

Scientific Management Still Endures in Education

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Abstract

Some schools in America have changed, while others remain unchanged due largely to the accretion of small adjustments in what remains a very traditional enterprise. The problem is rooted in the propagation and adoption of scientific management by educators who applied and/or continues to apply it to education to restore order and for accountability. This essay discusses the enduring legacies of Fredrick Taylor's scientific management in American schools and contends that contemporary administrative practices should completely demystify this taunting philosophy around which the management of many schools in America continue to be structured. Critical analysis of the historical relationship between scientific management principles and the administration of American public education, discussion of the propagation of scientific management by popular early American school administrators, critique of scientific control of competence and accountability in education, and a critical analysis of the link between scientific management tasks and learning outcomes in American education are provided.

Key Words: administration, educational, control, management, principles, school, science.

Scientific Management Still Endures in Education

Introduction

The impact of scientific management on education management in the United States is evident in practices still found in many schools and school systems. Since the release of the report of the National Commission on Excellence in Education (1983) titled “A Nation at Risk: The Imperative for Educational Reform,” hundreds of educational task forces have been organized in the United States (Crawford 1991, Bracey 2008, Hewitt 2008, Sally 2008, Lauren 2012). Additionally, many states have generated more rules and regulations about all aspects of education than before. These rules set out to raise standards, increase accountability, lengthen school days, enhance the rigor of the existing public education system, etc.—changes in the routine functions and operations of schools. Innovative curricula and teaching techniques, entrance and exit examinations for students, national standards for students and teachers, enhanced professional preparation and accountability (e.g., teacher examinations, teacher and administrator credentialing standards and certification processes), changing the physical structure of schools and classrooms, new content for students, and more rigorous teacher evaluations are a few of the changes being proposed at different levels (Rose 2011, Trujillo 2014). These reform efforts that resulted in existing goals and structures being unchanged simply reinforced what existed without disturbing the structure of schools and without substantially altering the basic organizational features of the system (Cuban 1988a, 1988b, Rose 2011, Shannon 2012, Bridwell-Mitchell 2015).

For example, the National Leadership Network Study Group on Restructuring Schools [NLNSGRS] (1991) reported that the existing system has failed in teaching basics such as thinking and reasoning, problem solving, use of information for knowledge production and

learning, and so forth. They cited, among others, rapidly changing global economy, inability of schools to prepare the right kind of graduates America needs to occupy a dominant place in the world economy, high percentage of dropouts, large number of failing students hidden behind the mean scores on standardized tests, and increasing number of graduates who are not ready for work or for further learning as evidence of the failure of school administrators to reform American schools. The National Education Association (1990) noted that:

the fashions of American public education resemble a river into which flow tributaries of various strength. When conditions are favorable, the waters of one of the tributaries make a substantial contribution to the river. When unfavorable conditions prevail, the tributaries slow to a trickle. The central river, however, is always the central river. Regardless of the merits of many of the innovations of education reform, they did not alter the basic course of the river, which had its sources in the adoption of scientific management and the formation of district organizations that resembled turn-of-the-century corporations. (p. 39)

Later, Gray (1993) argued that “it may be inevitable that America will lose the race for international markets... because its people are infected with a disease called Taylorism” (p. 371).

Despite criticisms such as those of NLNSGRS, the National Education Association, Gray and others recently (Au 2011, Stoller 2015), schools have remained unchanged due largely to the accretion of small adjustments in what remains a very traditional enterprise. The problem is deeply rooted in the propagation and adoption of scientific management with its emphasis on efficiency and control by educators who applied and/or continues to apply it to education to restore order and accountability. This contention is supported by Au (2011) who noted in his review of the policies and practices of education in the United States that much of the guiding

rationale behind contemporary schooling is linked directly to Frederick Winslow Taylor's scientific management principles.

This essay discusses the enduring legacies of Frederick Taylor's scientific management in American schools and contends that contemporary administrative practices should completely demystify this taunting philosophy around which the organization and management of many schools in the United States continue to be structured. While making critical review of Taylor's "Scientific Management" and analysis of the historical relationship between scientific management principles and the administration of American public education, I will specifically (a) discuss the propagation of scientific management principles by popular early American school administrators and/or curriculum experts, (b) examine scientific control of competence and accountability in education, and (c) present a critical analysis of the link between scientific management tasks and learning outcomes in education in America.

Taylor's Scientific Management

Frederick W. Taylor's "scientific" and managerial approach to the workplace maximized efficiency and productivity through the standardization of labor. Through motion and time study, Taylor vigorously studied body movements and assigned exact approximations of the time necessary to complete the labor. A primary principle of his management approach was to eliminate opportunities of chance or accident through the scientific investigation of every detail of labor. Scientific management eliminated the need for skilled labor by delegating each employee one simple task to repeat over and over. Although this method increased the productivity of factories, it stripped employees their freedom to choose their work, as well as how it should be done. Workers were expected to complete each task under a predetermined work time. The itemization of each basic motion "mechanized" the labor process and almost

alienated the worker from the object produced and the action of production. Capitalism made scientific management flourish because it increased productivity and the accumulation of capital for the employer.

Scientific management was characterized largely by methods for distilling work into discrete, quantifiable tasks; measuring observable outputs; exercising heavy managerial control over workers; and minimizing costs by appealing to workers' economic self-interests, as well as by engaging in systematically derived best practices and planning (Callahan 1962). Taylor's system was swiftly taken up by business and, shortly thereafter, education with several conditions coalescing to spur the quest for scientific management in industry, education, and beyond: economic philosophy of free enterprise and a growing concern over how to design America's system of schooling for a diverse society undergoing an influx of immigration (Tyack and Cuban 1995, Trujillo 2014). Together, the developments set the stage for "reformers" to demand more transparency, accountability, and efficiency in business and education. Educational administrators found themselves stuck squarely in the middle of this reform movement. Reformers implored education administrators to avail themselves of the lessons from big business (Callahan 1962, Kliebard 1970) and construct quantitative metrics to measure schools' products and to employ economic logic to guide the educational enterprise (Cuban 1988a, Gray 1993).

Monitoring, testing, and competition soon permeated public education, and the practice of hiring "efficiency experts" to collect data on schools' operations, evaluate performance, and make recommendations to maximize productivity became commonplace (Trujillo 2014). This point also marked the creation of bond between external consultants from business and industry and school administrators. Because educators and communities were left to deliberate about and

solve their own problems, individual consultants or firms were regularly hired to collect data from schools, to pinpoint errors to school leaders, and to design reforms intended to tighten up the bureaucratic slack (Cuban 1988a). Urban schools were particularly susceptible to these managerial reforms, for it was in these settings—usually occupied by large numbers of immigrants, non-native speakers, and children from low-income communities—where performance was deemed to be lacking and where the media and politicians diagnosed a need for better management (Trujillo 2014). Both for- and not-for-profit organizations have proliferated in recent years and have grown alongside the public school system with the primary purpose of strengthening educational performance using methods and resources that, presumably, the system lacks (Rowan 2002). For-profit consulting or intermediary firms are increasingly assuming responsibility for brokering managerial expertise, usually in the most struggling schools (Trujillo 2014).

They often align their assistance and support with federal education requirements—high-stakes accountability policies grounded in the principles of efficiency, productivity, and accountability (Burch 2009). Some policies have solidified intermediaries' roles in public education by making specific mandates for districts and schools to hire the agencies as a condition of their compliance with high-stakes accountability regulations (Lipman 2004, Burch 2009). For example, the No Child Left Behind Act and, more recently, Race to the Top programs, are examples of such support by federal policy. Today, these intermediaries continue to serve as external experts who promote schools' use of measurable outcomes; standardized processes; and observable, quantifiable indicators of test-based effectiveness. These national policy structures and the trend among states toward standards-based accountability—systems of standardized content, assessment, target-setting, and sanctions for low test performance—have

also helped to cultivate local policy contexts that are conducive to intermediaries' interventions (Trujillo 2014). Taylor's ideas of standardizing tasks to increase efficiency and output parallels the adoption of high stakes standardized testing with the No Child Left Behind Act (U.S. Department of Education 2001).

Propagation of Scientific Management by School Administrators

With the publication of his first article, "The Elimination of Waste in Education," John Franklin Bobbitt (1912) started his career as a leader in the field of curriculum and became one of the pioneers that set the stage for the adoption and implementation of scientific management in school administration in the US (Kliebard 1970, 2004). Bobbitt's work in curriculum studies in the US is particularly important because of his application of Frederick Taylor's concepts of scientific management to educational management and planning. While arguing that factory-like efficiency in education should be driven by objectives, Bobbitt (1920) stated:

It is the objectives and the objectives alone ... that dictate the pupil-experiences that make up the curriculum. It is then these in their turn that dictate the specific methods to be employed by the teachers and specific material helps and appliances and opportunities to be provided. These in their turn dictate the supervision, the nature of the supervisory organization, the quantity of finance, and the various other functions involved in attaining the desired results. And, finally, it is the specific objectives that provide standards to be employed in the measurement of results. (p.142)

Bobbitt argued that schools, like businesses, should be efficient, eliminate waste, and focus on outcomes to the degree that the curriculum must be useful in shaping students into adult workers. Along with Frederick Winslow Taylor, Bobbitt believed that efficient outcomes depended on centralized authority and precise, top down instruction for all tasks performed. Within Bobbitt's

educational vision—similar to Taylor’s vision of managers—the administrator gathers all possible information about the educational process and develops the best methods for teachers to get students to meet the standards (Kliebard 1970, Au 2011). Bobbitt (1912) explained:

The new and revolutionary doctrine of scientific management states in no uncertain terms that the management, the supervisory staff, has the largest share of the work in the determination of proper methods ... Under scientific management, the supervisory staff, whose primary duty is direction and guidance, must therefore specialize in those matters that have most to do with direction and guidance, namely, the science relating to the processes. (p. 52-53)

According to Bobbitt’s (1913) scientifically managed education, teachers must be required to follow the methods determined by their administrators because they are not capable of determining such methods themselves:

The burden of finding the best methods is too large and too complicated to be laid on the shoulders of the teachers ... The ultimate worker, the teacher in our case, must be a specialist in the performance of the labor that will produce the product. (p. 52–53)

Bobbitt’s conception embraced one of the core logics of scientific management in education, which asserts that the end-points of predetermined objectives and/or standards alone drive the educational process (the production of students). Within these logics, all aspects of education therefore must serve the ends of the education process, with student learning purely based on pre-determination, and teachers’ content delivery structured by pre-determined scientific methods. Thus, the ends determine the means. This allowed the curriculum to be broken down into content units that could be standardized, determined in advance, taught in a linear manner, and easily assessed (Smith 2004). In this way the application of the principles of

scientific management to education allowed for continued administrative control over the process of teaching itself because it usurped substantial amounts of power from teachers-as-workers and allowed for increased surveillance over their teaching (Au 2011). The application of scientific management to education also affected the relationships of teachers and students to the process of education: it dehumanized their relationship to teaching and students by alienating them from their own creativity and intellectual curiosity (Kliebard 2004). Other educational leaders such as David Snedden, Ellwood Cubberley, Edward L. Thorndike, and Frank Spaulding also openly advocated the same factory-like, capitalist production-minded educational reforms and structures (Callahan 1964, Cuban 2004). Despite some alternatives that were proffered by progressives such as John Dewey, the scientific management model promoted by Bobbitt, Snedden, Cubberley, Thorndike, Spaulding and others became the dominant model that guided education (Au 2011).

In response to expansion in education services and curriculum, educating diverse student populations, and a growing need for accountability school administrators applied Taylor's and Bobbitt's ideas to schools. As Callahan (1962) noted, the claim made about the results of scientific management in business and industry confounded the notion that it was the much needed antidote to the great waste that existed in many grossly mismanaged schools. Despite Callahan's views and those of others opposed to Taylor's ideas, scientific management with its emphasis on efficiency found responsive chords among educators (Kliebard 1970, 2004). School administrators, in conformity with the "scientific" design of work and management, assigned teachers fragmented teaching tasks, "efficient" step-by-step procedures for accomplishing the tasks, and control mechanisms in the form of teacher evaluation and state-wide proficiency tests (Fine 1997, Cuban 2004, Stoller 2015). The management of schools is still based on control

(legislative and administrative): control of the work process and its measurement, and control of motivation through economic rewards—a strategy researchers have found to have minimal, if any, positive impact on teachers' job satisfaction and performance (Walton 1991, Gray 1993, Holt 1993, Tischler 2007, Owens 2014, Stoller 2015).

Worthy of mentioning here is the fact that scientific management is not the only management strategy from which education has borrowed. However, no other strategy, theory, framework or principle of management has negatively influenced educational management and efforts to improve schools in America as scientific management did and, to some extent, continues to do so. As some writers (Wilms 1983, Watkins 1986, Fine 1997, Au 2011) have contended, the entrenchment of efficiency and control in education, especially in school administration, was exacerbated by educators who fanned and propagated the principles of scientific management. The National Education Association (1990) noted that “the efficiency movement bequeathed an undeniably powerful inheritance of attitudes, structures, and rituals to American education” (p. 31). Perhaps unaware of the future effect of scientific management on school administration, social efficiency crusaders, who in great significant ways shaped the organization and administration of schools, applied the principles and philosophies of scientific management to education.

For example, Ellwood Cubberly believed that the adoption of scientific management in schools would mean the ultimate changing of school administration from guesswork to scientific accuracy, and the changing of school supervision from a political job for which little or no technical preparation need be made, to that of a highly skilled piece of professional social engineering (Fine 1997). He suggested that scientific management would demand the creation of standards of measurement and units of accomplishment which would determine, at the

individual, school, or system-wide level the efficiency of the work being done. Such standards, he maintained, would substitute for personal opinion, which in the past had constituted the only standard of measurement in educational procedure. In the early years of the twentieth century, William C. Bagley (1910) published his influential “Classroom Management,” in which he described classroom management as a problem of economy that seeks to determine in what manner the working unit of the school plant may be made to return the largest dividend of time, energy, and money. In a similar trend in 1911, the National Society for the Study of Education appointed the Committee on the Economy of Time in Education and charged it with making recommendations for the elimination of waste in the elementary school curriculum, the improvement of teaching methods, and the establishment of minimum standards for each school subject (National Education Association 1990). Two members of the committee, Frank Spaulding and Franklin Bobbit, called for a three-step process for the “scientific” design of curriculum and instruction. In a process that replicated Taylor’s ideas, these three steps involved (1) analyzing the classrooms during instruction to identify the range of teaching styles, (2) using specially designed test to measure the effectiveness of the methods identified, and (3) using the method that yielded the highest result (Shannon 2012).

In his charge to school administrators concerning their responsibilities, Franklin Bobbit, a strong advocate of scientific management, asserted that efficiency depended on centralization of authority and definite direction by the supervisor of all processes performed so that there can never be any misunderstanding as to what is expected of a teacher in the way of results or in the matter of method (Au 2011, Stoller 2015). Similarly, Bagley instructed teachers that “unquestioned obedience” was the “first rule of efficient service” (Bagley 1910, p. 74). The result of the work of Bobbit and those of other proponents of scientific management in education

includes the surrender, by teachers and staff, discretion in their work; the unionization of teachers; and the adversarial relationship that was created between administrators and teachers.

As it did between management and employees in the business and industrial sectors, scientific management contributed to adversarial relationships between teachers and school administrators and/or school boards, and to the formation of teacher unions. Needless saying that unionization caused a shift in teachers' focus from classroom to more distant and abstract settings (Jacoby 2011). For example, as they organized and lobbied for higher wages and improved working conditions, larger bargaining units became necessary to lobby local, state, and federal policymakers. Because external criteria or forces in the form of union contracts have defined wages, working conditions, and class size legal and adversarial relationships have been substituted for personal relationships. Teachers and administrators in many school systems are still polarized and, in some cases, they defined their interests as different and often antagonistic to each other. The result of this kind of impersonal control is a slow death of ideas in teaching and administrators doing the creative thinking teachers need to be effective for them, even before teachers get to the classroom. Often the situation may degenerate to one in which working conditions, salaries, and class sizes are negotiated elsewhere; curricula would be established by an outside agency; content is specified by subject-matter experts; disciplinary procedures are prescribed by the courts; and the components of effective teaching will be itemized and quantified by administrators and legislators. These aspects of "scientific control" separate teachers from significant input in ideas about many aspects of schooling. We now know that improved teacher and student performance result from allowing and encouraging teachers to breathe the life of ideas into their professional work (Bridwell-Mitchell 2015). Outstanding

teachers describe their work as a creative process that depends on ideas and vitality (Chance 1991, Owens 2014).

Scientific Control of Competency and Accountability in Education

Since 1930s, standard tests have become the instrument enabling authorities to judge the performances of both students and teachers (Au 2011). It has become evident that the benefits of applying scientific methods to schools is that education has increasingly become characterized by standardized tests, expert opinion, and institutional authority and control (Stoller 2015). At first, the application of scientific control to education focused on diagnosing students needs and abilities and the teaching of subject matter. More recently, frustrated school boards and states have chosen to apply the method to the selection, training, and promotion of teachers (Au 2011, Stoller 2015). For example, North Carolina State Board of Education, among others throughout the country, have begun a plan to evaluate pre- and in-service teachers based on state-mandated competencies that are thought to be associated with good teaching and leadership (North Carolina Department of Public Instruction 2012). Such mass evaluation, while it promises simplicity and efficiency, may be deceptive. The good teacher most of us know entered into a personal relationship with each student; he or she ensured that the responsibility of learning was the students'; the teacher often taught a range of subjects; and he or she integrated subjects to help students find meaning in what might be ordinary disconnected bits of information.

Therefore, defining what that teacher did remains elusive and in the process of scientifically managed mass evaluation, the effective teacher may not be credited for outstanding qualities.

Yes, teachers should be accountable. The issues are To whom and How? Competencies are difficult to define and measure because neither our comprehension of teaching nor our knowledge of cause and effect as it operates in social systems is sufficient to apply simple

technical solutions to complex problems. Scientific management, with its emphasis on control and the “one best way” of doing work, has culminated in teachers being at the receiving end of public criticism. For example, persistent blames for the inadequacies of the educational system in America continue to be focused on teachers (Jacoby 2011, Bridwell-Mitchell 2015). The views of many of these critiques are replete with the belief that the problems of schools are due to the inefficiency of teachers (Fine 1997, Bridwell-Mitchell 2015). To such critiques, the multifaceted problems of American education will disappear overnight, if teachers become more efficient in performing the numerous tasks imposed on them by both the society and the school system. But contrary to these critiques, school administrators should exert less control and engage in more cooperative and collaborative endeavors with teachers in order to allow them to assert themselves professionally and to assume leadership roles in defining and controlling the substance of what they do—teaching.

John Dewey, a critique of Taylor, tried to dissuade educators from using tests that are developed based on the principles of scientific management. He recommended that tests be used for diagnostic purposes, to provide a better understanding of children, and not as a convenient means of classifying and standardizing students (Callahan 1964, Rose 2011). Contrary to Dewey’s recommendations, school administrators gathered and analyzed information in the educational workplace, and then assumed control of the process of directing teachers to teach in ways that management (state and local) considered the most efficient (Au 2011, Bridwell-Mitchell 2015, Stoller 2015).

One of the effects of restricting teacher autonomy was the transformation of education by a change in the relationship between teachers and administrators and by the development of educational standards and means of measurement (Rose 2011). School administrators would be

guided by a scientific system of pedagogical management that would require the measurement of results against fixed standards—concerted efforts to introduce an element of accountability into the educational process. The measurement of results are important for two reasons: (1) it affords administrators the opportunity of monitoring progress in the classroom, independently of teachers; and (2) it gave administrators publicly credible evidence of educational progress or dysfunction. Today, policymakers' and the public's fascination for standardized tests (control measures) continue to escalate, and has become the most accepted means of determining the effective or wasteful use of public's tax dollars.

Despite the glaring consequences of standardized testing (e.g., not being a valid assessment of the skills students need for life-long learning and for transition from school to work, inability to measure higher level cognitive skills, teachers teaching to the test, and others), we continue to be mesmerized by education's annual ratings and no doubt will continue to be until widely accepted supplemental sources of evaluation are developed. More than any other factor, scientific management and its concomitant influence in the development of measurement techniques greatly standardized the form and content of teaching (Allen 1979). In, "Education and the Cult of Efficiency," Raymond Callahan (1962) noted that the quest for efficiency was directed to the management of schools and the curriculum, to the extent that the superintendent of schools was transformed from an educator to a business manager. In reviewing the impact of Taylor's ideas on the study of administration, Callahan stated:

no wonder that schoolmen sought to emulate the efficiency of business and use whatever methods business has used to attain it; and no wonder that scientific management appeared in the forefront of these methods. Its appearance, however, was an unhappy one for our educational system. For instead of approaching the study of administration

through the social sciences, school administrators applied the science of business-industrial management as they understood it. (p. 245)

Callahan deplored the impact of scientific management on school administrators, noting that educational issues were “subordinated to business considerations” (1962, p. 246). For example, in curriculum development, the influence of scientific management principles is evident in the popular Tyler model. Tyler (1950) opined that instructional objectives should be specified in advance and used as a basis for determining and evaluating educational experience. Tyler’s curriculum planning model became the popular framework that guided the planning and development of school curricular. Like in an industrial process, the course of study became an instructional sequence, with each stage guided by explicit objectives that were judged by performance assessment techniques. The principles espoused in Tyler’s curriculum model is still ubiquitous (Jonnaert and Therriault 2013).

In fairness, scientific management principles were developed when workers were not well educated, and their social character was more predictable . Today’s workforce is better educated and is more innovative; their social character has changed drastically; and the pervasive impact of technology calls for advanced skills. Knowledge about the nature of human behavior in the workplace has enabled us to understand better the role of human interdependence in organizational development. What the society is prepared to pay high prices and high wages for now is higher quality, differentiation of instruction, and variety and responsiveness to changing learners’ styles and needs; scientific management methods are not well suited to these goals.

Scientific Management Tasks and Learning Outcomes

According to Taylor, the traditional method of management, “initiative and incentive model,” (rewarded employees based on completed work) was very problematic because it failed

to maximize production (1911, 1998). The solution was to recognize the system of production or work and localized knowledge around “the task” (Taylor 1998, p. 29). The task is the very specific thing a worker must know and be able to do in order to perform his or her role productively and correctly; collectively, a system of tasks worked in synchronization to support a process of production and reach a definable goal. Taylor (1998) described task as:

Perhaps the most prominent single element in modern scientific management is the task idea. The work of every workman is fully planned out by the management... in advance ... This task specifies not only what is to be done but how it is to be done and the exact time allowed for doing it. And whenever the workman succeeds in doing his task right, and within the time limit specified, he [is rewarded for his effort]. ... Scientific management consists very largely in preparing for and carrying out these tasks. (p. 29)

Like Taylor’s reconstruction of industrial organizations around the task (Taylor 1998, Head 2014), several public school reform efforts in American continue to be structured around “learning outcome.” Schooling in America, as increasingly defined and determined by the use of terms such as “learning outcomes,” is an extension of scientific management, and it yields the very real possibility of restricting the creative capacities and unique potentials of students (Shepard 2000, Au 2011, Nelson 2012, 2013, Stoller 2015). Though the systematic use of learning outcomes is a contemporary phenomenon, the philosophical groundwork for their construction and adoption was established in the first half of twentieth century as part of the social efficiency movement, which intended to use Fredrick Taylor’s principles as a foundation for the American education system (Shepard 2000). Today, the expansion of student learning outcomes tied to quantitative assessment metrics in America is being supported by significant corporate and legislative interests such as the Gates Foundation (Ashburn 2010), the Educational

Testing Service (Dwyer et al 2006) and the federal government (Nelson 2012, 2013). As reported by Garrison (1990), E. L. Thorndike's work, in particular, played a central role in moving Taylor's ideas into educational theory, measurement, and practice.

Like Taylor, Thorndike (1910) argued that there are "scales for everything in human nature" (p. 4). Thorndike (1910, 1935) saw his work as establishing scientific methods to 'measure such educational forces as the teacher's interest in his/her work, or the ingenuity of his/her questions, and such educational products as knowledge. Thorndike believed that learning is the accumulation of stimulus-response associations (Garrison 1990). While Thorndike is no longer a visible presence in educational theory, his ideas deeply influenced contemporary beliefs about the nature of evidence, the principles of fairness and the shape and trajectory of educational research in the twentieth century (Shepard 2000, Baez and Boyles 2009).

Current emphasis on learning outcomes at all level of education in America reduces assessment of learning and its use to that of classifying and/or labeling students and teachers. Instead, assessment should display as much of a student's understanding as possible and the expert/teacher must not simply evaluate the educational product, but also open the process for evaluation and critique—to see the inner workings of the student's mental process as he/she solves a problem or analyzes a concept. Rather than education viewed as the quantitative increase of facts or skills (an additive property), it is an ongoing process of both personal and cultural maturation through reconstruction (a hermeneutic capacity); education does not simply change what students know—it changes what they want to know (Stoller 2014). As Dewey (1981) noted, growth is present throughout the continuity of one's life and is merely expanded, refined and extended.

Conclusion

The success of efforts that are aimed at refocusing the mission of public education in America, depends greatly on the quality of leadership and team work manifested by school administrators and teachers (Tischler 2007, Rose 2011, Bridwell-Mitchell 2015). In fact, many schools have changed in an excitingly productive way because of school administrators' particularly striking and unique ability to cultivate and nurture human interrelations based on trust, team work, cooperation and collaboration between various constituents of the school system (Holt 1993, Fine 1997, Owens 2014). While these administrators have been able to mobilize people to overcome the resistance that the system reflexively generates, others have not been successful, perhaps, due to their indoctrination in the philosophy of efficiency and control. They seem to have become enmeshed in the bureaucratic nature of schools where rules, compliance, and support of the system is the norm (Chance 1992, Rose 2011, Owens 2014). In such failing school systems throughout the nation, management of schools is more of a technical exercise or the manipulation of human and material resources to achieve certain predefined and predictable outcomes; and the quest for the one best way of doing work still finds responsive chords. To a great extent, administrative practices in such school systems are replete with principles and philosophies reminiscent of Frederick W. Taylor's scientific management (Fine 1997). Such practice causes profound stress on both teachers (especially new ones) and students and creates a process for constantly identifying losers. Also, such practices emphasize control of curriculum and instructional processes, teachers, staff, resources, and reward systems.

At the present and in many schools, teaching tasks are still routinized and segmented according to established curricula. Control for efficiency is enforced through legislative mandates, state-wide standards, administrative rules and policies, and district-wide evaluation processes. Overt bureaucratic forms of control through numerical teacher evaluations and invalid

state proficiency tests are still wide spread. Scientific control measures designed to measure teacher efficiency at the state, local, and district levels have done no more than create adversarial relationships between teachers and school administrators. While scientific management made us believe that management was an increasingly complex science that required managers of high intellect, it also forced management to pay little or no attention to the importance of workers contributing to decisions concerning what they do: their role was simply to follow the rules established by management. The division of labor implied by scientific management quickly became a fundamental paradigm that structured the expectations educators had for the increasingly diverse student population.

In contrast, we should explore the intricacies of human interrelations as the basis for creating and nurturing responsive management of teaching and learning--a cooperative and collaborative effort to improve teacher and learner performances (Bennis 1993, Holt 1993, Au 2011, Shannon 2012, Owens 2014, Stoller 2015). Today's labor market and the pervasive influence of technology suggest that schools should prepare students to be life-long learners and should help them make appropriate transition from school to work or higher institutions of learning. But, as evident in many school organizations, some to whom management of education is entrusted are yet to make these responsibilities a reality. School administrators should harness the rewards of team work such as increased teacher motivation, success for all students, improved teacher and student performance, high morale, better community relations, and above all, a nurturing environment for creative teaching and learning. If quality education is to prevail in America, educational administrators must unlearn and demystify the psychology of efficiency and control and the lingering residues of scientific management should be completely eradicated.

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