to rise.[51]

At the same time the demand in the occupations typically employing persons with a high school education or less, which is roughly 64% of the U.S. population, has fallen. There is currently an excess

supply of those without appropriate skills. The result is that real earnings of this group have stagnated since 1980, and fallen dramatically since the 2008-9 recession began in August 2008. These are also the persons in the lowest 3/5 of the income distribution. The social rates of return at the high school level have remained flat since 1980.[52] These persons constitute a very large group. Many are members of the middle class in smaller towns and rural areas, although many are in the middle class neighborhoods of larger cities. They are not participating in the benefits of economic growth and are being increasingly economically and socially excluded.

There is another relevant kind of evidence of the exclusion of the less skilled middle class and the crucial role of education based on specific job markets. As secular economic growth occurs or as more transitory economic recovery from a recession occurs the demand for workers rises and more job openings are created. The U.S. Bureau of Labor Statistics (BLS) analyzes the 30 occupations that are growing the fastest currently and expected to grow through 2016.[53] All 30 occupations growing fastest percentage-wise except for home health care, medical, and pharmacy aides require a community college or four year college education or more. For the 30 occupations accounting for over half of the numerical growth in jobs, 11 are designated by the BLS as requiring an associate degree or more. And for the 30 occupations expected to account for over 2/3 of the numerical decline in jobs, 28 out of 30 are lower skilled, requiring only on-the-job training after high school.[54] So although it can be said that the largest number of openings is expected to be in the larger occupations, simply replacing those who retire with lower skills and not requiring a college education (e.g. food preparation, retail sales, stock clerks, farm workers, office clerks), it is also true that these are not growing as areas of employment.[55]

Fostering expanded enrollment in 2 and 4 year higher education through Federal support of Pell Grants and also Federal support through the states for institutions that accept increased enrollments are investments in human capital formation vital to America's future. They are also investments that will pay for themselves several times over time, just as did public investments in human capital under the GI Bill after WW II.

A 20% higher education enrollment rate in Korea than in the US, for example, has long been associated with a per capita growth rate there that is almost twice that of the U.S. prior to the current recession, 5% compared to 2.6%.[56] With respect to the public resources required, an increase of 20% in the higher education enrollment rate would within a few years result in an estimated $2.5-$3 billion in additional state and federal income and sales tax receipts each year.[57] This and the savings in correlated state health, public assistance, and criminal justice system costs would go a long way toward covering the costs of the increase in Pell Grants and institutional support that would be needed to achieve this enrollment increase. The entire public costs might be covered over several years by the increased tax receipts alone.

Walter W. McMahon

Action Area 2: Increase the Size and Effectiveness of Learning Investment

If it is to be the transformative influence that it can and should be, more needs to be invested in education and the investment needs to be more effective.

The public case for more investment in education also needs to be grounded in an economic logic that moves beyond the confines of the annual tax take and fiscal responsibility measured in financial years, and towards a longer term logic of borrowing and investment with longer term measures of return and frames of risk. One narrow calculus might be: what do we have to invest now, for what tax-take later? The more basic overall question is 'are the social rates of return properly calculated to include the total social benefits and total institutional costs?' If such a calculation were made, the results would be

significantly higher than the alternative returns that could be earned by pre-tax funds, usually taken to be about 10% in real terms (e.g. on S&P mutual fund investments).

These are extraordinary economic times, requiring an enormous economic stimulus to avert recession sliding into depression. These times provide cause for public investment in education on an unprecedented scale. Historically, many government-created economic stimulate have left little to show. Tax cuts or tax rebates feed into increased personal consumption, but this is not like investment in human capital or in physical capital, which also have a supply-side effect and increase productivity and output later. Wars provide a boost to industry and employment, but also leave no manifest legacy of increased productive capacity. Expanding roads may mean increasing private transport infrastructure, which aggravates energy costs and dependencies—and in any event, they may not be needed with the rise in telecommuting, cheaper person-to-person telecommunications, digital delivery of formerly physical content, and better public transportation. By comparison, there are few public infrastructure investments as evenly distributed and with as high a total return and tangible public value than investment in human capital formation through basic and higher education.

Education, however, also needs to use resources more effectively. Schools, it is estimated, are used for 13% of the hours in the year. In fact, the length of the school day, and the number of days in school per calendar year, are quite low in the U.S. in relation to most of the other OECD nations—one reason perhaps for the underachievement of students in the U.S. as measured in international tests. Instead, schools need to become 7 days per week, 7-11 resource, and a focal point of community life in a knowledge society. This is to just to consider the way we use the physical resources of the school. Similar observations, however, could be made of the school's human resources. Teaching to the middle of the class, where some learners are bored and others lost, is hardly efficient—customized learning is more efficient. And why does the ratio of learners to teachers need to be so consistent, when today's learning environments could span a broader range, as needed, from one teacher to one learner, to one teacher to a great many learners? Peers or more advanced learners can perhaps do a lot of the work of teachers, to the benefit of both amateur teacher and learner. However, this requires a reconfiguration of the physical plant of the school, into new and more flexible spaces reflecting a wider range of person-to-person learning relationships. The question of resource use goes to the very heart of the business of education. Higher productivity in producing desirable education outcomes might mean we can pay teachers much better and get better value for that pay.

The 'more investment' argument can also rest on a personal case. The personal case is this: invest now and you will reap the rewards later. But for this personal case to work, it has to be more directly personalized. At the moment, there is a less than perfect alignment between learning investors (parents under financial pressure from multiple sources or aging local tax communities) and learning dividend recipients (children and future generations of productive workers). Onerous loans create a personal disincentive. Government grants can produce distorted effects by favoring the already-privileged and elite institutions.

The evidence shows that individuals benefit directly from education in the form of receiving a higher income. If and when you benefit, you should be directly responsible to return a portion of that benefit for the public good. One solution would be to replace loans with an income taxation surcharge in which people repay the cost of their post-compulsory education if and when they reach the average income. Low paid professionals will never pay; those not working will not pay so long as they are not working. There will be additional benefits whether an individual repays the cost of their education or not, and that is the external benefit to the society and future generations, a benefit that would otherwise not be obtained because private families will invest too little.

It may be possible to add additional incentives that come from non-monetary private benefits to the individual and broader systems of reward for generating external social benefits. Considerable thought has been given in recent years to the economics of what is called 'social production', or non-market production that benefits others in the society, such as the unpaid contributions to open source software, to the authorship of Wikipedia, to the enormous community volunteer sector. This has sometimes been called a 'reputational economy', where people work to gain the non-monetary recognition of others.

Mary Kalantzis and Bill Cope

ACTION ITEMS

Action Item 2.1: Repair Old Schools and Build New Schools

Old schools need to be remodeled and new schools need to be built that support new relationships of learning and new connections with communities. *Knowledge Community Schools* would be 7 x 7-11 schools.? They would be the focal point for knowledge communities, be central points of community services and community development, and support students and communities in social-play relationships. They would be living laboratories of sustainable-green practice and support a wider variety of person-to-person learning configurations, beyond the conventional one teacher to a class of students.

To achieve some or all of these objectives, infrastructure development work needs to be based on minimum, average and optimal standards, in which all schools need to show progress in relation to infrastructure standards required of fully-fledged Knowledge Community Schools. Public audit and progress reports would be based on the standards of a Knowledge Community School.

To extend community buy-in, matching, tax deductible advancement funds would be established to which local businesses, service agencies, benefactors and parents may be motivated to contribute.

Action Item 2.2: Workforce Development

We propose a variety of significant changes in the way people are educated for the knowledge economy jobs and demands of today's complex workplace—the *Work to Learn Program*. The changes we are recommending cannot occur within current educational policies and academic research environments. From a policy perspective, several immediate federal actions are needed that are aimed at strengthening the education system in the United States and creating needed workforce changes in a time horizon as short as 3-4 years.

1. We must create greater access to workforce programs targeted to community needs, job openings, and forecasted types of job openings. Community colleges are in close communication with local community job force needs. These can include federal initiatives, such as green technologies and health care. Educational and financial policies must be in place to ensure that unemployed and displaced workers are provided access to educational opportunities that will develop the knowledge and skills needed for employment in knowledge economy jobs. Mechanisms are also needed to ensure that returning veterans have immediate access to educational programs and in forms that accommodate their unique personal, financial, and educational needs. These educational programs need to provide worker retraining and reintegration of returning military personnel into the world of work and their community.

In weak economic times, the underemployed, unemployed, and soon-to-enter workforce turns to the community college for skilling and re-skilling, or supplementing an existing skill set with more competitive certifications. Businesses, too, seek the services of community colleges to provide business-

or sector-specific support. Community colleges are uniquely capable of meeting these needs quickly and efficiently to streamlined career and technical curricular approval processes, noncredit and contract-training capabilities and established connections to business and industry through advisory committees and funding formulas that promote local responsiveness.

A forward-thinking, proactive higher education policy could take advantage of these capabilities in key three areas: alternative energy, health care, and efforts to promote equity in higher education, as well as broadening access and affordability.

2. Federal resources should be aimed at regional and state-focused consortia of education, business, government, and non-profit agencies with goals of creating local investment and growth in highly technical, highly creative industries—those that can continue to compete globally.

3. Revision education, not as developmental "modules" (K-8, HS, higher education, workforce), but as a strategic driver of U.S. labor, U.S. industry, and U.S. domestic and foreign policy; and as a key component to individual attainment. Federal policy should be aimed at reducing transition gaps, crediting learning and enabling individual efforts to change as employment opportunities and requisite skills change. Education has the opportunity to develop the public (communities and families) beyond a narrow focus on economic resources (labor/workforce). Our education system must be restructured to extend and enhance the high-interaction pedagogies that develop metacognitive skills, critical thinking skills, ethics, and evidence-based decision making skills. This restructuring will demand active engagement and responsibility among multiple publics (community, family, education, industry, government), including international engagement and responsibility with the world community. Industry support and collaboration will also be needed to build a citizenry and serve the common good.

4. Develop greater capacity to reach underserved populations, primarily through new forms of technologies for learning. This can be accomplished by efforts to reduce high school dropout rates, including expanding our use of media and ubiquitous technologies to address the learning needs of local communities and families for educational purposes.

5. Develop and foster enhanced individual knowledge and skill attainment through the creation of learning communities both inside and outside traditional educational institutions.

6. Develop stronger capacity for critical research initiatives that:

    - provide stricter accountability and evaluation of outcomes and effectiveness of public and private workforce education initiatives.
    - analyze policies and policy development for local, regional, state-level, national, and international workforce development.
    - improve professional qualifications and continuing professional development of workforce educators in public and private settings.
    - redesign the curriculum for the global workforce.
    - broaden the reach of workforce education to the professions and professional schools.
    - analyze the tension between social, organizational, and individual goals related to workforce education and learning at work.
    - improve models of program evaluation of work based learning initiatives.
    - break down of psychological contract between workers and organizations and the opportunities and liabilities of individually focused career models (so-called protean careers).

Adequate resourcing is obviously a prerequisite to these efforts, but the real change in policy is a return to the idea that work and education are intertwined and that the knowledge economy demands workers who are not only smart and skilled, but also capable of re-skilling, of creativity, and of being engaged. This means elevating education policy to a cornerstone of governance, focusing beyond funding and performance towards strategy, and ensuring that education expertise is drawn upon in a variety of contexts.

Action Item 2.3: Personalizing Educational Investment

Personalizing educational investment includes a system of deferred taxation—*The Personal Educational Investment Fund*. Long-term personalization can occur by aligning current educational costs of post-compulsory education with borrowings against future tax payments. If and when you earn an above average income, you would return the costs of your non-compulsory education over a period of time via an income tax surcharge.[58]

Action Item 2.4: Credit Unpaid Educational Contributions

There are many things peer or higher-level learners, or community supporters of education, might do outside of the formal educational finance system. They might get involved in tutoring and assessment; they might work as a teacher's aide, in class or online; they might do action-research learning in businesses or community organizations; they might take unpaid or minimally paid work placements. This could perhaps be supplemented with transferable credits—build up a certain number of *Open Learning Contribution Credits*. They could trade their value against the financial costs of education. Or you might donate the credits to another individual, perhaps a child in a poor neighborhood. In other words, it may be possible to supplement the financial economy of educational investment by use of a substantial and energetic barter based on open learning contributions. This informal or semi-formal economy might also become a place for people to work who are in traditionally unproductive parts of their lives—from the young who become recognized educational workers in their moments of peer teaching, to the old who can trade learning credits against updates to their skills and knowledge, or donate to younger family members. This could be a way of expanding the economy by blurring the conventional boundaries of working life, at the same time as reducing or mitigating the effects of unemployment.

SUPPORTING EVIDENCE

Supporting Evidence 2.1: The External Social Benefits of Education

The external social benefits of education are the public benefits of education that spillover to benefit others in the society, including future generations. The term "social benefits" is often used to refer to these external benefits, but total social benefits normally also include the private benefits. The external benefits of education must be sharply distinguished from these private market benefits to earnings, as well as from the private non-market benefits beyond earnings (such as to own-health or happiness). Private families and individuals have no incentives to invest in these external benefits because these benefits spill over to others in the society and future generations.

The external benefits of education include education's direct benefits to the development of civic institutions that contribute slowly over long periods of time to the rule of law, democracy, human rights, and political stability. Externalities also include the social benefits from greater longevity (avoiding losses to the workforce from early death), to reduced poverty, to lower crime rates, to lower public welfare and prison costs, to cleaner air, water, and environmental sustainability, to social capital, and to the dissemination and adaptation of new knowledge and technology.

External benefits of education also include the indirect effects of education that are over and above these direct benefits. Indirect effects operate through other variables and feedback over time to increase the private market and non-market benefits. Examples include the contribution of education to better governance, to political stability, and to trade, all of which are known to directly increase growth as well.[59] Education thereby indirectly contributes in significant ways to pure economic growth. More generally, indirect effects from education on measures of development set the stage for new growth.[60] This benefits others and future generations. The reverse side of the coin is that earnings and well being today are larger due to external social benefits of education from prior generations.

Major efforts have been made more recently to estimate not just the size of these external social benefits but also their value. There are four methods of estimating the monetary value, the Haveman-Wolfe[61] income-equivalent method, The McMahon[62] dynamic simulation method, the Breton[63] type aggregate externalities method, and the Eisner[64] 'Total' Social Accounts method. Each of these has its strengths and its weaknesses. But it is useful to use a mix to allow for cross-checking.

Based primarily on the Haveman-Wolfe method, McMahon has estimated the economic value of each of the separate external social benefits listed above, and added up the value expressed in 2007 dollars. On this basis, a first approximation of the external social benefits above and *beyond earnings* generated by graduates each year who are currently receiving a bachelor's degree is about $27,726. The value of the external social benefits generated annually by each two year Associate Degree would be about half that. The estimates of value made based on the other methods are reviewed, compared, and discussed, some of which are lower, some larger, and some are not strictly comparable.[65] But based on this first approximation, the social benefits of education have a value that is almost equal to the value of the earnings benefits.

Given that the above estimates of earnings and external social benefits do not include the value of the many non-market private benefits, it appears that there is a significant failure in higher education markets due to poor communication about the nature and value of these non-market education outcomes. This contributes to under-investment by families and by governments in access to and affordability of post secondary education. This market failure could be a very major source of the current tragedy facing the middle class.

Walter W. McMahon

Supporting Evidence 2.2: An Immediate Question of Infrastructure

In his radio address on the economy (Saturday, December 6, 2008) President-elect Barack Obama said "to help our children compete in a 21st century economy, we need to send them to 21st century schools." Further, he stated, "my economic recovery plan will launch the most sweeping effort to modernize and upgrade school buildings that this country has ever seen. We will repair broken schools, make them energy-efficient, and put new computers in our classrooms." No part of economic recovery plan is more important than rebuilding the infrastructure of American education. Too many of America's children go to school in overcrowded buildings with leaky roofs, faulty electrical systems, and outdated technology, all of which compromise their ability to achieve, succeed, and develop the educational skills necessary to compete in the knowledge economy of the 21st century. A well developed economic stimulus plan that places education at the core of rebuilding America's infrastructure is necessary for the nation to achieve the kind of high quality learning environment appropriate for the 21st century.

We have known for over a decade that the nation's education infrastructure is fundamentally inadequate to prepare our children to compete in the knowledge economy of the 21st century. At the end of the 20th century several studies reported that America's school infrastructure was in poor condition

and lacked the capacity to create an environment where children could be properly educated and prepared for the 21st Century. Recognizing that the studies in general relied too heavily on anecdotal evidence and also presented different methodological problems, the General Accountability Office (GAO) in 1995 conducted a study that could be used as a basis for determining the condition of the nation's education infrastructure. The GAO disseminated its study to House and Senate committees and to all members of Congress. Congress passed the Education Infrastructure Act of 1994,8 in which it stated, "Improving the quality of public elementary and secondary schools will help our Nation meet the National Education Goals."[66] Despite these efforts, through good times (the budget surplus of 2000) and bad times (the current market crisis) the infrastructure of American schooling has remained almost entirely a state and local responsibility, with virtually no help from the federal level. Given the current budget deficits among the vast majority of the States, local governments will continue to defer vital infrastructure needs from year to year due to lack of funds. A high-quality learning environment is essential to educating the nation's children for the 21st century and the nation's only option for a modern infrastructure in through a federal infrastructure recovery plan.

In 1995, the GAO concluded that rebuilding the physical infrastructure of American schools is critical for sustaining a high quality-learning environment for all students. In short, millions of students are in need of decent facilities, especially in urban areas. Decent school structures are generally defined as those that are structurally safe, contain fire safety measures, safe water supply, sufficient sanitary toilet and plumbing facilities, adequate light, and free from asbestos. The GAO found that too many public schools are in substandard condition and need major repairs due to leaking roofs, asbestos dust and fibers, plumbing problems, inadequate heating and lighting systems, poor ventilation or other system failures, including the poor state of technology. This means, among other necessary reforms, school construction, equipping classrooms to connect to the Internet, and increasing the physical capacity for distance education. Too many of U.S. schools, many built over 50 years ago, are increasingly run-down, overcrowded and technologically ill equipped. According to reports by the GAO in 1995 and 1991[67], one-third of U.S. schools needed major repair or outright repair or replacement; 60 percent needed work on major building structures such as a sagging roof or a cracked foundation; and 46 percent lacked even the basic electrical wiring to support computers, modems, and modern communications technology. Projected record increases in student enrollments over the next ten years, 1995-2005, necessitated 6,000 new schools. In 1995, the GAO estimated that the federal government would need to invest $112 billion to provide decent school facilities for all children. In response to such concerns, President Clinton introduced new school construction legislation that authorized $5 billion of federal funds to stimulate over $20 billion in school construction, as a starting point. However, Congress did not approve the proposed legislation. Meanwhile, conditions have deteriorated further over the past decade, especially in inner-city areas.

Rebuilding the education infrastructure fits perfectly into the economic recovery plan. New school construction and repair will stimulate the creation of thousands of new jobs in construction-related services, jobs that can't be moved off shore. New or newly repaired schools will be part and parcel of the green economy, energy-efficient school buildings that over time could save the nation millions from the reduced cost of utilities.

It is important to emphasize the fact that a modern school infrastructure is not just about buildings, repair and equipment. More important, the fundamental question is "How can we transform schools into genuine learning organizations that develop students who are ready for successful participation in a 21st century knowledge economy?" Hence, the call for a modern infrastructure is critical primarily as the foundation for a new learning environment that enables our students to acquire a competitive advantage for living and learning in the 21st century.

James Anderson

Supporting Evidence 2.3: Short Term Impacts of Education Spending on Job Creation

Investment in human capital formation through, for example, Pell Grants, not only has an enormous long run payoff, but also it has an immediate job creation effect for small businesses that is several times the size of the initial expenditure.

The 'Longer Run' (or Long Run?) Payoff. Investment in Pell Grants is a long-term investment in human capital that is vital to the individuals' and to America's future. This expenditure is not government "spending"; it is an *investment in human capital* that pays for itself over and over again. It pays for itself at the current social rates of return that it currently earns every six years during the 45 years or so each student is in the labor force, which is 7 1/2 times over, in the form of returns to the individual and economic growth in the society. Considering both earnings and also the value of non-market private benefits and non-market external social benefits, it pays for itself *over and over again every three to four years after graduation*. Beyond this it generates very significant additional state and Federal income tax and sales tax revenues, and reduces state Medicaid and welfare costs.

The Short Term Stimulus. The most obvious impact on reducing unemployment is that, as additional young people and adult lifelong learners are enrolled in community colleges or four year institutions as the result of new public support, there is an immediate effect in reducing the number of potentially unemployed. This immediacy was one of the major motivations for the GI Bill following World War II, although it had an enormous long run payoff along the lines discussed above.

Additionally, government spending in support of schools, colleges, and Pell Grants is money that is re-spent immediately by the recipients. This increases the demand for the products that small businesses and other businesses produce, allowing these businesses to retain workers and to hire, thereby creating new jobs. Small businesses and other reasonable businessman cannot create jobs or invest in physical capital when there is low or falling demand for their product and excess store or plant capacity. Investment tax credits are a fine thing, but in this situation of low demand they will not work. Only government expenditure (such as those supporting teachers or students will increase the private demand for products will work. It is a tragedy that some cannot see this. They oppose the very programs that create the most jobs and rescue small businesses.

But this is not the end of the process. After this first round of re-spending by the recipients of the government expenditure there are more rounds. A multiplier effect occurs as the recipient of the government expenditure spends, but perhaps saves some, and then the recipient of this new private expenditure re-spends again, going through a second, third, fourth, and fifth round, each smaller than the last. The result is that a multiple of 2.2 to 2.7 times the initial government investment in education (or 'spending') in the form of increases in the demand is created for the products of small businesses and for increases in the jobs they create before the impact of the initial government spending wears itself out.[68]

In the 2008-2009 recession, the same multiplier is working in a downward direction. As people are laid off or hours cut back, their spending is reduced, the recipients of this reduced demand is in turn cut back, leading to still further cutbacks that are a multiple of the initial shock coming from the housing sector, and businesses far beyond the housing sector are rapidly failing. The process plunges the economy downward, an environment in which most do not want to borrow, quite apart from the banks who, seeing the risk, do not want to lend. Monetary policy that has lowered interest rates about as far as is possible is ineffective. Only increased public spending, at the Federal level will effect change and can come in as the heavy artillery. This is true for government spending on education, just as much as it is true for government spending on defense as we got into World War II (which was a fiscal stimulus because it was government spending financed by borrowing).

If this fiscal stimulus is too short run, and is cut back, the multiplier will work in the reverse direction and the economy will plunge backward into recession. This happened in 1936-37 in the US, and in Japan in the 1990's. So the *package* must contain not just major short-term stimulus (e.g. Pell Grants, state spending on education or Medicaid, shovel-ready projects) but also some longer-term stimulus elements (e.g. construction that is only effective as a stimulus when work is put in place and money is spent over the life of the construction project). Otherwise the U.S. experience of 1936-7 and of Japan of falling back into prolonged recession will be repeated.

This is not the time to worry about inflation. Deflation is the problem. And temporary bounces in gasoline prices due to refineries restricting their output to below capacity for example, should more or less be ignored. As the fiscal stimulus package slows the decline and turns the economy around at the bottom in late Fall 2009, if by 2010 or 11 there is rising and then high demand and some inflation, then the fiscal stimulus will be removed, and the budget balanced, which will eliminate that inflation. Paul Volker, Obama's key adviser on this matter, is very experienced in using Federal Reserve Monetary policy, which, is also extremely effective in doing this even though there is a continuing fiscal stimulus as there was in the Reagan years. A doctor prescribing medicine for inflation as the economy is plunging downward or later before it fully recovers is going to kill the patient.

Households and businesses have piled up of consumer credit debt and mortgage debt. They also have a huge stock of relatively new cars and new houses, and there is excess office space, too many unoccupied shopping malls, and excess plant capacity. The initial first waves of the stimulus, especially the tax cuts, will be used in part to pay this debt off, let the cars and other household durables age, and work off the excess capacity in businesses. So the multiplier effects on new demand and new jobs created especially from tax cuts must be expected to be smaller at first. But these excess debts must be paid down, and the excess capacity worked off, before full recovery is possible. Also the bank balance sheets must be rid of toxic assets in order to get out of the recession. But these are first steps in the very familiar process, reducing the size of the multiplier at first in a predictable way. However, the multiplier effects from education spending should be in the neighborhood of 2.5 to 2.7 times the size of the initial expenditure in order to create the demand that first saves and then creates jobs.

As these multiplier effects from education spending kick in, there are short-term benefits to the increases in GDP and income and sales tax revenues. These short-term impacts are in addition to the even larger long run benefits from investment in human capital formation discussed above.

Walter W. McMahon

Supporting Evidence 2.4: The Trend to a Declining Skilled Workforce

According to many accounts, industry is facing a growing shortage of a qualified technical workforce.[69] The National Science Board's (NSB) Task Force on National Workforce Policies for Science and Engineering raised concerns about declining numbers of students pursuing engineering and scientific careers in the US.[70] Likewise, an analysis of ACT data found that the percentage of high school seniors who took the ACT test and reported plans to major in engineering in college declined from 8.6% in 1992 to 5.6% in 2002.[71] The declining percentage of high school students who reported that they plan to major in engineering in college exacerbates the workforce situation noted by the NSB.

Employers also complain that it is difficult to recruit qualified technicians and identify trainable individuals who have a career interest in technical fields. This problem is compounded by the fact that the Bureau of Labor Statistics (BLS) projects significant employment growth for technicians in a wide range of technical areas. For example, the heavy equipment industry, which employed about 393,000 service

technicians and diesel engine mechanics in 2002, will need 50,000 more technicians by the year 2012, a 12.7% increase in employment.[72] The need is even greater for the automotive field, which employed about 818,000 service technicians and mechanics in 2002. The Bureau of Labor Statistics projects that the employment need will increase by 101,000, or 12.4% by the year 2010.[73] Although these data reveal a growing need for qualified technicians, the problem, however, is likely to become worse as the aging baby boomers start to retire in the next two decades.[74] Comprehensive actions will be required to reverse these trends.

In addition to the dwindling numbers of new engineers and technicians, there is a growing recognition that those graduating with engineering and technical degrees lack many of the competencies required of the 21st century. The assessment of the Engineer of 2020 Project states that it is no longer sufficient for education to react to changes in technology and society, rather is it increasingly necessary for education to lead technological and societal changes[75]. Other sectors of the workforce also recognize the need to lead, as well as the need to broaden the definition of skilled workers beyond the traditional competencies of the past industrial era[76]. Recognizing the rising pluralism and complexity inherent in rapidly changing, globally based industries, as well as societies[77], authors in the scholarly and popular press alike proclaim the need for workers to become more proactively creative, analytic, and critical in the work they do.

There are many factors that contribute to the current shortage in the technical workforce. One reason is that students are less likely to be introduced to technical occupations in their high school career than in the past. This is due to the increased emphasis on academic requirements coupled with a reduction or elimination of high school career and technical programs. Another factor that explains the shortage of people choosing technical careers is the negative perception within society on the value of blue-collar occupations.[78] Changes in the family structure over the years also limit children's exposure to technical work in the home. For example, single-mother families increased from 3 million in 1970 to 10 million in 2003. This equates to a growth rate of 12% to 26% single-mother family groups between 1970 and 2003.[79] The lack of parental role models for children to observe and gain hands-on technical experience at home may further contribute to the shortage of individuals interested in pursuing technical careers.

A survey of the directors and instructors of technology programs in more than 120 post-secondary trade and technical schools generated a list of reasons that explain the difficulty of recruiting adequate numbers of students into technician preparation programs. These reasons included:

- Being overwhelmed by the recruiting power of four-year colleges and universities.
- The cultural bias against the "blue-collar" image of technical careers.
- The failure of state legislatures and school administrators to recognize the growing budget needs of technology programs.
- Inadequate community recognition of technical jobs that are available locally.
- The lack of funds to purchase necessary diagnostic tools and special equipment for instruction.
- Public ignorance of the high pays and benefits that technicians can receive.
- The growing focus on academic over technical education, despite trends showing an increasing need for technicians in all fields.
- Teacher salaries that make jobs unattractive to prospective technical instructors.
- Limited industry support for promoting technical careers, recruiting students, and providing up-to-date training aids.
- The failure of high school teachers and counselors to recognize technical careers as a valuable alternative to a four-year college education.[80]

Scott Johnson and Russ Korte

Supporting Evidence 2.5: Workforce Development for the 21st Century

The road to economic recovery depends heavily on job creation and the availability of a well-trained workforce. The role of education in meeting the needs of employers has never been more important. The shift to global competition, the movement toward a knowledge economy, the complexity of technology and technical systems, and the interdependence of work performance and social connections within the workplace place new demands on education at all levels[81].

The workplace is facing rapid changes in technologies and processes and the rate of change is accelerating. This demands increased knowledge and skill of employees at all levels as the half-life of workplace knowledge continues to shorten[82]. At the same time there are increasing competitive pressures on the U.S. workforce due to the availability of equivalent technical skill at lower costs in the international/global marketplace. Beyond the need to enhance technical competences, this new workplace requires greater social competency, including teamwork, leadership, and change management, interpersonal relations with international colleagues, customers, and suppliers. These rapid changes in the workplace have also promoted an equally rapid change in the career paths available with large employers and a move to a 'protean' career model that requires different levels of self-direction, flexibility, and career resilience.

Several troubling features of the U.S. education system deserve revisiting in light of emerging structural features shaping the workforce, such as globalization, technological innovation, and increased interdependence between the public and private sectors. Thus, at the same time that China and India, among many other nations, are gaining technical and creative expertise in their workforce, the United States is allowing technical capability to deteriorate by deemphasizing career and technical education at both K-12 and higher education levels[83]. Demographic shifts indicate that workforce numbers in emergent economies will outstrip the U.S. domestic workforce in such sectors as manufacturing, technology, and even engineering and science. Technological innovations in health care, hospitality, automotive repair, and other service industries demand a workforce skilled in both the job tasks of the industry and backroom technology applications that create efficiencies and competitiveness[84]. Finally, while multinational firms' revenues and expenditures rival state economies, growing networks of public and private entities -- profit, non-profit, and government – are driving local and regional economic growth.

The new workplace demands that we change our view of workforce education so that it becomes education for work, at work, through work, and about work. We currently have a highly fragmented 'system' of workforce education and training in public and private sector. This is a legacy of 1960s expansion of vocational education, which provided basic workforce education as a second-rate option for those who were not college bound. With little attention to occupational and workforce issues in public schools, students entered workforce development programs in community colleges and technical institutes with little prior preparation for technical work and the associate degree and certificate programs are unable to provide the depth of training needed to raise the quality of our technical and scientific workforce. According to the American Society for Training and Development (ASTD), the private sector has assumed a larger role in providing basic skills and literacy training as well as the more specific technical training that is needed for successful and productive employment in today's knowledge oriented workplace. The investment in workforce development by the private sector exceeds $65 billion per year in direct costs and approximately $220 billion in total expenditures[85]. In effect, the burden of workforce development has been transferred to the private sector, which has made a huge investment in workforce training and development[86].

The structural shifts in work and the economy call for an engaged education system, working with government and industry to meet workforce needs, at precisely the same time that the education system attempts to strengthen proficiencies in the "basics" at the expense of technical training. Engagement goes

beyond offering programs for emergent industries, although this is clearly important. Matriculation gaps must be narrowed. Strength of the United States education system has been its adherence to multiple paths of entry and exit, ability to demonstrate proficiency, wherever earned, and efforts to remediate where necessary[87]. This requires greater attention to what students/workers are doing in transitions, whether these are between high school and higher education, between higher education and work, or from work into higher education. Students need to be able to utilize technical credits toward the completion of B.S. and M.S. degrees, whether earned at a local community college, in military or industry training, or in community-based experiences. Critical work is needed to develop quality indicators across sectors, to scaffold programs based on combinations of credentials, degrees, prior learning assessment, and to enhance work-based skills development.

Workforce education needs to focus on individuals in all career paths and throughout the life span, early childhood to retirement. The modalities for this new perspective on workforce education will promote both formal and informal learning, structured and non-structured education, short-term and long-term perspectives, self-directed and prescribed learning, and in person and technology mediated delivery systems[88].

Despite its importance to the nation and world, workforce education is under-theorized, under-researched, and lacks the academic and intellectual identity and rigor needed to make a difference in our global competitiveness and our economic growth. Workforce education is rarely seen as a central mission in most colleges of education and seldom is it a valued priority for institutions of higher education.

However, higher education has an important and significant role to play in the reinvention of workforce development that provides education for the common good. Rather than pursue a narrow definition of workforce development based on industry, economic, and market issues, we now need to pursue a broader definition of individual and community development based on systems thinking and social and political process issues, in addition to industry, economic, and market needs. We need to develop an expanded notion of education that fosters the intellectual development of individuals and communities.

By making workforce development a responsibility of higher education, and recognizing at the same time the many additional non-market private and social benefits from extending higher education to more in the population, we can help preserve and strengthen education's charter for promoting a humanistic, democratic, community-oriented agenda. This avoids devolving into the marketization and commoditization of education that serves only employment and industry. The current and narrow economic focus on serving the needs of the market precludes a more holistic and systemic view of an informed, engaged citizenry. What is needed is an expanded focus on public and social issues to balance the growing focus on market and economic issues. We can help expand the notion of workforce, as more than labor, it is the community of people making up our society.

Scott Johnson, Russ Korte, Peter Kuchinke, Tod Treat

Supporting Evidence 2.6: Youth Transition to College

Reviewing college participation trends, transition to college has been rising in the United States, but some student population groups participate more than others. The percentage of high school completers who enroll in two- and four-year college in the fall immediately after high school increased nearly 20 percentage points between 1972 and 1997, from 49 to 67 percent, then dropped to 62 percent between 1997 and 2001 before rising to 69 percent in 2005, the most recent year statistics were computed by the National Center for Education Statistics.[89] However, this promising trend masks the differential transition rate by racial/ethnic group. Whereas White students show an all-time high in the immediate high school-

to-college transition rate of 73 percent, the immediate enrollment rates of African Americans and Hispanics have fallen between 2002 and 2005. Continuing a trend observed for several previous years, the immediate enrollment rate of female high school completers exceeds male high school completers, with much of the growth of females occurring at the 4-year level. Differences in immediate enrollment rates by family income and parental education have persisted for over 20 years, showing immediate college enrollment is higher for high school completers from high-income families than from low-income. Likewise, compared with completers whose parents had a bachelor's or higher degree, high school completers whose parents had less education had lower rates of immediate college enrollment in each year between 1992 and 2005. These enrollment trends point to a widening gap in college access for underserved students by race/ethnicity, income, parental education as well as gender.

Not surprisingly K-12 achievement patterns parallel the college access gap. Of the approximate 2.5 million public high school graduates in the United States each year, over half of these students aspire to a bachelor's degree despite their lack of engagement in high school-level course work that prepares them for collegiate studies. Over 50% of new college entrants take remedial courses, many in multiple subjects.[90] Referencing national statistics that show college completion has reached an all-time low for several consecutive years, Venezia argued the disconnect between student aspirations and academic preparedness contributes to large percentages of students leaving college before their second year.[91] The historical gap between K-12 and higher education, and the subsequent lack of communication, connection and accountability between the two educational sectors, exacerbates problems with college transition as well as completion.

Combined with changes in the labor market that deem at least a two-year college education vital to family-wage employment, the need for equitable transition to college for underserved groups highlights the criticality of better aligning secondary and postsecondary education.[92] Misaligned policies and practices are confusing to students, particularly those who are unfamiliar and inexperienced with college. Many struggle with determining what they need to know and be able to do to enter and succeed. Given the necessity for more youths to participate in college, some states have begun to recognize the importance of transition through the educational pipeline, emphasizing the transition from high school to college.[93] Despite this recognition, state and local responses often take different forms in attempting to connect disparate levels of the P-16 educational system.

Hodgkinson contends an ideal P-16 education system is a single integrated entity that promotes student achievement and educational attainment from the primary grades through college.[94] A P-16 framework is a way to enhance education system efficiency and effectiveness and stem criticism that education fails to prepare students for advancing to the next level of the system and finding employment linked to personal and financial success.[95] Ewell reported as many as 30 states implement P-16 state policy mechanisms to raise K-12 standards and enhance the academic preparation of students who desire to enroll in college and enter the workforce.[96] Alignment of curriculum, standards, and assessments represents an important means of linking K-12 with postsecondary education and creating increased opportunities for youths to transition to college ready to learn, but serious attempts at alignment are sporadic or lacking in evidence of effectiveness.[97]

Transition programs for youth show promise when academic and career preparations are combined. Bragg et al. and Lekes et al. report positive postsecondary outcomes when youths combine rigorous college prep studies with a sequence of three or more career-technical education (CTE) courses.[98] Students who balance a college preparatory course load with CTE courses exhibit outcomes superior to other students. Studies of youth transition also show promising results for student participation in dual credit, suggesting curriculum alignment and student outcomes are enhanced by dual credit.[99] Karp et al., Kim and Lekes et al. found dual credit contributed to participants' accelerated progress and success in college enrollment and progress to degree.[100] If youth transition programs are to flourish, it is crucial that

they be supported with adequate financial resources. Along with governmental support, more needs to be done to encourage the public and private sectors to work collaboratively to support student transition from high school to college.

Debra D. Bragg

Supporting Evidence 2.7: Transition of Low-Skilled Adults to College

Despite the growth in adults participating in education and training during the 1990s, a large segment of the adult population does not engage in formal education beyond high school. National studies find more than half of working adults do not participate in postsecondary education and training of any kind, which poses a problem for the individual as well as the economy.[101] The financial well-being of the individual and his or her dependents as well as the well-being of the economy depend on a workforce that possesses knowledge and skills beyond the high school level.[102] Increasingly, employment that provides family-sustaining wages requires postsecondary education of one, two or more years' duration. Adults who do not complete high school and who lack fundamental literacy and workplace skills are at much higher risk of living in poverty than individuals who participate in postsecondary education and training.[103]

In widely cited research referred to as the "tipping point" study, Prince and Jenkins used student record data from the Washington State Community College and Technical Education System to report that low-skilled adults experience serious barriers to program and degree completion in community and technical colleges.[104] Only 13% of non-native English speaking, low-skilled adults who start English Language Learning (ELL) programs persist to earn college credits; less than 30% of adult basic education (ABE) students make the transition to college-level courses. Prince and Jenkins found adult learners who attend at least one year of college (equivalent to at least 30 credit hours) and earn a postsecondary professional-technical education[105] (PTE) credential over as much as a five-year period experience a substantive boost in labor market outcomes, both employment and earnings. Taking basic skills courses concurrently with college courses produces significant improvements in average rates of employment and quarterly earnings. Despite the potential benefits, these types of programs are relatively rare.

Increasingly, community colleges are exploring an array of programs and services to address the needs of low-skilled adults[106], including non-credit ABE, GED, ELL, developmental (or remedial) education, and credit-bearing college-level instruction. Bailey and Morest contend that, despite their modest funding and competing multiple missions, community colleges are the most likely of all types of higher education institutions to meet the needs of underserved students.[107] Community colleges have a historical orientation to offering low cost and locally accessible options for underserved populations, including low-skilled adults. Already, they are a primary provider of education and training to meet adult workforce needs by aligning disconnected programs and implementing new programs, practices and services.[108]

Economic, cultural, social or other factors often mitigate completion of high school, let alone continuation to college. Moreover, postsecondary institutional and curricular policies and procedures, albeit unintended, marginalize low-skilled adults and magnify their hardships. Academic preparation is especially problematic for low-skilled adults, resulting in large proportions of incoming adults needing to participate in multiple remedial courses for which many never advance beyond the most rudimentary levels.[109] The completion of postsecondary programs is exacerbated by inadequate student services to address the wide ranging challenges low-skilled adults experience in life.[110] The presence of a professional who guides and supports adult learners has been shown by numerous studies to be an indicator of retention and success for vulnerable student populations, including low-skilled adults.[111]

Beyond the challenges of college attendance, employer skepticism about low-skilled adults' ability to fulfill employment obligations creates hurdles at the hiring stage and limits opportunities for training in the workplace. With rising workforce skill requirements, technology innovations, and global competition, low-skilled adults are likely to continue to be marginalized.[112] By 2014, more than 63% of all U.S. job openings will require at least some postsecondary certification or associate, baccalaureate, or graduate degrees.[113] The current economic crisis looms as a further complicating factor in the employment picture for low-skilled adults. The magnitude of the population currently in need of adult literacy coupled with the growing demand for increased literacy and the uncertainty of the economy presents a challenge to educators and policy makers alike.[114]

Short-term programs designed to help adults acquire foundational skills and knowledge and transition into college, often called "bridge programs", are increasing in number.[115] These programs integrate GED or developmental education with workforce training and PTE, drawing on funding from the federal Workforce Investment Act (WIA) and the Carl D. Perkins IV legislation. Alssid et al., Henle, Jenkin, and Smith; Jenkins and Spence, and others have called for "career pathways" that offer curriculum that extends beyond bridge programs, calling for a sequential and sustained educational experience that extends beyond a bridge and leads to postsecondary credentials.[116] Bragg et al. studied career pathways that link adult education to college, particularly community and technical colleges, identifying the importance of program components such as career development, contextual curriculum, and student support to retaining low-skilled, low-income adults.[117] Fully implemented, career pathways offer a means of enhancing the economic and personal circumstances of adult learners while improving the workforce and economy.[118]

Debra D. Bragg

Supporting Evidence 2.8: Employer-based Education and Training

The education and training of adults in so-called non-traditional settings, such as the workplace, the community, or religious organization have long played an important role in the system of education in the United States.[119] University departments of workforce and human resource education have a distinguished history of providing leadership through academic research, teaching, and service, including policy recommendations, program development and evaluation, and training and professional development of workforce and human resource educators working in a variety of settings including for-profit organizations, the not-for profit sector, government, and the military.[120] With rapidly increasing knowledge and skill requirements and the critique of the pedagogical model of the professional schools,[121] the importance of workforce development, for initial placement and in the context of continuing professional development has been recognized as key to individuals' career success and well-being,[122] to organizational success and competitiveness,[123] and to economic development at the local, regional, state, national, and international levels.[124]

With the Child Online Protection Act (COPA), workforce development addresses education *for* work (such as career and technical education in high schools and community colleges), education *at* work (such as continuing professional development or retraining), education *through* work (such as service learning and apprenticeships), and the increasingly important area of education *after* work (that is after formal employment and in retirement).[125] The size and importance of employer-based workforce education was recognized over 20 years by two influential reports sponsored by the Carnegie Foundation for the Advancement of Teaching that concluded that business and industry had, in fact, created a third system of education and training on par in terms of importance and expenditure with the public and private systems.[126] Today, the annual survey by the American Society of Training and Development indicates an investment of $134.39B in 2008 in direct costs for employee learning and development equal to about 2.15 percent of payroll.[127] The corporate curriculum includes a wide range of subject matter, including

remedial academic skills, computer literacy, social competencies, leadership development, technical training and re-training, health and safety, and compliance-oriented training.[128]

According to the U.S. Department of Labor's Occupational Outlook Handbook survey, specialists in human resource education and training are employed in virtually every industry, with the private sector accounting for over 80 percent of the jobs.[129] Total employment in the United States is estimated to be about 424,000 with some 17,000 education and training specialists being self-employed. Job growth is expected to be higher than average with an estimated increase of 16 percent between 2006 and 2016.

As the DOL report states: "…employers are expected to devote greater resources to job-specific training programs in response to the increasing complexity of many jobs and technological advances that can leave employees with obsolete skills. Additionally, as highly trained and skilled baby boomers retire, there should be strong demand for training and development specialists to impart needed skills to their replacements.[130]

With the funding constraints of public secondary and post-secondary education and the mandate for life-long education and training for the benefit of individuals, organizations, and the nation, a further shift of the responsibility for workforce development and training towards employers can be predicted. Unlike the public education system, however, there is little systematic research or accountability, and the need exists for rigorous academic research, innovation and reform of workforce educator preparation and professional development, and service to improve the systems of employer-based training and education. A further critical need exists in creating a link between the systems of public and private workforce education to ensure a seamless transition and synergy between the levels and to maximize the resources available to each sector.[131]

K. Peter Kuchinke

Supporting Evidence 2.9: Returns on Investment in a System of Early Care and Education

Every day, families in every neighborhood in every community in the United States rely on early childhood programs so that parents can work and their children can receive educational experiences vital for optimal development and school readiness. In fact, the early care and education industry is a vital contributor to each state's economy. In Illinois, for example, programs are offered at over 16,000 sites and employ more than 100,000 staff. The early care and education workforce is central to the quality and expansion of care and education for children from birth to formal school entry at age 5.[132]

Most importantly, research on cost benefit analysis for early care and education clearly demonstrates that investments in the quality of care for young children, ages 3 to 5 pay off in substantial savings with an estimate of $16.00 saved for every dollar spent.[133] A review of research and meta analyses demonstrate that participation in high quality early care and education programs promote gains in cognitive and emotional development for the child and improved parent-child relationships. The findings support improvements in the educational outcomes for children as well as future entry into the workforce with higher incomes and decreased probability of delinquency or crime.[134]

Illinois has engaged in extensive planning and development of an infrastructure to support current systems of care and professional development as well as to expand services that provide universal preschool for three and four year olds.[135] The key elements of this infrastructure are found in a few other progressive states and provide the necessary ingredients to promote systemic change within a state's design and delivery of early care and education, and in particular universal prekindergarten.[136] They include: 1) the establishment of a state level coordinating council; 2) creation of a Professional Development Advisory Council to identify a core body of knowledge—with content and competencies—which then are aligned to state and national standards; 3) development of a career lattice and credentialing

system for early care and education teachers; 4) establishment and expansion of a competitive grants program to increase high quality early care and education programs within existing community child cares as well as through local public schools, and 5) the development of a Quality Rating System to encourage families to choose high quality care provided by teachers with credentials.[137]

These components in combination will enable an expansion of high quality early care and education to serve the needs of all working families. The current system of child care in most states remains fragmented and uncoordinated. Effective use of Child Care Block Grant Funds and Education dollars, however, can bring together diverse agencies, regulatory and oversight systems, and promote a standard of care and the preparation of professionals who can deliver early childhood education that can impact the lives of all children and provide them with the trajectory to succeed in school and life.

Susan Fowler

Supporting Evidence 2.10: K-12 and Higher Education Funding in International Perspective

In comparison to the eight leading industrialized countries, the United States spends more per student at both the K-12 and higher education levels. In 2003, the U.S. spent 16-37% more per primary and secondary student than the other G8 countries. In higher education, this gap is even larger, with the U.S. spending 102-174% more per student in 2003[138]. Moreover, from 1995 to 2003, the U.S. increased educational spending at a rate higher than the OECD average[139]. The U.S. also spends a greater percentage of its GDP on education than the other G8 countries, 4.1% on primary and secondary education and 2.9% on higher education. However, a larger portion of this spending comes from private citizens in the U.S. than in most industrialized countries. In 2003, private education expenditures across all levels were equivalent to 2.1% of the U.S. GDP, and 57% of all U.S. spending in higher education came from private sources[140]. Also, it is important to note that international comparisons of educational spending are complicated by differences in the scope, categorization, and measurement of particular expenditures across countries[141].

The relatively high levels of aggregate funding in the U.S. mask the considerable funding inequities at state and local levels in K-12 education. The average school in a wealthy district receives about 24% more funding than an average school in a lower income district, despite the considerably greater needs of low income students[142]. Funding targeted to poor districts, higher state shares of total funding, and local tax efforts in poor communities were all major factors affecting these gaps. After weighting for students' socioeconomic needs, only three states provide more funding for low income districts[143]. These inequities occur despite the greater tax effort expended by citizens in poor districts in most states.

The U.S. higher education system is even more severely stratified. Elite institutions provide heavily subsidized education to their students, while lower tier institutions rely more heavily on tuition funds for operation. The top decile of institutions stand in stark contrast to the lower 90%, providing twice the subsidy of the second decile and more than 10 times the subsidy of the lowest decile[144]. The differences in wealth among tiers of institutions are so severe that even significant improvements in management may have only marginal benefits for institutions in lower tiers.[145]

Peter Weitzel

Supporting Evidence 2.11: Restructuring Federal Policy for the Funding of Higher Education

Current federal policy unfortunately provides incentive for state legislatures to increase tuition while correspondingly encourages the state houses to reduce appropriations to higher education. Strangely, federal funding policy for higher education, unlike for public elementary and secondary education, has no

prohibition against supplanting of state dollars with federal dollars. Only in 2008 did this issue arise in the halls of Congress resulting in a minor and wholly inadequate "maintenance of effort" requirement touching state appropriations.

To explain: The current federal policy rewards institutions of higher education, both public and private, that have higher sticker prices. The higher the tuition that is charged by an institution, the greater the amounts of money for which student qualifies. The subsidy that flows from the federal government is largely through subsidization of loans to students. Students attending higher-priced institutions qualify for greater subsidies.

Private institutions that have autonomy in setting their own tuition policy consistently raise their sticker prices reaping federal fiscal rewards. Federal policy also gives incentives to state legislatures to provide state tuition vouchers, modeled after federal Pell grants, which further incentivize private institutions to raise tuitions.

In a different, but equally problematic way, federal policy encourages state universities to raise tuition in order to obtain federal largesse, and in so doing, encourages legislatures to reduce funding for public institutions. As a result, in virtually all states the relationship between tuition and state appropriations has become distorted, with students bearing the increasing financial burdens that are shifted from the state appropriations.

Thoughtful commentators who understand this problem have called for a complete overhaul of federal financial funding policy for higher education. Ronstadt recently called for the killing of federal student aid policy.[146] Ehrenberg has repeatedly called attention to this major policy flaw,[147] and Alexander has pointedly addressed this issue and called for revision of federal policy.[148]

The present system of higher education funding has not been seriously examined for 40 years. The direction of current funding was predicated on economic assumptions fostered in 1969 that convinced Congress that access to higher education[149] would be enhanced if left to market forces.[150] As we are all now painfully aware, the solution to all public policy and economic issues cannot be left to the unfettered choice and the economic markets. The experiences have, thus, shown that access to quality higher education has not materially increased and the price of higher education has skyrocketed.

Solutions to this problem are not easy to obtain, as vested interests of the various types of institutions, public, private nonprofit and private for-profit institutions, have grown and multiplied over four decades. However, in spite of the obvious difficulty of the undertaking, solutions and alternatives must be explored that will result in a new direction of federal policy.

Kern Alexander

Supporting Evidence 2.12: Theories and Practices of Social Production

The terms 'open knowledge' and 'open knowledge production' are now well accepted in the literature to refer to a range of related models of 'peer production' and 'peer governance' that provide an emerging alternative to traditional proprietary models of knowledge production. The concept of 'open' and 'openness' deserves special attention because it has come to christen a range of related activities concerned with the advantages of decentralized distributed networks that characterize what Benkler calls 'commons-based peer production' and increasingly defines the political economy of the digital networked environment. [151] The concept of 'openness', for example, has been applied to: open government; open source; open access; open content; open courseware; open communication; open archives; open science; open learning; and open education. These changes and insights have been the basis for a series of major

reports by the U.S. Committee for Economic Development with its most recent report on *Open Standards, Open Source, and Open Innovation: Harnessing the Benefits of Openness*[152] that focuses on new collaborative models of 'open innovation,' originating outside the firm, that results in an 'architecture of participation.' Three major reports were published in 2007: *Giving Knowledge for Free: The Emergence of Open Educational Resources*;[153] *Open Educational Practices and Resources*; *A Review of the Open Educational Resources (OER) Movement: Achievements, Challenges, and New Opportunities*.[154] Open access and open knowledge production, sometimes also referred to A2K and P2P (peer to peer), now customarily refers to knowledge creation and sharing as well a range of other topics such as framing human rights and development, political economy of trade treaties and intellectual property, peer production and education, digital rights management, and open archives publishing and libraries, among others.

The role of nonmarket and nonproprietary production promotes the emergence of a new information environment and networked economy that both depend upon and encourage great individual freedom, democratic participation, collaboration and interactivity enabling social production and exchange to play a much larger role than ever before. Peer production of information, knowledge, and culture enabled by the emergence of free and open-source software permits the expansion of the social model production beyond software platform into every domain of information and cultural production. Open knowledge production is based upon an incremental, decentralized (and asynchronous), and collaborative development process that transcends the traditional proprietary market model. Commons-based peer production is based on free cooperation, not on the selling of one's labor in exchange of a wage, nor motivated primarily by profit or for the exchange value of the resulting product; it is managed through new modes of peer governance rather than traditional organizational hierarchies and it is an innovative application of copyright which creates an information commons and transcends the limitations attached to both the private (for-profit) and public (state-based) property forms.

Social media production serves to create new public domains and knowledge commons, which should be protected and extended. At a crucial time in the history of the U.S., facing the 2008-09 economic recession, open source models reconnect with the older community traditions and attempt for a more cooperative social order offering youth a vision of renewal and hope. There is no doubt that there exist relationships between these different sets of ideas. The emerging information environment is based upon a new form of open knowledge production that has strong implications for a kind of open informational democracy, open science, and open knowledge economy in which participation, inclusion and collaboration are the key ideas.[155]

Michael Peters

Action Area 3: Transform the Education Profession

As a profession, education is in need of major transformation. Some of the transformation is in employment conditions, including pay rates and greater opportunities for working flexible hours (more or less than the conventional working week). Other parts of the transformation need to be in the very nature of the job—creating a richer working environment (teacher safety, student engagement, school physical environments, greater professional responsibility, more holistic relationships with learners, more complex and rewarding relationships with communities). Quite simply, teaching needs to be made a more attractive profession.

Part of this shift will come with a transition from legacy notions of teaching to new notions of learning design, the latter capturing the spirit of a reflective, intellectual work culture rather than the instrumental role of teachers of the recent past, defined by narrowly delimited standards and testable learner outcomes. Teachers need to conceive themselves increasingly as participant designers and action researchers—planning designs for learning, enacting these plans, collecting outcomes data, evaluating

that data and redesigning programs in a process of continuous improvement. Instead of acting as conduits in a standards-textbook-test pipeline, teachers need to become active professionals, knowledge managers involved in peer-to-peer professional collaboration, designing, sharing and evaluating curriculum.

Moving beyond the boundaries of the school, teachers should consider themselves in a knowledge profession, making local contributions by addressing the big questions of our time in a community context—working with learners in the community to address real world issues of the environment, employment, inclusion and technology. Schools can become knowledge centers for communities, sites of energetic intellectual inquiry and practical solution development, to the enormous benefit of students. Teachers should be community experts and intellectual leaders, in this, the uniquely all-encompassing (there is not an area of the human and natural world for which there is no teacher or no curriculum) and quintessentially intellectual profession.

ACTION ITEMS

Action Item 3.1: Improve the Quality of Working Life of Teaching and Enhance the Rewards of Teaching

Develop a *Professional Pedagogue Program,* to rethink and redesign the job of teaching. This may involve more flexible working conditions for teachers (part time to overtime in full service extended-hours schools, and partly online in telecommuting arrangements, all with flexible remuneration structures). It may involve creating hybrid positions, bringing in health, community and even commercial services into the school, or making joint school-community and school-business appointments. The program would also aim to increase the level of professional responsibility for teachers by perceiving them as learning designers and action researchers. It would create a system of peer and expert review to evaluate the quality of learning community designs, the effectiveness of their delivery and their impacts on learners. The Professional Pedagogue Program would work in a number of experimental 'lighthouse sites', with a strategy to generalize best practices via a public communications strategy and teacher professional development offerings.

Action Item 3.2: Build Educational R&D into Every School

Create *Learning Design Labs* in every school, connecting teacher training colleges directly with the life of schools: as focal points for curriculum design, outcomes evaluation, trainee student placement and ongoing professional development. Institutionalize a culture of research and development, innovation and continuous improvement.

Action Item 3.3: Recruit New Teachers and Create Better Teachers

More than half the current teaching force will retire in the next ten years and the number of new teachers leaving the profession within the first few years of service is increasing. Meanwhile, teacher education colleges have been criticized for not creating enough teachers, and teachers that are good enough. A revitalized pre-service *Teach-the-Teacher Program* would aim to transform teacher education to make it more relevant to the learners of today and the school of the future, and also create flexible pathways to certification, including programs of rigorous on-the-job mentoring and certification for non-education graduates. The program would also retrain workers displaced from other industries or returning from military service as teaching aides and teachers, closely integrated into school-based Learning Design Labs.

Action Item 3.4: Make a Quantum Leap in Education R&D

Only 0.25% of education funding currently goes towards research into research on teaching and learning. If we are to design new, more effective and more resource-efficient teaching methods, considerably more resources need to be devoted to R&D. *The Breakthroughs in Learning* initiative would aim to do more than prove 'what works' in a conventional frame of reference. Rather, its focus would be on new designs for learning, from the micro dynamics of pedagogy to the larger question of the design of learning communities. Importantly, a broader range of research methods would be supported in addition to the exclusive focus on randomized controlled experimentation of recent years, including for instance mixed methods, qualitative case-based methods, participatory R&D involving schools and academic experts, action research, and longitudinal research linked to school-collected data.

SUPPORTING EVIDENCE

Supporting Evidence 3.1: Preparing Teachers for Tomorrow

The history of teacher education in the U.S. speaks to a past in which teacher education supported social development. Since its inception, mass education has been tied to interests of religion, business, and national security. Trained teachers have been pivotal. The education of our nation's children is of tremendous importance in the early 21st century, just as it has always been. We know that highly qualified teachers are a lynchpin to effective change. We also acknowledge that current teacher training practices are wanting and in need of re-envisioning.

Quality teacher education has consistently been under funded and tethered to State governments' labyrinthine teacher education licensure systems. Colleges and schools of education have walked a precarious tightrope between the studies of education as a research discipline while simultaneously undertaking the practical task of training future classroom teachers. The difficulties arise from several misconceptions about the role of education and the role of colleges and schools of education in society. Most adults, having experienced years of education, embrace commonsensical ideas of how education should occur in classrooms, without understanding the training received (or not received) by their former teachers and educators. Just as attorneys at law, medical doctors, scientists, and engineers require education and training, high quality teachers demand no less. In fact, given the responsibility of educating the nation's children, the demands in some sense are greater. What colleges and schools of education do best is study the field of education while at the same time preparing researchers, teacher educators, and classroom teachers, along with school administrators and scholars in higher education. These two tasks are inseparable. Recently, however, there have been several other institutions that seek to train and educate teachers without the same rigorous disciplinary practices, and with mixed results.[156]

To improve the quality of teacher education, research, and practice for all children regardless of their geographical locale, will require greater efforts of recruiting, educating/training, retooling, and retaining teachers. The use of new technologies can enable quality instruction to be had in areas where high quality education has been limited or nonexistent. There is no singular source for answers to the complex issues and challenges confronting education today. However, schools of education are uniquely situated to offer a clear pathway for change. Likewise, an emphasis on any singular aspect of change from research to classroom instruction is an inadequate response to change. What is needed is a multi-faceted approach to innovative thought for the human and humane enterprise of education in a globalized economy. This is a good thought and should be more prominent.

The challenge to prepare educators for the 21st century is enormous and takes us into uncharted territory. All educators, scholars, researchers, and teachers, will need to welcome every child and work diligently to offer each child the education that he or she needs to become a productive citizen prepared

for life in a global economy. The bulk of research under No Child Left Behind (NCLB), in response to the call for evidence- and scientifically- based research has left on the sidelines human (inter and intra personal) factors that make reform and interventions successful. Historically, education reform efforts have failed to have lasting impact because they sought a generic response to context-specific challenges, drawing on disciplinary knowledge and techniques that are related to but not center on education.[157]

Change in education calls for holistic approaches to research and teacher training to address the challenges in the 21st century. We are aware that actual change takes time and cannot be easily measured; we are not suggesting quick fixes, but we are committed to innovation to address the needs of all children. Solutions to the challenges should include a focused effort to recruit and maintain a diverse body of teacher candidates, training placements in a variety of educational settings, systematic follow-up of graduates through their first few years in the profession, support, coaching, and retooling of in-service teachers, and professional development programs working within community based programs.

To move U.S. education into the 21st century, teams of education researchers need to work in schools alongside classroom teachers and school administrators using a variety of methods of inquiry (action research, ethnography, critical theory, history, experimental and quasi-experimental, mixed-methods, and qualitative research).

Our goal is to extend and create research initiatives that are authentic, comprehensive, responsive, socially just, and most importantly, that capture the complexity of challenges and offer thoughtful solutions. As a nation we need to rearticulate what has worked well, under what conditions, and for whom, as well as to articulate, for whom research and reform efforts have not worked well, under what conditions. Then, we need to rework the areas in which we are failing to support education for all. Our goal is not to conduct research for research's sake but research that articulates processes and presents a way forward for progress and an improved democratic nation.

Arlette Ingram Willis

Supporting Evidence 3.2: What is this Science, 'Education'?

In order to minimize what were perceived to be 'political' agendas in education, the U.S. has over the past decade retreated into narrowly circumscribed methods as the basis for the learning sciences. Educational research funding under No Child Left Behind was tied to the 'gold standard' of randomized controlled experimentation. This idea is represented in its clearest and most influential form in the report of the U.S. National Research Council, *Scientific Research in Education*.[158] The report asserted that only a certain kind of empirical research and controlled experimentation—x initiative leads to y measurable results—is worthy of the name 'science'. Like the medical scientist, we might give some learners a dosage of a certain kind of educational medicine and others a placebo to see whether a particular intervention produces better test results. This, the report calls 'evidence-based research', rather too ambitiously insofar as there is surely other roads to empirical knowledge of the social world. The Department of Education was explicit about its reasons for establishing this: 'unlike medicine, agriculture and industrial production, the field of education operates largely on the basis of ideology and consensus. As such, it is subject to fads and is incapable of the cumulative progress that follows from the application of the scientific method and from the systematic collection and use of objective information ... We will change education to make it into an evidence-based field'.[159] So, in this conception, the intellectual task of education is to measure various classroom inputs in relation to learner test outputs an instrumentalist way without critically examining the broader frame of reference of the classroom in a changing society and the relevance of the outputs. For its methodical proceduralism alone, this variant of the discipline of education calls itself science. But what if it turns out to be a science, which is attempting minor re-engineering of a pedagogical system, which might be in need of a more thoroughgoing overhaul?

One possible rejoinder to the elevation of randomized controlled experimentation as the beginning and end of educational science, is that education can never be like a science—the model of controlled experimentation offered by laboratory natural science is unachievable in education and if anything unethical.[160] We're dealing with human beings with interests, desires, identities and agency, not just cognitive entities and clinically isolatable pedagogical moves.

Another rejoinder is that the natural and technological sciences are themselves 'ideological'—more subject to contestation around axes of human interest—than the narrow understanding of science proffered by the proponents of 'evidence-based' research seem to be able to comprehend. Whether it is bioethics, or the politics of climate research, or the debates around Darwinism and 'intelligent design', or the semantics of computer systems, questions of politics and ideology are bound closely with the ostensible evidence. There can no longer be any faux empiricism, not even in the natural and technological sciences. Nor can there be narrowly unambitious and apolitical horizons. Maybe there's something fundamentally wanting in the institutional inheritance that is today's schools? Meanwhile medical scientists are trying to tackle problems that are seemingly impossible and, much of the time, ethically contentious. They're doing something bigger than randomized controlled experimentation. Their ambitions are high. Their risks are great. They are trying to come up with things that are fundamentally new, radically innovative, shockingly transformative. Any such ambitions are way beyond the bounds of a narrowly 'evidence-based' view of education science, methodologically and in practice.[161]

Mary Kalantzis and Bill Cope

Supporting Evidence 3.3: Teacher Certification Alternatives

The importance of high quality alternatives to traditional, 4-year undergraduate teacher education programs is not debatable, given the need, the age of the teacher population and the diversity of the potential teacher candidate pool[162]. What is debatable – and hotly debated – are questions about *who* should offer these programs, *what* they should comprise and *how* they should be structured.

The policy debate over alternative certification programs has largely devolved into 'who should be doing teacher education?' with the choices being (a) universities or (b) just about anybody else. Proponents of market-driven approaches tout alternative certification as a way to increase access into teaching while bypassing intransigent colleges of education.[163] Supporters of professional teacher education and certification point to failures of "short cut" certification programs.[164] Ideological arguments overshadow two important facts: one is that universities *are* intimately involved in alternative certification programming; the other is that broad variations within both traditional and alternative programs muddy the waters enough to render such arguments moot.[165]

Contemporary debate seems to center largely on Teach for America (TFA), perhaps because it has so successfully captured the attention and the hearts of policy makers and the media. TFA has placed 20,000 teachers in high-need schools during its existence; according to the 2008 Senior Survey, TFA was the second-largest employer of University of Illinois graduates. The success of TFA teachers in improving student achievement varies (as it does with teachers from traditional programs).[166] A graver concern is that the vast majority of TFA teachers do not fulfill whatever promise they show, moving on to their "real" careers after completing their two-year commitment.[167]

Until research is able to link specific aspects of teacher preparation directly to student achievement (and that train has left the station), all discussion is at least somewhat speculative. However, years of research and practice in an ever-evolving context have yielded generally accepted notions about what good teachers need to know and be able to do: know their subject, exercise judgment to apply

instructional approaches that work best for that subject, differentiate instruction to address the needs of very diverse students, understand social and emotional development, assess students' progress, interpret the results and use them to improve instruction, manage a fertile learning environment, and negotiate the dynamics of the parallel universe that is "school" – all on top of the most fundamental qualities of genuinely caring about students and believing they can succeed.[168]

Universities with quality traditional teacher education programs are well positioned to create high quality alternative programs; however, restrictive state and/or national program approval and accreditation requirements hamstring efforts to offer programs that are truly "alternative." Institutions are left with programs that are very similar to their traditional programs in accessibility, duration, and expense. Persons interested in teaching have fairly open access to cheaper, faster, closer and most probably easier alternatives to university certification programs. Creative thinking by policy makers and education experts is needed to address this dilemma. The model in the succeeding paragraph is presented to stimulate discussion. Note that it applies only to secondary programs, where the most serious shortages reside (except for special education; but I would argue it is not practical to prepare a special educator in an abbreviated program).

For starters, it is given that the university is working in close partnership with a school or schools to develop and deliver the program. Subject matter knowledge is demonstrated by passage of a state- or nationally-approved content test, period. No additional assessment or subject matter course work is required. Appropriate screening processes/background checks determine dispositional suitability. These are conditions for admission to the program. All instruction is situated in an intensive, year-long, full-time internship experience under a mentor teacher in a real school with real students. Successfully passing the internship is the final and only requirement for achieving initial certification. Institutions are given a free hand to develop the essential skills of content pedagogy, differentiated instruction, and assessment of student learning in, with, and around the internship. One to two years of ongoing induction and mentoring on the job is mandatory to achieve 'full' or 'advanced' certification.

Chris Roegge

Supporting Evidence 3.4: Reforming Pre-Service Education to Fit the Times and Shape the Future

The American people face two long-term, formidable imperatives: To invest a population both with the skills and creativity to compete in a global economy and with the knowledge necessary to meet the many and multiplying complex challenges of a global society. Absent the infusion of these skills and knowledge in the population as a whole and in the lives of individual Americans, the United States as an open society, is at perilous risk.

Only a second-to-none educational system can address these mutually reinforcing imperatives. Such a system must disseminate solid, tested knowledge, incorporate best teaching practices, and pursue nimble and innovative strategies, adaptive to new national and global challenges and imaginatively exploitive of opportunities to perfect the system, forming ideally a virtuous circle.

Among the several, necessary requirements for superior education in the 21st century are a reliable and responsive K-12 system of teacher education. That system in the United States currently produces a national cadre of instructors of widely varying professional preparation, competence, sense of civic responsibility, and instilled passion for teaching. That obviously is not enough to meet national needs. The system has to be reformed.

Given the powerful forces resisting change, reform will be long, hard, and scarcely assured. To start the process of reform and to sustain it over the next generation, a well-funded and aggressively led

national program of reform of pre-service education must be launched and maintained over the initial education and professional careers of K-12 teachers.

To be awarded a professional certificate to teach in primary and secondary schools, instructors must meet two minimal but indispensable tests, both keyed to the educational imperatives imposed on the nation by globalization. First, all must be computer literate, capable of using and teaching widely employed, standard application programs and skilled in the navigation tools of the Internet. These skills (and their continual upgrading) would complement the foundational competencies possessed by these prospective professionals in teaching mathematics, the physical and biological sciences, social sciences, humanities, and the arts.

Second, all prospective K-12 professionals must acquire the conceptual and analytic skills to understand the complex issues impacting the nation and the world's populations and train students how to understand these challenges. Imparting the analytic skills to students to enable them to process information and knowledge about the issues their generation must address, as future national and global citizens, a precondition for supporting effective policies to cope and resolve them.

Professionals at the K-12 level must assume the role of global informational and knowledge entrepreneurs. That role combines two obligations: to keep abreast of the principal challenges confronting the nation to inform their students of these challenges, whether through formal lesson plans or in informal discussions, and to instill and inspire them to embrace their civic responsibility to contribute to their resolution. No open society can survive and thrive unless its members can continually bridge the gap between public will as a sine qua non to support and legitimate national policies and an *informed* public will capable of fashioning effective policies responsive to national and global needs. Freely governed open societies are demanding regimes: like all regimes they must not only solve real problems, but these solutions must also enjoy public support, which suggests accountability, transparency, and legitimacy.

Reform of pre-service programs implies that Colleges of Education must increasingly be integrated into the larger educational networks of their colleges and universities and be prepared to assume leading roles in the development of the teaching, research, and outreach agendas of their academic and local communities. Isolation and insulation are no longer options either for programs to educate teachers or for the disciplines that comprise a college or university. Members of both academic communities need to become much closer as partners in a shared educational commitment to contribute more effectively and responsibly to the skill and knowledge needs of their students and, ipso facto, those of the American people.

To encourage reforms, tailored to the varied needs of the nation across locales and regions, and to resist the lures that Washington always knows best or that one suit fits all, a national competition should be organized, similar to the Title VI process, in which resourceful and innovative Colleges of Education would compete for funds to reform their pre-service curricula. Competition for funds would also preclude the distribution of scarce public funds through the fiat of a hierarchically administered process, which would not be tested against the rigors of peer review.

The several models of curricula reform, expected to emerge from these annual competitions, would be public goods. Other Colleges of Education could draw on them in reforming and refining their pre-service programs. They, in turn, would be positioned to compete for funding to reform their pre-service curricula. These reforms would respond to the twin educational imperatives confronting the nation. They would also be tailored, differentially, to exploit the opportunities for creative change and to relax or surmount the constraints for innovation associated with particular academic and local communities. The outcome would be the institutionalization of self-sustaining reform of K-12 pre-service education to fit the times and shape the future.

Edward A. Kolodziej

Supporting Evidence 3.5: Trends in Class Size in U.S. Public Schools

Tennessee's Project STAR, one of the few large scale educational experiments in U.S. history, established smaller class sizes as a valuable approach for improving achievement in primary schools.[169] In the last 40 years, national pupil-to-teacher ratios have declined relatively steadily, from 25 to 1 in 1965 to around 16 to 1 in 2002.[170] Average class size, a different measure than student-to-teacher ratios, in U.S. public schools was about 21-24 students in 2000, depending on the grade level of the school.[171] Private schools in the U.S., in comparison, have an average class size of 19. [172]

As with many educational inputs in the U.S., there is considerable amount of variance on these measures across U.S. states. Public school elementary student-to-teacher ratios range from about 12.5 to 1 in states like Nebraska and Vermont to 20 to 1 in California.[173] Likewise, high school ratios range from about 12 to 1 in Vermont and Washington, DC, to 22 to 1 in California.[174] In international perspective, U.S. class sizes and student to teacher ratios overall are similar to those in the wealthier European countries, although U.S. student to teacher ratios in secondary schools tend to be slightly higher.[175]

Peter Weitzel

Supporting Evidence 3.5: Violence Against American School Teachers

Today's teachers are faced with a number of challenges. For example, they are expected to teach a population that is increasingly diverse not only in terms of unique cultural backgrounds, but also in terms of academic, behavioral, and social skill sets.[176] Further, teachers are expected to achieve high academic standards for all students (e.g. under No Child Left Behind); accommodate students with exceptionalities in inclusive settings; and serve students who exhibit high levels of violent behavior that stem from the growing incivility of our society. Furthermore, teachers are expected to address the flood of school violence by preventing the development of antisocial behavior while promoting student prosocial behavior and academic performance.[177]

Despite declines in juvenile violence, the prevalence of violent crimes in school continues to be alarming. For example, high school students responding to a national survey in 2003 indicated that fear of school-related crime prompted 5 out of 100 students to miss school at least once during the previous month.[178] Even teachers are victims of crime. In one year, 253,100 (7%) of teachers (8% secondary, 6% elementary level) were threatened with injury.[179] In short, school can be a frightening place for both students and teachers.

The consequences of school violence affect students, teachers, and administrators, but also society as a whole – particularly when the violence is extreme as in the cases of school shootings. The shocking instances of violence that occurred in our nation's schools during recent years are beyond tragic and have untold costs emotionally, financially, academically and otherwise. While many educators did not imagine they would have to address violent and antisocial behavior, they are facts of life that must be attended to by our schools.

The costs of teacher victimization range from lost wages; to early exiting of the profession; to lost instructional time.[180] Before we can begin to solve the problem of violence against teachers and students in our schools, we must first have a measurement system that provides an accurate assessment of the magnitude of the problem and then we need to conduct comprehensive studies to identify ways in which to prevent violence against teachers. While measures exist to assess violence against students, measures do not exist to assess violence directed against teachers and factors that contribute to this problem. This

represents a significant gap in the available armamentarium of school-based measures, as violence against teachers can strongly influence children's behavior and learning outcomes.

Dorothy Espelage

Supporting Evidence 3.6: Schools as Focal Points for Communities

Over the past three decades we have witnessed the disintegration of the communities of which schools have always been a part. As a result of changes in the patterns of work and labor relations, modes of production and consumption, mobility of people, media and youth cultures, as well as neoliberal economic policy, communities have become increasingly fragmented, with people living in them increasingly alienated from each other. Neo-liberalism has encouraged a destructive form of individualism, defined more by self-interest than by a sense of community. Robert Putnam, has amply demonstrated this in his book, *Bowling Alone.* Putnam has shown how Americans are becoming increasingly disconnected from family, friends, and neighbors, as well as from their democratic structures. Putnam warns that our stock of social capital—the very fabric of our connections with each other—has plummeted, impoverishing both our communities and our lives.[181]

Richard Sennett has similarly documented 'the fall of the public man', where social relations are now defined more by a new culture of consumerism than by commitment to a range of social goods.[182] Zygmunt Bauman has called this 'liquid modernity', produced by 'the new remoteness and un-reach ability of global systemic structure coupled with the unstructured and under-defined, fluid state of the immediate setting of life-politics and human togetherness'.[183] The current global economic crisis is only going to exacerbate these tendencies, unless we begin to re-imagine and once again build communities that give us a sense of belonging, where we can live our lives not only for ourselves but also for each other.

Schools have traditionally been a major site where communities are formed and develop. For John Dewey schools were only successful when the communities in which they were located valued them, and when schools accepted the responsibility of giving students a sense of civic pride, when they worked towards community renewal, especially in the context of rapid historical changes. In this sense, Dewey saw community not only as a geographical location, but a social project that involved a struggle in negotiating and living the conditions that give us a collective sense of meaning and purpose.[184]

In the era of globalization, we belong to multiple communities, but this does not eliminate the need for schools to continually try to understand, build and develop those multiple communities across space and social categories. Much of the recent discourse around educational reform has focused largely on what needs to happen within the boundaries of the school. We are often guilty of looking at schools as a sum of individual students and teachers. This ignores the role schools must now play in rebuilding communities, in some cases devastated by decades of deindustrialization and economic restructuring. In such circumstances the role schools must play in giving students intellectual and practical resources with which to understand and address issues of social and economic change is even greater.

This role however should not be viewed as a task that is in addition to the traditional roles schools have played in helping students acquire knowledge, skills and values. Rather, the processes of teaching and learning should themselves be informed by a concern for the community. Effective schools must not only use community resources but also contribute to community building. Now that we have a former 'community organizer' as the President of the United States, we must try to re-imagine the nature of the relationship between schools and their communities, so that educational reform is not concerned solely with the interests of the individuals, but of communities as well.

Fazal Rizvi

Action Area 4: Adapt to a Ubiquitous Learning Environment

The digital information and communications technologies that have transformed the world were invented and first made in America. However, in the home of their invention there has been no notable leadership in their application to education. Most classrooms are still strikingly not a part of the information age even by the most basic of measures—students' access to digital learning content and work spaces. And when students have access to these environments, the curriculum content and student work practices are often unimaginatively conventional (content transmission, lock-step sequencing, standardized curriculum, discrete item assessment). Much 'e-learning' does not innovate in ways that the new technologies allow. Student learning results are disappointing. Yet, ironically, these same technologies are having a marked and transformational impact on learning and communication *outside* the classroom. How can this be?

Ubiquitous learning is an extension of the idea of ubiquitous computing, a term which describes the pervasive presence of computers in our lives. Personal and portable computers have become an integral part of our learning, work and community lives, to the point where, if you don't have access to a computer networked with reasonable bandwidth you can be regarded as disadvantaged, located as a 'have not' on the wrong side of the 'digital divide'.

Meanwhile, many other devices are becoming more computer-like, or have computer power built in: mobile phones, televisions, global positioning systems, digital music players, personal digital assistants, video cameras, still cameras and game consoles, to name a few. These devices are everywhere. They are getting cheaper. They are becoming smaller and more portable. They are increasingly networked with each other. This is why we find them in many places in our lives and at many times in our days. The pervasive presence of these machines is the most tangible and practical way in which computing has become ubiquitous.

Ubiquitous learning is a new educational paradigm made possible in part by the affordances of digital media.[185] 'Made possible' means that there is no directly deterministic relationship between technology and social change. Indeed, educational institutions at every level have proven quite effective at adapting these new resources to their conventional practices and content, rather than vice versa. Digital technologies arrive and almost immediately, old pedagogical practices of didactic teaching, content delivery for student ingestion and testing for the right answers are mapped onto them and called a 'learning management system'. Something changes when this happens, but disappointingly, it is not much.

And another qualifier: 'affordance' means you can do some things easily now, and you are more inclined to do these things than you were before simply because they are easier. The technology becomes an invitation to do things better, often in ways that some people have been saying for a long time they should be done. You could do collaborative and inquiry learning in a traditional classroom and in a heritage institutional structure, but it wasn't so easy. Computers make it easier. Desirable social learning practices which were at times against the grain for their idealistic impracticality, become viable. What we are witnessing is a set of social and cultural changes (as well as technological changes), largely based in learning activities outside the classroom – the coffee house, the home, the social network, the gaming environment, the media and popular culture, the workplace – reflecting a set of changed expectations on the part of young people about what their learning experiences inside the classroom should look like. Learning processes, motivations, and relevance to the practical contexts of ordinary life are changed by this shift of emphasis, as is the need for the school and classroom to re-imagine themselves in relation to these other learning environments. This is the revolution we describe as "ubiquitous learning."

Here are some infrastructure and pedagogical imperatives that we can now more practicably put into place.

Move 1: To blur the traditional *institutional, spatial and temporal boundaries of education*. Learning is lifelong and life wide. And some important new things don't need to be learned in formal classrooms because they can be learned at user-friendly interfaces, by asking a help menu, through over-the-shoulder teaching by a friend or colleague. This is just-in-time and just-enough learning, a new pervasiveness for pedagogy. This requires a new systematic investment in access infrastructure, hardware, software, technical support and teacher professional learning.

Move 2: To shift the *balance of agency* in learning so that learners become active discoverers of available knowledge well beyond the previously constrained orbit of teacher talk and textbook; they become recorders of empirical observation; they become reporters and publishers of knowledge that they have (re)made in many contexts. Learners become knowledge actors at least as much as they are knowledge receptors. This requires IES, NSF and other agencies to increase dramatically research into e-learning and pedagogy

Move 3: To recognize *learner differences* and use them as a productive resource. Learners are more able to draw upon the resources of their identities and apply their experiences to the learning environment, to observe and report in a way that articulates their own perspectives and represents knowledge in the timbre of their own voice. This requires investment that encourages large scale, long term, university, community college and school partnerships, testing in laboratory conditions and developing proven ways in which all learners can be engaged to meet their aspirations and realize their potentials.

Move 4: To broaden the range and mix of *representational modes* in which students can express their knowledge—in text or image, audio or video, dataset or software program. This will necessitate investment in interdisciplinary research in and professional learning to provide teachers with an appropriate toolbox of 'grammars of meaning', which will enable learners to use a broader repertoire of media.

Move 5: To develop *conceptualizing capacities*, navigating one's way through the ersatz identifications in the form of file names and thumbnails, the navigational architectures of menus and directories, the semantic tagging of home-made the formal taxonomies that define content domains, and the standards which are used to build websites, populate web feeds, determine database fields and identify document content. These new, ubiquitous media need a peculiarly conceptualizing sensibility, entailing sophisticated forms of pattern recognition and schematization.

Move 6: To connect one's own thinking into the social mind of *distributed cognition and collective intelligence*. In the era of ubiquitous computing, you are not only what you know but also what you can find out. The measure of your intellect is not to recall knowledge but to able to find the knowledge that is at hand because you have the Internet in your hand. This makes closed book tests and much of rote learning anachronistic. To move in this direction will require interdisciplinary research to create assessment tools that provide both more useful and relevant formative and summative evaluative information to learners, parents and educators.

Move 7: To build *collaborative knowledge cultures*. Ubiquitous computing invites forms of social reflexivity which can create 'communities of practice' to support learning. In the ubiquitous learning context, teachers can harness the enormous lateral energies of peer-to-peer knowledge making and the power of collective intelligence. Learners can involve people who would formerly have been regarded as outsiders or even out-of-bounds in the learning process: parents and other family members, critical friends

or experts. The digital workspaces of 'social networking' technologies are fertile ground for this kind of work, at once simple and highly transparent when it comes to marking differential contributions.

Technology, however, is only one medium supporting the general goal of ubiquitous learning? Other aspects include:

- Lifewide learning, where the boundaries of formal learning are blurred and accreditation can be acquired for learning-in-situ.
- Lifelong learning, from early childhood education, to community and workplace learning, to retraining a workforce, which is likely to retire at an ever-increasing age.
- Full service learning, with integrated learning service provision crossing health, welfare, employment and other community services.
- 7 days per week, 7-11 schools—online as well as physical—offering expanded instruction time, as well as 'socializing plus play'.
- Flexible delivery learning, supporting a range of options from home schooling, to online education.

Technology may support these moves towards greater educational ubiquity. But it is not sufficient to produce them.

Bill Cope, Mary Kalantzis and Nick Burbules

ACTION ITEMS

Action Item 4.1: A Wireless Laptop for Every Learner

Every student needs his or her own computer at school which he/she can also take home—this is as essential to twenty-first century learning as pens, paper and textbooks were to nineteenth and twentieth century schooling. The *Get Digital* initiative will mass-purchase laptops from computer manufacturers, distributed through local retailers; students can purchase computers at a discount, or of unable to afford them, are provided with the support of cross-subsidies within the program.

Action Item 4.2: Expand Wireless Infrastructure, Provide Technical Experts to Schools

Every student needs wireless access at school and Internet access at home. Without this, we have a digital divide so fundamental that it is equivalent in the recent past to denying students pens, paper and textbooks. The *Get Connected* initiative will provide a free wireless account to every student and technical support based in the school.

Action Item 4.3: Create Innovative Digital Learning Environments and Redesign Classroom Architectures for Digital Learning Environments

Students today mostly get hand-me-down business software, cheap 'educational' games with none of the sophistication of 'real' games, and e-learning systems, which are no more than low-cost digital makeovers of nineteenth or twentieth century didactic pedagogies. For the enormous resources put into education, frighteningly few dedicated R&D resources are devoted to creating and evaluating new, digital and online learning environments.

The *u-Learn.net* initiative will dedicate Institute of Education Sciences (IES) and National Science Foundation (NSF) resources to mixed methods experimentation and intervention in the area of ubiquitous

learning, in partnership with IT industry, designing, introducing, testing and redesigning tools of new learning.

The initiative could be supported by a series of jointly funded *Ubiquitous Learning Linkage Grants* that support collaborative-participatory research between universities, schools and the IT industry to field test existing new technologies more suitable for learning.

Action Item 4.4: Online Supplements to Full Service, 7 day 7-11 Learning

Online learning may allow schools to shake off the constraints of geography and locally available teaching skill sets. Students of the near future may be able to join classes in multiple schools, near and far away, exactly suiting their capacities and interests. Full service and long hours schools will be able to offer supported mixed mode, partly or fully online programs for longer hours.

The *Anywhere Learning Program* would support learning that is anywhere/anytime, particularly for secondary school students and to provide flexible home and school learning options. A highly distributed development strategy would support the development of a variety of online learning management systems, linked nationally via the web and supported by a network of local learning centers attached to libraries or other community facilities, thus providing more flexibility and autonomy for learners. This could be supported by honor and buddy systems. Attendance and performance can easily be tracked in today's online environments.

SUPPORTING EVIDENCE

Supporting Evidence 4.1: The Digital Divide

Over 50 years after the Supreme Court struck down segregation in *Brown v Board of Education* on the grounds of securing educational equality for all, public education in the United States still battles severe inequity with respect to resources, infrastructure, and funding. As the information age continues into the 21st century, training students to work with technology becomes an exceedingly salient goal for public education. However, even as technological costs continue to decline and schools can afford more computers and greater internet access, the digital divide between the technological "haves" and "have nots" continues to grow.

Equity of access: Although some rural areas of the United States still face problems of Internet access, the most noticeable effects of the digital divide can be seen in low socioeconomic, urban areas, particularly when compared to their suburban counterparts.[186] Therefore, in essence, access to technology becomes a problem associated with race and socioeconomic status. White and Asian students are significantly more likely to use computers, both in school and at home, than African-American or Latino students. Households located in low socioeconomic areas are far less likely to own computers or have Internet connections than those families earning over $75,000.[187] Similarly, the more students from low socioeconomic households enrolled in a particular school, the greater ratio of computers per student.[188]

Equity of usage: Even when access ceases to be an issue, there is a secondary divide that occurs with respect to the level of digital literacy that is acquired in low socioeconomic, urban classrooms versus those found in suburban schools. Research shows that teachers in poorer school districts use computers less, and when they do use technology, these teachers tend to have students perform rudimentary tasks, such as drill-and-repeat exercises, or offer technology as a reward for good behavior rather than for learning purposes. These findings provide a stark contrast to research that reports teachers in affluent schools using technology for research, content acquisition, and statistical analyses. In addition, many low socioeconomic school districts have difficulty recruiting and retaining teachers proficient with

technology, resulting in classrooms run by teachers who lack the necessary training to use technology in meaningful ways.[189]

From an instructional standpoint, research in a variety of disciplines has suggested that incorporating technology into classroom instruction in meaningful ways increases student interest and raises academic achievement.[190] Moreover, those who never learn how to deftly navigate the internet run the risk of earning considerably lower wages than their technologically proficient peers, becoming unable to access political information and actively participate in an increasingly digitalized democratic society, and experiencing a loss of social status within their local community.[191]

The digital divide within public education is contributing to the perpetuation of economic, social, and political inequality in the United States and, therefore, policymakers should seek to narrow all aspects of the divide, not just access.

Wayne Journell

Supporting Evidence 4.2: New Teaching Practices for the Digital Era

In today's dynamic education environment we have to prepare our students for learning in ways that may prove challenging and frustrating. The learners of today are often highly sophisticated in their use of social networking and other software applications and to some degree web based text/data mining software such as Google. Often when students are provided with adequate computing hardware, the appropriate and current computer software, teachers fail to know how to integrate content using technology to keep student's interest. Despite the use of social networking programs such as facebook, Teacher Tube, and other Teacher driven networks to help with the implementation of technology in the classroom, little is actually achieved. Students continue to struggle with limited resources and with teachers who are not prepared or unwilling to make the transformation to using technology to teach curriculum in the classroom.

Much ignorance around this issue has been the primary cause of the problem because many university faculty in Teacher Education Programs fear using technology to deliver instruction or exposing student's use of technology in the classroom because of fear from loss of control.[192] Canned responses to using technology have not been an effective pedagogy for the classroom, yet such responses prevail in textbooks, and online materials.

Educational institutions must find ways of harnessing the power of Web 2.0 applications. Users are no longer consumers; they are creators within web environments. Higher Education Teacher Education Programs must find an approach that integrates web 2.0 applications while affording the opportunities for dynamic content changing as students engage in 'just in time learning' and collaborations. No longer is it necessary for teachers to create the content alone, teachers and students can co-create web based and computer based content and therefore leveraging creativity.[193]

More digital arts and creativity needs to be placed back in the hands of the users in schools.[194] We need to develop learning experiences using technology that leverage social networking applications. More applications should be used to integrate content in a variety of virtual spaces. Some virtual spaces include: Social networking, blogs, wikis, simulations (scientific and social) text messaging, text chat, social virtual worlds, games, podcasts, screen casts, listservs, discussion boards and forum and many others.

More so than ever schools and teacher education programs need to create an environment that challenges the integration of technology to foster more creativity and critical thinking.[195]

Sharon Tettegah

Supporting Evidence 4.3: Cyberbullying: What are Schools to Do?

There have been significant changes in how children and adolescents interact with technology and how technology is used to harass, humiliate, and bully others. For example, Pew Internet and American Life reported that 87% of U.S. teenagers (ages 12 through 17) currently use the Internet[196], and a Forrester report found that nearly 80% of youth between these same ages use MySpace at least weekly.[197] A more recent Pew Internet and American Life study reports that the preferred modality of communication is instant messaging; 75% of teens between the ages of 12 and 17 years used instant messaging and of these teens, 48% report using IM at least every day. These environments are social in nature; however, they do not involve face-to-face interactions. Thus, these social environments are not immune to the various negative interactions that are encountered in schools, families, and neighborhoods.

"Cyber-bullying" has emerged as a common occurrence among children and adolescents.[198] Cyber-bullying has also been called: ebullying, electronic bullying, cyberviolence, digital bullying, etc. A recent definition of cyberbullying posited by Ybarra and Mitchell is "intentional and overt act of aggression toward another person online."[199] Studies have found that 10-33% of youth between the ages of 11 and 19 have experienced being the target of aggression/bullying online, and more than 15% of youth reported being perpetrators of such behaviors.[200] As technology has grown exponentially in the lives of children and adolescents, most school-based violence and harassment prevention programs have failed to target cyber-bullying. This is disappointing given the finding that 45% of preteens and 30% of teens that had been cyber-bullied received messages while at school.[201] Thus, there is an urgent need to forge a comprehensive research program on understanding the types and prevalence of cyberbullying to assist schools, parents, and communities in developing evidenced-based intervention programs.

Dorothy Espelage

Supporting Evidence 4.4: P-12 Informatics

Although the basic tenets of education have not changed - education is still about preparing our children to be productive citizens - how we come to learn and what it is we should be learning has changed. For some, we will be preparing students for careers and opportunities that currently do not exist[202]. Three years ago, Forbes predicted that jobs of the future would include such things as teleport specialist, robot mechanic, drowned cities specialist, and Hollywood Holographer[203]. These projections have garnered strength as much has been declared regarding the need for individuals who can adapt their learning and bring new understanding to the vast amounts of digital data growing within our information society[204]. No greater support for this, however, has been seen as with the intense growth of informatics related studies[205].

In higher education, informatics harnesses the power of information technologies across all disciplines. Students engage with techniques and instructional practices that employ a synergy among technology, media, knowledge processing and creation. A student's cognitive flexibility[206] then permits him/her to authenticate the learning process so that social, emotional, and creative intelligences are matched with the hard sciences in shaping their understanding of knowledge.

Our challenge today in the P-12 classrooms, therefore, is to find the ways in which we foster critical thinking, collaboration, problem solving, and creativity which are coming to characterize the main attributes of success in our post high school experiences and even more importantly as lifelong learners in our global society. A curriculum designed around the principles of informatics would permit educators to rethink how they teach our students and instead of approaching subject matter as isolated disciplines, would apply learning amidst the student's ability to generate, obtain, manipulate, and/or display

information[207]. Learning thus is not only about obtaining core skills, but also about students acquiring portable skills in which they are actively engaged in how they are coming to understanding information and what it is telling us.

This digital wisdom[208] empowers the students to look at learning not as static knowledge, but as dynamic and instrumental in shaping the way we innovate, create, and educate. And as a result, they are better able to embrace the problems that they will face in the workforce which typically are ill defined and multi-disciplinary. This contradicts what many students currently face in today's curriculum that sees problems as clearly defined within a single discipline with one right answer[209]. The hallmark for a 21st Century informatics framed curriculum would then bring semantic awareness not only to applications[210], but also to the human mind. A student's capacity to bring seemingly unrelated ideas or concepts together to formulate new ways of thinking, and new ways of coming to know is what will ensure that there is a connection between what we are teaching and breakthrough ideas so that America is an influential leader in shaping our future.

Evangeline S. Pianfetti

Supporting Evidence 4.5: A Knowledge Management Approach to Lesson Planning

Today's learning communities need to regard themselves as organizations in which 'knowledge management' is pivotal. Knowledge management adds system and rigor—active learning by design—to the knowledge, which is implicit and informally learned within organizations.[211] It involves transforming personal knowledge into common knowledge, implicit and individual knowledge into explicit and shared understandings and everyday common sense into systematic designs.[212]

Teaching in modern times has been a talking profession, at least so long as the primary information architecture was the four-walled classroom. What happens in the classroom is ephemeral in the sense that the spoken word disappears once spoken. Except for the learners' marks, the classroom is a private, even secret place because the door is closed. There is not a lot of professional sharing.

However, self-paced and e-learning environments require the teacher to document more, to record learning processes explicitly. And once they do this, teachers can share their lesson plans or learning resources with other teachers. Teaching becomes a more collaborative profession. The school becomes a knowledge producing community. Using the new digital media, particularly, educators can share their pedagogical choices, document their learning programs, share effective practices and write up jointly developed learning community goals.[213] Students can themselves participate this collaborative, knowledge-building culture, by publishing portfolios of the work they have created digitally either individually or collaboratively—such as a course wiki to which students have contributed different components, or a digital portfolio. The result will be greater transparency and accountability amongst those who share responsibility for education. In this way, the traditionally closed door of the classroom is thrown open, and it's primarily oral, and thus its private and ephemeral character is transformed. Its knowledge-producing actions learning processes are recorded in such a way that they become publicly visible to peers, to the educational organization, to parents and communities.

At the level of whole-school organization, it is the project of knowledge management to ensure that collaboration is institutionalized and that knowledge sharing does occur. As a result, wheels are not needlessly reinvented. Lessons from mistakes are learned once. And the knowledge of the organization or community is not dangerously depleted when a key person departs. In short, the extra work of organizing knowledge should create less work. This is the basis of the 'learning organization' the sum of whose knowledge is greater than the individual components of knowledge in the heads of individuals.

Mary Kalantzis and Bill Cope

Supporting Evidence 4.6: Open Education

Open education develops around a successive series of utopian historical moments based on a set of similar ideas stemming from core Enlightenment concepts of freedom, equality, democracy and creativity. The early history of open education consists political and psychological experiments conducted in special schools established in the early twentieth century.[214] The movement from the very beginning thus was shaped by contemporary political and psychological theory that attempted to provide alternatives to the mainstream, connected to and exemplified a form of society and set of institutions that was seen as politically desirable. These early ideas also significantly involved an analysis of the space and architecture of schools and the associated idea of freedom of movement underwent considerable refinement and development over the course of the twentieth century.

An important aspect concerned not only the analysis of architecture but the overcoming of distance in a form of distance education that began in the late nineteenth century through correspondence and progressed through various media eras including that of radio and television. Open education consisted of several strands and movements that often coalesced and overlapped to create a complex skein that despite the complexity was able to rapidly avail itself of new communication and information technologies in the last decade of the twentieth century and to identify itself more broadly with the new convergences among open source, open access, and open courseware movements. It was as though the open education movement in its infancy required the technological infrastructure to emerge as a major new paradigm rather than a set of small-scale and experimental alternatives or a form of distance education.

The model of technology-based distance education really received its impetus in the 1960s when the Open University in the UK was established founded on the idea that communications technology could extend advanced degree learning to those people that for a variety of reasons could not easily attend campus universities. It has been immensely influential as a model for other countries and distance education flourished in the 1970s and picked up new open education dimensions with the introduction of local area network environments.[215] Open courseware (OCW) is very much a feature of the twenty-first century. MIT, one of the first universities to introduce OCW, announced its intention in the New York Times in 2001, formed the OpenCourseWare Consortium in 2005, and by 2007 published virtually all its courses online.[216] MIT is only one example of the OpenCourseWare movement, an important player, but nevertheless, only one institution amongst many.[217] Most recently The Cape Town Open Education Declaration mentions the variety of openly licensed course materials, including lessons, games, software and other teaching and learning materials that contribute to making education more accessible and help shape and give effect to a 'participatory culture of learning, creating, sharing and cooperation' necessary for knowledge societies. It goes on to provide a statement based on a three-pronged strategy designed to support 'open educational technology, open sharing of teaching practices and other approaches that promote the broader cause of open education.'[218]

The open education movement and paradigm has arrived: it emerges from a complex historical background and its futures are intimately tied not only to open source, open access and open publishing movements but also to the concept of the open society itself.[219]

Michael Peters

Action Area 5: Teach to a New Basics

Whether well founded or not, it seems to have become a perennial complaint that education is falling behind in key areas of the 'basics'. We have a crisis of science, mathematics and technology education. We have a crisis in literacy education. Standards are dropping. Our global competitiveness is at risk.

There may indeed be a crisis, but perhaps it is at deeper orders of difficulty than anything measurable by today's curriculum frameworks and assessment processes.

The first order of difficulty is the question of discipline boundaries and curriculum content. The basics of science, technology and mathematics have shifted in the context of new areas of fundamental intellectual and practical concern (such as nanotechnology, web informatics and environmental sustainability). The basics of literacy have shifted in the context of the deep multimodality of the new media in every aspect of our working and personal lives, mixing written language with spoken language, image, sound, gesture, touch and space. The intellectual and practical work we need to do today to address the key challenges of our times take us beyond the disciplines as they have been historically conceived. We cannot simply keep teaching the things we have always taught within the traditional subject areas and expect our teaching to remain relevant.

But there is a second fundamental problem, a problem of an even greater order of difficulty, and that is a change in the epistemological bases of the basics, a transformation in the social conditions of knowing. Top-down systems of knowledge authority and application are in many places rapidly being replaced by the more grounded and dialogical systems of knowledge-producing communities. Whether it is product and market research in workplaces, or learning design in schools, or clinical knowledge management in hospitals, or environmental policies and practices by local governments, or community outreach initiatives to diverse communities in non-profit organizations, a new bottom-up knowledge making energy is needed today. Persons and groups use available knowledge resources, for sure, in the form of multiple sources of fact and concept, which require critical analysis and interpretation. Then they reframe, rework, redesign, recalibrate, reapply then re-circulate these ideas based on the subtleties of local experience and practicalities of application. Every worker and every community member is becoming a knowledge producer. Or that should be our program of action.

Add to this a generational factor, the rise of a new Generation P, for 'participatory'.[220] We'll just consider the example of young people living in new media environments. Not simply vicarious viewers of movies, they play computer games in which they are the central character and in which their actions and identities in part determine narrative outcomes. Not simply listeners to the top forty songs on a radio station's play list, they create their own playlists on their personal listening devices. Not simply consumers of broadcast television, they choose amongst thousands of television channels and millions of YouTube clips; they even choose their own viewing angles on interactive TV or make their own television programs and upload them to the web. Not simply readers, today's literacy experiences as often as not also position readers at the same time as writers—in wikis, or blogs or their Facebook and MySpace pages, or small messaging spaces such as SMS or Twitter. Not simply consumers of pre-packed products, they become 'prosumers' of products, which allow customization and even consumer contribution to the shape of the product for other consumers. Traditional relationships of knowledge and culture are profoundly disrupted, and even the terms of the either/or differentiations we have hitherto used to describe these relationships: creator/audience, producer/consumer, writer/reader. The key to these changes is an intensified cognitive and practical input on the part of previously more passive recipients of culture and knowledge, a shift in the fundamental direction of the flows of knowledge and culture, a transformation in the balance of creative and epistemic agency.

For better or for worse, Generation 'P' represents a new kind of person, a person who will be less comfortable with the relations of cultural command and compliance that underlay the old, didactic education. We have in our classes today a generation of young people who will be bored and frustrated by learning environments that fail to engage every fiber of their intellectual and active capacities. If we don't rework our pedagogies, we are in all probability going to find we have increasing discipline problems and 'attention deficits'—diseases that may reach plague proportions, in need of drastic social epidemiology.

So, what do we need to do to order this order of challenge? What are the new basics stated in terms of the kind of person who can live a good life in the changing social conditions of the unfolding future? What will be their dispositions, sensibilities, and stance? How will they navigate change, take responsibility, solve problems, negotiate differences, resolve conflicts, think creatively, act innovatively, take well measured risks, learn-as-they-go, collaborate, be flexible?

Mary Kalantzis and Bill Cope

ACTION ITEMS

Action Item 5.1: Re-examine Microdynamics of Learning

The P-for-P or *Pedagogy for Generation 'P' Program* would bring together educational researchers and practitioners to reconceive the microdynamics of pedagogy in order to reflect and support a shift the balance of agency in knowledge making towards learners as active knowledge makers and collaborative participants in knowledge producing communities. This is a pragmatic thing when educating 'generation P', and a necessary thing in the service of a knowledge economy. The program would aim to generate exemplars of new pedagogical practice, which harness lateral communities and knowledge making energies amongst learners. In a world of 'social networking', these environments would exemplify 'social learning' or 'learning 2.0'.

Action Item 5.2: Reframe Standards

Educational standards are in urgent need of reconception and reformulation so they go beyond the factual content and canonical theories of the discipline areas; instead to address through the discipline areas deeper and broader cognitive capacities: experiential, conceptual, analytical and applied. The *New Basics Standards* would supplement the old basics of conventional schooling with twenty-first century capacities of participatory work and citizenship.

Action Item 5.3: Frame New (Inter)disciplines

The challenges of our times defy the disciplinary boundaries of our heritage educational systems. The *Project for the Conception of New (Inter)disciplines* would aim to reconceive the conventional subject areas to address key contemporary scientific, technological and social issues. For instance, here are just two areas of intellectual concern, the breadth and depth of which are barely captured by today's disciplines:

- Interdisciplinary Informatics

The new technologies and sciences of informatics are infused to a remarkable degree with the human of the humanities: the human-centered designs which aim at 'usability'; the visual aesthetics of screen designs; the multimodal grammars of the digital media which overlay language, image and sound; the communicative plays of computer interfaces and mobile communications devices; the formal logic models of computer programming; the ontological schemas of the semantic web; the information architectures of data archives; the logics of machines which assist human intelligence; and the literariness of the code that drives them. Areas of study and their disciplinary lineages could include:

- artificial intelligence *(computing, studies of society, mathematics)*
- visual design *(art, design)*

- textual design *(English, language)*
- interface usability and human-user interfaces *(business studies, computing)*
- customer/user needs analysis *(business studies)*
- the 'infotainment' industry *(social studies, business studies)*
- knowledge society and knowledge economy *(economics, social studies)*
- the global information economy *(language, culture, economics)*
- creativity, innovation, problem solving *(social studies, mathematics, science)*
- formal logic *(philosophy, computer programming, mathematics)*
- game theory and practice *(mathematics, computing)*
- ontology and semantics *(philosophy, computer programming—underlying philosophical issues re the 'semantic web')*

- Interdisciplinary Biotics

The new biosciences deeply inveigle the human—when considering, for instance, the ethics of bioscience and biotechnology, or the sustainability of the human presence in natural environments. Areas of study and their disciplinary lineages could include:

- sustainability *(biology, mathematics, social studies)*
- environmental planning *(biology, social studies, computing, mathematics)*
- bioethics *(biology, philosophy)*
- health - personal and community *(biology, health/PE, social studies)*
- sports studies *(biology, health, business studies)*
- food and other resource based supply chains *(business, economics, biology)*
- the biosphere *(biology, mathematics)*
- cybernetics and feedback mechanisms *(computing, mathematics, environmental studies)*

Action Item 5.4: Reframing Learner Outcomes

We need to start specifying and building performance measures of a 'new basics'. The *New Basics Learner Outcomes Framework* may include the stuff of:

- collective intelligence in a context of distributed knowledge
- autonomous and collaborative knowledge making and learning
- developing deep, specialist knowledge and expertise
- connecting little pictures with big pictures
- developing lateral knowledge connections between divergent domains of knowledge and practice
- critical evaluation of perspectives, addressing problems that can only be solved by drawing on multiple ways of thinking, sources of expertise, modes of knowledge
- civics in a participatory culture: ethics, mutual obligation, corporate responsibility
- negotiating local and global diversity
- negotiating change, complexity and ambiguity

SUPPORTING EVIDENCE

Supporting Evidence 5.1: STEM Trends

At the outset of the 21st century, the National Science Board unequivocally asserted that "advances in science and engineering . . . will to a large measure determine economic growth, quality of life, and the

health and security" of our nation and the world.[221] A recent RAND Corporation study found that, presently, the U.S. remains the dominant leader in scientific, engineering, and technological innovation worldwide.[222] The continued inflow into the U.S. of students, scientists, and engineers from around the globe has contributed to this dominance and several of the RAND study recommendations focused on maintaining and strengthening this trend. The latter study, however, strongly cautioned against complacency and raised questions about the vulnerabilities associated with the U.S. *overreliance* on global human resources, which, we believe, is a form of reverse outsourcing of the last distinctive advantage of the U.S. in an increasingly globalized world. We agree with the recent assessment of the National Science Board [223] that, to a significant extent, continued U.S. world competitiveness and leadership in science, technology, engineering, and mathematics (STEM) hinges on the preparation of highly qualified, diverse, and motivated 21st century learners—the future of the scientific workforce—at every stage of the U.S. academic pipeline and, in particular, at the precollege level. The US, nonetheless, is falling seriously short in these areas.[224] Despite modest gains during the past decade, our K-12 students continue to perform rather poorly on international comparisons of science and mathematics achievement [225,226,227]. Equally alarming is the fact that K-12 education in the STEM areas continues to fail girls[228] and students from minority populations[229]. There is an urgent need for action: Maintaining our nation's scientific competitiveness entails the transformation and continuous upgrading of K-12 STEM education[230].

The first crucial step toward improving K-12 STEM teaching and learning is addressing the unprecedented severe and increasing shortages of highly qualified teachers[231]. Better STEM teachers are central to better teaching: Evidence strongly indicates that student learning is affected by the qualifications of teachers.[232] In this regard, research indicates that universities and colleges of education have a significant role to play. After all, "the most consistent and powerful predictors of student achievement in mathematics and science are full teaching certification and a college major in the field being taught".[233] Teachers holding certificates in specific subject areas—"in-field" teachers, are more effective in impacting student learning and achievement than "out-of-field" teachers.[234] It is imperative that substantial federal funds be made available to the recruitment and education of highly qualified STEM teachers, as well as to the betterment of the employment conditions of those teachers, which would serve to decrease the revolving door phenomenon in terms of teacher attrition and help protect public investments in this domain.[235] With the current downturn in the U.S. economy and the oversupply of unemployed, highly trained STEM professionals, federal funds are well placed to help transition those professionals into STEM teaching jobs, thus, addressing both the need for highly qualified teachers and securing sorely needed jobs as part of the current economic recovery efforts. In turn, institutions of higher education need to transform their paradigms and practices for the preparation of K-12 STEM teachers by moving beyond outdated disciplinary boundaries and debates on whether STEM teacher education is the realm of disciplinary departments or colleges of education. Federal funds could be *structured* to encourage universities to provide the rigorous, trans-disciplinary programs that allow for the preparation of STEM teachers with strong disciplinary backgrounds who, nonetheless, are well prepared to engage *all* students in our increasingly diverse nation in the sorts of meaningful and authentic 21st century learning environments whose characteristics are explicated throughout this document.[236]

Interestingly enough the recommended transformations for K-12 STEM teaching and learning as explicated in a host of national documents during the past decade[237] correspond with many of the espoused trends and patterns for transforming teaching and learning writ large as explicated in this document. With an eye to the unique epistemological underpinnings of the scientific enterprise, which largely remains an expert-driven knowledge generation enterprise, the various transformative investments in K-12 schooling outlined in this document would serve to advance the aim of providing the sorely needed, innovative and responsive K-12 STEM teaching and learning environments.

Fouad Abd-El-Khalick

Supporting Evidence 5.2: Literacy Trends

In the past 30 years debates about the best ways to teach students to read through a holistic literature-based approach or a skills-based phonics approach have been replaced by the need for a more comprehensive, balanced approach to instruction that includes focusing on the alphabetic principle, word identification, fluency, vocabulary, text structure, and comprehension.[238] The goal of effective instruction is developing independent readers who can apply skills and strategies, process texts fluently, adapt to purpose and text structure, develop new knowledge, and self-monitor their understanding of texts.[239] Understanding that reading is a strategic, motivated, and social process has led to practices such as shared reading, book clubs and literature circles, reader's workshop, and inquiry projects that provide students with opportunities to engage in reading meaningful texts, talking about texts, and representing their understanding in innovative ways.[240] Adolescents require even more choice about texts and tasks that link to their diverse cultures to sustain motivation; they need responsive classrooms that foster critical thinking, address diverse interests, and provide opportunities for hands-on activities, discussion, small group work, and multiple forms of expression.[241]

Similar debates about whether writing instruction should focus on conventions and grammar or the process of writing such as drafting, revising, and editing have been replaced by a focus on writing instruction that is holistic (an ongoing developmental process), authentic (for an audience and purpose with real-world connections), and varied (collaborative and technology-based in many genres and disciplines).[242] Focusing on the ways in which students intertwine their own experiences with media and text and understanding the role of context in students' writing have resulted in classroom practices that include writing conferences, collaborative writing, and constructing projects that allow students to address real world problems.[243] Critical literacy practices focus on writing as a tool for revealing tensions and inequities in the larger society at the same time that writing empowers culturally and linguistically diverse students to promote social change.[244] Writing instruction that provides extended opportunities for writing, promotes the discussion of strategies with diverse learners, and encourages students' responses to texts is effective for learners from diverse backgrounds.[245]

A shift in terminology reflects a larger shift in conceptualizing what it means to be literate. Instead of considering reading and writing as separate processes, the term "literacy" encompasses an understanding of reading and writing as related social practices.[246] These social practices, which have created possibilities for literacy to become more personally and socially empowering, are increasingly related to personal computing and the use of the Internet.[247] Digital literacy is now reshaping what it means to be literate as even kindergartners use computers, elementary-aged students surf the Internet, and adolescents use text messaging and social networks.[248] Writing with video in ways that mirror the written composition process, acquiring global identities through their use of fiction, and using multimodal platforms for rethinking and transforming traditional texts are practices in which adolescents have engaged.[249] Much of the information in these new modes remains encoded in conventional print as digital literacies incorporate hypertext, audio, still and video images with print texts, combining new and old modes.[250] However, not all adolescents have access to these types of technologies, compounding existing inequities. Teachers' roles are increasingly important in closing the digital divide by helping students reflect on the role of technology in their lives, providing website access in classrooms, introducing wikis and other media to students, and encouraging multimodal presentations.[251]

While not all students have access to the tools to engage in new learning environments, increasing globalization demands that current practices be transformed to include key concepts including the need for (a) collaboration, (b) integration, (c) consideration of culture and context, and (d) multimodality. Adaptations of practices to and from U.S. contexts to international ones are apparent in the uses of collaborative reasoning, online books clubs, and wikis for revision.

Supporting Evidence 5.3: Creativity, Design and Innovation through Education

Today there is a strong renewal of interest by politicians and policy-makers world-wide in the related notions of creativity and innovation, especially in relation to terms like 'the creative economy', 'knowledge economy', 'enterprise society', 'entrepreneurship' and 'national systems of innovation'.[252] In its rawest form the notion of the creative economy emerges from a set of claims that suggests that the Industrial Economy is giving way to the Creative Economy based on the growing power of ideas and virtual value—the turn from steel and hamburgers to software and intellectual property.[253]

In this context increasingly policy latches onto the issues of copyright as an aspect of IP, piracy, distribution systems, network literacy, public service content, the creative industries, new interoperability standards, the WIPO and the development agenda, WTO and trade, and means to bring creativity and commerce together.[254] At the same time this focus on creativity has exercised strong appeal to policy-makers who wish to link education more firmly to new forms of capitalism, emphasizing how creativity must be taught, and how educational theory and research can be used to improve student learning in mathematics, reading and science, and how different models of intelligence and creativity can inform educational practice.[255]

Under the spell of the creative economy discourse there has been a flourishing of new accelerated learning methodologies together with a focus on giftedness, the design of learning programs for exceptional children.[256] One strand of the emerging literature highlights the role of the creative and expressive arts, of performance, of aesthetics in general, and the significant role of design as an underlying infrastructure for the creative economy.[257] There is now widespread agreement among economists, sociologists and policy analysts that creativity, design and innovation are at the heart of the global knowledge economy. Together creativity, design and innovation define knowledge capitalism and its ability to continuously reinvent itself.[258] The fact is that knowledge in its immaterial digitized informational form as sequences and value chains of 1s and 0s—ideas, concepts, functions, and abstractions—approaches the status of pure thought. Unlike other commodities knowledge operates expansively to defy the law of scarcity that is fundamental to classical and neoclassical economics and to the traditional understanding of markets. A generation of economists has expressed this truth by emphasizing that knowledge is (almost) a global public good[259]; it is non-rivalrous and barely excludable.[260] It is non-rivalrous in the sense that there is little or marginal cost to adding new users. In other words, knowledge and information, especially in digital form, cannot be consumed. The use of knowledge or information as digital goods can be distributed and shared at no extra cost and the distribution and sharing is likely to add to its value rather than to deplete it. This is the essence of the economics of file-sharing education; it is also the essence of new forms of distributed creativity, intelligence and innovation in an age of mass participation and collaboration.[261]

Michael Peters

Action Area 6: Create More Responsive Learning Feedback Systems

Education, people often say, easily falls prey to purportedly cure-all fads, singular interventions, which are supposed to have miraculous general effects. If one were to go through the fads of recent times, test-driven accountability stands out as perhaps the most widely promoted and tried educational solution.

Having reached new heights since the enactment of No Child Left Behind, the limitations of test-based accountability are now well documented.[262] Ideally tests are no more than a few hours long and

machine readable. The logistics of their form are such that they tend to measure discrete knowledge items distilled to clear-cut and isolable facts and aphorisms drawn from theories, and specifically items that can be adjudged right or wrong. These may not be the best things to be measuring in an era when the questions are at times complex and ambiguous, facts contestable, and theories open to interpretation. Testing what is readily testable has also produced a narrowing of the curriculum—to the receptive capacities of reading comprehension, for instance, more than the productive capacities of writing which are harder and more expensive to test (an irony in times when more people are writing and writing more). Today's tests, moreover, mostly require memory work, when we live an era of at-your-fingertips mnemonics, where you can readily reach for empirical answers, and definitions of concepts and representations of causality. They are individualistic when cognition is increasingly distributed and intelligence collective (learning organizations, knowledge management, communities of practice). They have a cognitivist 'what's-in-your-head' bias when learning today is a matter of melding conceptualization with practical demonstration, analysis with application, experience with theorization. They represent an end-of-the-production line, quality control model of evaluation when they should more usefully provide constant, formative feedback oriented to continuous learner improvement. They represent a taxation model of accountability, where activity is measured in increments of evenly spaced time and outcomes can be reduced to a numerical bottom line—when, in fact, much of the most important learning occurs in shorter and longer timeframes and the outcomes are utilities, not numbers or grades. Indeed, the tests we have today, more than anything else, test for the tricks and tropes of tests, how well you can play this strange, other-worldly game of second-guessing the answers that will give you the best score.

Our testing and accountability system is in need of radical reform. Here are a few things we could work on:

We need to *test more for learning*, in addition to accountability. Testing should help learners and make them want to learn more, instead of serving primarily as a punitive/reward end-of-program measure. We have focused on summative assessment for accountability in recent years at the expense of formative assessment. We don't gather student-learning progress (formative assessment) much at all, and rarely in a way, which is directly useful to and encouraging for learners.

We need assessment, which provides *day-to-day information*, useful to and immediately useable by learners and teachers—feedback loops integrated into curriculum, curriculum designed to incorporate incremental assessment where there are no learning activities without feedback systematically built in.

We need to measure *complex performances* (a scientific experiment, making a short video, reporting on a community controversy) as readily as we measure things we think we can break into discrete, unambiguous facts and definitive theoretical aphorisms.

We need *assessments, which are 'open book'*, measuring not what you know but how you find out.

We need to ways to measure *collaborative learning,* not just of the whole group but providing multiple perspectives upon, and evidence of, differential contribution.

We need to abandon the sporting *logic of results distribution* in which there have to be losers in order for there to be winners, where necessarily, by fiat of statistical distribution, some must fail in order for others (relatively) to succeed. What if we were to set our objectives at universal success, or personalized achievement of customized learning outcomes?

We need to change the *motivational structure of assessments*, whether that is the anxieties and fears of failing for the learner, or the failure to meet average yearly test progress on the part of a school.

We need to move away from *judgmental feedback* (most peremptorily reduced to a grade) to constructive feedback on learning work, from the idea that intellectual works are ever finished to the idea that can always considered to be works-in-progress, that feedback can always be used for clarification, or improvement, or elaboration, or extension.

We need to provide *digital portfolio* spaces, which show what a learner actually did. This can speak for itself to those who want or need to know, and much more powerfully at times than bald grades.

We need to create learning and assessment environments which in their core design provide *multiple sources of assessment feedback*—self, peer, teacher, critical friend, parent—with metamoderation loops and reviewer ratings that reward useful feedback by weighting raters. Today's social networking technologies make this easily achievable—in fact, rating and commentary is an integral part of the new, participatory media. This adds sociability to assessment for learning, in contrast to the lonely isolation of the traditional test. It also creates an additional, lateral plane of evaluation rather than a unidirectional vertical one—the audience of one, the traditional teacher-judge. This also creates a sense that students are working in and for a knowledge and learning community.

We need to *automate some aspects of feedback and assessment* by developing as-yet-barely realized potentials of learners working in digital spaces, including natural language processing mechanisms, domain-defined semantic tagging, and machine learning algorithms, which read in progressively more intelligent ways the noisy data of learning engagement.

We need *a new psychometrics,* capable of reading multiple sources of data on student learning—social and automated—and interpreting this across time (individual or cohort progress) and between demographically definable groups.

If we were to do any or all of these things, we would in fact be doing more testing than ever, but doing it better and more usefully. Our education would be more accountable and more transparent.

Mary Kalantzis and Bill Cope

ACTION ITEMS

Action Item 6.1: Create Better Tests

The standardized tests of today are by and large abysmally poor—measuring things, which are mechanical and superficial. Their limitations become daily more glaring in comparison with the emerging needs of the knowledge society and economy. Simply stated, we need to invest in research and development, a *Testing Things That Matter Program* supporting research and development that lead to the creation of a new generation of tests addressing twenty-first century capacities.

Action Item 6.2: Integrate Assessment for Learning into Curriculum and Instruction

Nearly all testing resources take the form of end-of-production-line quality control or end-of-year taxation-style returns on educational investment. It is time to rebalance our testing agenda to give at an at least equivalent emphasis on testing for learning: diagnostic testing, formative testing, and testing that give learners immediate, specific and useable feedback. The *Assess-To-Learn Program* would invest in the development of formative assessments, a glaring near-absence in the current testing industry.

Action Item 6.3: Develop Non-test Assessments

We need to supplement conventional tests with a balanced mix of other forms of assessment, including learner portfolios, self- and peer-assessment, group assessment, and task-based performance assessment. The *Learning Outcomes Portfolio Initiative* would support research and development programs in which the work a learner has actually done is a demonstration of learner capacities, not simply a numerical or pass/fail grade.

Action Item 6.4: Develop Assessment Technologies

We have barely begun to realize the potentials of the new technologies in assessment: as-you-go formative assessment, peer assessment via social networking technologies, and content assessment based on rubric construction and semantic web tagging. The *Assess-As-You-Go Program* would support the development of digital environment, which incorporate human and machine feedback loops.

Action Item 6.5: Develop a More Comprehensive, Reliable and Diagnostically Useful Psychometrics

Data collection and analysis technologies are now available which would allow longitudinal tracking of individual student progress, and continuous, rigorous and consistent tracking on the basis of risk-group demographics. These need to be explored urgently, and for the same reasons as integrated medical records—the resource efficiency and effectiveness of educational investment. The *Comprehensive Educational Records Program* would support the development of multidimensional online student and cohort records.

SUPPORTING EVIDENCE

Supporting Evidence 6.1: A Short History of Testing

The United States has a long been a leader in educational assessment. Horace Mann called for standardized testing as early as the 1840s, and numerous American scholars drove the creation of educational standards and tests of both learning and innate intelligence[263]. In a society that aimed to foster a meritocracy, tests provided a way for the upwardly mobile to demonstrate their abilities independent of their race or social class. In concert with other efforts of the Progressives, the emergence of testing gave the field of education a level of scientific rigor and fostered the perception that schools could be managed through professional judgment rather than politics and ideology[264].

In the latter half of the 20th century, the space race, the Coleman report, and other high profile issues raised concerns about inefficient bureaucracies and created pressure on schools to improve their results. Stagnant or declining educational outcomes and declining perceptions of public education in the 1970's eventually culminated in the "A Nation at Risk" report in 1983. Following A Nation At Risk, political attention increasingly shifted from educational inputs to outputs, and standardized testing began to expand rapidly. Business leaders, many of whom were implementing high performance accountability systems in their own organizations, were particularly influential with state politicians in the late 1980's and early 1990's.[265] These ideas found considerable traction in economically struggling Southern states, and governors of two of these states soon ascended to the White House, eventually leading to the implementation of No Child Left Behind in 2002.

Politicians and central leadership have largely driven the growth of standardized testing, particularly for accountability purposes. Not surprisingly, the current approach to testing largely serves the purposes of these actors. Rather than providing formative feedback to improve ongoing instruction, standardized testing under NCLB provides summative measures that are not available until students have already moved on to the next grade[266]. Although formative assessment has not received much attention among

politicians, many schools and districts have implemented periodic benchmark testing in order to continuously inform their curriculum and instructional practices.

Peter Weitzel

Supporting Evidence 6.2: No Child Left Behind and its Critics

To receive federal funding under No Child Left Behind, states are required to comply with the following: (a) have academic content standards, (b) administer standards-based assessments in reading and mathematics in grades 3 through 8, (c) employ a single statewide accountability system that measures and reports adequate yearly progress of all schools, (d) identify schools for improvement or corrective action, and (e) require teachers to be highly qualified in their subject area. Proponents of the program suggest that students are making progress, the achievement gap is closing, and that the accountability system has resulted in under-performing schools being closed.

At least 20 states and many school districts protested the act; the National Education Association brought a lawsuit against the federal government; the Congressional Black Caucus has introduced a bill to place a moratorium on high-stakes testing, and the Harvard Civil Rights Project has warned that the law threatens to increase the drop-out rate for students of color.[267] Educators have pointed out conflicts between the government and business when implementing NCLB, especially in relation to Reading First.[268] Surveys and polls by several professional organizations have found that while teachers support the basic premises, they have identified the following problems: (a) results from a statewide high-stakes test are poor measures of school performance, (b) teaching to the tests is detrimental, (c) growth models that track students are better indicators than percentages of students who pass mandated tests, (d) emphases on reading and math to judge school performance has led to less emphasis on other subjects, (e) reporting disaggregated scores does not help improve schools, and (f) NCLB has resulted in lowering teacher morale.[269]

Research on NCLB has shown that changes in plans that were negotiated with states have resulted in eroding consistency. Accountability depends on which statistical techniques are used, which subgroups are included in the system, and how Adequate Yearly Progress (AYP) is calculated.[270] Some researchers have found that the narrowing of the achievement gap has disappeared in the wake of NCLB.[271] Several unintended consequences have occurred including large numbers of students of color ending up with the least qualified teachers, an unrealistic standard of 100% of students being proficient by 2014, and the use of norm-referenced tests, which have been adopted by some states, defining 50% of the students as below average. Schools that serve English language learners and special needs students are penalized if they cannot meet targets; when English language learners become proficient they are transferred out of that group.[272]

The enactment of NCLB has exacerbated the differences in both learning and motivation among students who attend schools with differing resources.[273] Narrowing of the curriculum has occurred as well; social studies, science and art, have been cut to devote more time to subjects that are tested, and teachers in low-income schools tend to spend less time on writing instruction since NCLB. [274] Teachers who are in struggling schools have decreased their efforts to assist students.[275] Teachers' tasks have increased in number and scope as their instructional roles have been increasingly controlled by expectations and assessment. Teachers' pedagogical and personal relationships with students have suffered as they experience high levels of stress in the current policy environment.[276] Increased use of scripted reading programs that often accompany district implementations of NCLB have resulted in limiting the curriculum and teachers' abilities to address the needs of diverse students.[277]

While many problems have surfaced related to NCLB, several professional groups have attempted to make recommendations for improving NCLB. For example, the National Council of Teachers of English has recommended changes in the measures of adequate yearly progress, support for high quality teachers, English language learners, and support for 21st Century Literacies before reauthorization of the Elementary and Secondary Education Act.[278]

Sarah J. McCarthey

Supporting Evidence 6.3: Improving Assessment

That all assessment can be aimed at teaching and learning has great appeal. To date, there are significant barriers to designing assessments that can be used for such wide-ranging purposes as accountability and improvement. Assessments used for accountability based on well-known, robust psychometrics are designed to be efficient. While there is wide agreement that multiple measures (e.g. short answer, essay) would improve large-scale accountability assessment, there is tension between broadening what is assessed and increasing costs[279]. Incorporating universal design into assessment design is another proposed improvement. This idea is to develop assessments so that individuals will not need accommodations. For example, assessments would be developed without time constraints so no assessment accommodations (e.g., increased testing time) would be required[280].

Multiple measures and universal design would be notable improvements to large scale assessments. Nevertheless to improve teaching and learning, new assessment designs and foundations are required including knowledge about the processes and the patterns that represent the way people think and act. These kinds of assessments are designed to structure situations, which evoke evidence about students' thinking and acting in terms of patterns[281]. The authors of the seminal report, *Knowing What Students Know,* commissioned by The National Research Council lay the groundwork for new theoretical and technical foundations for this kind of revitalized assessment designed to improve teaching and learning[282].

Future assessment designs afford the opportunity for developing balanced assessment systems across classroom, district, and state, national, and international levels. In addition, they could be aligned and mutually reinforcing[283]. One argument is that a balanced and coherent system is based on a nested system of assessments exhibiting multiple features: 1) multiple measures, 2) alignment of standards, assessments, curriculum, and instruction within and across different levels of the system (school, district, and state); and 3) multiple assessments with timely reporting[283]. Early prototypes like The BEAR[284] system and STARS system[285] could be classified as multilevel assessment systems. Another report from U.K. also presents guidelines for building a multilevel assessment system[286].

The advantages of multi-level assessments systems can only be realized by incorporating information and communication technology (e.g. web browser, word processor, etc.) into assessment design to support the design of complex, dynamic, and interactive tasks. These tasks can expand the range of knowledge, skills, and cognitive processes that can be assessed. Large-scale assessments are exploring these possibilities to gain evidence of student content knowledge and reasoning although regulatory, economic, and logistic issues under NCLB present potential constraints. At the classroom level, technological systems, such as DIAGNOSER delivering continuous formative assessment and feedback and ASSISTments providing a comprehensive intelligent tutoring system, show promising results in validation studies[283].

Katherine E. Ryan

Supporting Evidence 6.4: The Value of Formative Assessment

In a landmark 1998 research review examining 250 articles, researchers concluded that formative assessment could improve student learning, particularly for lower achieving students, in a more effective way than other interventions (effect sizes between 0.4 and 0.7)[287]. Formative assessment is believed to help develop metacognitive skills and enhance motivation differentially for these students[288]. Through formative assessments, learning sequences can be properly designed, instruction modified during the course of learning, and programs refined to be more effective in promoting student learning goals[289].

A theory of formative assessment based on cognitive and sociocultural learning provides the foundation for "assessment for learning" in addition to "assessment of learning"[290] [288] [289]. Within this kind of formative assessment framework that directly links assessment to how students learn, assessment forms and tasks are integrated with the kinds of learning to be achieved. Students are presented with a broad range of assessments forms (e.g., performance assessment, portfolios) and assessment tasks (e.g., constructed response, selected response), to show what they know and can do.

Recent pedagogical theory is aligned with this notion of formative assessment. That is, assessment provides an important cognitive and social function in teaching and learning; feedback is essential to enable students and teachers to understand their learning goals, compare the actual level of their performance to the desired level, and to engage in effective actions to reduce the gap[291]. Multiple assessment forms and tasks are essential to this kind of pedagogy. Instruction is adjusted to better meet students' needs by using evidence about student learning.

There is nearly unequivocal agreement about the value of formative assessment based on cognitive and sociocultural learning theories and pedagogical theory. Nevertheless it has been notably difficult to successfully initiate and implement in schools on a large-scale basis. Time to develop, manage, and mark such assessments and teacher knowledge of these assessment practices are identified barriers. Technology is increasingly recognized as a critical means for developing and implementing this kind of formative assessment in schools. To date there are a few exploratory projects that illustrate the power of technology for re-imagining formative assessment in schools[283]. To achieve the promise of these prototypes, a large, well-theorized research and development program is required.

Katherine E. Ryan

Supporting Evidence 6.5: Imagining a Time When the Exercise Book and the Test are Not Separate

The Assess-As-You-Go Writing Assistant is a project proposal of the College of Education at the University of Illinois. This will be an online writing environment which, via a combination of tagging, social networking, and natural language processing technologies, gives learners constant feedback on their writing in the form of on-demand, as-you-go formative assessment. The Writing Assistant will also track individual learner progress, the progress of cohorts, and the progress of individuals in relation to cohorts—thus providing summative assessment data which meets teacher, school, parent, and community accountability requirements at least as rigorously as—and we would hope potentially more rigorously than—today's summative assessments.

Success in the proposed approach could have a revolutionary impact on the education system. Those conceiving this project can imagine a classroom in the not-too-distant future where all assessment is strongly, clearly, and reciprocally connected to learning; where teachers do not need to teach to the test; where distinct tests are an increasingly redundant mechanism for corroborating the outcomes of learning

that have already been more systematically assessed; and where the distinction between assessment for instruction and assessment for accountability is no more than an analytical one.

The intervention would not require any adjustments to normal school schedules beyond what might normally be allowed for group or private writing time on a computer. Students would need access to computers connected to the Internet. This could occur in class time if students had laptops or were working in a computer lab, or even if the classroom had a small number of computers that could be shared so several students could be writing at any particular time. Alternatively, the writing could occur out of class time in the library or at home.

For the English/language arts class, for instance, the Writing Assistant might be used for any and all forms of writing, though the emphasis for the purposes of prototyping and feasibility analysis in this project will be informative and persuasive writing. The Writing Assistant could be used in any other subject areas as well; however, for this project, just one other discipline area will be selected for testing: informational and persuasive report writing in science—for instance, a research report which links facts and interpretation by synthesizing data and reviewing perspectives across a topic and recommends a course of action, a report of an experiment, or a report of a field study.

The process of outcome assessment would remain rigorous—potentially more rigorous, in fact, than what one can achieve even with the broadest battery of tests currently available to the education community. Such a classroom would be much more effective than current classrooms, improving both education outcomes and teacher satisfaction. We believe this would be a revolutionary step in education. Given our current, state-of-the-art computer science and pedagogical understandings, this revolution is for the first time achievable in the near future.

Mary Kalantzis and Bill Cope

Action Area 7: Meet the Needs of Diverse Learners

The melting pot of the historical imagination offered everyone the same opportunity to social mobility through education. Mobility was the reward promised to students who met its universal and uniform educational standards.

Despite its rhetoric, this system failed in practice to provide opportunities equitably. In a new civic era, such failure is no longer acceptable. The rhetoric is now to be taken at its word, not only by virtue of civil rights, but also for the most pragmatic of economic reasons—the growing cost of a long tail of failure measured against the more ambitious opportunities in the 'knowledge economy'. That is, inequality in access to good quality education is contributing to rising inequality of income in the nation.[292]

For practical as well as principled reasons related to the dynamics of contemporary identity formation, you don't have to be the same to be equal. This is democracy's new promise, after civil rights, after the rise of identity politics, after multiculturalism, after globalization.

What are the variables of human difference to be negotiated in communities, in product and service relationships, through the hugely diversified new media, and in schools? The gross demographic categories immediately tell us of differences, which are principally material (socio-economic class, locale, family circumstances), corporeal (age, race, sex, sexuality, and physical and mental abilities) and symbolic (culture, language, gender, identity).[293] These differences intersect in unique ways in individuals. We become ever more aware of their significance and sensitive to nuances.

However, for the oversimplifications of such categorization, the overgeneralizations about uniform life experience within groups, and their unreliable prediction of need, these demographics have also let us down. How do we identify learners who are at risk? How do we read their trajectories and customize learning programs which meet their needs? How do we enhance equality of educational opportunity by treating people differently in carefully calibrated ways? How do we look outside the educational system to see who is being left out and why?

To do any of these things, we need to bring underlying dimensions of deep diversity into the analysis, by connecting directly with life narratives (experiences, networks and places of belonging), by negotiating varied personae (affinities, attachments, orientations, interests, stances, values, worldviews, dispositions and sensibilities) and by addressing divergent styles (epistemological, discursive, interpersonal and learning styles).

This requires a revolution in pedagogy, escaping at last the baleful twentieth century influence of all things mass—mass markets, mass culture, mass society, mass education. In schools, instead of common curriculum and one-size-fits-all teaching, we need customized learning aimed at equivalent or comparable, but not necessarily the same, outcomes. To achieve this we need pedagogies which actively and consciously bring learner knowledge and experiences into the classroom, and which then involve collaborative learning amongst students, drawing upon these differences as a resource. No longer must we have every student on the same page at the same time. This is particularly the case in the digital era when customized learning designs can be so easily be recorded, and stored, shared amongst teachers, and delivered directly to one student at a time. These are just a couple of examples of a curriculum reorientation away from standardization and towards customization for diversity.

Mary Kalantzis and Bill Cope

ACTION ITEMS

Action Item 7.1: Review and Redefine Diversity Categories and Data Collection

We need to review and revise our diversity categories in order to make them more workable, supplementing the at times overly simple aggregations of visible demographics with a more differentiated and multifaceted view of differences relevant to student learning. An *Accounting for Differences Project* would review the demographic categories we currently use, and suggest ways to account for difference more directly relevant to community needs.

Action Item 7.2: Reform Instruction

A revolution is needed in classroom pedagogy, taking us beyond the traditional model of one teacher at the front of the classroom with twenty more or less similar students listening. We need to develop pedagogical approaches which move beyond on-the-same-page, standardized content paradigms, replacing them with approaches that continuously diagnose differentiated learning needs and promote the design of customized learning programs. A *Pedagogy of Productive Diversity Program* would explore pedagogical models that move away from traditional one-size-fits-all instruction, developing and testing strategies for customization of learning to meet individual learner needs more effectively.

Action Item 7.3: Diversify Curriculum

A broader aspect of curriculum customization will entail research and development of new programs to meet the needs of special groups, such as transitional bilingual programs for English Language Learners and new special education interventions—inside and outside the ‘inclusive’ classroom.

NCLB needs to be reconceived (as well as renamed) to enable multiple pathways for learners, to comparable ends—instead of its currently homogenous approach to learning outcomes. Teachers need to be supported as designers of learning that suits learner needs, instead of 'cookie cutter curriculum' based on reverse engineering of standardized tests. The *Productive Diversity Curriculum* needs to be developed through collaborations with learners, their communities and education experts. It would also require ongoing professional learning opportunities and investment in leadership training to support pedagogical improvements and effective use of resources.

SUPPORTING EVIDENCE

Supporting Evidence 7.1 Education and Inequality

The economic returns to education are considerable from both public and private perspectives. On average, a high school dropout earns 23% less income than a high school graduate, 39% less than a holder of an associate's degree, 55% less than a holder of a bachelor's degree, and 62% to 79% less than holders of advanced degrees[294]. Moreover, while real hourly wages for college graduates have risen considerably since the 1970s, real wages for those with some college or less have been flat or declining over the same time period[295]. These trends have led to rapidly widening wage inequality. In 1970, workers in the 10th percentile earned about $7.50 per hour in 2000 dollars, or about 3.7 times less than workers in the 90th percentile. By 2000, however, the 90-10-percentile wage ratio had increased to 5.5 to 1[296]. Wages of course are only part of the picture, and inequality in wealth and family income continues to grow as well. In fact, the top income quintile has received 62% of all income growth since 1973[297]. The U.S. workforce is extremely productive, creating the world's largest economy and the highest per capita GDP among the Organization for Economics Cooperation and Development (OECD) countries. However, America's considerable wealth has not reached a large number of its citizens. Using 50% of median income as the poverty line, about 17% of Americans are in poverty compared to 5 to 12% in most OECD countries[298]. The U.S. has the highest child poverty rate in the OECD by far at almost 22%[299].

Improving the educational outcomes of disadvantaged citizens will not only improve our economic growth but also help control public expenditure. More educated citizens not only contribute more in tax dollars but are also far less likely to be imprisoned, to rely on public assistance, or to require other additional public expenditures. Every high school dropout requires approximately $260,000 in additional public expenditure over the course of his or her lifetime, meaning that the students who are projected to drop out in the next decade will cost the country approximately $3 trillion[300-301].

Meeting the needs of diverse and disadvantaged learners will be not being easy. Poor children in the U.S. enter school with enormous disadvantages in relation to their middle and upper class peers, including delayed language acquisition, vision and hearing problems, low birth weight, asthma, poor overall nutrition, and complications due to parental alcohol consumption or smoking during pregnancy[302]. A wide range of studies has identified a relationship between poor health status and low student achievement after controlling for other student background factors[303]. Moreover, American poverty tends to be lasting longer, more residentially concentrated, and associated with poor health outcomes due to the large number of citizens lacking health coverage. Although often labeled as the "land of opportunity", U.S. income and class mobility is lower than in most industrialized countries[304]. Student background factors play an enormous role in educational outcomes, and we will not be able to close achievement gaps without also addressing the stark inequalities disadvantaged students face outside of school.

Peter Weitzel

Supporting Evidence 7.2: English Language Learners

How to best address the educational needs of English language learners so that they acquire academic literacy in English and perform at grade level in the all-English classroom still is an urgent question that merits major attention. Recent evaluations of bilingual education have revealed that Spanish-speaking, English language learners (3/4 of the English language learner population) benefit when they receive literacy instruction in Spanish and English, compared to students who only receive instruction in English.[305] Yet, because several states with large populations of Spanish-speaking students (such as California and Arizona) no longer allow bilingual education, much of the instructional rhetoric has focused on the instruction of English language learners in all-English settings, even though the drop out rate for Spanish-speaking students continues to increase.[306]

If policy makers are serious about improving the academic performance and engagement of English language learners, then it is time to pay attention to current evaluation findings that support bilingual education, especially long-term programs such as dual language instruction and maintenance or developmental bilingual education.[307] Similarly, research is urgently needed on (a) the types of instructional programs and assessments[308] that can best support the academic performance and engagement of English language learners, (b) the instructional contexts that promote the transfer of students' knowledge from the first language to the second language, and (c) the training of teachers and principals to implement such instruction.[309]

Georgia Earnest García

Supporting Evidence 7.3: African-Americans Learning

Educating African American children for equal access and consideration in the 21st century should be of the highest priority. In the process of addressing the infrastructure and educational considerations of urban public school environments, the educational preparedness of African American children could almost simultaneously be addressed. Urban education and African American school children are inextricably tied. According to the 2000 census, nearly 58% of African Americans lived in metropolitan areas. The largest black population, more than two million African Americans (28 percent of the city's population) lived in New York City, and the second largest black population, 1.6 million (18 percent of total metropolitan population) lived in Chicago. In cities with a population of 100,000 or more, the 2006 census illustrates that over 80% of the populations in Gary, Indiana and Detroit, Michigan were African American; over 70% of the residents in Miami Gardens, Florida, Birmingham, Alabama, and Jackson, Mississippi were African American; more than 60% of the population in New Orleans, Louisiana, Baltimore, Maryland, Memphis, Tennessee, Atlanta, Georgia, and Washington, DC were African American; and roughly nine additional metropolitan areas had an African American population between 50% and 59%.[310] Improving the school environments and performance in metropolitan America would by default improve the academic preparedness of African American children.

Countless researchers have investigated the educational experiences of the African American child. Two issues in particular (resegregation and the achievement gap) resonate in more recent studies. Resegregation is the reestablishment of segregation in the nation's public schools or districts following the *Brown v. Board of Education* (1954) decision. The traditional metric for determining whether a school is segregated or desegregated has been the ratio of white to black students in a school or district. Throughout the nation, the pattern of resegregation began nearly 15 years after the *Brown* decision and has sharply impacted the educational placement, opportunities, and outcomes of American children, particularly African American children. Frankenberg and Lee (2002), who studied the racial trends and desegregation efforts in 239 school districts with a total enrollment greater than 25,000 students, illustrate that the "last 10-15 years have seen the steady unraveling of almost 25 years of increased integration"

because of resegregation efforts.[311] Their findings further demonstrate that despite the fact that the nation has become increasingly more diverse in this same time period, our nation's public schools have become less diverse and more segregated. In suburban and rural school communities, whites attend school in the virtual absence of African American and Latino students. In small and large metropolitan areas, African American and Latino students attend school in isolation of whites. There are, as Gary Orfield (1996) describes, tremendous costs associated with resegregation. Many of the resegregated schools African American children attend in metropolitan America reside in high poverty areas. These schools not only suffer from insufficient funds and resources, poor physical plants and infrastructures, but also the loss of highly qualified teachers and administrators who seek out alternative and less demanding professional opportunities. In the wake of the most recent Supreme Court ruling on race and its usage in public school assignment, Orfield and others (2007) are convinced that resegregation continues a vicious cycle of advantage for some and inequality for others. Not only does resegregation isolate African American students from schools and resources whites, in general, will readily obtain, but also it systematically denies African American children an equal chance to obtain a quality education, and by default, a chance to live a quality life.[312]

A by-product of segregation and resegregation is the continual academic achievement gap of African Americans to other racial and ethnic groups. In virtually every category (other than punishment) African American children perform lower than their peers. They have lower standardized test scores, are disproportionately placed in special education or behavioral disorder classrooms, have lower graduation rates, have lowered college attendance rates. Some scholars have argued that African American children devalue school and this devaluation or low motivation explains their continued underperformance and low achievement.[313] Other scholars have not blamed the student, but have looked to more systemic developments that may explain the gap. The literature on the subject has found that teachers' expectations, parental expectations, socio-economic status, lack of quality preschool education, lack of summer schooling opportunities, a lack of congruence between home and school culture, school practices and disciplinary protocol, and racial discrimination all contribute to the achievement gap of African Americans.

Preschool education is arguably a very important consideration that demands change. The National Longitudinal Survey of Youth (1998), for example, documented that most African American and Latino children either do not attend a preschool or attend one that is not staffed by early childhood professionals. As a result, these children begin school at a disadvantage in vocabulary, reading comprehension, basic arithmetic, and overall readiness. Increasing the number and quality of early educational opportunities for African American children would systemically begin the achievement gap.

School practice, teachers' expectations, and additional schooling opportunities (summer or supplemental) could also effectively address the achievement gap. Horvat and O'Connor, for example, demonstrate that African Americans students perform as well as other students when they have equal representation, consideration, and access to resources in public school environments.[314] Their studies, alongside the work of Tyson, Darity and Castellino and others, illustrate that equality of opportunities, resources, and consideration, along with respect for diversity are key remedies to the academic underachievement of students of color, particularly African American children.[315]

Christopher Span

Supporting Evidence 7.4: Gender Differences and Learning

While there have been some significant improvements in gender equity in education, research increasingly shows that it is important to shift our thinking to the diversity of gender gaps that remain. Overall girls have narrowed the gender gap in math and science. However, when researchers examine the difference that race and ethnicity makes in these gaps, it becomes clear that while gender may be

decreasing as a single gap, the gaps between girls and young women of color and white girls and young women is increasing. Further, while the gap between white young men and women is decreasing, the gap between white students and students of color is increasing in math, science, and reading.[316] Gender gaps in technical knowledge and experience continue to exacerbate the gendered digital divide.[317] Men earn more than women at every level of education, but young women are significantly more economically affected by dropping out of high school earning only 63% of male drop out salaries.[318]

Academic outcomes alone do not fully describe the gendered aspects of schooling. Parallel to gendered hostilities that keep girls away from schools across the globe, U. S. girls report that sexual harassment is a serious impediment to their educational experiences. While boys and girls report high rates of sexual harassment, there are still gender differences in the experience of sexual harassment. For instance, the higher the frequency, the higher the gender difference in rates reported (all levels 81% girls, 76% boys; often 31% girls, 18% boys). Boys do not report sexual harassment affecting their academic experience with near the same frequency as girls. Nearly 1 in 4 girls report that sexual harassment caused them to stay home from school or miss a class. Importantly, there is a gender gap in the effects of sexual harassment: boys do not report negative outcomes at anywhere near the same rates as girls, especially reporting that sexual harassment diminishes their confidence or leads them to doubt whether they can have a happy romantic relationship. Girls also try to avoid the harasser at much higher rates than boys do, including changing their seat in class or stopping particular activities in school. 85% of boys and 87% of girls say they would be 'very upset' if they were called gay or lesbian—a higher rate of upset than even physical harassment provokes.[319]

Family-related stresses and teen pregnancy also still disproportionately affect young women's academic achievement. Race and ethnicity also intersects with gender in these issues, with 69% of Latina teen mothers dropping out compared to 58% of teen mothers dropping out overall. Latinas also have a higher drop out rate due to other family related reasons.[320]

HIV and STD rates also reflect gender and race differences. While young men represent the highest proportion of HIV/AIDS cases, young black women account for more than 66% of the cases among women. According to the CDC, black women are 23 times more likely to get HIV than white women and Latinas are 6 times more likely to get HIV than white women.[321] Because HIV is leading cause of death among 25-24 year olds, and increasingly teen women between 14-19 represent a larger proportion of those with HIV, it is crucial that educational efforts be directed at younger women before they contract HIV and in order to provide early care for those with HIV (CDC, 2005).[322]

Cris Mayo

Supporting Evidence 7.5: Sexual Orientation and Learning

In order to lead a productive, psychologically healthy life, all individuals must master particular developmental tasks during their adolescent years[323]. The development of a secure identity, a positive sense of self, and the capability to merge with another in a truly intimate relationship had earlier been identified as the ultimate goal of adolescence[324]. However, for youth who are gay or questioning their sexual orientation, achieving these tasks can be difficult due to the stigmatization of homosexuality. Often times, these youth are attempting to develop their identities without the support of various social systems including family, peers, and schools[325]. The classroom has been described as "the most homophobic of all social institutions"[326].

Recent research on post-high school education intentions[327] indicated that questioning homosexual students were over seven times more likely to indicate they did not intend to complete their high school education than heterosexual students, and over four times more likely compared to LGB students.

Compared to heterosexual students, LGB students were almost twice as likely to indicate that they did not intend to complete their high school education. Both questioning and LGB students were more likely to indicate that they planned to attend a 2-year college than heterosexual students, whereas differences between questioning and LGB students were not significant. In contrast, heterosexual students were approximately twice as likely to indicate that they planned to attend a 4-year college compared to both questioning and LGB students. No significant differences emerged in comparing questioning to heterosexual students and questioning to LGB students on plans to attend a vocational or technical school, although LGB students were more likely to indicate plans to attend a vocational or technical school compared to heterosexual students. Questioning and LGB students were more likely to indicate plans to enter into a full-time job after high school than heterosexual students, and differences between LGB and questioning students were not significant. Finally, questioning students were slightly more likely to indicate that they did not know what they would do after completing high school than heterosexual students, whereas no significant differences emerged between LGB and heterosexual students or questioning and LGB students.

In examining psychological health outcomes[328] sexual minority youth were more likely to report high levels of depression/suicide feelings and alcohol/marijuana use; students who were questioning their sexual orientation reported more teasing and general victimization; greater alcohol/marijuana use; and more feelings of depression and suicide than either heterosexual or LGB students. Sexually questioning students that experienced homophobic teasing was also more likely than LGB students to use alcohol/marijuana and rate their school climate as negative in comparison to LGB and heterosexual students who experienced homophobic teasing at the same frequency. LGB and questioning students who reported moderate to high levels of parental support and moderate levels of homophobic teasing reported significantly less depression/suicidal feelings and less alcohol/marijuana use. Finally, LGB and questioning students with the highest frequency of homophobic teasing that perceive the lowest positive school climate report the highest depression/suicidal feelings and alcohol/marijuana use; and students who reported moderate to high levels of positive school climate reported significantly less depression/suicidal feelings.

This body of research has highlighted the important role the social environment plays in protecting our children and adolescents from negative psychological and behavioral outcomes[329]. The latter study has highlighted the influence that two critical support networks – parental communication/support and positive school climate – have on certain psychological outcomes for students who are questioning their sexuality and those who identify as homosexual. Although all children or adolescents will suffer negative consequences when parents and schools are unsupportive, this study confirms that sexual minority students are particularly susceptible to these outcomes and in need of support. These results expand on previous research that has shown that social and institutional support are essential components of maintaining wellbeing in sexual minority youth, as well as all students[330].

Mental health experts in schools have expertise in the area of child development; hold a critical role in educating teachers, administrators and parents about research exploring sexual orientation in children and the effect of unsupportive educational and family climates[331]. School psychologists can also play a direct role in improving the social and emotional climate in their own schools by influencing school policy and the implementation of outreach programs for students. Many of the youth victimized in schools happen to identify as gay and questioning students; therefore, it is important that prevention efforts do not overlook assessing homophobic bullying and the level of school support of LGB and questioning students. Additionally, this research suggests that prevention programs may need to target youth who are questioning their sexual orientation, as these children are more at risk of experiencing negative outcomes than either heterosexual or LGB students.

Steven Aragon

Supporting Evidence 7.6: Disabilities and Learning

The United States has been a world leader in the development and provision of special education for children and youth with disabilities, ages three to 21, since 1975 with the passage of the Education for the Handicapped Act (P.L. 94-142), which guaranteed all children the right to a free and appropriate education.[332] The most current data show that over 6.8 million children currently receive special education services in our nation's schools and that the majority is served in the general education classroom with support services.[333] The field of special education has grown tremendously in the past 30 years, particularly in the development of successful instructional strategies for enhancing the learning of children who struggle and in the development of models to include nearly all children in school and community settings.[334] A substantial portion of the 77 billion dollars in the Stimulus Recovery Package (12.2 B) is directed at special education funding, not only to pay for a greater share of the federal commitment for these services, but also to provide funding to address standards, assessments, data systems and teacher quality initiatives.

The funding is timely given the current stresses and demands on meeting the critical shortage of teachers and specialists who serve these children. Two of the most pressing issues facing the field, identified in a national survey of special educators, include the teaching and learning conditions of the profession and the continued need to foster and communicate the use of evidence based practices in general and special education.[335] The U.S. is facing a growing shortage of both university faculty in special education and special education teachers in the school.[336] The role of special education teachers is also changing from one of serving as a resource room teacher to one of collaborating and co-teaching in the general education curriculum.[337] The shifting roles and requirements for teachers have led to a severe shortage estimated to exceed 20,000 in the next 10 years.[338] At the same time, the percentage of doctoral students has decreased by more than one-fourth, leaving many university positions unfilled.[339] New incentives and approaches will be needed if we are to meet the projected shortages in the schools and higher education. The shortages have been attributed to the difficult conditions of teaching children with disabilities, in which teacher case loads are too large, paperwork is burdensome, support services, such as speech therapy and social work are insufficient and administrative support is too often lacking.[340] The disproportionate representation of students from culturally and linguistically diverse backgrounds as well as of color add to concerns about the current structure of identification and delivery of services.[341]A research and development agenda is needed to address ways of improving the conditions of teaching, beginning with initial preparation programs and continuing through career long professional development. Professional learning communities, which encourage collaboration, are needed to support effective practices by special and general educators and administrators and to support the implementation of evidence based practices.

At the same time, R and D funding as well as support for technical assistance and dissemination is needed around the concept of evidence-based practices. Practitioners have expressed concern and confusion over how best to identify and use evidence-based practices, raising questions like, "evidence-based for which students"? And "under what conditions"?[342] Centers of teaching excellence and research are needed to address these concerns and ensure that teachers and administrators have the knowledge, tools and skills to address the needs of the diverse students who qualify for special education. These centers not only could serve as resources to state departments of education, but also to Innovative Higher Education's in translating new research to practice and in scaling up such practices to assess critical implementation issues of fidelity of treatment and generalization and maintenance of outcomes.

Susan Fowler

Supporting Evidence 7.7: Personalized Learning

Personalized learning has emerged in the last decade as a response to the problem of the reorganization of the State dealing with globalization and the end of the effectiveness of the industrial mass production model in the delivery of public services.[343] The massively centralized state is no longer considered morally or economically desirable, efficient or effective. Personalization provides an overall solution to this problem. It is seen as a model of provision for an ever-increasing demand for public services that depends upon the active participation of the citizen. The model encourages a form of self-responsibility and citizen empowerment within a more 'open architecture' of government that permits both the citizen and the state greater choice including the co-design and co-production of public goods. It also enables greater customization of public services, niche marketing and the tailoring of public services in accordance with the different needs of various client groups. Personalization rides on the back of the revolution in open government and the revolution in communication and information technologies that provide new architectures of participation and collaboration.[344]

Personalization developed in response to the twin problems of globalization and the second industrial divide and must be seen in this light: it promotes the radical disaggregation of State monopolies, decentralization of decision-making to the local and individual levels, and the promotion of consumer/individual choice as a general service philosophy. The new open architectures of participation that characterize new Web 2.0 platform technologies enable governments to help shift the ethos and mode of delivery away from state bureaucracies to the consumer or client, often blurring the lines between 'citizen' and 'consumer'.[345]

The rise of personalization as a major new philosophy of public service defines a major change in political philosophy and a shift in the underlying principles the organization of social policy. It also represents the adoption of a new style of *molecular* government that implies a radically decentralized social democratic relationship between the individual and the State. In essence, this shift can be viewed in part as a strategy for modernizing social democracy in the face of increasing globalization, the decline of the mode of mass production, and a response to a new model of 'openness' exemplified in open source and e-government. With the increasing demands for more transparent democracy, for greater citizen participation, and for delivery systems of public goods to be tailored to the needs of individuals, personalization as an over-arching policy idea will increase its influence as its implementation is refined and developed. Personalized learning is a promising part of this shift that offers the basis for putting the learner at the heart of the education system.

Michael Peters

Action Area 8: Educate for Global and Local Citizenship

Too often, our teaching and learning is narrowly local. We fail to teach adequately for a world of global interconnectedness. In the context of globalization, new ways of thinking about curriculum have become necessary. This is so because education now needs to pay greater attention to how it uniquely spans the cultural, economic and interpersonal dimensions of global relations. Schools and colleges need to recognize their transformative power, and their capacity to become responsive to contemporary global changes. The context in which education now occurs has been re-shaped by globalization.

Much has been said and written in recent years about globalization. Some of it is hype. But a great deal of it is seeking to understand the profound global changes are helping to integrate the world into one extensive system. Recent developments in information and communication technologies, for example, involve knowledge production and exchange that defy traditional boundaries. This has resulted in a major shift towards international integration of products and markets. National institutions are still significant in

the global environment but now must become engaged in the global processes or face obsolescence. International competition and technological change is associated with a workplace that is more integrated and more devolved, and requires higher levels of cognitive and communication skills. The post-Fordist vision of flatter organizational structures demands higher level of participation, strong teams, multi-skilling and life-long learning. The future of work is increasingly shaped by technology, the capacity of labor and change management in an international context. Competitive international advantage is determined by capacity for continuous innovation and by a workplace culture that is self- and skill-reflective; that is, a workplace in which workers can put into practice their own judgments about the skills and knowledge they require in order to meet the needs of technology and competition.

The contemporary context is also characterized by the changing global knowledge economy. Among other features this includes: an exponential increase in the amount of internationally distributed and globally accessible knowledge; wider dispersal of the centers of knowledge creation; a huge development in globally focused knowledge-mediated industries and services; changes in the access to and control over knowledge on a global scale; and the emergence of new ways of thinking about the links between knowledge and innovation. The traditional links between knowledge and culture are also changing, with a greater recognition that knowledge creation and use is mediated by cultures. The changing nature of the knowledge economy involves an intricate global- local relationship. It suggests that the nature of knowledge use and innovation demands a simultaneous engagement with local factors as well as global processes. This is so because in cultural terms the local is now re-shaped globally, and because the idea of "global" is meaningless without its local references.

These large trends highlight the importance of looking at globalization through the lens of the changing nature of social relations its spawns. In the new context, the changing boundaries of nationhood, geography and identity become fluid and shifting. The changes that we now experience come partly from increasing exposure to cultural diversity through the influences of international news and media, information and communication technologies and consumer products as well as greater personal and employment mobility. These increases in cultural globalization are experienced as pressure towards both heterogeneity and homogeneity at the same time, a resurgence of localized cultural identities as well as the development of globalised cultural practices. The global context is defined by a language that highlights cultural aspects of economic relations, and the need to develop products that are responsive to local needs, values and traditions.

In terms of these considerations, one possible definition of the internationalization of education is to view it as both an expression of and response to the processes of globalization. However, the relationship between what might be viewed as the global context and educational goals is not a simple one. This is so because what is seen as –'the context' is never self-evident, but always requires interpretation. Descriptions of global processes are highly contested, as are the suggestions about how best to explain them, respond to them, react to them or indeed to use them for our competitive advantage. The questions we might ask about the implications of globalization are often as complex and as pertinent as the possible answers. In terms of the internationalization of curriculum, this suggests a curriculum approach that seeks to provide students with skills of inquiry and analysis rather than a set of facts about globalization. Since we are confronted a fast-changing knowledge economy, students need to develop questioning skills so that they are able to identify the sources of knowledge, assess claims of its validity and legitimacy, examine its local relevance and significance, determine its uses and applications and speculate about how it might be challenged and refuted. The ability to think reflectively and critically about knowledge creation and use requires a form of global imagination; the capacity to determine how knowledge is globally linked, no matter how locally specific its uses.

Fazal Rizvi

ACTION ITEMS

Action Item 8.1: Internationalize Curriculum and Pedagogy

New approaches to global studies need to be developed which balance specific 'area studies' with generalized capacities: intercultural communication, global rights, international business, and interpreting and negotiating differences. The *Live Local Learn Global Initiative* will support initiatives that represent a paradigm shift in the focus and pedagogy of global studies.

Action Item 8.2: Build Global Studies as a Discipline Area

Pre-service teacher education must be fundamentally reformed to create a national cadre of instructors, capable of educating their students about the issues the nation and they confront in a global context. Currently, only about five percent of the nation's K-12 teachers have had any academic preparation in global studies. To support the development of the field once global studies teachers are in service, a network of global studies high schools should be created. Among the distinguishing properties of *Global Studies Lighthouse Schools* would be four-year, performance-based language instruction, including less commonly taught languages, deep knowledge of at least one non-Western culture, and the institution of a problems-based approach to global issues throughout the curriculum.

Action Item 8.3: Create Global Learning Networks

To achieve this objective, person-to-person relationships are essential. The *Global Schools Network* will support joint online curriculum planning and teaching between teachers in classrooms in different parts of the world: sister classrooms, global buddies, and more extensive student exchange programs.

Action Item 8.4: Expand Efforts to Recruit International Students

For some countries in the Anglophone world, international education is a significant and dynamically growing export industry. The United States has been less focused internationally; the United States is in overall economic terms comparatively less successful; and growth of the industry in recent years has stalled. Not only does international education have an immediately positive impact on balance of trade, but it also creates longer term benefits in the form of relationships with multiplier effects. It is time to invest more systematically in international education at all levels—a *World Learn America Program*—in the spirit of globalism, and as an export industry with immediate and longer term benefits.

SUPPORTING EVIDENCE

Supporting Evidence 8.1: Changing Concepts of Citizenship

The underlying political concept of the notion of citizenship developed during the Enlightenment is in disarray under the combined and sometimes contradictory processes of globalization, localization and regionalization. Traditionally, the concept of citizenship had a home in the bounded nation-state and referred to rights, privileges and responsibilities ascribed to people born or migrated to a territory with clear boundaries.[346]

In the history of political philosophy the social contract is the means by which order and civil society is maintained: we agree to a social contract thereby gaining civil rights in return for subjecting ourselves to the law. This social contract was made in the name of the common good and people gave their consent to it, it is argued, because of enlightened self-interest through the rule of law, they gain. The political arrangements varied considerably from state to state as did the legal and philosophical justifications, yet

nothing can disguise the palpable state of affairs that the transition to civil society constitutes a social agreement which involves a moral commitment to a set of values and ethical norms that work for all members of a community.

Global citizenship education is a means to promote a form of democratic educational philosophy based on political socialization through community service and one that also recognizes the moral imperatives that we live in an interconnected global world that is increasingly integrated. Global and local (community) citizenship education needs to be critically self-aware that all the traditional assumptions governing our situated world-views ought to be continually open to change, sometimes quite radically and unexpectedly, as when the Berlin Wall came down or the Soviet system collapsed or the neoliberal experiment faltered and failed. By contrast we seem to be confronted with ample evidence of the predicted future dominance of the world system by China and India, yet a coherent educational response to this future probability has barely begun to emerge.

President Barack Obama suggests 'The American moment is not over, but it must be seized anew'.[347] He talks of a renewal of U.S. global leadership 'grounded in the understanding that the world shares a common security and a common humanity'. Today we have passed into an era that is best symbolized by regional trading blocs and attempts at regional governance with the huge growth also of NGOs and other global agencies. These transcend national boundaries. On the one hand, there is the economic organization of the truly stateless corporation, now sometimes referred to as the 'globally integrated enterprise', and, on the other hand, the development of regional forms of governance like the EU that through twin processes of integration and enlargement, is creating a 'new Europe' based on an alternative vision of globalization.

Global citizenship education offers the prospect of extending the ideologies of human rights and multiculturalism in a critical and informed way. It does not name the moment of global citizenship or even its emergence so much as the hope of a form of order where the rights of the individual and groups, irrespective of race, gender, ethnicity or creed, are observed by all governments and become the basis of participation in new global spaces that we can call global civil society.[348]

Michael Peters

Supporting Evidence 8.2: Internationalizing Curriculum

Internationalization of education involves a complex of global processes concerning conceptions of knowledge, economic exchange, the changing nature of work and labor requirements and cultural diversity. It entails a complex interplay between history, politics, and knowledge development and its use, as well as teaching and learning. With increasing global flows in communication and movement, we are now all influenced by globalization, which as we have noted above, which can be characterized as a process of transformation in which various practices are increasingly geared to operating in international surroundings, under international market conditions and with an international professional orientation. If this is so, then internationalized curriculum involves the development of new skills, attitudes and knowledge among students and teachers alike. It requires the creation of new learning practices, spaces, ethos and cultures. This cannot be done by an edit but through the creative utilization of imagination. This imagination itself needs to be globalized in ways that are both self-reflexive and critical. Internationalization of curriculum should therefore be seen as a dynamic process that gives staff and students the opportunity to own the processes of their own learning and knowledge production.

The idea of internationalization of curriculum can be seen as much more radical, referring to the integration of a global perspective in both curriculum design and development and evaluation. What this means is that curriculum content should not arise out of a singular cultural base but should engage

critically with the global plurality of the sources of knowledge. It should not only respond to the needs of the local community but should seek to give students knowledge and skills that assist their global engagement. It should encourage students to explore how knowledge is now produced, distributed and utilized globally. It should help them develop an understanding of the global nature of economic, political and cultural exchange. In short, it should assist them in the development of not only global understanding but also global imagination.

Significantly, however, the idea of the internationalization of curriculum should not be concerned with content alone. It should also address issues of pedagogy and cross-cultural understanding. With demographic changes in our classrooms, the issue of how to cater to and take advantage of individual and cultural differences in learning should become crucial in the development of effective pedagogies. The emergence of new communication technologies has created the possibilities of new learning spaces designed to link students to the global networks of information and ideas. With globalization, cultural diversity has become a permanent feature American schools; this diversity is its greatest strength and asset. It is an essential characteristic of a dynamic and creative society that is able to engage effectively with global forces and to meet the challenges of the new century. Internationalization of curriculum therefore should incorporate a range of values that include openness, tolerance and cosmopolitanism. It should demand culturally inclusive behavior, designed to ensure that cultural differences are heard and explored, that curriculum is a product of the determination to learn from other cultures and that there are a wide variety of factors that affect cultural change.

Finally, internationalization of curriculum requires both students and staff to become more self-reflexive about what they teach and how students learn. It also demands new practices of assessment and evaluation that are culturally sensitive and inclusive. If analysis and self-reflexivity are considered pedagogically important then such assessment practices should reward innovation and critical engagement. If schools are to prepare students for a world of ever-changing global knowledge economies and social relations then the goal of professional learning should not only be defined in terms of the global nature of work and economic and cultural exchange but also based on the premise that these matters are subject to continuous change. Preparing students to see change as positive and to manage it effectively in a global context should be a central aim of an internationalized curriculum.

Fazal Rizvi

Supporting Evidence 8.3: K-12 Global Citizenship Education

For the first time in the evolution of the human species, we are now all members of a global society. Solving global issues requires that they be addressed *simultaneously and synchronously* at all levels of relevant human action; that is, globally. These issues now cover all human concerns, encompassing universal striving for sustainable economic growth, immigration, disease, crime, shared security and ecological threats, and demands for popular rule and human rights.

This revolutionary human condition poses new and formidable threats and exciting opportunities for citizens of open societies. Americans are uniquely positioned to lead in shaping the global society. The precondition for leadership and for the preservation of the American democracy is an educated population, informed in-depth about global challenges and inspired, as a civic responsibility, to contribute constructively to their resolution.

Needed urgently is a two-pronged change in how we educate the next generation of students, notably at the K-12 level. First, pre-service teacher education must be fundamentally reformed to create a national cadre of instructors, capable of educating their students about the issues the nation and they confront.

Currently, only about five percent of the nation's K-12 teachers have had any academic preparation in global studies.

Second, to create an informed populace, which is prerequisite to developing effective policies that garner public support, a network of global studies high schools should be created to produce an ever-enlarging pool of globally informed citizens throughout the nation. Among the distinguishing properties of these high schools would be four-year, performance-based language instruction, principally in Less Commonly Taught Languages, deep knowledge of at least one non-Western culture, and the institution of a problems-based approach to global issues throughout the curriculum.

Created would be an expanding cohort of informed citizenry who would be connected initially, conceivably throughout their lives and careers, through the resulting network of these high schools. Exploited fully would be the use of the Internet and other innovations in communication to ensure that these high schools, their instructional staff, and students are truly networked.

Students would acquire the analytic tools and up-to-date humanistic and social science knowledge to equip them to tackle the challenges posed by global issues and to identify those solutions that maximize benefits to Americans and to peoples around the globe. Students would also develop the social skills of collaboration and cooperation and be imbued with a life-long sense of civic responsibility for community leadership in addressing global issues impacting on local interests. They would be instilled with a personal commitment to continuing self-education and self-improvement as a community asset. Introduced would be an increased number of informed and civic-minded professionals within the body politics spurred to lead the nation to shape the world society to reflect its values and interests.

To address these two interdependent needs—pre-service reform and a locally based leadership corps in global issues—a national competition would be organized to assist Colleges of Education to globalize their curricula and for high schools and their communities to compete to be recognized as global studies high schools.[349]

Edward A. Kolodziej

Action Area 9: Educate for Sustainability

During the last thirty years, environmental education has acquired an increasing influence over the design of educational and environmental public policies on both the national and international level.[350] Over this time, environmental education has contributed to the strengthening of the curriculum in a range of areas including biology, social studies, economics, business studies and health education.

However, as EE became established a great variety of viewpoints from different schools of thought and action arose, representing at times conflicting interests. Environmental education is a poly-discursive field that however its significance today is demonstrated in terms of current policies of sustainability, energy efficiency and conservation. Environmental education has much to contribute to the process of establishing new social identities in response to the challenges of these difficult times because, as this new field of learning becomes established, it is increasingly distanced from the original proposals for an environmental education coupled with naturalism, conservationism and other movements that place importance on preserving the environment without taking into account the needs and expectations for social change of human groups that live both in natural and urban environments.

Today's context requires a renewal of the commitment to science and to science-based environment-policy with education curricula and pedagogies designed to raise awareness of environmental issues (such

as protected areas, preservation of species, climate change etc.), sustainability policies and their impacts on U.S. business, industry and public life.

In particular, in the K-12 system a new emphasis on environmental education must accord with the emphasis of the Obama administration on sustainability in energy policy and its relationship to environmental issues, especially policies aimed at new energy efficiencies and the development of alternative and renewable energy resources.[351] One of the principal difficulties is that the older conception of environmental education has been substituted and replaced by 'sustainable development' and increasingly given ground to prevailing models of economic development. This is consistent with a quest to find market solutions to the world's environmental problems, such as emissions trading, where sustainability is driven by new market rationalism. However, such apparently straightforward solutions may at times be at variance with the ecological complexity of living organisms – the *biota* – and its major organizing principle of the network. The assumptions of individuality, rationality and self-interest at the heart of *Homo economicus* are called into question in relation to the environment – natural, social or informational – especially in relation to 'the commons' and the complex biota of the planet considered over timescales and cycles outside the natural human lifespan.

The complexities of our times point to a pressing need for the renewal of environmental education in American schools and universities that promotes understanding, identity and citizenship consonant with the new emphasis on investment in clean energy, green jobs, and green technologies, as well as stewardship of the earth. There is a need also for an understanding of the broad sweeping shifts in environmental education, public policy and ethics—from anthropocentrism to systems thinking, from industrial capitalism to Green Capitalism 2.0, and from a dependent oil-hungry based economy to an efficient, renewal able and green energy system.

Michael Peters

ACTION ITEMS

Action Item 9.1: Create Interdisciplinary Environmental Studies Curricula

School curricula are divided into disciplinary silos, which make the study of interdisciplinary questions (such as the environment and sustainability) difficult. Innovative environmental studies curricula are needed under a *Learn Sustainability Initiative*, which:

- go beyond traditional discipline boundaries, and cut across heritage discipline areas such as biology, geology, social studies and business studies;
- involve a mix of real world engagement, high level theoretical work, empirically grounded and ethical reflection;
- link global issues (energy, climate change, food, water) with local solutions; moving between intellectual holism and the complexities and practicalities of the highly specific.

Related initiatives might incorporate environmental sustainability as a stand-alone set of standards, linked also into particular subject standards, and establish and fund a President's or First Lady's School Sustainability Quest acknowledging school based initiatives to support environmental sustainability.

Action Item 9.2: Transform School Buildings into Green Showcase Sites

Schools themselves can become demonstration sites for the new, green economy, saving recurring costs through immediate investment in greener architecture, as well as involving learners directly in environmental projects within the school. Initiatives would be supported through a *Learn Green Program.*

SUPPORTING EVIDENCE

Supporting Evidence 9.1: Environmental Ethics: From Anthropocentrism to Systems

As the renowned theoretical physicist, Stephen Hawking indicates in a lecture 'On the Beginning of Time,' 'All the evidence seems to indicate, that the universe has not existed forever, but that it had a beginning, about 15 billion years ago. This is probably the most remarkable discovery of modern cosmology. Yet it is now taken for granted.'[352] He outlines how the discussion whether or not the universe had a beginning persisted through the 19th and 20th centuries and was conducted on the basis of theology and philosophy on the basis of anthropocentric assumptions with little consideration of observational evidence partly because of the poor unreliability of cosmological evidence until very recently. 'Big Bang,' the name for a cosmological model of the universe coined by Fred Hoyle for a theory he did not believe, began with observations by Edwin Hubble and his discovery of evidence for the continuous expansion of the universe. In essence, the theory is based notably on observations of the Cosmic Microwave Background Radiation, large-scale structures, and the *redshifts* of distant supernovae.[353] The technical details need not detain us, as there are many good accounts of the standard model.

What is important for our purposes is to note the shift from a set of anthropocentric assumptions to a theory based on observation and its importance for providing an observational and empirical basis for an environmental ethics based on the existence, life, scale and longevity of the sun at the center of our solar system. This feature requires some comment because it is an unusual claim to consider the way in which empirical matters to some extent determine the philosophical nature of environmental ethics even where the notion of ethics in relation to the environment is also unclear. Yet it seems clear that environmental ethics as the theory of environmental right conduct or the environmental good *life* (where the notion of life itself is, definitionally, at stake) rests fundamentally upon the notion of 'environment' and how we understand it.

Environmental ethics has been slow to develop and has suffered from anthropocentrism or 'human-centeredness' embedded in traditional western ethical thinking that has assigned intrinsic value only to human beings considered as separate moral entities from their supporting environment. The difficulty is whether such anthropocentric accounts can re-conceive the relations between human beings and their environment and if so, whether the concept of environment might be taken in an extra-terrestrial sense as applying to our solar system with the sun at the center. This seems more like the environmental package that has a kind of systemic wholeness and integrity as a system with the energy source at its center without which life would not be possible.

If we are to accept this more inclusive notion of environment that decenters Earth within the solar system, then the notion of environment has to be renegotiated as one that dynamically also includes the lifespan of the solar system. One of the advantages of this definitional move is to resituate human beings in relation to the 'environment' out of which they emerged in a number of evolutionary steps towards complex intelligent life forms and systems, and into which they will finally be remerged.

When environmental ethics emerged in the 1970s it began to call for a change of values based on ecological understandings that emphasized the interconnectivity of all life and thereby issued a challenge to theological, philosophical and scientific accounts that posited individual moral agents as separate from

and logically prior to their environment. This challenge drew on early environmental studies, and prompted the emergence of ecology as a formal discipline and deep ecology, as well as feminist, new animism, and later social ecology and bioregional accounts, sought to dislodge anthropocentric accounts that gave intrinsic value to human beings at the expense of the moral value of living systems.[354] While this insight does not establish what kind of environmental ethical theory one should adopt it does establish the *prima facie* case that traditional theories of ethics have been unable to talk about the environment in ethical terms. This is largely because they have been bolstered by deep anthropocentric assumptions that are embedded in earlier modern, scientific accounts of 'nature', and also in the nature of industrial capitalism.[355]

Michael Peters

Supporting Evidence 9.2: Ecopolitics and Green Capitalism as Foci of Environmental Education

Ecopolitics must come to terms with the scramble for resources that increasingly dominates the competitive motivations and long-range resource planning of the major industrial world powers. There are a myriad of new threats to the environment that have been successfully spelled out by eco-philosophers that have already begun to impact the world. First, there is the depletion of non-renewable resources and, in particular, oil, gas, timber and minerals. Second, is the energy crisis itself upon which the rapidly industrializing countries and the developed world depend. Third, is the rise of China and India with their prodigious appetites that will match the U.S. within a few decades in a rapacious demand for more of everything that triggers resource scrambles and the heavy investment in resource-rich regions such as Africa. Fourth, global climate change will have the greatest impact upon the world's poorest countries, multiplying the risk of conflict and resource wars.

With these trends and possible scenarios only a better understanding of the environment can save the planet and us. A better understanding of the earth's environmental system is essential if scientists in concert with politicians, policy-makers and business leaders are to promote green exchange and to ascertain whether green capitalism strategies that aim at long-term sustainability are possible.

At this stage of the world's development with space travel, planetary exploration, satellite communications systems in space, and scientific probing of the beginnings of the universe, concept of environment itself ought radical extension to the solar system and universe. Increasingly, the earth needs to be thought of as an organic living system, but also as part of a larger, environmental system. The notion that the environment is a dynamic concept, of which we are a part, is the central understanding of a greening of capitalism. Sustainable prosperity becomes possible with a shift to knowledge and creative economies based on services and clean, efficient technologies, although the ecological society depends on a broad consensus regarding the nature of the market and the economic system: What are the conflicts between free market and ecological economics?[356] Does sustainability imply 'limits' and to what extent?[357] Can Green Capitalism 2.0 solve the looming biocrisis within the constraints of a green free market? 'Natural capital', the self-renewing eco-system on which all wealth depends, is the basis of green capitalism and we need to develop democratic means by which to encourage and pursue it.

Michael Peters

Supporting Evidence 9.3: Environmentalism and Distributed Energy Systems

The energy crisis may be a blessing in disguise for the U.S. Jeremy Rifkin envisions a new economy powered by hydrogen that will fundamentally change the nature of our market, political and social institutions as we approach the end of the fossil-fuel era, with inescapable consequences for industrial society. New hydrogen fuel cells are now being pioneered which together with the design principles of

smart information technologies can provide new distributed forms of energy use.[358] Thomas Friedman also argues the crisis can lead to reinvestment in infrastructure and alternative energy sources in the cause of nation building.[359] Education has an important role to play in the new energy economy both in terms of changing worldview and the promotion of a green economy but also in terms of R&D's contribution to energy efficiency, battery storage and new forms of renewable energy.

Michael Peters

Action Area 10: Shape More Resilient Structures of Educational Governance

Until recently, educational governance and management structures have been primarily bureaucratic in their mode of operation, based on centralized and top-down control, from systems to districts to schools to departments to teachers to students. More recent organizational theories and practices, however, suggest that more effective organizations afford greater degrees of self-management and lateral collaborations, tempering and reforming the vertical chains of command that characterized bureaucratic school management.[360] The general trend has been towards devolved responsibility, allowing schools greater scope for self-management, communities, which schools serve broader opportunities to become involved in school governance, and the empowerment of teachers to take professional responsibility for the learning that goes on in their classes.

These changes in the organization of schools in recent decades have at times been varied and extensive, from systems-mandated standards which allow teachers to use their professional judgment to determine the particular approach that would be best for their students to meet the requirements of those standards, to the spread of charter schools which allow a great deal of self-management at the school level. However, these changes have often produced disappointing results, when, for instance, standards are implemented with textbook dominated learning and teaching to the test, or when charter schools work in ways that are themselves bureaucratic and produce results no better than the schools they displaced.

Here are some principles for the new school governance:

- Cede managerial responsibility, but with more rigorous accountability and greater transparency, cascading down (or perhaps trickling up?) from broad educational objectives set by education systems, to self-managing school governance structures at the local community level, to the leadership responsibility of superintendents and principals, to the learning design and student welfare responsibilities of the professional teacher, to the learning responsibilities of students.
- Recognize that the public/private distinction is increasingly being blurred, in which personal energies and resources supplement public schooling and private schooling is open to public scrutiny.
- Build organizational structures which encourage and reward educational innovation and entrepreneurship, and which provide diversity offerings and choice without prejudice to the comparability of learning outcomes.
- Create a flexible range of learning offerings: hours, sites, modes of access (such as in person and online), shaking off the historical constraints of institutional sites, local geography, and even differential resourcing based on local property values and taxation revenues.
- Develop holistic approaches to education and its complementary social agencies, with proactive identification of risk and resilience factors amongst learners.

ACTION ITEMS

Action Item 10.1: Create the Conditions for Innovation, Diversity and Holistic Accountability

Whether it be public, private or charter schools, we need to create conditions which a) cede progressively more managerial responsibility down through the system; b) require greater transparency to all stakeholders; c) have in place more rigorous and more holistic reporting and accountability requirements—not just narrow test results. The *New Educational Leader Program* would attempt to reconceive the organizational structure of schools and develop leaders for the transformed, and transformative, schools of the future. The program would, amongst its possible initiatives, sponsor a virtual network of leadership academies to lift expertise of educational leaders and align their efforts with learner performance goals; and rethink and expand the Federal Department of Education's 'What Works' portal to include leadership strategies.

Action Item 10.2: Support Innovations, which Blur Conventional Spatial and Time Boundaries of Education

The *Blurring the Educational Boundaries Initiative* would support and evaluate innovations, for instance schools that open their doors for longer hours or provide e-learning programs, which extend beyond their usual geographic or demographic reach. Broader and more rigorous reporting of evidence of success or failure would support these innovations.

Action Item 10.3: Develop Whole of Community Approaches to Student Welfare

Develop *Full Service Schools*, which engage a federation of providers, and careers— education, health, police, community and families—in a student focused approach, which identifies risk, and resilience factors in the conditions of student learning.

SUPPORTING EVIDENCE

Supporting Evidence 10.1: Investing in Charter Schools, But Investing Well

President Obama has spoken quite favorably of charter schools, not so much as competitors for public schools, or even as necessarily superior to public schools, but as potentially valuable alternative options for families. He is expanding funding for charter schools, and supports more proactive efforts to shut down bad ones. Here is the main evidence on the record of charter schools:

Innovation: Charters are intentionally positioned to generate innovations for the public school sector.[361] There are many examples of innovative schools, particularly in terms of administrative practices (marketing, employment, contracting, etc.).[362] Charter schooling itself is recognized as an innovative reform strategy in terms of governance. But there is a consensus among researchers that, with few exceptions, charter school classrooms are generally no more innovative than are other public schools, and in fact may be more traditional.[363] However, the new "CMOs" (or charter school management organizations) such as KIPP and Green Dot are widely viewed quite favorably as offering a workable alternative model to public schools for disadvantaged children.[364]

Access and Equity: Charter schools have been lauded for serving, on average, higher proportions of minority students.[365] However, there has also been concern that they may be contributing to increased segregation in local communities, and that the minority students they serve are more advantaged than comparison groups in the public schools.[366] There is also concern about segregation by ability, and that charters serve a disproportionately low numbers of students with special needs.[367] Some scholars have

found that segregative patterns are often the result of self-segregation (such as white flight) by different ethnic groups,[368] while other studies have tied marketing practices and location decisions used by charter schools to greater segregation.[369]

Effectiveness/achievement: The question that has received the most attention is whether charter schools, by virtue of their autonomy from local district bureaucracies, are more effective than district schools. A number of state evaluations have produced mixed findings on charter school performance, largely depending on the details of the state's charter school policy.[370] Large-scale studies of nationally representative samples of charter and public schools found charter schools to be performing at a level comparable to, or slightly lower, than public schools, once demographic differences are considered.[371] Smaller-scale studies of achievement in some cities have found a small advantage for charter school students in some instances; these often focus on schools run by specific CMOs.[372] However, there is still some concern about selection bias and attrition compromising the findings.

Different types of charter schools produce different results. Therefore, rather than promoting a generic idea of "charter schools"—as is the case with NCLB, for instance—policymakers should move beyond ideological commitment to charters, and focus on actual evidence to determine what aspects of charter schools "work," and seek to replicate those factors.

Christopher Lubienski

Supporting Evidence 10.2: Full Service Schools and School-Centered Community Revitalization

Student background factors have an enormous impact on academic outcomes. As much as 70-80% of the variance in student achievement is due to factors outside the formal schooling experience.[373] In comparison to most industrialized countries, the U.S. has considerably higher rates of children in poverty and much greater wage inequality across the economy.[374] Poor children in the U.S. enter school with enormous disadvantages in relation to their middle and upper class peers, including delayed language acquisition, vision and hearing problems, low birth weight, asthma, poor overall nutrition, and complications due to parental alcohol consumption or smoking during pregnancy.[375] Moreover, American poverty tends to be longer lasting, more residentially concentrated, and more strongly associated with poor health outcomes due to the large number of citizens lacking health coverage. Policymakers have known for decades that academic outcomes are strongly influenced by factors outside the school, yet our systems for the delivery of educational and social services are still largely separate. Urban schools and public agencies confront chronic, interrelated problems, but the system treats them as acute. Poor urban families today often must deal with several separate public service providers, each with different intake procedures, terminology, and concepts of need.[376] Numerous educational policy organizations have recognized the need to more directly address the out-of-school needs of students.[377]

A number of communities and public leaders across the country are attempting to improve both student achievement and overall well-being by providing more comprehensive networks of support in and around public schools. 56% of U.S. elementary schools have at least one after school program located at their facility, but a significant portion of these schools report that costs to parents hinders participation.[378] There is also growing interest in community schools, sometimes called full-service schools, which attempt to provide a "one-stop shop" for family, health, and educational services.[379] Approximately 1,700 schools now have school based health center that cater to local needs and aim to reduce students absences and under performance.[380] Social entrepreneurs like Geoffrey Canada have gone a step further, creating support networks across multiple schools and neighborhoods in an attempt to break the cycle of generational poverty.[381] At this point, however, most public educational and family support services remain fragmented, and the creation of comprehensive support in schools depends on local social entrepreneurs and non-profit organizations.

Peter Weitzel

Supporting Evidence 10.3: Implementing Distributed Leadership Practices

The current era of accountability and school reform has placed significant demands on educators in schools and school systems. In particular, the principalship has been subjected to a sustained period of role expansion, with increasing time pressures and intensification of work responsibilities.[382] Distributed leadership practices are emerging in response to this increasing role complexity, as a mechanism for administrators, teachers, and staff members to work collaboratively within their organization to reap collective benefits for improved student learning. Effective principals organize in such a way that leadership activities are interwoven into the fabric of school life. By empowering teachers and other personnel within the school organization, principals can be proficient in bringing together people, resources, and organizational structures to work toward a common cause.[383]

Distributed leadership practices challenge technical-rational perspectives of leadership that mandate a division of labor, with only those at the top of the organizational hierarchy bestowed with decision-making authority. Changes within divisions of labor, however, are creating workplace interdependencies that require new forms of coordination[384], and the traditional top-down leadership model is being replaced by one that embraces collaborative and shared forms of leadership.[385] By working in participatory and inclusive ways, principals can facilitate the development of human capital throughout the organization, building leadership density that can positively influence teachers' behaviors and classroom practices.[386]

As school leaders strive to distribute leadership activities across their schools, they should be cognizant of some obstacles that can inhibit its implementation and acceptance. Some leaders may be reluctant to relinquish power and that may be placed in vulnerable positions when they lack direct control over certain organizational functions. Another issue to consider is that traditional departmental or grade-level structures can inhibit teachers' abilities to work collaboratively. Additionally, leaders must address the twin challenges of *how* to distribute responsibilities and *who* is in control of distributing responsibility and authority.[387] Authentic forms of distributed leadership require a redistribution of power, with a shared commitment to collaborative leadership activities.

Although this practice demonstrates substantial promise, as a relatively recent phenomenon, distributed leadership currently is not tightly defined, and the term is used in varied ways.[388] There is relatively little empirical evidence to suggest a direct causal relationship between distributed leadership practices and increased school achievement[389], but this theory is being employed as a framework for studies conducted in elementary-secondary systems both in the United States and in many international settings, including Australia, Canada, England, and Norway. Although the vast majority of the research has focused on leadership at the school level, some studies are beginning to examine distributed practices of school district leaders[390] and across schools.[391] Although sparse, this growing body of empirical research does present some encouraging evidence to indicate that distributed leadership practices can be effective in promoting increased student learning.

Donald G. Hackmann

Supporting Evidence 10.4: School Accreditation

A recent article in the Chronicle for Higher Education highlights the current debate in federal governance and policy for education.[392] While the Department of Education recognizes accrediting agencies for purposes of financial aid allocation and distribution of federal monies, the federal government is not currently involved in accreditation itself. Rather, this role has been filled by a variety of private agencies.

While the role of the Federal government in direct school funding is relatively small, the symbolic and operational impact of Federal policy on education contributes to shaping the educational landscape for all educational sectors. As the Obama administration moves forward on policy initiatives in a dire economic environment, government is taking a more active role in regulating a variety of sectors. Education is one area where self-regulation is working and should be reinforced, not centralized.

The primary mechanism for ensuring quality and public accountability in education P-20 has been the regional accreditation process, formed through a public-private partnership outside of the federal government. The University of Illinois, for example, receives accreditation through the Higher Learning Commission of the North Central Association. Primary and secondary schools in the Midwest region have, until recently received their accreditation through the North Central Association Commission on Accreditation and School Improvement (NCA CASI). The regional system has been built on voluntary participation, systematic improvement, evidence-based self-evaluation, and peer review. The regional system has been both lauded and criticized and the Bush Administration policies on accreditation were decidedly in favor of centralization of accreditation.

We will address first primary and secondary school accreditation and then proceed to higher education. Our goal is, first, to address what we believe is the appropriate role between the U.S. Department of Education and the regional accrediting bodies, and, second, to suggest that masterful use of this unique relationship can be used to promote an aggressive agenda of access, excellence, and success for all of America's youth – a system that can stimulate improvement and accommodate educational innovation.

Primary and secondary schools

One pattern worthy of note is the movement away from regional accrediting bodies toward a broader set of standards impacted by globalization. The NSA CASI recently merged with the southern regional commission to form a "unified" organization with stated goals of "[transforming] from regional accreditation to global systems of accreditation, continuous improvement, and research."[393]

Higher Education

In higher education, regional accrediting agencies oversee institutional accreditation, while specialized agencies provide programmatic accreditation in technical and professional fields. Processes range from intensive periodic accreditation to ongoing, continuous processes reflective of business models.

Criticisms of the current accreditation process focus in two broad areas: political agendas and lack of accountability. The American Council of Trustees and Alumni (ACTA) has raised concern that accreditation focuses too much attention on inputs, not outcomes.[394] ACTA proposes greater involvement of trustees in accreditation, movement towards a market driven accreditation process in which membership is not regionally driven, but subject to competition, and decoupling financial aid eligibility from accreditation. While the principles underlying these recommendations merit discussion and debate, wholesale adoption would create disruption in a globally admired educational system.

Tod Treat

Supporting Evidence 10.5: Defining the American University

The much discussed problems of "affordability" in higher education have many root causes, but one of the most basic, yet least obvious, is the lack of a consistent and acceptable policy definition of the

university itself. Billions of dollars in public funding flow to both private and public institutions that call themselves universities (or colleges) with little transparency and few discernible measures of performance or quality to justify the investment.

In today's society, with information conveyed at the speed of light, it is not surprising that there is much disagreement as to what a university actually is, or is supposed to be. In the United States today, distant learning, on-line, interactive television, non-resident and storefront facilities located from Michigan Avenue in Chicago to strip malls in Los Angeles and Jacksonville, Florida, bear the appellation of "university." As early as 1930, Abraham Flexner recognized and commented on the problem, "The term 'university' is very loosely used in America."[395] And Flexner, not one to buy into non-tradition, complained that "It must be a rare experience to listen to the pronunciation of a foreign language by a boy or a girl who has qualified for matriculation in the University of Chicago by correspondence."[396]

Visitors to the United States from other advanced nations with different perceptions and codes defining the nature of universities are both amused and amazed at what passes for a "university" in the United States. The federal government in the United States by massive funding mechanisms such as vouchers, tax credits, tax deductions, and loans, incentivizes the creation and perpetuation of the plethora of private not-for-profit, religious, for-profit, and public institutions, most of which are called universities. The nature of federalism in the United States leaves basic accreditation control of universities to states, supplemented by a complex system of regional accreditation such as Western Association of Schools and Colleges (WASC) or the Southern Association of Colleges and Schools (SACS) and nationwide professional accreditation by such organizations as the American Bar Association, American Medical Association, the National Council for Accreditation of Teacher Education, etc. Accreditations by state bodies have the reputation of being mired in politics and influence peddling by private non-profit and for-profit institutions.[397] Moreover, while universities are chartered at the state level, those holding regional accreditation are given exemptions from meeting requirements of each state in which they operate. The intense motivation for accreditation is stimulated by the necessity of some rudimentary stamp of accreditation approval in order to be an institutional recipient of federal or state taxpayer funds.

The basic problem lies in the historically nebulous nature of the role and perception of the university in society and what its actual legal structure happens to be. The range of notions of what a university is quite broad. John Henry Newman saw the university as a place for the acquisition of "a cultivated intellect, a delicate taste, a candid, equitable, dispassionate mind, a noble and courteous bearing in the conduct of life – these are the connatural qualities of a large knowledge."[398] According to Newman, the object of the university is to provide such enhancements to all who would partake. Lord Curzon, the reactionary Chancellor of the University of Oxford a century ago, averred that Oxford had only "a special duty to educate the leisured classes."[399] And, a bit in the same vein, Alison Richard, currently Vice Chancellor of the University of Cambridge, and former Provost of Yale, in 2009 notoriously explained to her fellow Vice Chancellors in the United Kingdom that universities are not "engines for promoting social justice."[400] The definition of the university, its role and purpose in society is, today, largely in the eye of the beholder.

Thus, the lack of generally accepted definitions as to what the intents and purpose is of higher learning, and the defining of the social mission of the university, is an issue of no small moment. The Spellings Commission, 2008, evidenced an awareness of the problem, but fell short of any viable solution. As with the commercial banks of America, the non-regulation of higher education coupled with contradictory and ill-defined government policy toward funding has resulted in generally questionable quality of higher education that comes at a very high price for the consumer. Any measure of efficiency in the development of human capital and in the deployment of public resources requires a rethinking of the nature of the American university.

Kern Alexander

Endnotes

1 Peters, Michael A., Marginson Simon and Murphy Peter. 2008. *Creativity and the Global Knowledge Economy*. New York: Peter Lang.

2 Hayek, F. 1937. Economics and Knowledge. Presidential address presented to the London Economic Club, November 10, 1936; Reprinted in *Economica IV* 1937. 33-54; Hayek, F. 1945 The Use of Knowledge in Society. *The American Economic Review*: XXXV, No. 4: 519-30.

3 Machlup. F. 1962. *The Production and Distribution of Knowledge in the United States*. Princeton: Princeton University Press.

4 Becker, G. 1993. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*: Chicago, University of Chicago Press.

5 Drucker, P. 1969. *The Age of Discontinuity: Guidelines to Our Changing Society*. New York: Harper & Row.

6 Bell, D. 1973. *The Coming of Post-Industrial Society A Venture in Social Forecasting*. New York: Basic Books.

7 Touraine, A. 1971. *The Post-Industrial Society: Tomorrow's Social History; Classes conflicts & Culture in the Programmed Society*. New York: Random House.

8 Granovetter, M. 1973. The Strength of Weak Ties. American Journal of Sociology: Vol. 78 :No. 6: pp 1360-1380.

9 Porat, M. 1977. *The Information Economy*. Washington, DC: US Department of Commerce.

10 Toffler, A. 1980. *The Third Wave*. New York, Bantam Books.

11 Lyotard, J-F. 1984. *The Postmodern Condition: A Report on Knowledge*. Manchester: Manchester University Press.

12 Harvey, D. 1989. *The Condition of Postmodernity*. Oxford: Blackwell.

13 Coleman, J. 1988. Social Capital in the Creation of Human Capital, *American Journal of Sociology*. 94 Supplement: S95-S120.

14 Bourdieu, P. 1986. The Forms of Capital, *Handbook of Theory of Research for Sociology of Education*, J.F. Richardson, 241-58. Westport, Connecticut: Greenwood Press. 241-58.

15 Putnam, R. 2000. Bowling Alone: *The Collapse and Revival of American Community*. New York: Simon and Schuster.

16 Romer, P. M. 1990. Endogenous technological change. *Journal of Political Economy, 98*, 71–102.

17 OECD 1996. *The Knowledge-Based Economy*. Paris: The Organization.

18 Stiglitz, J. 1999. *Knowledge for Development: Economic Science, Economic Policy, and Economic Advice*. Paper presented at the Annual Bank Conference on Development Economics 1998. World Bank in Washington D.C.

19 Partnership for 21st Century Skills. 2008. 21st Century Skills, Education & Competitiveness.

20 Hearn, G., & Rooney, D. 2008. Eds. *Knowledge Policy: Challenges for the Twenty First Century*. Cheltenham: Edward Elgar.

21 Lucas, Robert E. 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics*. 22:3-42.

22 Romer, Paul 1990. Endogenous Technical Change. *Journal of Political Economy* 98(5): S71-S98.

23 Barro, Robert J., and Xavier Sala-I-Martin. 2007. *Economic Growth*. New York: McGraw Hill; Barro, Robert J. 1991, Economic Growth in a Cross Section of Countries, *Quarterly Journal of Economics*. 106 (2): 407-444; Barro, Robert 1997, *The Determinants of Economic Growth; a Cross Country Empirical Study*. Cambridge MA: MIT Press.

24 Marshall, Alfred 1927. *Principles of Economics*. London: Macmillan. Marshall, for example, said, "All that is spent during many years in opening the means of higher education to the masses would be well paid for if it called out one more Newton or Darwin, Shakespeare or Beethoven."

25 Becker, Gary 1993. *Human Capital*. Chicago: University of Chicago Press.

26 Schultz, T.W. 1971. *Investment in Human Capital: the Role of Education and of Research*. New York: Macmillan Co. Free Press.

27 McMahon, Walter W. 2002. *Education and Development, Measuring the Social Benefits*. New York and Oxford: Oxford University Press Angelopoulos, Konstantinos, J. Malley, and A. Philippoulos 2009. "Welfare Implications of Public Education Spending Rules", NBER Working Paper, Feb. 2009

28 Lucas, Robert 2008. Ideas and Growth. NBER Working Paper, NY: National Bureau of Economic Research.

29 Department for Trade and Industry UK. 1998. *Our competitive future: building the knowledge-driven economy: analytical background*. Retrieved from (*http://www.dti.gov.uk/comp/competitive/ an_reprt.htm*) on 04-08-09.

30 Solow R 1956. A contribution to the theory of economic growth. *Quarterly Journal of Economics*. vol 70: 65-94; Solow R. 1994. Perspectives on growth theory. *Journal of Economic Perspectives*. vol 8: 45-54.

31 Department for Trade and Industry UK. 1998. *Our competitive future: building the knowledge-driven economy: analytical background*. Retrieved from (http://www.dti.gov.uk/comp/competitive/main. htm) on 4-08-09.

32 See Peters, Michael A., Marginson, Simon and Murphy, Peter. 2008. *Creativity and the Global Knowledge Economy*. New York: Lang, Peter; Peters, Michael A. 2007. *Knowledge Economy, Development and the Future of Higher Education*. Rotterdam: Sense Publishers; Peters, Michael A. and Besley, Tina. 2006. *Building Knowledge Cultures: Education and Development in the Age of Knowledge Capitalism*. Lanham, Boulder, NY, Oxford: Rowman & Littlefield.

33Reich, R. 1991. The work of nations: Preparing ourselves for twenty-first century capitalism. New York: Knopf; Stuart, L. 1999. 21st century skills for 21st century job: A Report of the U.S. Department of Commerce, U.S. Department of Education, U.S. Department of Labor, National Institute for Literacy and Small Business Administration. U.S. Government Printing Office, Washington, DC; Handel, M., & Levine, D. 2004. Editor's introduction: The effects of new work practices on workers. *Industrial Relations*. *43*(1): 1-43; Osterman, P. 2000. *Revolutionizing work*. Washington, D.C.: Progressive

Policy Institute; Cope, B. & Kalantzis, M. 1997. *Productive Diversity* Sydney Pluto Press; Kalantzis, M. & Cope, B. 2008. New Learning. Cambridge UK*: Cambridge University Press*.

34 U.S. Department of Labor. 1991. *What Work Requires of School: A SCANS report for America 2000*. Washington, D.C; Autor, D., Levy, F., & Murnane, R. 2003. The skill content of recent technological change: An empirical exploration. *Quarterly Journal of Economics*. *118*(4): 1279-1333.

35 Reich, R. 1991. *The work of nations: Preparing ourselves for twenty-first century capitalism*. New York: Knopf; Scott, A. J. 1992. The Roepke lecture in economic geography: The collective order of flexible production agglomerations: Lessons for local economic development policy and strategic choice. *Economic Geography*. *68*: 219-33.

36 Handel, M. 2005. *Worker skills and job requirements: Is there a mismatch?*. Washington, D.C.: Economic Policy Institute; Olson, L. 2006. Ambiguity about preparation for workforce clouds efforts to equip students for future. *Education Week*. *25*(38): 1.

37 Cavanagh, S. 2007. What kind of math matters? *Education Week*. *26*(40): 21-23; Cauldron, S. 1999. The hard case for soft skills. *Workforce*. *78*(7): 7-18; Coll, R., & Zegwaard, K. 2006. Perceptions of desirable graduate competencies for science and technology new graduates. *Research in Science & Technological Education*. *24*(1): 29-58; Handel, M. 2005. *Worker skills and job requirements: Is there a mismatch?* Washington, D.C.: Economic Policy Institute; Levesque, K., Lauen, D., Teitelbaum, P., Alt, M., Liberera, S., & MPR Associates. 2000. *Vocational education in the United States: Toward the year 2000*. NCES report 2000-029. National Center for Education Statistics. Washington, D.C.; National Center on Education and the Economy. 1990. *America's choice: High skills or low wages! The report of the Commission on the Skills of the American Workforce* Rochester, NY.

38 Bartel, A.P., and F.R. Lichtenberg 1987. The Comparative Advantage of Educated Workers in Implementing the New Technology. *Review of Economics and Statistics*. 69: 1-11.

39 U.S. Department of Labor, Bureau of Labor Statistics. 2008. Retrieved from *http://www.bls.gov/data/* on 10-10-08.

40 World Bank, Development Data Group. 2007. World Development Indicators Online. Retrieved from *http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,menuPK:232599~pagePK:64133170~piPK:64133498~theSitePK:239419,00.html* on 10-10-08.

41 Krugman, P. 1979. Increasing returns, monopolistic competition, and international trade. *Journal of International Economics*. *9*(4): 469-479.

42 Reich, R. 1991. *The work of nations: Preparing ourselves for twenty-first century capitalism*. New York: Knopf.

43 Juhn, C., Murphy, K., & Pierce, B. 1993. Wage inequality and the rise in returns to skill. *The Journal of Political Economy*. *101*(3): 410-442.

44 Goldin, C., & Katz, L. 2007. Long-run changes in U.S. wage structure: Narrowing, widening, polarizing. Brookings Papers on Economic Activity. Retrieved from *http://www.economics.harvard.edu/faculty/goldin/files/GoldinKatz_Brookings.pdf* on 10-1-08.

45 Autor, D., Levy, F., and Murnane, R. 2003. The skill content of recent technological change: An empirical exploration. *Quarterly Journal of Economics*. *118*(4): 1279-1333.

46 Organization for Economic Cooperation and Development. 2007. Education at a Glance. Retrieved from *http://www.oecd.org/department/0,3355,en_2649_39263238_1_1_1_1_1,00.html* on 05-05-09. Goldin, Claudia and Lawrence F. Katz. 2008. *The Race between Education and Technology*. Cambridge: MA: Harvard University Press

47 Almeida C, Johnson C, Steinberg A. 2006. Making Good on a Promise: What Policymakers can do to support the educational persistence of dropouts. *Jobs for the Future*. Retrieved from *http://www.jff.org/download.php/MkingGood_Sum.pdf* on 11/09/06; Swanson C. 2004. High School Graduation, Completion, and Dropout Indicators: A primer and catalog. *Urban Institute*. Retrieved from *http://www.urban.org/UploadedP DF/411116_GCDCatalog.pdf* on 11/9/2006; Swanson, C. 2004. The Real Truth about low graduation rates: An evidence-based commentary. *Urban Institute*. Retrieved from *http://www.urban.org/UploadedPDF /411 050_realtruth.pdf* on 11/9/2006; Mishel, L 2006. The exaggerated dropout crisis. *Education Week*. 25(26): 40.

48 Bernstein, J., and Mishel, L. 2007. *Economy's gains fail to reach most workers' paychecks* No. Briefing Paper 195). City: Economic Policy Institute.

49 National Center for Education Statistics. 2004. Trends in International Mathematics and Science Study: TIMSS 2003 Results. Retrieved from *http://nces.ed.gov/timss/Results03.asp* on 12-10-08; National Center for Education Statistics. 2008. Trends in International Mathematics and Science Study: TIMSS 2007. Retrieved from *http://nces.ed.gov/timss/Results07.asp* on 12-20-08; National Center for Education Statistics. 2007. Program for International Student Assessment: A summary of findings from PISA 2006. Retrieved from *http://nces.ed.gov/surveys/pisa/pisa2006highlights.asp* on 10-8-08.

50 Swanson C. 2004. High School Graduation, Completion, and Dropout Indicators: A primer and catalog. *Urban Institute*. Retrieved from *http://www.urban.org/UploadedP DF/411116_GCDCatalog.pdf* on 11/9/2006.

51 McMahon, Walter W. 2009. *Higher Learning, Greater Good: The Private and Social Benefits of HigherEducation*. Baltimore: Johns Hopkins University Press.

52 Mishel, Lawrence, J. Bernstein, and S. Allegretto. 2007. *The State of Working America*. Economic Policy Institute, ILR Press, Ithaca: Cornell University Press, Fig. 1K, p.61.

53 US Bureau Labor Statistics. 2007. Table 6.

54 McMahon. 2009. Chapter 3.

55 *Ibid*., Table 8

56 McMahon, Walter W. 2006. International Economic Forces Driving Higher Education Policy: The Race Involving Technology, Globalization, and Needs for Higher Education. *Proceedings of the Global Human Resources Forum*. Seoul, Korea: Korean Government and Seoul National University. Figure 8.

57 This assumes that there are about 400,000 additional associate and bachelors graduates, 20% of the approximately 2,000,000 in 2007 NCES 2007, Tables 27 and 28. If these on average earn $25,000 more than the average high school graduate, and pay 25% of their additional income in federal and state income and state sales taxes, the additional tax revenue is $2.5 billion.

58 See the Australian scheme. Retrieved from http://www.ato.gov.au/individuals/pathway.asp?pc=001/002/008/013/001&mnu=&st=&cy=1&mfp= on 11-09-07.

59 McMahon, Walter W. 2009. *Higher Learning, Greater Good: The Private and Social Benefits of HigherEducation*. Baltimore: Johns Hopkins University Press. Appendix D.

60 McMahon, Walter W. 2007. An Analysis of Education Externalities with Applications to Development in the US Deep South. *Contemporary Economic Policy*. 23(3): 459-82.

61 Haveman, Robert and Wolfe, Barbara. 1984. Schooling and economic well being: the role of non-market effects, *The Journal of Human Resources,* 19(3): 377-407.

62 McMahon, Walter W. 2009. The External Benefits of Education. *International Encyclopedia of Education*. Oxford: Elsevier Publishing Co., forthcoming July 2009; McMahon, Walter W. 2004. The Social and Externality Benefits of Education, in Johnes, Geraint and Johnes, Jill eds.), *The International Handbook of the Economics of Education*. London: Edward Elgar Publishers.

63 Breton, Theodore R. 2008. Schooling and National Income: How Large Are the Externalities? *Education Economics*. City: Cambridge, MA: New York City Charter Schools Evaluation Project: 1-26.

64 Eisner, Robert. 1989. *The Total Incomes System of Accounts*. Chicago: University of Chicago Press.

65 McMahon 2009, Ch. 5.

66The Education Infrastructure Act of 1994 was introduced by Senator Carol Moseley-Braun and was passed as part of Improving America's Schools Act (P.L. 103-382, Oct. 20, 1994.

67U.S. Government Accountability Office. 1995. *School Facilities: America's Schools Not Designed or Equipped for 21st Century* (HEHS-95-95, (Washington, D.C.: U.S. Government Printing Office; Education Writers Association. 1989. *Wolves at the Schoolhouse Door: An Investigation of the Condition of Public School Buildings*. Washington, D.C.: U.S. Government Printing Office. American Association of School Administrators. 1992. *Schoolhouse in the Red: A Guidebook for Cutting Our Losses*. Arlington Va.: American Association of School Administrators.

68 Current Congressional Budget Office estimates of the government expenditure and private and business tax cut multipliers. Retrieved from *http://www.dailykos.com/storyonly/2009/2/6/194044/2319/363/694258* on 3-08-09.

69 Colley, S. 2000, February 1). Finding and keeping qualified technicians. *American City & County*. http://www.americancityandcounty.com/mag/government_finding_keeping_qualified Kilcarr, S. 2005. The technician shortage: How bad is it? *Fleet Owner*. http://fleetowner.com/mag/fleet_technician_shortage_bad on March 1 2009.

70 National Science Board Committee on Education and Human Resources Task Force on National Workforce Policies for Science and Engineering. 2003. *The science and engineering workforce: Realizing American's potential*. Washington DC: National Science Foundation. Retrieved from http://www.nsf.gov/nsb/documents/2003/nsb0369/nsb0369.pdf on 04-09-2009.

71 Noeth, R. J., Cruce, T., & Harmston, M. T. 2003. Maintaining a Strong Engineering Workforce. Act Policy Report. Retrieved from http://www.act.org/research/policymakers/pdf/engineer.pdf on 02-15-09.

72 Bureau of Labor Statistics. 2004a. *Occupational Outlook Handbook* 2004-05 edition. Washington, DC: U.S. Department of Labor. Retrieved from http://www.bls.gov/oco/ocos197.htm on 3-02-2009.

73 Bureau of Labor Statistics. 2004a. *Occupational Outlook Handbook* 2004-05 edition. Washington, DC: U.S. Department of Labor. http://www.bls.gov/oco/ocos197.htm on 3-06-2009.

74 Bovbjerg, B., Jeszeck, C., & Petersen, J. 2001. *Older workers: Demographic trends pose challenges for employers and workers* (Publication No. GAO-02-85. Washington DC: U.S. General Accounting Office.

75 National Academy of Engineering. 2004. *The engineer of 2020: Visions of engineering in the new century*. Washington DC: The National Academies Press.

76 Mintzberg, H. 2004. *Managers, not MBAs: A hard look at the soft practice of managing and management development*. San Fransisco: Berrett-Koehler.

77 Goldberg, D. E. 2006. *The Entreprenuerial Engineer*. Hoboken, NJ: Wiley.

78 Olsztynski, J. 2001. *Blue-collar bias*. Plumbing & Mechanical. Retrieved from http://www.pmmag.com/CDA/ArticleInformation/features/BNP__Features__Item/0,2379,19957,00.html on 04-01-09.

79 Fields, J. 2003. *America's families and living arrangements: 2003*. Current population reports, P20-553. Washington, DC: U.S. Census Bureau.

80 Giannelli, F. 2002. *Survey of post-secondary school heavy equipment technology programs*. Oak Brook, IL: The AED Foundation.

81 Drucker, P. F. 2001. Management challenges for the 21st century. New York: Collins; Swanson, R. A., & Holton, E. F. 2009. Foundations of human resource development. (San Francisco: Berrett-Koehler.

82 Reich, R. B. 1992. *The work of nations: Preparing ourselves for 21st century capitalism*. New York: Vintage Books

83 Organisation for Economic Cooperation and Development. 2001. *Investment in human capital through post-compulsory education and training*. Paris: OECD Economic Outlook No. 70.
84 Bureau of Labor Statistics. 2009. *Occupational outlook handbook 2008-2009 edition: Human resources training and labor relations managers and specialists*. Retrieved from http://www.bls.gov/oco/ocos021.htm on February 10, 2009.
85 American Society for Training and Development. 2008. *2008 state of the industry report*. Alexandria, VA: American Society for Training and Development.
86 Eurich, N. P. 1990. *The learning industry: Education for adult workers*. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching.
87 Gray, K. C. & Herr, E. L. 1998. *Workforce education: The basics*. Boston, MA: Allyn and Bacon.
88 Lewis, T. 1998. *Toward the 21st century: Retrospect, prospect for American vocationalism* (Information Series No. 373. Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education. Lynch, R. L. (n.d.). *A vision of high school career and technical education for the 21st century*. Washington, DC: Department of Education, Office of Vocational and Adult Education.
89 U.S. Department of Education. 2007. T*he Condition of education*. Washington, DC: National Center of Educational Statistics.
90 Adelman, C. 2006. *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: U.S. Department of Education, Office of Vocational and Adult Education.
91 Venezia, A. 2001. *A student-centered p-16 accountability model: Encouraging high standards, equitable educational opportunities and outcomes, and flexibility within a seamless system of education*. ECS Issue Paper. Denver, CO: Education of the Commission of States.
92 Carnevale, A. P. 2000. *Community colleges and career qualifications*. Washington, DC: American Association of Community Colleges; Carnevale, A. P., & Desrochers, D. M. 2001. *Help wanted…credentials required: Community college in the knowledge economy*. Princeton, NJ: Educational Testing Service.
93 Kirst, M. W., & Venezia, A. Eds. 2004. *From high school to college: Improving opportunities for success in postsecondary education*. San Francisco: Jossey-Bass; Venezia, A., Callan, P. M., Finney, J. E., Kirst, M. W., & Usdan, M. D. 2005. *Betraying the college dream: how disconnected K-12 and postsecondary education systems undermine student aspirations*. Standford, CA: Stanford Institute for Higher Education.
94 Hodgkinson, H. 1999. *All one system: A second look*. Institute for Educational Leadership. Washington, DC: Author.
95 Haycock, K., & Huang, S. 2001. *Are today's high school graduates ready? Thinking K-16.* Eugene, OR: ERIC Clearinghouse. *5*(1): 3-17; Van de Water, G., & Rainwater, T. 2001. *What is P-16 education?* Denver, CO: Education Commission of the States.
96 Ewell, E. 2004. An accountability system for doubling the numbers. In R. Kazia, J. Vargus, & N. Hoffman Eds. *Double the Numbers: Increasing postsecondary credentials for underrepresented youth*. Cambridge: Harvard Education Press, 101-112.
97 Kirst, M. W., & Venezia, A. Eds. 2004. *From high school to college: Improving opportunities for success in postsecondary education*. San Francisco: Jossey-Bass.
98 Bragg, D., Loeb, J., Gong, Y., Deng, P., Hill, J., & Yoo, J. 2002. *Transition from high school to college and work for tech prep participants in eight local consortia*. St. Paul, MN: National Research Center for Career and Technical Education University of Minnesota. Lekes, N., Bragg, D., Loeb, J., Oleksew, C., Mazsalek, J., Laraviere, M., & Hood, L. 2007. *The impact of career-technical educationtransition program practices on student outcomes*. St. Paul: National Research Center for Career and Technical Education, University of Minnesota.
99 Bragg, D., & Barnett, E. Eds. 2006. Academic pathways to and from the community college. *New Directions for Community Colleges*, No. 135. San Francisco: Jossey-Bass.
100 Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D. W., & Bailey, T. R. 2007. *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states*. St. Paul, MN: National Research Center for Career and Technical Education; Kim, J. 2006. *The impact of dual and articulated credit on college readiness and total credit hours in four selected community colleges*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign; Lekes, N., Bragg, D., Loeb, J., Oleksew, C., Mazsalek, J., Laraviere, M., & Hood, L. 2007. *The impact of career-technical education transition program practices on student outcomes*. St. Paul: National Research Center for Career and Technical Education, University of Minnesota.
101 Voorhees, R., & Lingenfelter, R. 2003. *Adult learners and state policy*. Denver, CO: State Higher Education Executive Officers and Chicago, IL: Council for Adult and Experiential Learning.
102 Bosworth, B., Callahan, A., Choitz, V., Davidson, C., Hoops, J., Kazis, R., & McLeod, A. 2007. *Adult learners in higher education: Barriers to success and strategies to improve results*. Boston: Jobs for the Future.
103 Levy, F., & Murnane, R. 2005. *The new division of labor: How computers are creating the next job market*. Princeton, NJ: Princeton University Press.
104 Prince, D., & Jenkins, D. 2005. *Building pathways to success: Lessons for community college policy and practice from a longitudinal student tracking study. CCRC Brief, 25,* New York: Columbia University, Teachers College, Community College Research Center.
105Professional-technical education (PTE) is used as an umbrella term to refer to career, occupational and workforce education and training programs designed to prepare students for entry or advancement in employment.
106 Grubb, W. N., Badway, N., & Bell, D. 2003. *Community colleges and the equity agenda: The potential of noncredit education*. In B. Townsend, & D. Bragg, Eds. *ASHE reader on community colleges*. Boston, MA: Pearson Custom Publishing, 227-242.

107 Bailey, T., & Morest., V. Eds. 2006. *Defending the community college equity agenda*. Baltimore: John Hopkins Press.
108 Carnevale, A. P. 2000. *Community colleges and career qualifications*. Washington, D.C.: American Association of Community Colleges.
109 Bailey, T. 2009. Rethinking developmental education in community college. CCRC Brief, No. 40. New York: Community College Research Center, Teachers College, Columbia University.
110 Matus-Grossman, L., Gooden, S., Wavelet, M., Diaz, M., & Seuersad, R. 2002. *Opening doors: Student perspectives on juggling work, family, and college*. New York: Manpower Demonstration Research Corporation. (ERIC Document Reproduction Service No. ED471815)
111 Strawn, J. 2007. *Policies to promote adult education and postsecondary alignment*. Washington, D.C. National Commission on Adult Literacy.
112 Jacobs, J. 2007, January. Income equity and workforce development: Balancing the simple earnings scale. *Community College Journal: 77*, 22-24.
113 Hecker, D. E. 2005. Occupational employment projections to 2010. *Monthly Labor Review: 128,* 70.
114 Mazzeo, C., Roberts, B., Spence, S., & Strawn, J. 2006. *Working together: Aligning state systems and policies for individual and regional prosperity*. Brooklyn, N.Y.: Workforce Strategy Center.
115 Bosworth, B., Callahan, A., Choitz, V., Davidson, C., Hoops, J., Kazis, R., & McLeod, A. 2007. *Adult learners in higher education: Barriers to success and strategies to improve results*. Boston: Jobs for the Future.
116 Alssid, J. L., Gruber, D., Jenkins, D., Mazzeo, C., Roberts, B., & Stanback-Stroud, R. 2002. *Building a career pathways system: Promising practices in community college-centered workforce development*. Retrieved from http://www.workforcestrategy.org/publications/ *http://www.workforcestrategy.org/publications/promising_practices.pdf*> on November 1, 2008; Jenkins, D., & Spence, C. 2006. *The career pathways how-to guide*. New York: Workforce Strategy Center; Henle, T., Jenkins, D., & Smith, W. 2005. *Bridges to careers for low-skilled adults*. Chicago, IL: Women Employed, with Chicago Jobs Council, & UIC Great Cities Institute.
117 Bragg, D., Bremer, C., Castellano, M., Kirby, C., Mavis, A., Schaad, D., & Sunderman, J. 2007. *A cross-case analysis of career pathway programs that link low-skilled adults to family-sustaining wage careers*. St. Paul, MN: National Center for Career and Technical Education. Retrieved from *http://136.165.122.102/UserFiles/File/pubs/Career_Pathways.pdf*. on December 14, 2008.
118 Bragg, D., & Barnett, E. 2007. *Promising breakthroughs: Year-one evaluation results of "Breaking Through"*. Boston: Jobs for the Future;s Bragg, D., & Barnett, E. 2009. *Final report of the Charles Stewart Mott Breaking Through Foundation*. Boston: Jobs for the Future.
119 Gray, K. C. & Herr, E. L. 1998. *Workforce education: The basics*. Boston, MA: Allyn and Bacon.
120 Kuchinke, K. P. *2003*. Strengthening ties between career-technical education and human resource development. *Journal of Vocational Education Research 27*(2): 179-197. Kuchinke, K. P. *2004*. Contested domains: Human resource development programs in colleges of education. *Workforce Education Forum 3*(1): 43-60.
121 Kuchinke, K. P. 2007. Birds of a feather? The critique of the North American business school and its implications for educating HRD practitioners. *Human Resource Development Review 6*(2): 111-126.
122 Bartlett, K. R., & McKinney, W. R. 2004. A study of the role of professional development, job attitudes, and turnover among public park and recreation employees. *Journal of Park and Recreation Administration, 24*(4): 63-81; Egan, T. M., Yang, B., & Bartlett, K. R. 2004. The effects of organizational learning culture and job satisfaction on motivation to transfer learning and turnover intention. *Human Resource Development Quarterly, 15*(3): 279-301.
123 Swanson, R. A. & Holton, E. F. 2009. *Foundations of human resource development*. San Francisco, CA: Jossey-Bass.
124 Organisation for Economic Cooperation and Development. 2001. *Investment in human capital through post-compulsary education and training*. OECD Economic Outlook No. 70. Paris: Bureau of Labor Statistics.
125 Copa, G. H. 1992. *A framework for the subject matter of vocational education*. Report No. MDS 095. Berkeley, CA: National Center for Research in Vocational Education.
126 Eurich, N. P. 1990. *The learning industry: Education for adult workers*. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching.
127 American Society for Training and Development (ASTD) 2008. *2008 state of the industry report*. Alexandria, VA: American Society for Training and Development.
128 Eurich, N. P. 1985. *Corporate classrooms: The learning business: A report on education in American business and industry*. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching; Eurich, N. P. 1990. *The learning industry: Education for adult workers*. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching.
129 Bureau of Labor Statistics. 2009. *Occupational outlook handbook 2008-2009 edition: Human resources training and labor relations managers and specialists*. Retrieved from http://www.bls.gov/oco/ocos021.htm on 4-15-09.
130 Bureau of Labor Statistics. 2009. Occupational outlook handbook 2008-2009 edition: Human resources training and labor relations managers and specialists. Retrieved from http://www.bls.gov/oco/ocos021.htm on 5-01-09.
131 Lewis, T. 1998. *Toward the 21st century: Retrospect, prospect for American vocationalism* (Information Series No. 373). Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education; Lynch, R. L. (n.d.). *A vision of high school career and technical education for the 21st century*. Washington, DC: Department of Education, Office of Vocational and Adult Education. Draft Report.
132 Alexander, D., Cahn, S., Slaughter, S., and Traill, S. 2005. *The economic impact of the early care and education industry in Illinois*. Retrieved from *http://www.chicagometropolis2020.org/25_3.htm* on July 1, 2008 . Burton, A., Whitebook, M.,

Young, M., Bellm, D., Wayne, C., & Brandon, R. N. 2002. *Estimating the size and components of the U.S. child care workforce and caregiving population: Key findings from the child care workforce estimate*. Washington, DC: Center for the Child Care Workforce and Human Services Policy Center.

133 Rand Research Briefs: Early childhood interventions: Benefits, costs and savings Retrieved from *http://www.rand.org/pubs/research_briefs/RB5014/index1.html* on Feb. 2, 2009.

134 A. J. Reynolds. 1997. *The Chicago Child-Parent Centers: A Longitudinal Study of Extended Early Childhood Intervention*. Institute for Research on Poverty Discussion Papers 1126-97. Madison, WI: University of Wisconsin Institute for Research on Poverty.

135 Shore, R. 2006. *Preschool for all: High-quality early education for all of Illinois' children*: *Executive summary*. Springfield: Illinois Early Learning Council. Retrieved from *http://www.illinois.gov/gov/elc/reports.cfm* on April 2, 2008.

136 Barnett, W. S., Hustedt, J. T., Friedman, A. H., Boyd, J. S., & Ainsworth, P. 2007. *The state of preschool 2007: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research; Zigler, E., Gilliam, W. S., & Jones, S.M. 2006. *A vision for universal preschool Education*. New York: Cambridge University Press; Schulman, K. & Blank, H. 2007. *A centerpiece of the pre-K puzzle: Providing state prekindergarten in child care centers*. Washington, DC: National Women's Law Center.

137 Fowler, S. A., Bloom, P. J., Talan, T., Beneke, S., Kelton, R. 2008. Who's caring for the kids? The status of early childhood workforce in Illinois—2008. Retrieved from: *http://cecl.nl.edu* on 4-05-09.

138 National Center for Education Statistics. 1997. International Education Expenditure Comparability Study: Final Report. NCES Working Paper No. 97-16. Retrieved from http://nces.ed.gov/pubs97/9716.pdf on 10-1-08.

139 Organization for Economic Cooperation and Development. 2006. Education at a Glance 2006. Retrieved from *http://www.oecd.org/document/52/0,3343,en_2649_39263238_37328564_1_1_1_1,00.html* on 10-1-08.

140 World Bank. (n.d.). Private Education Expenditure. Retrieved from *http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/EXTDATASTATISTICS/EXTEDSTATS/0,,contentMDK:21217413~menuPK:4324086~pagePK:64168445~piPK:64168309~theSitePK:3232764,00.html* on 10-1-08.

141 National Center for Education Statistics. 1997. International Education Expenditure Comparability Study: Final Report. NCES Working Paper No. 97-16. Retrieved from http://nces.ed.gov/pubs97/9716.pdf on 10-1-08.

142 United State General Accounting Office. 1997. School Finance: State Efforts to Reduce Funding Gaps Between Poor and Wealthy Districts. GAO/HEHS Report 97-31. Washington DC.: *ibid*. *GAO*.

143 *Ibid*.

144 Winston, G. 1999. Subsidies, hierarchy and peers: The awkward economics of higher education. *Journal of Economic Perspectives: 13*(1)

145 *ibid*.

146 Ronstadt, Robert. 2009. Don't Fix the Student-Aid System. Kill It. *The Chronicle of Higher Education*.

147 Ronald G. Ehrenberg. 2000. *Tuition Rising: Why College Costs So Much*. Cambridge: Harvard University Press.

148 Alexander, F. King. 2006. *What's Happening to Public Higher Education?* Ed. Ronald G. Ehrenberg. Westport, CT, Praeger and American Council on Education. 338-344.

149 Joint Economic Committee, Chair, Wright Patman. 1969. *The Economics and Financing of Higher Education in the United States*. (Wash. D.C.: Joint Economic Committee Print, 91st Congress.

150 Slaughter, Sheila and Rhoades, Gary. 2004. *Academic Capitalism and the New Economy: Markets, State and Higher Education*. Baltimore: Johns Hopkins University .

151 Benkler, Yochai. 2006. *The Wealth of Networks*: *How Social Production Transforms Markets and Freedom*. Cambridge: Harvard University Press.

152 See *http://www.ced.org/images/library/reports/digital_economy/report_ecom_openstandards.pdf*.

153 See *http://www.oecd.org/dataoecd/35/7/38654317.pdf*.

154 See *http://www.olcos.org/cms/upload/docs/olcos_roadmap.pdf*.

155 See Peters, Michael A. & Britez, Rodrigo. 2008. *Open Education & Education for Openness*, Rotterdam: Sense.

156 American Association of Colleges for Teacher Education. 2009. Report of the Accreditation Task Force: Retrieved from http://www.edweek.org/login.html?source=http://www.edweek.org/ew/rticles/2008/06/18/42aacte_web.html&destination=http://www.edweek.org/ew/articles/2008/06/18/42aacte_web.html&levelId=2100 on 4-30-09.

157 Ball, D. L. & Forzani, F. M. 2007. *What makes education research "educational"?* Educational Researcher. 36 (9): 529-540.

158 Shavelson, Richard J. and Towne, Lisa. 2002. Scientific Research in Education. Washington DC: National Academies Press. Retrieved from http://books.nap.edu/books/0309082919/html on 02-01-09.

159 Quoted in Erikson, Frederick and Kris Gutierrez. 2002. Culture, Rigor and Science in Educational Research. *Educational Researcher*. 31: 1-24.

160 Popkewitz, Thomas S. 2004. Is the National Research Council Committee's Report on Scientific Research in Education Scientific: On Trusting the Manifesto. *Qualitative Inquiry*. 10:62-78.

161 Kalantzis, Mary and Cope, Bill. 2008. *New Learning: Elements of a Science of Education*. Cambridge UK: Cambridge University Press.

162 Darling-Hammond, L. 2009. The 2009 Charles W. Hunt Lecture, presented at the annual meeting of the American Association of Colleges of Teacher Education, Chicago, IL, February 8, 2009.

163 Zeichner, K. 2006. Reflections of a university-based teacher educator on the future of college- and university-based teacher education. *Journal of Teacher Education, 57*(3): 326; Imig, D., & Imig, S. 2008. From traditional certification to competitive certification: a twenty-five year retrospective. In Cochran-Smith, M., Feiman-Nemser, S., McIntyre, D. and Demers, K. Eds. *Handbook of research on teacher education*. New York: Routledge, 886-907.

164 Laczko-Kerr, I., & Berliner, D. 2002. The effectiveness of Teach for America and other under-certified teachers on student academic achievement: A cast of harmful public policy. Education Policy Analysis Archives: 10 (37); Kane, T.E., Rockoff, J.E., & Staiger, D.O. 2006. What does certification tell us about teacher effectiveness: Evidence from New York City. Working Paper 11844 Cambridge, MA: National Bureau of Economic Research.

165 Zumwalt, K., & Craig, E. 2005. Teachers' characteristics: Research on the indicators of quality. In M. Cochran-Smith & K. Zeichner. Eds. *Studying teacher education: the report of the AERA panel on research and teacher education*. Washington, DC: American Educational Research Association, 157-260. Wilson, S. & Tamir, E. 2008. The evolving field of teacher education: how understanding challenge(r)s might improve the preparation of teachers. In M. Cochran-Smith, S. Feiman-Nemser, D. McIntyre & K. Demers. Eds. *Handbook of research on teacher education*. New York: Routledge, 908-936. Zeichner, K., & Conklin, H. 2005. Teacher education programs as sites. In M. Cochran-Smith & K. Zeichner. Eds. *Studying teacher education: the report of the AERA panel on research and teacher education*. Washington, DC: American Educational Research Association, 645-736.

166 Darling-Hammond, L. 2009. Zumwalt, K. and Craig, E. 2005.

167 Darling-Hammond, L., Holtzman, D., Gatlin, S.J., & Helig, J.V. 2005. Does teacher preparation matter? Evidence about teacher certification, Teach for America, and teacher effectiveness. *Education Policy Analysis Archives: 13*(42); Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wyckoff, J. 2006. How changes in entry requirements alter the teacher workforce and affect student achievement. *Education Finance and Policy*. *1*(2): 176-216.

168 Darling-Hammond, L. 2006. Constructing 21st century teacher education. *Journal of Teacher Education*. *57*(3): 300; Imig, D., & Imig, S. 2006. What do beginning teachers need to know? *Journal of Teacher Education*. *57*(3): 286; Ball, Deborah. 2008. The work of teaching and the challenge for teacher education. The 2008 Charles W. Hunt Lecture, presented at the annual meeting of the American Association of Colleges of Teacher Education, February 9, 2008, in New Orleans, LA.

169 Finn, J. D., Achilles, C.M. 1990. Answers and questions about class size: A statewide experiment. *American Educational Research Journal* 28: 557-577; Folger, J., Breda, C. 1989. Evidence from Project STAR about class size and student achievement. *Peabody Journal of Education 67*: 17-33; Krueger, A. B. 1999. Experimental estimates of education production functions. *Quarterly Journal of Economics 114*(2): 497-532.

170 U.S. Department of Education. 2004. National Center for Education Statistics, *Digest of Education Statistics, 2004*, based on the Common Core of Data (CCD) surveys. Washington, D.C.

171 U.S. Department of Education, National Center for Education Statistics. 2001. Schools and Staffing Survey (SASS), Public, Public Charter, and Private School and Teacher Surveys. 1999–2000. Washington, D.C.

172 *ibid*.

173 U. S. Department of Education, National Center for Education Statistics. 2001. Overview of Public Elementary and Secondary School Districts: School Year 1999-2000. NCES Report 2001-339R. Washington, DC.

174 *Ibid*.

175 Organization for Economic Cooperation and Development. 2005. *Education at a Glance: OECD Indicator*. *Vol*. 15:1-435. Washington, D.C.

176 Lane, K. L., Weisenbach, J. L., Little, M. A., Phillips, A., & Wehby, J. 2006. Illustrations of function-based interventions implemented by general education teachers: Building capacity at the school site. *Education and Treatment of Children*. *29:* 549-671.

177 Sprague, J. R., and Walker, H. M. 2005. *Safe and healthy schools: Practical Prevention Strategies*. New York , New York : Guilford Press.

178 Snyder, Howard N., and Melissa Sickmund. 2006. Juvenile Offenders and Victims: 2006. National Report. Washington, D.C.: Office of Juvenile Justice and Delinquency Prevention. NCJ 212906.

179 Dinkes, R., Cataldi, E.F., & Lin-Kelly, W. 2007. *Indicators of School Crime and Safety: 2007* (NCES 2008-021/NCJ 219553. Washington, DC. National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, and Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice.

180 Elliott, D.S., Hamburg, B.A., and Williams, K.R. 1998. Violence in American Schools: An Overview. In Elliott, D.S., Hamburg, B.A., and Williams, K.R. Eds. *Violence in American Schools*. 3–28. New York: Cambridge University Press.

181 Robert D. Putnam. 2000. *Bowling Alone : The Collapse and Revival of American Community*. New York: Simon & Schuster.

182 Richard Sennett. 2007. *The Culture of the New Capitalism,* Yale University Press; Richard Sennett. 1992. *The Fall of Public Man*. New York: Alfred Knopf.

183 Bauman, Z. 1992. *Intimations of Postmodernity*. London: Routledge.

184 Dewey, John and McDermott, John J. 1981. *The Philosophy of John Dewey*. London: Routledge.

185 *http://ed.uiuc.edu/uli/* ; Cope, Bill and Kalanatis, Mary. Eds. 2009. "Ubiquitous Learning." Champaign IL: University of Illinois Press.

186 Bozionelos, N. 2004. Socio-economic background and computer use: The role of computer anxiety and computer experience in their relationship. *International Journal of Human-Computer Studies 61:* 725-746; Chakraborty, J., & Bosman, M. M. 2005. Measuring the digital divide in the United States: Race, income, and personal computer ownership. *Professional*

Geographer 57: 395-410; Haythornthwaite, C. 2007. Digital divide and e-learning. In R. Andrews & C. Haythornthwaite. Eds. *The Sage handbook of e-learning research* 97-118. London: Sage.

187 Eamon, M. K. 2004. Digital divide in computer access and use between poor and non-poor youth. *Journal of Sociology & Social Welfare. 31:* 91-112; Hacker, K. L., & Steiner, R. 2002. The digital divide for Hispanic Americans. *Howard Journal of Communications. 13:* 267-283; Kalyanpur, M., & Kirmani, M. H. 2005. Diversity and technology: Classroom implications of the digital divide. *Journal of Special Education Technology. 20*(4): 9-18; Servon, L. J., & Nelson, M. K. 2001. Community technology centers: Narrowing the digital divide in low-income, urban communities. *Journal of Urban Affair. 23:* 279-290.

188 Huang, J., & Russell, S. 2006. The digital divide and academic achievement. *The Electronic Library. 24:* 160-173.

189 Brown, M. R., Higgins, K., & Hartley, K. 2001. Teachers and technology equity. *Teaching Exceptional Children. 33*(4): 32-39; Swain, C., & Pearson, T. 2002. Educators and technology standards: Influencing the digital divide. *Journal of Research on Technology in Education. 34:* 326-335; Warschauer, M., Knobel, M., & Stone, L. 2004. Technology and equity in schooling: Deconstructing the digital divide. *Educational Policy 18:* 562-588.

190 Page, M. S. 1998. Conflicts of inequity: Educational technology in America. *Computers in the Schools. 14:* 137-153; Page, M. S. 2002. Technology-enriched classrooms: Effects on students of low socioeconomic status. *Journal of Research on Technology in Education. 34:* 389-409.

191 Glenn, A. D., & Kaviani, K. 2006. Political socialization, technology, and schools. *International Journal of Social Education. 21*(1): 1-17; Kim, S. 2003. The impact of unequal access to the internet on earnings: A cross-sectional analysis. *Perspectives on Global Development and Technology. 2:* 215-236; Mehra, B., Merkel, C., & Bishop, A. P. 2004. The internet for empowerment of minority and marginalized users. *New Media and Society. 6:* 781-802; Waring, S. M. 2006. The agentic power of the internet. *International Journal of Social Education. 21*(1): 59-72; VanFossen, P. J., & Berson, M. J. Eds. 2008. *The electronic republic: The impact of technology on education for citizenship*. West Lafayette, IN: Purdue University Press.

192 Cuban, Larry. 2001. *Oversold and Underused: Computers in the Classroom*. Cambridge, MA: Harvard University Press.

193 See GenYes *http://www.genyes.com/*

194 Pflaum, William D. 2004. *The Technology Fix: the Promise and Reality of Computers in Our Schools*. Alexandria, VA: Association for Supervision and Curriculum Development*;* Rose, D. H. & Meyer, A. 2002. *Teaching every student in the digital age*. Alexandria, VA: Association for Supervision and Curriculum Development.

195 Torres., M.N. & Mercado, M. 2007. The need for critical media literacy in teacher education. In Macedo, M. & Steinberg, S. Eds., *Media Literacy*. NewYork: Lang.

196 Pew Internet: Teens Forge Forward with the Internet and Other New Technologies. 2005, July 25. Retrieved October 23, 2007, from http://www.pewinternet.org/press_release.asp?r=109.

197 Forrester Research. 2007, July 11. Retrieved from *http://www.forrester.com/ER/Research/Survey/Excerpt/1,5449,535,00.html*. On October 23, 2007.

198 Espelage, D., & Horne, A. 2008. School violence and bullying prevention: From research based explanations to empirically based solutions. In S. Brown and R. Lent (Eds.), *Handbook of counseling psychology*, 4th edition (pp. 588 - 606. Hoboken, NJ: John Wiley and Sons; Ybarra, M.L., Espelage D.L., & Mitchell, K. 2007. The co-occurrence of Internet harassment and unwanted sexual solicitation victimization and perpetration: Associations with psychosocial indicators. *Journal of Adolescent Health*. 41: S31-S41; Ybarra, M. L., & Mitchell, K. J. 2004a. Youth engaging in online harassment: associations with caregiver-child relationships, Internet use, and personal characteristics. *Journal of Adolescence. 27*: 319 - 336; Willard, N. E. 2007. *Cyberbullying and cyberthreats: Responding to the challenge of online social aggression, threats, and distress*. Champaign, IL.: Research Press:

199 Ybarra, M. L., & Mitchell, K. J. 2004. Online aggresssors/targets, aggressors, and targets: a comparison of associated youth characteristics. *Journal of Child Psychology and Psychiatry. 45:* 1308 - 1316.

200 Finn, J. 2004. A survey of online harassment at a university campus. *Journal of Interpersonal Violence. 19*: 468 – 483; Patchin, J. W., & Hinduja, S. 2006. Bullies move beyond the schoolyard: A Preliminary Look at Cyberbullying. *Youth Violence & Juvenile Justice. 4*: 148 -169.

201 Kowalski, R. M., Limber, S. P., & Agatston, P. W. 2008. Cyber Bullying: Bullying in the Digital Age. Malden, MA: Blackwell Publishing.

202 Shift, K., McCloud, S. & XPlane. 2006. Did You Know? Retrieved from [http://www.youtube.com/watch?v=k-8DRPCJ86U&feature=related] on 2-15-09.

203 Fobes. 2006. Retrieved from http://www.forbes.com/2006/05/20/jobs-future-work_cx_hc_06work_0523jobs.html on 03-20-09.

204 Zappola, 2007. Where will the jobs be in 2012? Retrieved from http://www.msnbc.msn. com/id/20284970/ on 3-4-09; Toffler, A. 1970. *Future Shock*. New York: Random House.

205 Illinois Informatics Institute, Indiana School of Informatics, Healthcare Informatics, University of California at Irvine.

206 Jacobson, M. J., & Spiro, R. J. 1995. Hypertext learning environments, cognitive flexibility, and the transfer of complex knowledge: An empirical investigation. *Journal of Educational Computing Research. 12*: 301-333.

207 Greenes, R.A. and Shortliffe, E.H. 1990 Medical Informatics: An emerging discipline with academic and institutional perspectives. *Journal of the American Medical Association*. 263(8): 1114–20.

208 Presky, M. 2009. H. Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom. *Innovate*. 5(3). Nova Southeastern University Press: Miami Beach Florida. Available online at: http://innovateonline.info/.

209 Pink, D. 2009. The Problem with Problems. Retrieved from http://www.danpink.com/archives/2009/01/ the-problem-with-problems on 3-18-09.
210 Johnson, L., Levine, A., & Smith, R. 2009. *The 2009 Horizon Report*. Austin, Texas: The New Media Consortium.
211 Kalantzis, Mary. 2004. Waiting for the Barbarians: 'Knowledge Management' and 'Learning Organisations'. *International Journal of Knowledge, Culture and Change Management* 4:1827-1833. Cope, Bill and Mary Kalantzis. 2002. Manageable Knowledge: Communication, Learning and Organisational Change. Pp. 1-15 in *Developing Knowledge Workers in the Printing and Publishing Industries: Education, Training and Knowledge Management in the Publishing Supply Chain, from Creator to Consumer*, vol. 4, B. Cope and R. Freeman, Eds., Melbourne: Common Ground.
212 Kemmis, Stephen and Mervyn Wilkinson. 1988. Participatory Action Research and the Study of Practice in *Action Research in Practice: Partnership for Social Justice in Education*, Ed., B. Atweh, S. Kemmis, and P. Weeks, 21. London: Routledge. http://education.qld.gov.au/students/advocacy/equity/gender-sch/action/action-cycle.html See extract at NewLearningOnline.com
213 *http://L-by-D.com*; Kalantzis, Mary and Bill Cope. 2005. *Learning by Design*. Melbourne: Victorian Schools Innovation Commission. Kalantzis, Mary and Bill Cope. 2008. *New Learning: Elements of a Science of Education*. Cambridge UK: Cambridge University Press.
214 Lane, Homer and Neill, Alexander S. 1960. *Summerhill: A Radical Approach To Child Rearing,* Oxford, Hart Publishing; Rogers, Carl. 1969. *Freedom to Learn,* Columbus, OH: Charles Merrill; Illich, Ivan. 1972. *Deschooling Society,* New York, Harrow Books.
215 See, for example, the Indian Open Schooling Network (IOSN) at *http://www.nos.org/iosn.htm*, the National Institute of Open Schooling at *http://www.nos.org/*, and Open School BC (British Columbia) at *http://www.pss.gov.bc.ca/osbc/*.
216 Retrieved from *http://www.ocwconsortium.org/index.php?option=com_content&task= view&id=15&Itemid=29* on 4/17/09.
217 See the OpenCourseWare Consortium for the full list of participating countries and list of courses at *http://www.ocwconsortium.org/*.
218 The fulldeclaration can be found at *http://www.capetowndeclaration.org/read-the-declaration*.
219 See Peters, Michael A. and Britez, Rodrigo. 2008. *Open Education and Education for Openness*, Rotterdam, Sense, Iiyoshi, Toru and M. S. Vijay Kumar. 2008. *Opening Up Education: The Collective Advancement of Education through Open Technology, Open Content, and Open Knowledge*. Cambridge MA: MIT Press.
220 Gee, James Paul. 2003. *What Video Games Have to Teach Us about Learning and Literacy*. New York: Palgrave Macmillan. 2004. *Situated Language and Learning: A Critique of Traditional Schooling*. London: Routledge. 2005. *Why Video Games are Good for Your Soul: Pleasure and Learning*. Melbourne: Common Ground; Jenkins, Henry. 2006. "Confronting the Challenges of Participatory Culture: Media Education for the 21st Century." John D. and Catherine T. MacArthur Foundation, Chicago. 2006b. *Fans, Bloggers and Gamers: Exploring Participatory Culture*. New York: NYU Press; Kalantzis, Mary. 2006. Changing Subjectivities, New Learning. *Pedagogies: An International Journal* 1:7-12; Cope, Bill and Mary Kalantzis. 2009. *Ubiquitous Learning*. Champaign IL: University of Illinois Press.
221 National Science Board. 2001. *Toward a more effective role for the U.S. government in international science and engineering*. Arlington, VA: National Science Foundation, p7.
222 Galama, T., & Hosek, J. 2008. *U.S. competitiveness in science and technology*. Santa Monica, CA: RAND Corporation.
223 National Science Board. 2007. *National action plan for addressing the critical needs of the U.S. science, technology, engineering, and mathematics education system*. Arlington, VA: National Science Foundation.
224 National Commission on Mathematics and Science Teaching for the 21st Century. 2000. *Before it's too late*. Jessup, MD: Education Publications Center.
225 National Center for Education Statistics, U.S. Department of Education. 2000. *Pursuing excellence: comparisons of international eighth-grade mathematics and science achievement from a U.S. perspective, 1995 and 1999*. Gonzales, P., Calsyn, C., Joceyln, L., Mak, K., Kastberg, D., Arafeh, S., Williams, T., & Tsen, W. NCES 2001–2008. Washington, DC: U.S. Government Printing Office.
226 National Center for Education Statistics, U.S. Department of Education. 2004. *Highlights from the trends in international mathematics and science study (TIMMS) 2003*. Gonzales, P., Guzman, J. C., Partelow, L., Pahlke, E., Jocelyn, L., Kastberg, D., & Willilams, T. NCES 2005 –005. Washington, DC: U.S. Department of Education.
227 National Center for Education Statistics, U.S. Department of Education. 2008. *Highlights from TIMMS 2007: Mathematics and science achievement of U.S. fourth and eighth-grade students in an international context*. Gonzales, P., Williams, T., Jocelyn, L., Roey, S., Kastberg, D., & Brenwald, S. NCES 2009–2010. Washington, DC: U.S. Department of Education.
228 American Association of University Women. 1994. *Shortchanging girls, shortchanging America: Executive summary: A nationwide poll that assess self-esteem, educational experiences, interest in math and science, and career aspirations of girls and boys ages 9–15*. Washington, DC: Author.
229 Lee, O., & Luykx, A. 2006. *Science education and student diversity: Synthesis and research agenda*. New York: Cambridge University Press.
230 Committee on Prospering in the Global Economy of the 21st Century: An Agenda for American Science and Technology, National Academy of Sciences, National Academy of Engineering, Institute of Medicine. 2007. *Rising above the gathering storm: Energizing and employing American for a brighter economic future*. Washington, DC: National Academy Press.
231 Ingersoll, R. M. 2006. Understanding supply and demand among mathematics and science teachers. In J. Rhoton & P. Shane Eds., *Teaching science in the 21st century*. Arlington, VA: National Science Teachers Association Press, 147-162.

232 Darling-Hammond, L., & Hudson, L. 1990. Pre-college science and mathematics teachers: Supply, demand and quality. In C. B. Cazden Ed, *Review of research in education* Vol. 16. Washington, DC: American Educational Research Association, 223-264; Ferguson, R. F. 1991. Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation. 28:* 465-498; Shavelson, R., McDonnell, L., & Oakes, J. 1989. *Indicators for monitoring mathematics and science education*. Santa Monica, CA: RAND Corporation.

233 National Commission on Mathematics and Science Teaching for the 21st Century. 2000. *Before it's too late*. Jessup, MD: Education Publications Center, 7.

234 Ingersoll, R. M. 1999. The problem of under qualified teachers in American secondary schools. *Educational Researcher. 28*(2): 26-37; Sanders, W. L., & Rivers, J. C. 1996. *Cumulative and residual effects of teachers on future students academic achievement*. Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center.

235 Committee on Prospering in the Global Economy of the 21st Century: An Agenda for American Science and Technology, National Academy of Sciences, National Academy of Engineering, Institute of Medicine. 2007. *Rising above the gathering storm: Energizing and employing American for a brighter economic future*. Washington, DC: National Academy Press.

236 Darling-Hammond, L., Bransford, J., LePage, P., Hammerness, K., & Duffy, H. Eds. 2007. *Preparing teachers for a changing world: What teachers should learn and be able to do*. San Francisco, CA: Jossey-Bass

237 American Association for the Advancement of Science. 1990. *Science for all Americans*. New York: Oxford University Press; American Association for the Advancement of Science. 2001. *Atlas of science literacy*. New York: Oxford University Press; National Research Council. 1996. *National science education standards*. Washington, DC: National Academic Press.

238 Allington, R. S. & Walmsley, S. Eds. 1995. *No quick fix: Rethinking literacy programs in America's elementary schools*. New York: Teachers College Press; Weaver, C., Ed. 1998. *Reconsidering a balanced approach to reading*. Urbana, IL: National Council of Teachers of English.

239 Hoffman, J. V. & McCarthey, S. J. 2000. Our principles and our practices. In Hoffman, J.V, Baumann, J. F., & Afflerbach, P. *Balancing principles for teaching elementary reading*. Mahwah, NJ: Erlbaum.

240 Tompkins, G. E. 2003. *Literacy for the 21st Century*. Upper Saddle River, NJ:Pearson.

241 Guzzetti, B., & Gamboa, M. 2004. Zines for social justice: Adolescent girls writing on their own. *Reading Research Quarterly*. 39: 408-437; Langer, J. 2001. Beating the odds: Teaching middle and high school students to read and write well. *American Educational Research Journal*. *38*, 4: 837-880; Moje, E.B. 2002. Re-framing adolescent literacy research for new times: Studying youth as a resource. *Reading Research and Instruction*. *41*: 211- 228; National Council of Teachers of English. 2007. Adolescent Research Brief.

242 National Council of Teachers of English. 2008. Writing Now: A Policy brief.

243 Dyson, A. 1991. *The social worlds of children learning to write*. New York: Teachers College Press; McCarthey, S. J. 2007. Four metaphors for the composing process. In L. Bresler (Ed.) *International handbook on research in arts education*. Netherlands: Springer.

244 Comber, B. 2001. Classroom explorations in critical literacy. In H. Fehring & P. Green, Eds., *Critical literacy*. Newark, DE: International Reading Association, 90-102; Fairbanks, C. 1997. Writing for our lives: Literacy through social and cultural inquiry. *Teacher Education and Practice*. 13 (1): 52-63.

245 Ball, A. F. 2006. Teaching writing in culturally diverse classrooms. In C. A. MacArthur, S. Graham, & J. Fitzgerald. Eds., *Handbook of Writing Research*. New York: Guilford Press, 293-310.

246 ERIC. 1989. *Cases in literacy: An agenda for discussion*. Newark, DE: International Reading Association and the National Council of Teachers of English; Langer, J. A. Ed. 1987. *Language, literacy, and culture: Issues of society and schooling*. Norwood, NJ: Ablex.

247 Alvermann, D. E., Hinchman, K., A., Moore, D. W., Phelps, S. F., & Waff, D. R. 2006. Eds. *Reconceptualizing the literacies in adolescents' lives*. Mahwah, NJ: Erlbaum; Dressman, M., McCarthey, S. J., & Prior, P. 2009. Editor's Introduction. *Research in the Teaching of English*. 44 (2); Gee, J. 2000. Teenagers in new times: A new literacy perspective. *Journal of Adolescent and Adult Literacy 43*: 412-420; Kress, G. 2003. *Literacy in the new media age*. London: Routledge; New London Group. 1996. A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*. *6* (1): 60-92.

248 Grunwald Associates 2003. Connected to the future: A report on children's Internet use from the Corporation for Public Broadcasting. Retrieved from http://www.cpb. org/stations/reports/connected/connected_report.pdf on July 18, 2007; National Telecommunications and Information Administration. 1999. Falling through the Net: Defining the digital divide. Washington, DC: U.S. Department of Commerce. Retrieved on from http://www.ntia.doc.gov/ntiahome/fttn99/appendix. html#e on July 18, 2007. Norris, C., Sullivan, T., Poirot, J., & Soloway, E. 2003. No access, no use, no impact: Snapshot surveys of educational technology in K-12. *Journal of Research on Computing in Education*. 36(1): 15-28; Waldman, J.A. 2007. Acknowledging criteria: A look at research and reality of children's digital libraries. Retrieved from http://etd.ils.unc.edu:8080/dspace/handle/1901/ 398?mode=simple on August 20, 2007. Wells, J., & Lewis, L. 2006. Fast/Facts: Internet Access in U.S. Public Schools and Classrooms: 1994-2005 (NCES 2007-020). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from http://nces.ed.gov/fastfacts/display.asp?id=46Wells on July 30, 2007. Wells, J., and Lewis, L. 2006. Internet access in U.S. public schools and classrooms: 1994-2005 (NCES 2007-020). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubs2007/2007020.pdf. on August 3, 2007.

249 Hall, L. S. 2009. Research in the Teaching of English, 44 (2); Bezemer, J. & Kress, G. 2008. Writing in multi-modla texts: A social semiotic account of designs for learning. *Written Communication*, *25* (2), 166-195; Ranker, J. 2008. A case study of digital video production in a fifth grade classroom. *Written Communication*, *25* (2), 196-234.

250 Moje, E. 2009. Standpoint: *Research in the Teaching of English*. 44 (2).
251 National Council of Teachers of English. 2008. 21st Century Literacies: A Policy Brief.
252 Baumol, William J. 2002. *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*. Princeton, NJ: Princeton University Press; Cowen, Tyler. 2002. *Creative Destruction: How Globalization is Changing the World's Cultures*. Princeton, NJ: Princeton University Press; Lash, Scott and John Urry. 1994. *Economies of Signs and Space*. Thousand Oaks, CA: Sage.
253 Florida, Richard. 2002. *The Rise of the Creative Class*. New York: Basic Books; Howkins, John. 2001. *The Creative Economy: How People Make Money from Ideas*. London: Allen Lane; Landry, Charles. 2000. *The Creative City: A Toolkit for Urban Innovators*. U.K.: Earthscan.
254 Cowen, Tyler. 2002. *Creative Destruction: How Globalization is Changing the World's Cultures*. Princeton, NJ: Princeton University Press; Shapiro, Carl and Hal Varian. 1998. *Information Rules: A Strategic Guide to the Network Economy*. Cambridge, MA: Harvard Business School Press; Davenport, Thomas and John Beck. 2001. *The Attention Economy: Understanding the new economy of business*. Cambridge, MA: Harvard Business School Press; Hughes, Justin 1988. *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287, 337- 44; Netanel, Neil W. 1998. *Asserting Copyright's Democratic Principles in the Global Arena*, 51 VAND. L. REV. 217, 272-76; Netanel, Neil W. 1996. *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283, 347-62; Gordon, Wendy J. 1993. *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 YALE L.J. 1533, 1568-72; Lemley, Mark A. 2005. *Property, Intellectual Property, And Free Riding*, 83 Tex. L. Rev. 1031, 1031; R. Polk Wagner, 2003. *Information Wants To Be Free: Intellectual Property And The Mythologies Of Control*, 103 *Colum. L. Rev*. 995, 1001-03.
255 Blythe, Mark. 2000. 'Creative Learning Futures: Literature Review of Training & Development Needs in the Creative Industries.' http: //www.cadise.ac.uk/projects/creativelearning/New_Lit.doc.
256 See The Center for Accelerated learning. Retrieved from *http://www.alcenter.com/* on 4-30-09; see e.g., *The Framework for Gifted Education* at *http://education.qld.gov.au/publication/production/ reports/pdfs/giftedandtalfwrk.pdf*.
257 Caves, Richard E. 2000. *Creative Industries: Contracts Between Art and Commerce*. Cambridge, Mass: Harvard University Press; Frey, Bruno. 2000. Arts and Economics: Analysis and Cultural Policy. New York: Springer; Frey, Bruno S. and Werner W. Pommerehne. 1989. Muses and Markets: Explorations in the Economics of the Arts. Cambridge, Mass: Blackwell; Ginsburgh, Victor A. and Pierre-Michel Menger. Eds. 1996. *Economics of the Arts*. Amsterdam: North Holland; Heilbrun, James and Charles M. Gray. 2001. *The Economics of Art and Culture*. New York: Cambridge University Press, 2 edition; Hesmondhalgh, Desmond. 2002. *The Cultural Industries*. Thousand Oaks, CA: Sage.
258 For innovation theory see the Swedish economist Bengt-Åke Lundvall's webpage at *http://www.business.aau.dk/ike/members/bal.html* and especially his concept of 'the learning economy'; see also Globelics, The Global Network For The Economics Of Learning, Innovation,
And Competence Building Systems at http://www.globelics.org/.
260 See Stiglitz, Joseph E. 1999. 'Knowledge as a Global Public Good' *Global Public Goods*, July 1999 , pp. 308-326(19); Verschraegen, Gert & Schiltz, Michael 2007. Knowledge as a Global Public Good: The Role and Importance of Open Access. *Societies without Borders*, Volume 2, Number 2, 2007: 157-174.
261 Brown, John Seely and Paul Duguid. 2000. *The Social Life of Information*. Boston: Harvard Business School Press; Tapscott, Don and Anthony Williams, 2006. *Wikinomics: How Mass Collaboration Changes Everything*. New York: Portfolio (Penguin); Surowiecki, James 2004. *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations*. New York: Doubleday.
262 McGuinn, Patrick J. 2006. *No Child Left Behind and the Transformation of Federal Education Policy, 1965-2005*. Lawrence KS: University Press of Kansas; Sunderman, Gail L., James S. Kim, and Gary Orfield. 2005. *NCLB Meets School Realities: Lessons from the Field*. Thousand Oaks CA: Corwin Press; Abernathy, Scott Franklin. 2007. *No Child Left Behind and the Public Schools*. Ann Arbor MI: University of Michigan Press.
263 Gallagher, C. J. 2003. Reconciling a tradition of testing with a new learning paradigm. *Educational Psychology Review*, 15 (1): 83-99; Matthews, J. 2006. Just Whose Idea Was All This Testing? The New York Times, November 14.
264 Tyack D. 1974. *The One Best System*: *A History of American Urban Education*. Cambridge: Harvard University Press; Ravitch, D. 2002. A Brief History of Testing and Accountability. Hoover Institution. Retrieved from *http://www.hoover.org/publications/digest/4495866.html* on 10-2-08.
265 Ravitch, D. 2002. A Brief History of Testing and Accountability. Hoover Institution. Retrieved from *http://www.hoover.org/publications/digest/4495866.html* on 10-2-08; Emery, K., & Ohanian, S. 2004. *Why is corporate America bashing our public schools?*. Portsmouth, NH: Reed Elsevier, Inc.
266 Stiggins, R.J. 2005. Assessment Crisis: The Absence of Assessment FOR Learning. *Phi Delta Kappan*. *83*,10: 758-765.
267 Darling-Hammond, L. 2007. Race, inequality and educational accountability: The irony of No Child Left Behind. *Race Ethnicity and Education*, *10* (3), 245-260.
268 Allen, J., Altwerger, B., Edelsky, C. Larson, J., Rios-Aguilar C., Shannon, P. et. al. 2007. Taking a stand on NCLB. *Language Arts*. *84* (5): 456-464. Krashen, S. 2006. Did Reading First work? Retrieved from http://www.elladvocates.org/issuebriefs/Krashen_reading_first.pdf on July 16, 2008.
269 Mixed Reactions to NCLB. 2005. *Reading Teacher*. *22*(4): pp. 1, 4.
270 Sunderman, G. L. 2006. *The unraveling of No Child Left Behind: How negotiated changes transform the law*. Cambridge, MA: The Civil Rights Project at Harvard University.

271 Fuller, B., Wright, J., Gesiki, K., and Kang, E. 2007. Gauging growth: How to judge No Child Left Behind. *Educational Researcher*. *36* (5): 268-278.
272 Darling Hammond, L. 2005. Race, inequality and educational accountability: The irony of No Child Left Behind. *Race Ethnicity and Education*. *10* (3): 245-260.
273 McCaslin, M. 2006. Student motivational dynamics in the era of school reform. *Elementary School Journal, 106*: 479-490.
274 Center on Education Policy. 2007. Choice, changes, and challenges: Curriculum and instruction in the NCB era. Washington D.C.: Author; McCarthey, S. J. 2008. The impact of No Child Left Behind on teachers' writing instruction. *Written Communication*. *25* (4): 462-505.
275 Finnigan, K. S., & Gross, B. 2007. Do accountability sanctions influence teacher motivation? Lessons from Chicago's low-performing schools. *American Educational Research Journal*. *44* (3): 594-629.
276 Valli, L. & Bueses, D. 2007. The changing roles of teachers in an era of high-stakes accountability. *American Educational Research Journal*. *44*(3): 519-558.
277 Parsons, M., Melissa Wilson, and the Teachers at Park Street Elementary. 2007. *Success Stories from a Failing School: Teachers Living under the Shadow of NCLB*. Charlotte, NC: Information Age Publishing; Harper, C., Platt, E., Naranjo, C., & Boynton, S. 2007. Marching in unison: Florida ESL teachers and No Child Left Behind. *TESOL Quarterly*: 642-651.
278 Reauthorization of the Elementary and Secondary Education Act. National Council of Teachers of English. Retrieved from http://www.ncte.org/positions/statements/2008legisplatform on February 21, 2009.
279 Cole,N.S. & Zieky, M.J. 2001. The new faces of fairness. *Journal of Educational Measurement*. *38* (4): 369-382.
280 Ryan, K.E. 2008 *Fairness Issues and Educational Accountability*. In K.E. Ryan & L. Shepard, Eds., *The futures of test-based educational accountability,* 191-208). New York, NY: Routledge.
281 Mislevy, R.J. 2006. Cognitive psychology and educational assessment. In R.L. Brennan, Ed., *Educational measurement*, 257-305). Westport, CT: American Council on Education / Praeger.
282 National Research Council. 2001. *Knowing what students know: The science and design of educational assessment*. Committee on the Foundations of Assessment. In J.Pellegrino, N. Chudowsky, & R. Glaser, Eds. Board on Testing and Assessment, Center for Education, Division of Behavior and Social Sciences and Education. Washington, DC: National Academy Press.
283 Quellmalz, E.S. & Pellegrino, J.W. 2009. Technology and testing. *Science*. *323*: 75-79.
284 Berkeley Evaluation & Assessment Research Center. The BEAR assessment system: A brief summary for the classroom context. Retrieved from http:// bearcenter.berkeley.edu on 02/10/2009.
285 Bandalos, D.L. 2004. Can a teacher-led state assessment system work? *EducationalMeasurement: Issues and Practice*. *Summer,* 33-40.
286 Brooks, R and Tough, S. 2006 *Assessment and Testing: making space for teaching and learning* London: Institute for Public Policy Research
287 Black, P., & Wiliam, D. 1998. Assessment and classroom learning. *Assessment in Education: Principles, Policy, and Practice*. *5*(1): 7–74.
288 Shepard, L. 2006. *Classroom assessment: Caveat Emptor*. In R.L. Brennan Ed. *Educational measurement*, 623-646. Westport, CT: American Council on Education / Praeger.
289 Stiggins, R. J. 2002. Assessment crisis! The absence of assessment for learning. *Phi Delta Kappan*. *83(*10): 758-765.
290 Shepard, L. 2000. *The role of classroom assessment in teaching and learning*. CSE Technical Report 517, Center for the Study of Evaluation, National Center for Research on Evaluation, Standards, and Student Testing.(CRESST). Los Angeles:University of California. Retrieved on February 12, 2009.
291 Sadler, R. 1989. Formative assessment and the design of instructional systems. *Instructional Science*. *18*: 1-25.
292 Education Equality Project. 2008, (*http://www.educationequalityproject.org/)*; Ladd, Helen F., Noguera, Pedro, Payzant, Tom et al. 2007, "A Broader, Bolder Approach to Education", (*http://www.boldapproach.org/)*
293 Kalantzis, Mary and Bill Cope. 2008. *New Learning: Elements of a Science of Education*. Cambridge UK: Cambridge University Press. Chapter 5.
294 Day J, Newburger E. 2002. "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings". U.S. Census Bureau. Retrieved from *http://www.census.gov/prod/2002pubs/ p23-210.pdf* on 11-11-2006.
295 Bernstein, J., & Mishel, L. 2007. *Economy's gains fail to reach most workers' paychecks*. Briefing Paper No. 195. Washington, DC: Economic Policy Institute.
296 Wheeler, C. 2005b. Wage gap widens, especially in cities. *The Regional Economist*. Retrieved from *http://www.stls.frb.org/publications/re/2005/a/pages/wage_gap.html* on 4-4-08.
297 Krueger, A. 2002. Inequality, too much of a good thing. *Alvin Hansen Symposium on Public Policy*. Retrieved from *www.irs.princeton.edu/pubs/pdfs/inequality4.pdf* on 2-2-08
298 Mishel, L., Bernstein, J., & Allegretto, S. 2005. State of Working America 2004-05. Washington, D.C.: Economic Policy Institute.
299 Mishel, L., Bernstein, J., & Allegretto, S. 2007. *State of Working America 2006-07*. Washington, D.C.: Economic Policy Institute.
300 Alliance for Excellent Education. 2007. "The High Cost of High School Dropout: What the Nation Pays for Inadequate High Schools". Retrieved from *http://www.all4ed.org/publications/HighCost.pdf* on 2/10/2007
301 Rouse, C.E. 2005. Labor market consequence of an inadequate education. Paper presented at the Symposium on the Social Costs on Inadequate Education, October 2005, Teachers College Columbia University.

302 Rothstein, R. 2004. *Class and schools: Using social, economic, and educational reform to close the black-white achievement gap*. Washington, D.C.: Economic Policy Institute.

303 Ding, W., Lehrer, F., Rosenquist, J., & Audrain-McGovern, J. 2005. *The Impact of Health on Academic Performance: New Evidence using Genetic Markers,* Ontario, Canada: Queens Univerity; Glewwe, P., Jacoby, H. G., & King, E. M. 2001. Early childhood nutrition and academic achievement: A longitudinal analysis. *Journal of Public Economics*. *81*(3): 345-368; Hanson, T.L. and Austin, G.A. 2002. *Health risks, resilience, and the Academic Performance Index* (California Healthy Kids Survey Factsheet 1. Los Alamitos, CA: WestEd; Florence, M. D., Asbridge, M., & Veugelers, P. J. 2008. Diet quality and academic performance. *Journal of School Health 78*(4): 209-215.

304 Mishel, L., Bernstein, J., & Allegretto, S. 2005. State of Working America 2004-05. Washington, D.C.: Economic Policy Institute.

305 August, D., Beck, I. L., Calderón, M., Francis, D. J., Lesaux, N. K., & Shanahan, T. 2008. Instruction and professional development. In D. August & T. Shanahan, Eds., *Developing reading and writing in second language learners: Lessons from the Report of the National Literacy Panel on Language Minority Children and Youth*. 131-250. NY: Routledge, Center for Applied Linguistics, and International Reading Association; Crawford, J. 2004. *Educating English learners: Language diversity in the classroom*, formerly Bilingual education: History, politics, theory, and practice. Los Angeles: Bilingual Education Services.

306 Llagas, C., & Snyder, T.D. 2003. *Status and trends in the education of Hispanics*. Retrieved from *http://nces.gov/pub2003/2003-008pdf* on February 3, 2006.

307 Ramirez, J. D. 1992. Executive summary. *Bilingual Research Journal*. *16*(1-2): 1-62; Wright, W. E. 2005. English language learners left behind in Arizona: The nullification of accommodations in the intersection of federal and state policies. *Bilingual Research Journal, 29*(1): 1-29.

308 García, G. E. 2000. Bilingual children's reading. In M. Kamil, P.B. Mosenthal, P. D. Pearson, & R. Barr, Eds. *Handbook of reading research Vol. III*, 813-834. Mahwah, NJ: Lawrence Erlbaum; García, G. E., McKoon, G., & August, D. 2008. Language and literacy assessment. In D. August & T. Shanahan, Eds., *Developing reading and writing in second language learners: Lessons from the Report of the National Literacy Panel on Language Minority Children and Youth*. 251-274. NY: Routledge, Center for Applied Linguistics, and International Reading Association.

309 Genesee, F., Geva, E., Dressler, C., & Kamil, M. 2008. Cross-linguistic relationships in second-language learners. In D. August & T. Shanahan, Eds, *Developing reading and writing in second-language learners: Lessons from the report of the National Literacy Panel on Language-Minority Children and Youth*. 61-93 NY: Routledge, International Reading Association, and Center for Applied Linguistics.

310 The nine cities are: Richmond, Virginia (57.19%), Savannah, Georgia (57.08%), Newark, New Jersey (53.46%), Flint, Michigan (53.27%), ST. Louis, Missouri (51.20%), Cleveland, Ohio (50.99%), Shreveport, Louisiana (50.80%), Portsmouth, Virginia (50.61%), Baton Rouge, Louisiana (50.02%). 2006 Census.

311 Frankenberg, Erika and Lee, Chungmei. 2009. Race in American Public Schools: Rapidly Resegregating School Districts. Retrieved from http://www.civilrightsproject.ucla.edu/research/ deseg/reseg_schools02.php on February 8, 2009.

312 *PARENTS INVOLVED IN COMMUNITY SCHOOLS v. SEATTLE SCHOOL DIST. NO. 1* (Nos. 05-908 and 05-915) No. 05–908, 426 F. 3d 1162; No. 05–915, 416 F. 3d 513, reversed and remanded.

313 John Ogbu. 2003. Black Students' School Success: Coping with the 'Burden of Acting White, *the Urban Review*; John Ogbu. 2003. *Black American Students in an Affluent Suburb: A Study of Academic Disengagement*. New York: Lawrence Erlbaum Publishers; and McWhorter, John. 2000. *Losing the Race: Self-Sabotage in Black America*. New York: Free Press.

314 Horvat, Erin McNamara and O'Connor, Carla. 2006. *Beyond Acting White: Reframing the Debate on Black Student Achievement*. New York: Rowman & Littlefield.

315 K. Tyson, W.A. Darity Jr., and D. Castellino. 2005. It's Not a Black Thing: Understanding the Burden of Acting White and Other dilemmas of High Achievement," *American Sociological Review* 70: 582-605; and Carter, Prudence. 2005. *Keepin' it Real: School Success Beyond Black and White*. New York: Oxford University Press.

316 American Association of University Women. 2008. *Where the Girls Are: The Facts about Gender Equity in Education*. New York: AAUW, 2008.

317 American Association of University Women. 1998. *Gender Gaps: Where Schools Still Fail Our Children*. New York: AAUW.

318 National Women's Law Center. 2007. *When Girls Don't Graduate We All Fail: A Call to Improve High School Graduation Rates for Girls*. Washington, D.C.

319 American Association of University Women. 2001. *Hostile Hallways: Bullying, Teasing, and Sexual Harassment in School*. New York: AAUW, 2001.

320 Manlove, J. 1998. The Influence of High School Dropout and Social Disengagement on the Risk of School-Age Pregnancy. *Journal of Research on Adolescence*. 8(2): 187-220.

321 Center for Disease and Control. 2007. *HIV/AIDS Surveillance Report*. Vol. 17. Retrieved from http://www.cdc.gov/hiv/topics/surveillance/resources/reports/2005report/default.htm on 4-20-09.

322 Center for Disease and Control. 2005. Slide Set: HIV/AIDS Surveillance in Adolescents and Young Adults. Retrieved from http://www.cdc.gov/ on 4-30-09.

323 Brown, R. 2002. Self harm and suicide risk for same-sex attracted young people: A family perspective. *Australian e-Journal for the Advancement of Mental Health*. 1: 1-11; D'Augelli, A. R. 2002. The cutting edges of lesbian and gay psychology. In A. Coyle & C. Kitzinger. Eds., *Lesbian and gay psychology: New perspectives*, xiii-xvi. London: British Psychological

Society/ Blackwell; Radkowsky, M., & Siegel, L. J. 1997. The gay adolescent: Stressors, adaptations, and psychosocial interventions. *Clinical Psychology Review*. *17:* 191-216.

324 McAnarney, E. 1985. Social maturation: A challenge for handicapped and chronically ill adolescents. *Journal of Adolescent Health Care*. *6:* 90-101.

325 Morrison, L. L., & L'Heureux, J. 2001. Suicide and gay/lesbian/bisexual youth: Implication for clinicians. *Journal of Adolescence*. *24:* 39-49; Radkowsky, M., & Siegel, L. J. 1997. The gay adolescent: Stressors, adaptations, and psychosocial interventions. *Clinical Psychology Review*. *17:* 191-216.

326 Mufioz-Plaza, C., Quinn, S. C., & Rounds, K. A. 2002. Lesbian, gay, bisexual and transgender students: Perceived social support in the high school environment. *The High School Journal*. *85:* 52-63.

327 Aragon, S. R., Poteat, V.P., Espelage, D. L., & Koenig, B. W. (under review). Homophobic teasing, educational outcomes, and sexual orientation among high school students. *American Educational Research Journal*.

328 Espelage, D. L., Aragon, S. R., Birkett, M., & Koenig, B. W. 2008. Homophobic teasing, psychological outcomes, and sexual orientation among high school students: What influence do parents and schools have [Special issue]? *School Psychology Review*. *37*(2): 202-216.

329 *Ibid*.

330 D'Augelli, A.R. 2003. Mental health problems among lesbian, gay, and bisexual youths ages 14 to 21. *Clinical Child Psychiatry and Psychiatry*. 7: 1359-1045; D'Augeli, A. R., Pilkington, N. W., & Hershberger, S. L. 2002. Incidence and mental health impact of sexual orientation victimization of lesbian, gay, and bisexual youths in high school. *School Psychology Quarterly*. 17: 148-167; Hershberger, S. L., & D'Augelli, A. R. 1995. The impact of victimization on the mental health and suicidality of lesbian, gay, and bisexual youths. *Developmental Psychology*. *31:* 65-74; Mufioz-Plaza, C., Quinn, S. C., & Rounds, K. A. 2002. Lesbian, gay, bisexual and transgender students: Perceived social support in the high school environment. *The High School Journal*. 85: 52-63.

331 Espelage. Op.Cit.

332 Grzywasc, P. 2004) Students with Disabilities and Special Education. Birmingham AL: Oakstone.

333 OSEPS's 28th Annual Report to Congress on the Implementation of the Individuals with Disabilities Act. Retrieved from http://www.ed.gov/about/reports/annual/osep/index.html on Feb. 20, 2009.

334 Gallagher, J. 2006. Driving change in special education. *Baltimore:* Brookes.

335 Council for Exceptional Children Strategic Plan. 2009-2011. Retrieved from http://www.cec.org on Feb 20, 2009.

336 Smith, D. D., Pion, G. M. Tyler, N. C. & Gilmore, R. 2003. Doctoral proograms in special education: The Nation's supplier. *Teacher Education and Special Education*. 26: 172-181.

337 Cook. L., & Friend, M. 1995. Co-Teaching: Guidelines for creating effective practices. *Focus on Exceptional Childrer*. *28*: 1-116.

338 McLeskey, J. L., Tyler, N., Flippin, S. S. 2004. The Supply of and Demand for Special Education Teachers: A Review of Research Regarding the Chronic Shortage of Special Education Teachers. *The Journal of Special Education*. Vol. 38: 5-21.

339 Smith, D. D. 2009. Estimated shortages in faculty and doctoral students within the field of special education. Paper presented at the Higher Education Consortium of Special Education, Washington, D.C.

340 Council for Exceptional Children Strategic Plan 2009-2011. Retrieved from http://www.cec.org on Feb 20, 2009.

341 Coutinho, M. J., & Oswald, D. P. 2000. Disproportionate Representation in Special Education: A Synthesis and Recommendations. *Journal of Child and Family Studies*. 9: 135-156.

342 Buysse, V., & Wesley, P. W. Eds. 2006. Evidence-based practice in the early childhood field. Washington, DC: Zero to Three Press.

343 Peters, Michael A. 2009. Personalisation, Personalised Learning and the Reform of Social Policy: The Prospect of Molecular Governance in the Digitised Society in Yvonne Hébert & John Burger, Eds., *Personalised Learning* (forthcoming); Campbell, R.J. et al. 2007. Personalised Learning: Ambiguities in Theory and Practice. *British Journal of Educational Studies*. Vol. 55, No.2: 135–154; Hargreaves, D. 2004-6 *Personalising Learning,* *http://www.clusterweb.org.uk/docs/HargreavesPersonalised Learning.pdf*; Leadbeater , C. 2005. *The Shape of Things to Come: Personalisation and Collaboration in Education*, at *http://www.standards.dfes.gov.uk/sie/documents/shape.pdf*; see the website at *http://www.ssat-inet.net/whatwedo/personalisinglearning.aspx*; see also the NZ Ministry of Education's booklet *Let's Talk about Personlised Learning* 2006 at *http://www.tki.org.nz/r/ personalising_learning/pdf/personalising-learning.pdf*; Sebba, Judy, Brown, Nick, Steward, Susan, Galton, Maurice and James, Mar y. 2007. *An Investigation of Personalised Learning Approaches used by Schools* at *http://www.sussex.ac.uk/education/documents/rr843.pdf*; Leadbeater, Charles. 2009. Learning about Personalisation: How Do We Put the Leaner at the Heart of the Education System? at *http://www.innovationunit.co.uk/images/stories/files/pdf/Learningabout ersonalisation.pdf*.

344 Osborne, David and Ted Gaebler. 1993. *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector*. New York: Penguin; Blair, Tony 1999 *Modernising Government*. Paper presented to Parliament in London, England. At *http://www.archive.official-documents.co.uk/document/cm43/4310/4310.htm*; Bentley, T. 2003. *The Adaptive State: Strategies for personalising the public realm,* at *http://www.demos.co.uk/files/HPAPft.pdf*; Cutler, T., Waine, B. & Brehony, K. 2007. A New Epoch of Individualization? Problems with the Personalization of Public Services. *Public Administration*, Vol. 85, No. 3: 847–855.

345 Peters, Michael A. 2004. Consumer-Citizens, Social Markets and the Reform of Public Services. *Policy Futures in Education*. 2 (3-4): 621-632; Gordon Brown (Chancellor of the Exchequer). 2003. A Modern Agenda for Prosperity and Social Reform, speech presented to the Social Market Foundation, February 2, 2003. Cass Business School, London;

Giddens, Anthony. 2003. Introduction. Neoprogressivism: a new agenda for social democracy, in A. Giddens, Ed. *The Progressive Manifesto: new ideas for the centre-left*. Cambridge: Polity Press; Trentmann, F. 2004. Beyond Consumerism: new historical perspectives on consumption. *Journal of Contemporary History*. 39(3): 373-4-1.

346 Anderson, Benedict. 1991. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. London: Verso; Gellner, Ernest. 1983. *Nations and Nationalism*. Ithaca NY: Cornell University Press; Kalantzis, Mary and Bill Cope. 2008. *New Learning: Elements of a Science of Education*. Cambridge UK: Cambridge University Press, chapter 4.

347 Obama, Barack. 2007. Renewing American Leadership. *Foreign Affairs*.

348 Peters, Michael A, Blee, Harry and Britton, Alan. 2008. *Global Citizenship Education: Philosophy, Theory, Pedagogy,* Rotterdam, Sense.

349 Merryfield, Merry. 1994. Teacher Education in Global & International Education, *American Association of Colleges for Teacher Education*. Longview Foundation for Education in World Affairs and International Understanding. 2008. *Teacher Preparation for the Global Age: The Imperative for Change*. Silver Spring, MD; Dolby, Nadine and Rahman, Aliya R. 2008. Research in International Education. *American Educational Research Association*.

350 Peters, Michael A. and Gonzales-Gaudiano, Edgar, Eds. Introduction to *Environmental Education: Identity, Politics and Citizenship*. Rotterdam: Sense.

351 González-Gaudiano, Edgar, Ed. 2005. Environmental Education and Education for Sustainable Development. Special Issue, *Policy Futures in Education,* Volume 3 Number 3.

352 See *http://www.hawking.org.uk/lectures/bot.html*.

353 Ross, M. 2008. Expansion of the Universe - Standard Big Bang Model. Retrieved from http://arxiv.org/PS_cache/arxiv/pdf/0802/0802.2005v1.pdf on 3-36-09.

354 Brenan, A., & Lo, Y.-S. 2008. Environmental Ethics, Stanford Encyclopaedia of Philosophy. Retrieved from *http://plato.stanford.edu/entries/ethics-environmental/* on 4-5-09.

355 White, L. 1967. The historical roots of our ecological crisis. *Science*. 55: 1203–1207; Merchant, C. 1990. *The death of nature: Women, ecology, and the scientific revolution*. New York: HarperOne.

356 Hermann E. Daly and Joshua Farley. 2004. *Ecological Economics: Principles and Applications*. New York, Island Press.

357 Dan Greenwood. 2007. The halfway house: Democracy, complexity, and the limits to markets in green political economy. *Environmental Politics*. 16(1): 73-91.

358 Rifkin, Jeremy. 2003. *The Hydrogen Economy*. New York: Tarcher.

359 Friedman, Thomas. 2008. *Hot, Flat and Crowded: Why We Need a Green Revolution—and How It Can Renew America. New York:* Farrar, Straus and Giroux.

360 Kalantzis, Mary and Cope, Bill. 2008. *New Learning: Elements of a Science of Education*. Cambridge UK: Cambridge University Press, chapter 9; Cope, Bill and Kalantzis, Mary. 1997. *Productive Diversity: A New Approach to Work and Management*. Sydney: Pluto Press.

361 Kolderie, T. 1990. *Beyond Choice to New Public Schools: Withdrawing the Exclusive Franchise in Public Education* (Policy Report No. 8). Washington, DC: Progressive Policy Institute; Kolderie, T. 1994. Charters: An Invitation to Change. *Educational Leadership*. *52*(1): 36; Kolderie, T. 1998. *What Does It Mean To Ask: "Is 'Charter Schools' Working?"* (ED426133). St. Paul, MN: Charter Friends National Network; Kolderie, T. 2003. *Chartering is both an innovation and a framework for innovation*. Paper presented at the Innovations In Education Conference, April 15, in Cambridge, MA; Nathan, J. 1996. *Charter Schools: Creating Hope and Opportunity for American Education*. San Francisco, CA: Jossey-Bass.

362 Rofes, E. 2000. Teachers as communitarians: A charter school cooperative in Minnesota. In B. Fuller, Ed., *Inside charter schools: The paradox of radical decentralization*. 203-229. Cambridge, MA: Harvard University Press.

363 Good, T. L., Braden, J. S., & Drury, D. W. 2000. *Charting a New Course: Fact and Fiction About Charter Schools* (No. 11-130-W). Alexandria, VA: National School Boards Association; Lubienski, C. 2003. Innovation in Education Markets: Theory and Evidence on the Impact of Competition and Choice in Charter Schools. *American Educational Research Journal*. *40*(2): 395-443; Stout, R. T., & Garn, G. A. 1999. Nothing New: Curricula in Arizona Charter Schools. In R. Maranto, S. Milliman, F. Hess & A. Gresham, Eds., *School choice in the real world: Lessons from Arizona charter schools,* 159-172. Boulder, CO: Westview Press.

364 Scott, J. T. & DiMartino, C. (unpublished manuscript). Hybridized, franchised, duplicated, and replicated: Charter schools and management organizations. Paper prepared for an edited volume on charter schools (C. Lubienski & P. Weitzel, Eds.). Forum on the Future of Public Education, University of Illinois.

365 SRI International, Finnigan, K., Adelman, N., Anderson, L., Cotton, L., Donnelly, M. B., et al. 2004. *Evaluation of the Public Charter Schools Program: Final Report*. Washington, DC: SRI International.

366 Carnoy, M., Jacobsen, R., Mishel, L., & Rothstein, R. 2005. *The Charter School Dust-Up: Examining the Evidence on Enrollment and Achievement*. Washington, DC: Economic Policy Institute.

367 Garcia, D. R., McIlroy, L., & Barber, R. T. 2008. Starting behind: a comparative analysis of the academic standing of students entering charter schools. *Social Science Quarterly*. *89*(1): 199-216.

368 Bifulco, R., & Ladd, H. F. 2006. School choice, racial segregation, and test-score gaps: Evidence from North Carolina's charter school program. *Journal of Policy Analysis and Management*. *26*(1): 31-56; Cobb, C. D., & Glass, G. V. 1999. Ethnic Segregation in Arizona Charter Schools. *Education Policy Analysis Archives*. *7*(1): Garcia, D. R. (in press). The Impact of School Choice on Racial Segregation in Charter Schools. *Educational Policy*.

369 Lubienski, C. 2007. Marketing Schools: Consumer Goods and Competitive Incentives for Consumer Information. *Education and Urban Society*. *40* (1): 118-141*;* Lubienski, C., Gulosino, C., & Weitzel, P. (under review). School Choice and Competitive Incentives: Mapping the Distribution of Educational Opportunities Across Local Education Markets. Submitted to *American Journal of Education*; Lubienski, C., & Weitzel, P. (accepted). The Impact of Charter Schools on Student Sorting. *The Journal of Gender, Race & Justice*.

370 Horn, J., & Miron, G. 2000. *An Evaluation of the Michigan Charter School Initiative: Performance, Accountability, and Impact* (Final No. Report). Kalamazoo, MI: The Evaluation Center, Western Michigan University; Miron, G., & Horn, J. 2002. *Evaluation of Connecticut Charter Schools and the Charter School Initiative*. Kalamazoo, MI: The Evaluation Center, Western Michigan University; Miron, G., & Nelson, C. 2000. *Autonomy in Exchange for Accountability: An Initial Study of Pennsylvania Charter Schools*. Kalamazoo, MI: The Evaluation Center, Western Michigan University; Miron, G., & Nelson, C. 2002. *What's Public About Charter Schools? Lessons Learned About Choice and Accountability*. Thousand Oaks, CA: Corwin Press; Miron, G., Nelson, C., & Risley, J. 2002. *Strengthening Pennsylvania's Charter School Reform: Findings From the Statewide Evaluation and Discussion of Relevant Policy Issues, Year 5 Report*. Kalamazoo, MI: The Evaluation Center, Western Michigan University.

371 Braun, H., Jenkins, F., & Grigg, W. 2006. *A Closer Look at Charter Schools Using Hierarchical Linear Modeling* (No. NCES 2006–460). Washington, DC: National Center for Education Statistics; Lubienski, C., & Lubienski, S. T. 2006. *Charter, Private, Public Schools and Academic Achievement: New Evidence from NAEP Mathematics Data* (Occasional Paper No. 111). New York: National Center for the Study of Privatization in Education; Lubienski, C., & Lubienski, S. T. 2006. Charter Schools, Academic Achievement and NCLB. *Journal of School Choice*. *1*(3): 55-62; Lubienski, S. T., & Lubienski, C. 2006. School Sector and Academic Achievement: A Multi-Level Analysis of NAEP Mathematics Data. *American Educational Research Journal*. *43*(4): 651-698.

372 Booker, K., Gill, B. P., Zimmer, R., & Sass, T. R. 2008. *Achievement and Attainment on Chicago Charter Schools*. Santa Monica, CA: RAND; Hoxby, C. M., & Muraka, S. 2007. *New York City's Charter Schools Overall Report*. Cambridge, MA: New York City Charter Schools Evaluation Project; Hoxby, C. M., & Rockoff, J. 2004. *The Impact of Charter Schools on Student Achievement: A Study of Students Who Attend Schools Chartered by the Chicago Charter School Foundation*. Cambridge, MA: Department of Economics, Harvard University.

373 Marzano, R. 2003. *What works in schools: Translating research into action*. Alexandria, VA: Association for Supervision and Curriculum Development.

374 Mishel, L., Bernstein, J., & Allegretto, S. 2005. State of Working America 2004-05. Washington, D.C.: Economic Policy Institute; Mishel, L., Bernstein, J., & Allegretto, S. 2007. *State of working America 2006-07*. Washington, DC: Economic Policy Institute.

375 Rothstein R. 2004. Class and Schools: Using Social, Economic, and Educational Reform to Close the Black-White Achievement Gap. New York: Teachers College Press

376 Briar-Lawson K, Lawson H, Collier C, Joseph A. 1997. School-linked comprehensive services: Promising beginnings, lessons learned, and future challenges. *Social Work in Education*. 19(3): 136-48.

377 Association for Supervision and Curriculum Development 2004. The whole child and Health and Learning. ASCD Adopted Positions. Retrieved from *http://www.ascd.org* on October, 12, 2008; Bold Approach 2008. A Broader, Bolder Approach to Education. Retrieved from *http://www.boldapproach.org/bold_approach_full_statement.pdf* on November 11, 2008; Council of Chief State School Officers. 2004. Policy statement on school health. 2004. Retrieved from http://www.ccsso.org/content/pdfs/SchoolHealthPolicyStatement.pdf on September 20, 2008.

378 U.S. Department of Education, National Center for Education Statistics. 2001. After-School Programs in Public Elementary Schools. NCES Report 2009-043. Washington, DC.

379 Warren, M. R. 2005. Communities and schools: A new view of urban education reform. *Harvard Educational Review*. *75*(2): 41; Coalition for Community Schools. 2003. Making the Difference: Research and Practice in Community Schools. Retrieved from http://www.communnityschools.org/mtdhomepage.html on April 10, 2008; Rubenstein, G. 2008. Full service schools: Where success is more than academic. *Edutopia*. Retrieved from *http://www.edutopia.org/whats-next-2008-community-services* on January 01, 2009.

380 National Assembly on School-based Health Care. (n.d.). Advocacy at NASBHC. Retrieved from http://www.nasbhc.org/site/c/jsJPKWPFJrH/b.2561543/k.C944/advocacy.htm on 1-10-09.

381 Tough, P. 2008. Whatever It Takes: Geoffrey's Canadas Quest to Change Harlem and America. New York: Houghton Mifflin.

382 Gronn, P. 2003. *The new work of educational leaders: Changing leadership practice in an era of school reform*. London: Paul Chapman Publishing; Grubb, W. N., & Flessa, J. J. 2006. A job too big for one: Multiple principals and other nontraditional approaches to school leadership. *Educational Administration Quarterly*. *42:* 518-550.

383 Spillane, J. P., Camburn, E. M., & Pareja, A. S. 2007. Taking a distributed perspective to the school principal's workday. *Leadership and Policy in Schools*. *6*(1): 103-125.

384Gronn, P. 2003. *The new work of educational leaders: Changing leadership practice in an era of school reform*. London: Paul Chapman Publishing.

385Harris, A., Brown, D., & Abbott, I. 2006. Executive leadership: Another lever in the system? *School Leadership and Management*. *26:* 397-409.

386Murphy, J. 2005. *Connecting teacher leadership and school improvement*. Thousand Oaks, CA: Corwin Press; Smylie, M. A., & Hart, A. W. 2000. School leadership for teacher learning and change: A human and social capital development

perspective. In J. Murphy & K. S. Louis, Eds., *Handbook of research on educational administration,* 421-441). San Francisco: Jossey-Bass.

387Harris, A. 2004. Distributed leadership and school improvement: Leading or misleading? *Educational Management Administration and Leadership*. *32*(1): 11-24.

388Mayrowetz, D. 2008. Making sense of distributed leadership: Exploring the multiple usages of the concept in the field. *Educational Administration Quarterly*. *44:* 424-435.

389Hartley, D. 2007. The emergence of distributed leadership in education: Why now? *British Journal of Educational Studies*. *55:* 202-214.

390Firestone, W. A., & Martinez, M. C. 2007. Districts, teacher leaders, and distributed leadership: Changing instructional practice. *Leadership and Policy in Schools*. *6*(1): 3-35; Leithwood, K., Mascall, B., Strauss, T., Sacks, R., Memon, & Yashkina, A. 2007. Distributing leadership to make schools smarter: Taking the ego out of the system. *Leadership and Policy in Schools*. *6*(1): 37-67.

391Harris, A., Brown, D., & Abbott, I. 2006. Executive leadership: Another lever in the system? *School Leadership and Management*. *26:* 397-409.

392 Davenport, Cynthia. 2007. The Federal Role in Accreditation.(Letter to the editor). *The Chronicle of Higher Education*. 53: 22 Feb. 2.

393 http://www.advanc-ed.org/

394 Accessed online at the American Council of Trustees and Alumni, goacta.org

395 Flexner, Abraham. 1930. *Universities American, English, German*. Oxford: Oxford University Press. p. 45.

396 *Ibid*. p. 60.

397 Olivas, Michael A. 2006. *The Law and Higher Education*. (Durham, North Carolina: Carolina Academic Press. p. 126.

398 Newman, John Henry. 1976. *The Idea of a University*. (Oxford: Clarendon Press, p. 110.

399 Kenny, Anthony and Kenny, Robert. 2007. *Can Oxford Be Improved?* Exeter, U.K.: Imprint Academic. p. 3.

400 *The Chronicle of Higher Education*, September 10, 2008.