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Educational Disarmament, and How to Stop It

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If it is true that education represents the world's battleground of the 21st century, then the United States, with its budget cutbacks and recent criticism of educators, has been committing unilateral educational disarmament compared to other nations. This has been especially noticeable in education for advanced learners. The United States has three major enterprises that it supports to the tune of about $1,000 billion each: health, defense, and education (to make us healthy, safe, and wise). Two of these enterprises, health and defense, have major support services to aid in their operation. Only education falls short. If we are to meet our expectations for education, we need to match these other enterprises in commitment to research, curriculum development, technical assistance, evaluation, and other necessary support features so that we build an effective educational infrastructure. This article proposes a pilot study for programming for advanced learners by providing funds for educational infrastructure development for five states willing to volunteer to establish and assess infrastructure elements. Assuming a successful outcome, this infrastructure is recommended to be expanded for all students.

Keywords: advanced learners, educational disarmament, infrastructure, multidisciplinary support system, parallel curriculum, STEM curriculum, technical assistance

Educators of students with special gifts and talents have continually stressed the long-term importance of these students to the larger society. These educators have been largely drowned out by issues of more immediate concern, such as the education of children from families in poverty. Poverty is, of course, an important issue, but not the only one that should demand the attention of the American public. There are two major goals for American education—equity and excellence—and we should be paying attention to both.

One of the byproducts of our hard economic times has been a series of attacks by multiple critics on the poor performance of our students, as shown by international comparisons (Bruer, 2010). At the state level, teachers and other school personnel are being fired—and even attacked politically—in a style that may hinder young people from considering this profession (Ravitch, 2010).

Though it is clear that some of the 3.5 million elementary- and secondary-school teachers might fail to meet the high standards set for them, it is too simplistic to cast all of the problems of American education at their feet. One can even characterize these attacks as a form of *educational disarmament*, making us demonstrably weaker as a nation in the face of our international competitors. This is particularly true of the education of our brightest students, who, the literature assures us (Plucker & Callahan, 2008; Van Tassel Baska & Stambaugh, 2007), will be our future leaders in business, science, the arts, and politics.

Nor are educators the only group to become alarmed at our current situation. Consider the comments of the Business Roundtable (2008):

> One of the pillars of American economic prosperity—our scientific and technological superiority—is beginning to atrophy even as other nations are developing their own human capital. If we wait for a dramatic event—a 21st-Century version of Sputnik—it will be too late. There may be no attack, no moment of epiphany, no catastrophe that will suddenly demonstrate the threat. Rather, there will be a slow withering, a gradual decline, a widening gap between a complacent America and countries with the drive, commitment, and vision to take our place. (p. 5)

We can only imagine the roar of outrage if there were suggestions to cut in half our Marine Corps units, put our aircraft carriers in mothballs, and reduce our satellite scanners by 60%. Such disarmament would be putting our nation at risk! Yet we stand by while the core of our educational enterprise at all levels is bruised and dismembered. Perhaps

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this is because we do not see this educational disarmament as hurting our nation in a similar fashion.

The purpose of this article is to provide a framework of an educational infrastructure that can be applied to students with special gifts and talents and to present the rationale for this reform. It is the lack of such infrastructure that is the true barrier to educational excellence (Gallagher, 2006).

EDUCATION AND NATIONAL DEFENSE

If the National Defense plans for the 21st century are based on brains, not just bombs, then we need time and concentrated effort to create the conditions where our education system turns out intelligent citizens ready to build a society that is impervious to outside influence or economic attack. We gave ourselves a full decade to reach the moon; surely we can expect it to take as long to strengthen the current educational system by building an educational infrastructure second to none—one that can turn out first rate poets and engineers, scholars, as well as colonels. This means a national commitment of a decade where resources are made available and guaranteed for that same length of time (Augustine, 2007). However, we must accept the fact that we live in a society that has to cope with dysfunctional families and major poverty and its multiple consequences, populated by a public not often concerned with the educational enterprise. Our system of government has not been designed to cope with long-term problems like climate change, population increase, and, yes, education (Gallagher, 2002).

There have been any number of studies on the international level to show that American students do not compare favorably with students of other countries (Augustine, 2007; Bruer, 2010; Gallagher, 2011). One of the latest is the Program for International Student Assessment (PISA), which measures the academic performance of 15-year-olds in mathematics (Schleicher, 2009). When PISA compared the percentage of students who performed at the two highest levels of math (those levels needed to solve complex problems), the United States had only 10% of its students performing at that level. This means that we were ranked 25th in the world on this index.

Yet, rather than asking, "What do we need to get the job done?" as we did with the Space Program, we seem content to blame failing schools on *bad* teachers, demanding that all teachers should be totally committed to their jobs, ask for little compensation, and be expected to serve quietly. Teachers are being blamed for poor student output when social factors and lack of "system" in the educational system should take similar responsibility. Policy makers need to realize that the production of innovative and creative students who will keep us in a world leadership position requires a strong educational infrastructure that has yet to be built in America.

It is too much to ask for major investments from the public for an educational enterprise that has been so thoroughly vilified over the past few years (e.g., Finn, 2010), so will ask that these ideas should be piloted on programs advanced students and, once these procedures have be validated, then brought into general education.

THREE MAJOR ENTERPRISES

America's budgetary history has shown that we are w ing to invest in programs that provide significant help a protection for our society, especially in health, defense, a education. Each represents a major investment by our so ety. For fiscal year 2009 health care was $980 billion, defense $795 billion, and for education $853 billion. The are many interconnecting parts in each of these domai that provide an infrastructure undergirding their operatio These support systems are designed to increase the quali performance of the persons who directly deal with the issu involved.

Health Care

The primary care physician directly acts for the health ca of the patient, but an impressive cluster of support pe sonnel stands behind that physician, largely unseen by t patient (see Table 1). Research, laboratories, support pe sonnel, medical schools, and other elements all combine create a support fabric that provides a foundation for t practitioner. Without these health components actively inte acting, the decisions made by the key person providing t direct service, the physician, will lack the quality needed f the individual and public good.

Defense

For the defense department, the key persons are the com bat troops in the Army, Navy, Air Force, and Marines. B behind these troops are thousands of support personnel an impressive equipment whose purpose is to increase the eff ciency of those on the firing line (see Table 1). It has bee estimated that we may have only 100,000 personnel in direc

TABLE 1
Infrastructure of Three Societal Giants

Health	*Military*	*Education*
Medical schools	Weapons research	Administrative suppor
Laboratories	Intelligence	Special personnel
Pharmaceutical research	Logistics	Personnel preparation
Professional associations	Communication	Staff development
Group practices	Support, air and artillery	Research
Communication	Personnel preparation	Technology
Nurses and support personnel		Technical assistance
		Professional associations

combat roles, thouogh each combat person is backed by 15 to 20 personnel designed to build a physical and human infrastructure of logistics, intelligence, and communications to increase their combat efficiency.

Education

The educational enterprise, however, has quite a different structure than health and defense. Because educational enterprises have evolved from schools at the local level, to state standards for personnel preparation, to federal support for research and leadership training, educational infrastructure and support elements are scattered or, in some cases, nonexistent.

A sharp reminder of just how huge these differences are can be seen in Figure 1, which describes the investment at the federal level in research and development. Though $77.5 billion was spent on defense and $31 billion on health and human services, only about $362 million was spent on education research and development. Looking at these figures another way, for every $1,000 spent on defense, about $4.50 was spent on education.

Education also lags far behind agriculture, the National Aeronautics and Space Administration, the National Science Foundation, and energy in investment. Because education is a primarily service enterprise, few dollars are spent on research at the state or local level as well. So though we call for innovation in education, we do not provide the resources necessary to make it happen.

The key person in education is the classroom teacher, and though there have been attempts to surround that person with support that could mirror the infrastructure of health and defense (see Table 1), the amount and level of support fall far short of that provided to the other two fields. We lack the structural components necessary for an effective educational response.

Education, at its best, is a team game with many different players and disciplines that should be playing a part, not just one overburdened adult with a group of students. To be a team game in the best sense of that term, we need an infrastructure or support system operating to design content and implement strategies to meet the diverse needs of students (Gallagher, 1975, 2002, 2006).

A New Support Infrastructure for Education

The support infrastructure that is presented here draws from the system already in place for children with disabilities, a system that has proven effective (Kirk, Gallagher, Coleman, & Anastasiow, 2011). Due to major public and legislative support, resources have been made available through PL 94–142 (Education of All Handicapped Children Act, 1975) and later versions of that law, Individuals With Disabilities Education Improvement Act (2004), that provided help for the elements noted here. These changes have upgraded special education from an educational backwater in the 1960s to a strong leader in educational innovation (consider positive behavior supports, response to intervention,

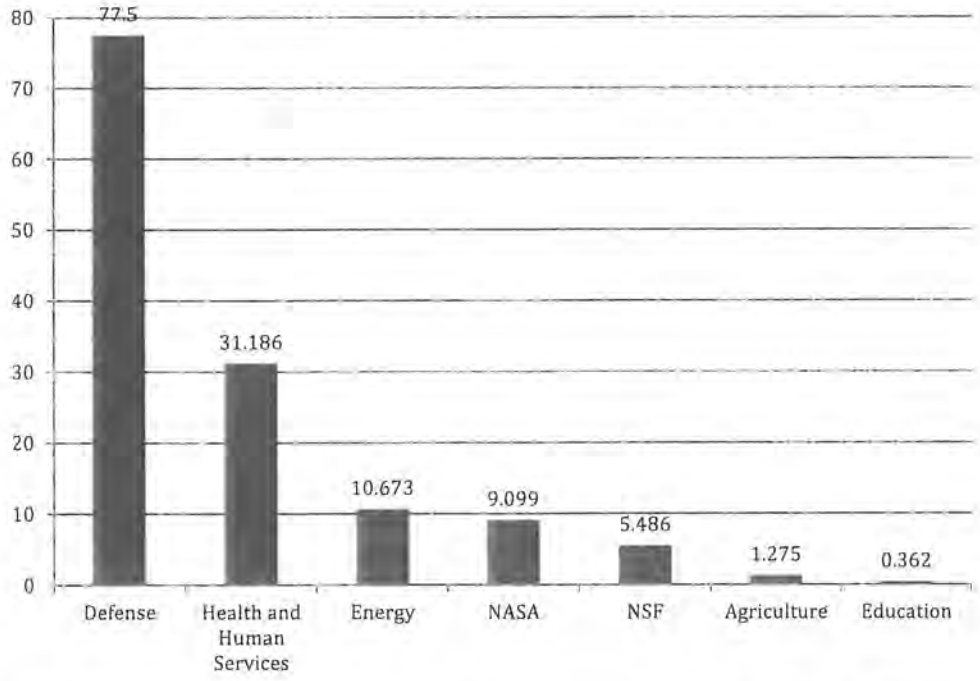

FIGURE 1 Federal research and development budget for fiscal year 2011: Dollar amounts in billions. *Source.* Data from "FY2013 Analytical Perspectives: Budget of the US Government," by Office of Management and Government, 2012, p. 370. Retrieved from http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/spec.pdf.

TABLE 2
Federal Special Education Infrastructure

Research	*Competition for research funds over multiyear periods on issues of great importance*
Personnel preparation	Funds to provide support to higher education for graduate fellowships and qualified faculty in special fields
Demonstration centers	Financial support for programs that illustrate best practices and provide short-term training in area of specialty
Technical assistance	Provide assistance upon demand to teachers and administrators from centers staffed to provide counsel on issues of current interest
Communication	Funds for centers that would expedite the movement of information on evidence-based practices and identification
Technology development	Funds to support the development and testing of new ways to use technology to help children with special needs to learn
State grants	Funds to aid states in bearing extra costs of special education

early intervention, etc.; Gallagher, 2006; Plucker & Callahan, 2008). Table 2 shows a brief description of the elements in the federal special education infrastructure.

The proposed infrastructure for students with special gifts and talents is also based on the assumption that education is a team game in that the varied backgrounds of many professionals should be used to bring a wide variety of knowledge and skills to bear on the diversity of the particular student's needs and challenges. Unfortunately, many citizens and public decision makers remember education as the schoolrooms of their own past where a lone teacher struggled with a group of 25 students of varying abilities, backgrounds, and interests. The world has changed, and we need an educational enterprise far different from the one-room schoolhouse or the "egg carton" model of elementary schools of our past. The communication technology developed in the last decade alone should tell us that things need to be different if we are to compete in the 21st century with other societies bent on economic success (see Augustine, 2007).

The Proposed Infrastructure

Research

A major investment in research and program evaluation could pay off with a greater understanding of the students in their studies and in understanding the learning environments and curriculum that works best for them. Currently, the investment in educational research is less than 1% of that in health care or the military and is almost exclusively provided at the federal level (Gallagher, 2006).

The design of new curricula or the study of the impact of charter schools cannot be hurried, and advances are measured in years, not months. This is just as true in education research as it is in cancer research or space flight research, but it increases the importance of those poli makers willing to commit to long-term efforts.

Curriculum Development

The development of curriculum designed for studer with special gifts and talents such as done by Van Tasse Baska and Little (2011) and Tomlinson et al. (2009) in the parallel curriculum can be an enormous step forward providing for differentiated curricula for advanced student We need educational research in classroom interactions help our teachers and other specialists to improve their pe formance. We need continuing funds for teams of curriculu specialists and for the centers and institutes where they wo to design, test, and evaluate new content and procedur that will excite and motivate students with special gifts ar talents.

Program Evaluation

The focus of the No Child Left Behind (2002) legi lation has been on accountability, to judge what works i education and what does not. If done well, it could sav huge investments in programs that prove to have little payo (Callahan & Davis, 2011). Because of the diversity of pupil teachers, and programs, such program evaluation takes tim A hefty investment in the construction of good evaluatio tools is a worthy endeavor but must overcome the natur desire for speedy answers from public decision makers eage for instant resolutions to our problems.

Leadership Training

States have already accepted teacher training, and the set ting of standards, as their responsibility in education, but tha still leaves administrators who set policy and directions fo education, often without sufficient preparation to plan fo advanced learners. One of the key elements of an educationa infrastructure is the preparation of leaders who will set th policies and long-term goals of education and provide senio leadership at local and state levels.

Support for graduate students and university faculty whose task is educational leadership preparation would b a signal of long-term commitment to the educational infras tructure. Advanced graduate students who take on these task should not be expected to pay for their total education an more than advanced medical students would be expected t pay for theirs. They are performing a service to the society and the society should provide support to the universities who take on this important but nonprofitable (in the shor run) task.

Technical Assistance

High on the list of services that are *not* currently available to teachers and professors is *technical assistance*, meaning organized help provided upon specific request by teachers

and administrators (Gallagher, 2006). What happens if a teacher or supervisor in distress calls an educational 911 for help—Does anyone answer? If we are to make the team concept real in educating students, there must be an opportunity to learn from short-term workshops and individual consultations from regional technical assistance centers that could be established by state departments of education.

A technical assistance program for preschool children with disabilities has been in continuous operation at the Frank Porter Graham Child Development Institute at the University of North Carolina at Chapel Hill for 38 years, illustrating the utility of this approach in preschool education for children with disabilities (Gallagher, 2002). Such centers, established competitively, could demonstrate the newest techniques on topics such as problem-based learning or science, technology, engineering, and mathematics (STEM) curriculum (Bruer, 2010). It would allow state departments of education to play a helping role instead of just being the "policemen" monitoring state standards.

Demonstration Centers

Demonstration centers can illustrate best practices in curriculum content and thinking processes. Teachers often need to see new teaching methods in action with their own eyes and talk to their educational counterparts about the pluses and minuses of change before they are "sold" on it. New ventures in STEM programs particularly need demonstration (Bruer, 2010). These demonstrations can take place in regular schools or special programs and schools, such as residential schools for secondary programs in math or science (Kolloff, 2003). There are 13 states that support residential programs for advanced students, such as the Illinois Math and Science Academy and the North Carolina School of Science and Math, that could demonstrate initiatives in science education.

Technology Utilization

There need to be grants for technology specialists made available to translate the latest communication developments to programs for advanced learners. Distance learning can be one important part of the infrastructure. Technology can provide important tools to match master teachers to students and for staff development. Technology centers could work closely with state departments of education and technical assistance centers to keep them current.

State Aid for Data Systems and Long-Range Planning

There are currently state planning units devoted to collecting and storing data on students and teachers. Data systems should provide valid information about students and teachers as well as other personnel upon which to plan for long-range development.

If there is not an organization bringing together these various support elements, they will still fall short of their potential. Gallagher (2006) presented a plan for a multidisciplinary support system that brings together these support features in a coordinated effort under a director with policy influence at the state departments and local level. One purpose of the proposed 5-year pilot studies would be to iron out the administrative problems that such a proposal would create and determine how such a system could work just as well in rural areas as in urban centers.

Until we can recognize that an organized support system is fundamental to an efficient educational system, we will be captives of the status quo, stumbling through local crises, patching what can be patched but never getting ahead of the game.

THE POWERFUL STATUS QUO

Any major attempt to change our current practices must include changes in the powerful status quo (Fullan, 2007). To make such changes requires strong and persistent effort because the status quo has served us well in many ways and we have become used to its operation. Those who have risen to leadership in this status quo, whether in the political system or the school systems, are often comfortable with their status and unwilling to change without powerful reasons, both emotional and technical, that would be needed to shift direction.

Two things have to happen to obtain the changes we want:

1. We need the will to change. It takes intense and persistent effort to make changes in the status quo. The parents' groups who supported policy change for children with disabilities are a good example of such intense effort (Kirk et al., 2011). The intensity supporting an educational infrastructure must come from a public concerned not just for these advanced students but for the society itself.
2. We need the mechanisms to put the desired change in place. Even after we have agreed on what needs to be changed, does the educational enterprise have the necessary components or systems to allow the changes to take place? This is where the concept of the infrastructure becomes particularly important in pointing to tangible goals for productive change.

Costs

When we consider costs, we might compare our suggestions for education with two other major efforts that the United States has been involved in: the Eisenhower interstate highway system and the Apollo moon shot. Both of these depended heavily on a national defense rationale. Proponents of the highway system said it was designed to enable troops

and supplies to be more easily moved from one part of the country to another, if needed. It has certainly proved its worth in moving people and goods more easily around the country. The cost was about $12 billion a year, mostly paid for by the federal government through gasoline and vehicle taxes (McNichol, 2006).

The space race was, in reality, a battle with the Soviet Union as to who would control space and, once we had clearly won, we rather lost budget interest in traveling to other parts of the solar system. The Apollo system cost about $25 billion in 1970 dollars and we did it regardless of budget deficits that we were running at the time (Murray & Cox, 1989). The truth of the matter is that anything strongly linked to our national defense rarely gets delayed or dismissed because of budget balancing. The predominant feeling is, "What do we need to get the job done?"

It should be clear to the most casual observer that opposition to educational programs for advanced learners is irrational and clearly against the public interest. Over the past 40 years, a series of reports has been produced that pointed to this irrationality and the importance of paying some special attention to these students:

- *Marland Report* (Marland, 1972)
- *A Nation at Risk* (Gardner, 1983)
- *National Excellence* (Ross, 1993)
- *Rising Above the Gathering Storm* (Augustine, 2007)
- *Preparing the Next Generation of STEM Innovators* (Bruer, 2010)

One of these, *A Nation at Risk*, even said, "If a foreign power had imposed upon us our current educational system we well might have considered it an act of war" (Gardner, 1983, p. 1).

All of these reports point out that it is in our urgent national interest to nurture the special talents that can be found in all segments of our society. We are well aware from past research (Plucker & Callahan, 2008) that early identification and nurturance of students with special gifts and talents will reveal a potential that will, in most cases, flower into future leadership and produce major contributions and leadership in the sciences, arts, politics, business, etc. So why can't we get public policy makers to provide the resources to reach this desirable goal?

It would be possible to conduct a competition among states that would be willing to participate in a trial or pilot operation of this multidisciplinary support system. The costs would center around personnel preparation, technical assistance centers, demonstration programs, evaluation, and curriculum development. Each state would design its own program that includes these elements. The total cost should be under $400 million for a full tryout of the system in five states, or less than $2 billion for the full 5-year period—a small sum of money for a major national trial but large enough and long enough to convince observers of its worth.

Reaching Public Policy Makers

What has been true in the past and the present is that muc of educational policy has not been made by educators b by politicians or those who influence politicians. Our valu call for both equity and excellence in education, althoug educational policy has, so far, focused on equity.

Take the legislation known as No Child Left Behir (2002), for example—a most influential law (Finn, 2010 It was formulated by people with political power in th public domain, largely not educators. When some educato were involved in its implementation, it is certain that the knew little about the needs of exceptional children. They ha to be told that there were some children who would nee some support to gain a year's growth over a calendar ye and that it had little to do with the teaching they received– children with intellectual disabilities, or who were deaf c blind, or autistic, or had learning disabilities. Certainly chi dren who were advanced learners were the furthest from the minds when they crafted this policy. The Race to the To (2009) legislation has had similar problems in ignoring th needs of advanced learners.

Policy Implementation

How can such changes to the powerful status quo b brought about? Gallagher (2006) identified four engine of change in policy: legislation, court actions, administra tive rules, and professional initiatives. The introduction o a multidisciplinary support system would seem to call fo action on the legislative and professional initiative front The introduction of new legislation has many barriers t overcome, so it might be more prudent to attach this pro posed pilot study to existing legislation. A special amend ment to the budget of the Institute for Educational Science in the Department of Education to earmark funds for thi program might be possible; similarly, some additions to th STEM legislation already in place could be feasible, give strong motivation and leadership.

The professional associations for advanced learners the National Association for Gifted Children and The Association for the Gifted, would have to become politically engaged, and there would need to be powerful support fron the Department of Education as well. Such actions woulc need to be taken over a period of time because the idea requires buy-in from the American public. The author has no illusions as to how difficult this will be, but every public policy innovation has to start with an idea such as what is presented here.

The Emotional Rationale

Where will support come from for education of advanced learners? If emotions, rather than reason or evidence, are the driving force for decision making, can we use that conclusion on our behalf? There are two powerful emotions that can

be in play here—*fear* and *national ambition*—and they are linked together. The past challenge to our educational system by Sputnik, revealing Soviet temporary superiority in mathematics and science, shook American self-confidence and introduced fear as part of the Cold War educational scene.

For the first time in the 1970s, enormous funds were available for the education of accelerated learners through grants from the National Science Foundation for curriculum development and personnel preparation. The Physical Science Study Committee, Biological Sciences Curriculum Study, Chemical Bond Approach, and School Mathematics Study Groups were provided with extensive resources and others later joined the alphabet soup of curriculum reform. Teams of scholars were joined with teachers and administrators to produce the final products. This fear served us well in gifted education, until the Soviet Union collapsed (Gallagher, 2002).

A companion emotion is the desire and ambition for our nation to be the best in the world in all important domains. To our dismay, we have been finding that far from being number 1, we have fallen far behind in degrees in science and engineering (Augustine, 2007; Bruer, 2010). As mentioned earlier, the latest PISA report puts us at 25th in the world in math for 15-year-olds. Our collective desire to regain the high status that our country once held is another powerful force pushing special programming for advanced learners (we might call it *Saving the American Dream*). It is the emotions such as fear and national ambition that will drive educational change, not research results on program effectiveness.

This message of national survival must be repeated by many sources over a long period of time. The development of the educational infrastructure will be an act of patriotism that will pay heavy dividends in the future if we can just get the job done.

SUMMING UP

There is broad general agreement on the importance of education for U.S. national defense and international competition in the 21st century. We do not seem to be able to put into practice or implement these ideas at the practical level. Instead, we are engaged in educational disarmament against our national interests.

We need an educational infrastructure to match those already existing in health and defense areas. There is a shortage of components of research, evaluation, personnel preparation, curriculum development, demonstration, technical assistance technology, and data systems needed to bring quality to the educational enterprise. The public investment in infrastructure for advanced learners would be a prelude to general public acceptance for infrastructure support of all students.

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