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Commentary on Contemporary Issues

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Introduction From Joe

Over the years I have written a number of short pieces for the Commentary section of *Education Week,* the nation's most widely read education newspaper. Although this publication has a strict policy limiting articles to 1,200 words, it is extensively read by education leaders and administrators. My purpose for writing these articles is to promote advocacy about issues that are important to the field of gifted education by bringing them to the attention of leaders who are more likely to have decision making power over program and service opportunities in their schools. Editors at *Ed Week* have been somewhat reserved about having too many articles focusing on "the gifted" and therefore I have attempted to pitch our message with titles that would be more appealing to their editorial proclivities and to readers who might routinely skip over articles with "gifted" in the title. I have selected the four of my Commentary articles that follow because they are topics that deal with issues our field has struggled with over the years and that will continue to be relevant in the years ahead.

A Quiet Crisis Clouding the Future R&D People[1]

> Those who own the rights to inventions own the world. —From the political platform of the Japanese Democratic Party, June 6, 2000

"Why" I asked the three visitors from the Japanese Ministry of Education "are you interested in the work we are doing?" They had come to our research center to learn about the work we do to promote the development of creative productivity in American schools. I reminded then that our education leaders regularly remind us to look east. "You have the highest scores in the world on international achievement comparisons" I said.

I'll never forget the reply! "Very simple dear professor. We have no Noble prizewinners. Your schools have produced a continuous flow of inventors, designers, entrepreneurs, and innovative leaders. We can make anything you invent faster, cheaper, and, in most cases, better. But we want to learn what role this 'creative productivity' focus plays in the production of creative and inventive people." This experience caused me to think about what might be the one great asset of the American education system—an asset that we may be unwittingly losing as attention is turned more and more to cranking up our achievement test scores.

[1] Renzulli, J. S. (2005). A quiet crisis clouding the future R&D people. *Education Week, 24*(38), 40, 52–53. As first appeared in *Education Week* May 24, 2005. Copyright 2005 *Education Week.* Reprinted with permission.

How much are new ideas worth? What are we willing to pay for the persistence, creativity, and task commitment that research scientists or industrial designers devote to following through on innovative ideas with potential high stakes payoff? Can we calculate the economic value, job opportunities, and contributions to social and political stability that result from investments in young people whose potential for creativity and innovation will develop new products, find solutions to unsolved problems, and even develop entire new industries?

Innovation resulting from research and development is widely recognized as a key ingredient to productivity, but the United States may be losing its edge in the culture of innovation. A quiet crisis is building that could jeopardize our nation's pre-eminence and well being, and this crisis could reverse the global leadership Americans currently enjoy. U.S. productivity growth has slowed significantly since 1973 and continues to grow at a slower rate than our major trading partners. And patent data, one of the best indicators of R&D productivity, also raises concerns about future U.S. competitiveness. Approximately 45 percent of new U.S. patents are now granted to foreigners and the quality of these patents is strong, especially in the high technology areas.

Although many factors contribute to a nation's overall productivity, the education system in any country is a prime source for producing the R&D people of the future. In a recent report the National Science Board pointed out that the United States faces a major shortage of scientists because too few Americans are entering these fields. We are already experiencing a decline in the indicators that track international comparisons in academic achievement. The recently reported PISA study ranked the United States 24th out of 29 countries in the Organization for Economic Cooperation and Development, a Paris-based group that represents the world's richest countries. Our most talented American students rank near the bottom of industrialized nations in mathematics and science comparisons, and only 39 percent of recent American university doctorates in engineering were granted to American students. Thirty-eight percent of all the nation's scientists and engineers with doctorates are now foreign born, however a recent report from the Institute of International Higher Education announced a 2.5 percent decrease in foreign enrollment. The Council of Graduate Schools reported a 28 percent decline in international graduate applications between 2003 to 2004 and a 9 percent decline in the enrollment of first-time international graduate students at the top U.S. universities. The largest drop in applications was in engineering with a decline of 36 percent. International students are turning in greater numbers to the higher education systems of our global competitors and are more likely to remain and seek employment in those countries following graduation. Although our capacity to attract top college and graduate students from abroad remains high, employment opportunities in other countries for our most talented foreign students are increasingly luring these students to return home, and tightening immigration and security regulations threaten to restrict the inflow of foreign students. Even if our net flow of intellectual capital from foreign countries remains high, our domestic development of high-level scientific talent is lagging, and we are relying on inflow, which is increasingly regulated.

In spite of these concerns about our declining reservoir of top foreign and domestic talent, massive investments in the American education system are currently directed toward improving the basic skills of struggling learners. No one can argue against this worthy goal, nor is there any attempt here to suggest that we should deviate from our course that attempts to

improve the educational opportunities of all students. This investment will pay off in the form of a more qualified workforce, which is unquestionably an important factor for better preparing the nation's youth for the more demanding jobs required in a knowledge driven economy. Our $350 billion annual investment in public education, however, has shifted quite dramatically, not only to the detriment of in-depth curriculum at the highest levels in areas such as the sciences and social studies, but also to the detriment of physical well being (i.e., physical and health education) and creative and artistic development, which are now considered peripheral curricular components. Many states test only math and reading, and base school and student accountability on these two areas alone.

But what about support for the highly gifted, creative and innovative young people whose ideas will create the products and the jobs that start the wheels of productivity turning? The federal government provides only $11.2 million for research and model programs that serve gifted and talented students. Current estimates of federal education spending indicate that only two cents of every $100 is dedicated to the education of gifted and talented students. And there has been a slow but steady decrease in state level expenditures for this segment of our school population. In the last few years expenditures for services to gifted and talented students have been severely cut by many state departments of education, and states which formerly were shining examples of high quality programs for the gifted—Connecticut, Illinois, Michigan, New York, and Oregon to name a few—have completely eliminated all funding. Pressure on school budgets has also resulted in a decline in allocations for special programs at the local level. Almost weekly I receive yet another phone call or email saying "our program has been cut." Based on the 2002 U.S. Census survey of local government finances, it appears that of state money allocated to schools, less than one-half of one percent was targeted as categorical funding to gifted education programs (on average, across regular K-12 school districts). Only 2,424 of 10,549 public K-12 school districts (reporting) received categorical grants for gifted education from their states. Only about 1,800 K-12 districts received more than $100 per 5% of their enrollment in categorical aid (this excludes states that flow gifted program funds through general funds).

Growth economists believe that improvements in productivity can be linked to a faster pace of innovation and extra investments in human capital, but are we turning our backs on the R&D people of the new century when we fail to support this segment of our school population? Is our education system's current emphasis on just ratcheting up test scores at the expense of promoting creativity and innovative thinking the way to insure our future as a leading nation in the business of generating original ideas, new knowledge, and even entire new industries?

I refer to this neglect of America's most gifted and talented youth as a "quiet crisis" because by the time the damage is done it will be too late to reverse a trend that may place our country in jeopardy. Unchecked, this trend wi11 leave a dearth of scientists, engineers, inventors, entrepreneurs, and creative contributors to all areas of the arts and sciences. These kinds of contributions are precisely the things that made America a prosperous and powerful nation through the twentieth century. Our innovation stimulated a powerful knowledge driven economy and shaped a country that made its fame and fortune by creating things rather than merely making them. Neglect of our most gifted and talented students, including those who come from limited economic circumstances, will make it impossible for America to compete in a global

economy that is driven by new ideas. Improving the achievement of all students is obviously an important national goal. But let us not turn our back on the one aspect of the American education system that has contributed to our prosperity. Dr. Leon Lederman, the Nobel Prize winning physicist, said in 1990, "Once upon a time, America sheltered an Einstein, went to the Moon, and gave the world the laser, electronic computer, nylons, television, and the cure for polio. Today, we are in the process, albeit unwittingly, of abandoning this leadership role" (Berger, 1994).

Engagement Is the Answer[2]

Closing the achievement gaps between advantaged and disadvantaged students constitutes the biggest challenge facing today's schools. We all know the statistics on test scores and dropout rates. But a sadder commentary may be the resulting collateral damage that has dragged down good instruction, de-skilled many teachers, squeezed subjects other than math and reading out of the curriculum, and produced data juggling and test falsification by desperate administrators trying to avoid having their schools branded as "failing."

How did this mess happen? Why hasn't the estimated $3 trillion spent on school reform since the 1960s made a difference? We've tried just about everything: smaller schools, year-round schools, single-sex classes, after-school mentoring, school uniforms, charter and magnet schools, school-business partnerships, merit pay for teachers, payments to students for performance, private management companies and for-profit schools, takeovers by mayors and state departments of education, site-based management, data-based decision making, and just about every idea containing the words "standards" and "accountability." All of these suggested silver bullets promised results, but little has changed. Most are built on structural changes and calculated to have an impact on entire school districts or states. But these structural changes have focused too much on low-level, highly prescriptive pedagogy intended to improve standardized-test scores.

The mainstream school diet for many poor and struggling learners is dominated by a remedial pedagogy that has failed to lessen achievement gaps. I believe it has actually contributed to their perpetuation. The instruction these children receive is often designed to determine what they can't do, don't like to do, and see no reason for doing. Then their teachers are told to focus on beating them to death with it.

Evidence of this failed pedagogy is apparent in one national report after another, and yet we continue to search for quick-fix structural solutions rather than alternative methods. The solutions, by whatever new names we give them, are always reiterations of the same pedagogy—the same drill-and-practice model for learning. And our universal criterion for accountability remains the same, with new names given to the same old achievement tests of decades past. The singular reliance on tests for accountability forces the pedagogy of prescription and hamstrings good instructors in the process. Is it any wonder that some excellent teachers leave the profession, or flee urban schools where prescription is almost universally practiced?

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[2] Renzulli, J. S. (2008). Engagement is the answer. *Education Week, 27*(43), 30–31. As first appeared in *Education Week* July 14, 2008. Copyright 2008 *Education Week.* Reprinted with permission.

Isn't it time to explore a counter, perhaps even counterintuitive, approach based on pedagogy radically different from what Pavlov used to train his dogs? Accountability for truly educated minds in today's knowledge-driven economy should consider high-end learning skills—those that include the ability to do the following:

- Plan a task and consider alternatives;
- Monitor understanding and the need for additional information;
- Identify patterns, relationships, and discrepancies;
- Generate reasonable arguments, explanations, hypotheses, and ideas;
- Draw comparisons to other problems;
- Formulate meaningful questions;
- Transform factual information into usable knowledge;
- Rapidly and efficiently access information;
- Extend one's thinking;
- Detect bias, make comparisons, draw conclusions, and predict outcomes;
- Apply knowledge and problem-solving strategies to real-world problems;
- Work and communicate effectively with others;
- Derive enjoyment from active engagement in learning; and
- Creatively solve problems and produce new ideas.

These learner-centered skills help develop young minds and promote genuine student engagement, thus increasing achievement. Focusing on these kinds of outcomes may be counterintuitive to the "more practice is better" pedagogy, but our track record with compensatory learning models should help us realize that we need more-creative approaches. We also need an infusion of motivationally rich experiences into the curriculum that will promote engagement, increase enjoyment, and produce a genuine enthusiasm for learning.

Common sense and our own experience tell us that everyone does a better job when working on something that is personally engaging. Extracurricular activities are based, for example, on instruction that is the opposite of drill and practice. How many unengaged students have you seen on the school newspaper staff or the debate team? In the chess club or the concert choir? Engagement occurs when students have choices in what they participate in and how, when they can interact in a goal-oriented environment with like-minded students, and when they are able to use authentic problem-solving, interpersonal skills, and creative learning strategies. Engagement comes when they have the opportunity to produce a product, service, or performance, or to develop work for intended audiences. The enthusiasm and interest that result from such experiences exemplify a learning environment that differs completely from prescriptive pedagogy.

All learning, from diapers to doctorate, exists on a continuum that spans the deductive, didactic, and prescriptive on the one hand, and the inductive, investigative, and inquiry-based on the other. Students with lower achievement are subjected to endless didactic activities, and when their scores don't improve, they receive double the drill-and-kill work. This has turned many schools into joyless places that generate mind-numbing boredom, a lack of genuine student and teacher engagement, absenteeism, and increased dropout rates. Proponents of popular but highly

prescriptive programs may boast of test-score increases, but does the endless practice simply prepare students for more test-taking or help them learn to enjoy the act of learning?

Student engagement has been defined in many ways, but I view it as the infectious enthusiasm students display when working on something of personal interest pursued inductively. This and other highly engaging approaches motivate students to improve basic skills and complete higher-level work. True engagement comes from learning activities that challenge young people to stretch above their current comfort level. Such activities are based on resources and methods of inquiry that are qualitatively different from repetitive practice. The guiding principle in this kind of learning can be stated simply: No Child Left Bored.

Research in this area is clear and unequivocal: High engagement results in higher achievement, improved self-concept and self-efficacy, and more-favorable attitudes toward school and learning.

It will not be easy to turn around an education establishment that has made massive financial and policy investments in one particular brand of learning. Nor will it be easy to circumvent the powerful influence of the textbook- and test-publishing industries that thrive on prescriptive curricula and test-driven approaches to accountability.

But change is possible if we take advantage of the remarkable advances in information technologies that have given teachers the equivalent of a dozen teaching assistants in their classrooms. These technologies make it possible to quickly and easily assess students' interests, learning styles, and preferred modes of expression. What formerly took teachers weeks or even months to learn about students' strengths can now be determined electronically. Powerful search engines can then match engaging learning resources to individualized student profiles.

When technology does some of the hard work, true differentiation can occur. Yet while every other field of study has made imaginative uses of technology, educators have too often settled simply for electronic worksheets and encyclopedias online.

We need the courage to explore bolder, more innovative alternatives, so that we can provide all students with highly engaging experiences—the kind of instruction available in the nation's best public and private schools. A more engaging pedagogy, combined with greater and more innovative uses of technology, can deliver the resources to make these alternatives possible.

Going Beyond Gutenberg and Skinner: Fighting the Enemies of Personalized Learning[3]

There are conferences for just about everything these days, but because of my interest in personalized learning, it appeared that this one on redesigning personalized learning would be just the ticket for gaining new insights into how learning can be more responsive to the divergent needs and diverse populations in today's schools. Most educators agree that the one-size-fits-all

[3] Renzulli, J. S. (2012). Going beyond Gutenberg and Skinner: Fighting the enemies of personalized learning, *Education Week, 31*(22), 21. As first appeared in *Education Week* February 28, 2012. Copyright 2012 *Education Week.* Reprinted with permission.

curriculum needs addressing, and this by-invitation-only "summit" showed so much promise that I wangled an invite. Resplendent with all the buzzwords of the personalization and differentiation mystique ("flexible," "student-driven," "authentic," "everywhere learning," "systemic redesign"—to mention a few), the event would be staffed by the gurus of school reform and attended by education power brokers and CEOs from the public and private sectors.

Wow! What could be more appealing and hopeful for a change from the harmful direction that education has taken since the No Child Left Behind Act turned the learning process into a gigantic text-consumption and weakness-based test-prep industry? And the expectation that technology was a major answer to this promise of a revolution in personalizing learning made the conference even more appealing.

The emergence of technology in education has certainly created a renewed interest in personalizing learning and providing teachers with the tools necessary for differentiating curriculum. Early efforts to use technology to personalize learning can be traced back to B. F. Skinner's teaching machines, which were designed to use rote-and-drill to automate the task of programmed instruction. Get the correct answer and you moved on to the next question. A wrong answer recycled the student through more practice material until he or she answered the question correctly.

Teaching machines were another failure in the long history of so-called "innovations" in education, but when computers and the Internet came along we seemed poised to capitalize on technology that placed vast amounts of the world's knowledge at students' fingertips. Just as Gutenberg revolutionized access to knowledge, at least for the restricted number of scholars of his time, we now have the capacity to make knowledge public for anyone who can read and log in.

It soon became clear that the general focus of the conference was on basic curriculum competencies and more-efficient procedures for mastery and improved achievement-test scores. Now, rather than covering material in a lock-step fashion for all students at the same time, teachers can direct content at different levels to students according to their varied achievement levels. Although this use of technology extends (by a giant step) the traditional one-size-fits-all instructional model, it only accounts for varying competency levels rather than examining at least three other categories of learner characteristics that define true personalization. This restricted focus led me to conclude that we are using today's technology for what might be called "Gutenberg-online"—the electronic shuffling of worksheets and standard-text material—and that, pedagogically, we haven't progressed much beyond the type of learning that Skinner advocated with his teaching machines.

A similar case can be made for the explosion of online courses currently available to school-age students. These courses have great value when not available locally, but they almost always follow a linear, sequential instructional model rather than a more inductive and investigative model of learning. To paraphrase Gertrude Stein, a course is a course is a course, or in education-speak: Standards-driven prescriptive material is geared toward answering the questions at the end of the chapter and taking another achievement test. Skinner's teaching-machine movement failed because we were treating students like Pavlov's dogs. We could face

the same consequences with today's technology unless we expand our vision about what personalization could be and how technology can help make it happen.

True personalization requires more than just looking at achievement levels and trying to compensate for deficiencies. At least three other characteristics of the learner and differentiation of content and process are necessary to give us a more comprehensive profile of student potentials and point us in the direction of making modifications in the learning process. In addition to achievement levels, information about student interests, learning styles, and preferred modes of expression allow us to make decisions about personalization that take multiple dimensions of the learner into account.

This information can easily be gathered and analyzed through the use of computer-generated profiles and from search engines that match multiple categorized resources from databanks containing vast quantities of highly interactive online material. Teachers can use this technology to infuse into any and all standards-driven curriculum highly engaging enrichment materials that can make any lesson or unit of study more exciting, engaging, and enjoyable. Math concepts improve and become more relevant when students use technology to design and build their own roller coaster. Students can gain a greater appreciation and understanding of ancient Egyptian culture when they do a virtual dissection and preservation of their own mummy.

The differentiation of content requires adding more depth and complexity to the curriculum rather than transmitting more or easier factual material. By focusing on structures of knowledge, basic principles, functional concepts, and methods of inquiry in particular disciplines, students are prepared to assume roles as firsthand inquirers rather than mere consumers of information. The differentiation of process requires the use of a variety of instructional strategies that differ from the traditional deductive, didactic, prescriptive approach used in most classrooms. Respect for learning-style variations can be achieved by using instructional strategies such as simulations, Socratic inquiry, problem-based learning, dramatizations, and individual and small-group investigations of real problems. Expression-style preferences can be accommodated by giving students opportunities to communicate visually, graphically, artistically, and through animatronics, multimedia, and various community-service involvements.

The biggest enemies of differentiation are time and the overprescription of learning. Before the availability of computers and the Internet, teachers simply did not have the time to find and direct customized resources to individual students.

Our obsession with content mastery and Skinner's behavioral theory of learning are slowly but surely giving way to an interest in personalization and differentiation. While it is understandable that our early use of technology was mainly an adaptation of Gutenberg-online and a teaching-machine mentality of what learning is all about, we now have both the pedagogical rationale and technological capability to use the many dimensions of student characteristics that clearly and unequivocally result in higher engagement, enjoyment, and enthusiasm for learning.

Amazon and Netflix know what we like to read and view, and they make use of this information to "differentiate" the material they send us. We can do the same thing to enrich the entire learning environment by capitalizing on a broader spectrum of learner characteristics, creating comprehensive computer-generated student profiles, and using the interactive capabilities of today's technology to revitalize learning. By so doing, we can minimize boredom and make learning the challenging, enjoyable, and relevant process that it should be.

Dealing With the Differentiation Debacle[4]

The two recent Commentaries in *Education Week* on differentiation (Delisle, 2015; Tomlinson, 2015) have accurately described the criticisms and potential of an important concept that has captured unprecedented attention among American educators. Both commentaries, however, have overlooked the one thing that can make differentiation successful without burying teachers under a mountain of time-consuming resource acquisition and classroom management demands that would place unreasonable and perhaps even impossible demands on their time. This argument is truly a "baby and the bathwater" issue; however, there is a way of dealing with differentiating that makes it both feasible and an effective way for adding an element of personalization to all aspects of the curriculum.

So picture this. Students sit down at their computers or pick up their handheld devices and respond to a series of questions that document their academic achievement levels, interests, learning styles, and preferred modes of expression. A search engine then scans through various categorical databases containing thousands of both basic skill builders and highly engaging enrichment activities that are classified by common core standards, achievement levels, interests, learning styles, and preferred modes of expression styles. The search engine next matches these resources to each student's individual profile and sends the resources directly to the student's computer.

Teachers can use the same technology to find topics, subtopics, and sub-subtopics within any general curricular area, unit of study, or preselected standard. Using their class lists and categorized student profile data, teachers can then identify and send differentiated resources at various grade and achievement levels to their students. They can use their knowledge about various student needs and interests to create and name computer-generated achievement level groups and/or interest groups on their classroom dash-board and they can send differentiated resources to individuals, small groups, or their entire classes. The ability to differentiate using this technology is now available and as one teacher who has used it said, "It's like having a dozen teaching assistants in my classroom, every day, all day."

The unfortunate reality of today's standards-driven curriculum and the demands on most teachers to improve standardized test scores at all costs has left little time or motivation for teachers to accommodate the many differences that exist in today's demographically diverse classrooms. Our research on reading, for example, has shown that as many as 12 reading levels exist in some heterogeneously grouped middle grade classrooms (Reis et al., 2011) and in most cases when differentiation strategies are applied, the only changes taking place are content-level adjustments (i.e., more drill and practice for low-performing students and more advanced content

[4] This piece was written in response to two *Education Week* pieces and submitted for publication.

for high achievers). True differentiation must also deal with variations in instructional strategies and classroom organization and management as well as simple adjustment to content levels. Some students learn best through group work and some by working alone. Some students learn more effectively by doing projects, while others learn best by discussion, simulations, computer-assisted instruction, or by tracking down on the web Just-In-Time information and resources needed for a project they are pursuing.

Teachers can also differentiate the learning environment and how they manage it by *infusing* differentiated activities into the standard curriculum. Students can be given opportunities to work individually, in groups with other students who share similar interests or learning styles, or in groups in which every student has a chance to demonstrate his or her own unique style of learning. Students also have preferences for the ways in which they like to express themselves—orally, visually, graphically, dramatically, through construction, through digital media, or through various written genres. In basic skill areas, there is an almost unlimited amount of material that covers math and reading/language arts concepts at various levels. These materials can easily be directed to individuals or small achievement-level groups electronically by letting the computer do the heavy lifting, making the very valuable concept of differentiation a workable reality.

Many of the resources available from the web incorporate opportunities for addressing the kinds of student differences mentioned above and they extend differentiation beyond mere content modifications. A board game called *Escape to Freedom* allows students to learn about the Fugitive Slave Act through a competitive simulation that capitalizes on students who prefer an interactive style of learning about the Civil War. A virtual dissection and mummy preservation activity called Fun With Mummies allows students to study Ancient Egypt through a highly engaging and hands-on experience that incorporates anatomy, Egyptian history, language, and culture into the activity. Students interested in STEM applications can build their own roller coaster or underwater Remotely Operated Vehicles. Existing software makes thousands of resources such as these easy to locate, download, and direct to individuals or groups. In places where this approach to differentiation has been used, we have witnessed remarkable turnarounds and improved achievement test scores on the parts of struggling or turned-off learners (Field, 2009). In addition, high-achieving students have had opportunities to engage in challenging problem-based enrichment projects that extend their thinking skills and creative productivity far beyond what is typically covered in the standards driven curriculum.

As is almost always the case, education is usually slower than other professions to adapt to changes in technology. Conversely, the entire field of health care is now driven by "personalized medicine" literally "differentiated" for patients' needs. Amazon and Netflix know our preferences and only send us selections in which they know we have an interest. And what about the pop-up ads that appear in almost every document downloaded from the Internet? They are always posted by companies from which previous purchases have been made. Differentiation or personalization (my preferred term) in education is a powerful concept, and I agree with critics who say that implementation is challenging. But we need to figure out how to make it work and the use of technology that is now available is one approach that will enable teachers to easily access the almost unlimited resources that will not only improve achievement, but also make learning the enjoyable, engaging, and exciting process that it should be. Although the

previous commentaries on this topic present what appear to be opposing points of view, they serve a very useful purpose of calling our attention to the powerful potential of an instructional strategy that can increase at least a part of the personalized learning process for all students.

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