Journal of Curriculum Studies

ISSN: 0022-0272 (Print) 1366-5839 (Online) Journal homepage: http://www.tandfonline.com/loi/tcus20

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To cite this article: Wayne Au (2011) Teaching under the new Taylorism: high-stakes testing and the standardization of the 21st century curriculum, Journal of Curriculum Studies, 43:1, 25-45, DOI: 10.1080/00220272.2010.521261

To link to this article: http://dx.doi.org/10.1080/00220272.2010.521261

Published online: 27 Jan 2011.

J. CURRICULUM STUDIES, 2011, VOL. 43, NO. 1, 25–45

Teaching under the new Taylorism: high-stakes testing and the standardization of the 21st century curriculum

WAYNE AU

The application of the principles of scientific management within the structure, organization, and curriculum of public schools in the US became dominant during the early 1900s. Based upon research evidence from the modern day era of high-stakes testing in US public education, the fundamental logics guiding scientific management have resurfaced 100 years later, as teachers' classroom practises are increasingly standardized by high-stakes testing and scripted curriculum. As such, this paper offers a critical analysis of the changes made to teaching in modern times and argues that public school teachers in the US are teaching under what might be considered the 'New Taylorism', where their labour is controlled vis-à-vis high-stakes testing and pre-packaged, corporate curricula aimed specifically at teaching to the tests.

Keywords: critical analysis; prescriptive teaching; educational assessment; curriculum research

Introduction

> As in industry, the price of worship at the altar of efficiency is the alienation of the worker from his work—where continuity and wholeness of the enterprise are destroyed for those who engage in it. (Kliebard 1975a: 66)

The application of the principles of scientific management within the structure, organization, and curriculum of public schools in the US became dominant during the early 1900s (Kliebard 2004). Based upon research evidence from the modern day era of high-stakes testing in US public education, the fundamental logics guiding scientific management have resurfaced 100 years later, as teachers' classroom practises are increasingly standardized by high-stakes testing and scripted curriculum. As such, this paper offers a critical analysis of the changes made to teaching in modern times and argues that public school teachers in the US are teaching under what might be considered the 'New Taylorism', where their labour is controlled vis-à-vis high-stakes testing and pre-packaged, corporate curricula aimed specifically at teaching to the tests.

The analysis undertaken here begins with a historical and conceptual review of scientific management and Taylorism in education, specifically

Wayne Au is Assistant Professor in the Education Program at the University of Washington - Bothell, Box 358531, 18115 Campus Way NE, Bothell, WA, 98011-8246; email: wayneau@u.washington.edu. Au is a contributing editor with *Rethinking Schools*, author of *Unequal By Design* (Routledge, 2009), and co-editor of *The Routledge International Handbook of Critical Education* (with M. Apple and L. Gandin) (Routledge, 2009). His next book, *Critical Curriculum Studies*, is to be published by Routledge in 2011.

Journal of Curriculum Studies ISSN 0022–0272 print/ISSN 1366–5839 online ©2011 Taylor & Francis
http://www.informaworld.com
DOI: 10.1080/00220272.2010.521261

focusing on the work of John Franklin Bobbitt to illustrate the core principles underlying the factory production model of education that eventually became dominant within US public education. Then, drawing on the body of existing research on the effects of modern day high-stakes testing on the classroom practises of teachers in the US, this analysis goes on to outline the ways such testing largely standardize both the curriculum and teaching—a process perhaps best epitomized pre-packaged, scripted curricula aimed specifically at increasing the test scores of pupils. This evidence is then analysed using conceptual work done on the political economy of teaching (see, e.g. Apple 1995), which conceives the rigid controls placed on teachers as a resurgence of Taylorism and scientific management of the early 20th Century US. Finally, this analysis concludes with a consideration of how standardized tests themselves, through the inter-related processes of decontextualization, objectification, and commoditization, fundamentally provide the foundational basis for education to be framed as a form of factory production, and thus also serve as the central tool for the control of teaching in the New Taylorism.

Scientifically-managed education

According to Kliebard (1979), no one in the US 'exemplified [the] spirit of scientific curriculum making more than John Franklin Bobbitt' (p. 74), because he was 'the man who gave shape and direction to the curriculum field' (p. 55). Bobbitt was first brought to the University of Chicago's Department of Education as a lecturer in 1909. By 1910 he was promoted to the position of Instructor of School Administration, and soon after published his first article, 'The Elimination of Waste in Education' (Bobbitt 1912) which started his career as a leader in the field of curriculum in the US (Kliebard 2004). Bobbitt's importance in the history of curriculum studies lay in his application of Frederick Taylor's concepts of scientific management in factory production to systems of educational management and planning. For Taylor, efficient production relied upon the factory managers' ability to gather all the information possible about the work which they oversaw, systematically analyse it according to 'scientific' methods, figure out the most efficient ways for workers to complete individual tasks, and then tell the worker exactly how to produce their products in an ordered manner—a process more popularly known as 'Taylorism' (Noble 1977). This aspect of scientific management, as Noble (1977: 264) argues, secured 'managerial control over the production process and lay the foundation for the systematic reorganization of work …'.

Under the guidance of curriculum leaders such as Bobbitt, Snedden, and others, scientific management provided a particular logics of efficiency US education (Kliebard 2004). According to Bobbitt (1920: 142), such factory-like efficiency in education is driven by objectives, where he states that:

> 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.

In addition to objectives driving education, within Bobbitt's educational vision—akin 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. As Bobbitt (1913: 52–53) explains:

> 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.

Further, according to Bobbitt's 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 labour that will produce the product. (Bobbitt 1913: 52–53)

And finally, principals and other administrators should use tests to determine 'weak' and 'strong' teachers as well as rates of teacher pay or access to other privileges (Bobbitt 1913). Thus, Bobbitt maps the metaphor of Taylorism on to US schools in a very simple and neat way. Students are the 'raw materials' to be produced like commodities according to specified standards and objectives. Teachers are the workers who employ the most efficient methods to get students to meet the pre-determined standards and objectives. Administrators are the managers who determine and dictate to teachers the most efficient methods in the production process. The school is the factory assembly line where this process takes place.

Bobbitt's conception embraces one of the core logics of scientific management in education, which asserts that the end-points of pre-determined 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. Kliebard (1975b, 1995) describes this type of logic in the curriculum as 'means-ends rationality' where, as Posner (1988: 80; original emphasis) posits, 'it is a *technical* matter to decide such issues as instructional method and content, a matter best reserved for people with technical expertise about the methods and content optimally suited for particular objective'.

Historically, means-ends rationality has had a tremendous impact on the shape of curricular content and the pre-determined outcomes of student learning in the US. Kliebard (1979: 76; original emphasis) explains that:

> The implications of the application of scientific precision to the curriculum planning process by Bobbitt and his contemporaries were enormous. First, a

> standard procedure for stating the objectives of the curriculum was instituted. … Second, the subjects of study would no longer be the central feature of the curriculum; they became relegated to the status of the *means* by which objectives … would be achieved.

Such precision allowed the curriculum to be broken down into minute units of work that could be standardized, determined in advance, taught in a linear manner, and easily assessed (Apple 2000, 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 allows for increased surveillance over their teaching (Braverman 1974, Noble 1977, Apple 1979/2004, 1986, Apple and Beyer 1988, Carlson 1988b). Further, moving towards an efficient, means-ends rationalized curriculum also greatly 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 1975a).

It is important, however, to recognize that Bobbitt's educational vision was far from singular. Other educational leaders such as Snedden, Cubberley, Thorndike, and Spaulding also openly advocated the same factory-like, capitalist production-minded educational reforms and structures (Callahan 1964, Hursh and Ross 2000, Cuban 2004). Historically, then, even though there existed some choice between the education reforms in the US offered by progressivists like John Dewey and the scientific management model offered by those like John Franklin Bobbitt, '… the impact of an ideological position drawing its modes of operation and criteria of success from the management industry has had a lasting … impact on curriculum thinking in the United States' (Kliebard 1979: 80). As Cuban (2004: 50) explains:

> By the 1920s, business leaders were no longer in the forefront of school reform, but they could see the triumph of these core assumptions across the nation in new public school goals, reshaped governance, efficient organization, and differentiated curricula. … Occasionally challenged in subsequent decades, these assumptions about the relationships between education, the economy, and a stable society, and between business and schools, were generally unquestioned beliefs that shaped the thinking of business leaders, public officials, journalists, educators, and parents for the remainder of the twentieth century.

Hence, in part due to the make-up of school boards, in part due to the implementation of mass schooling in the US, and in part due to a particularly heated struggle between capital and labour in the country during this critical time period, scientific management became the dominant model guiding education there (Au 2009b).

Scientific management or 'social efficiency'?

Recent research in curriculum studies has caused a shift in the conception of scientific management in the curriculum, and this shift is relevant to the present discussion. Previously, scholars such as Kliebard (2004) have

asserted that scientific management in the curriculum has been the result of what he termed the 'social efficiency movement'. More recent research has challenged the accuracy of this position. As Null (2004) argues, for instance, 'social efficiency' had different and variable meanings amongst educational leaders in the US at the time (e.g. William C. Bagley's definition of social efficiency as social service or Irving King's definition of social efficiency as community harmony). Further, Knoll's (2009) research has found that, not only did the concept of social efficiency originate in the UK with the 1894 publication of Benjamin Kidd's *Social Evolution*, but Knoll also argues that progressive educators in the US, specifically Dewey, explicitly advanced much different versions of social efficiency than the particularly conservative conceptions of Bobbitt, Cubberly, Snedden, and others.

While such research contradicts Kliebard's (2004) important work in curriculum studies, it also perhaps ultimately improves upon it as well. Not only do Null's (2004) and Knoll's (2009) research push for more accuracy and refinement in our histories, but the latter also seeks to internationalize curriculum studies in the process—all of which can only be good for the field. However, while conceptual clarity is critically important in this area, it is too much of a reach, for instance, when Knoll (2009) asserts that Kliebard (2004) and others have been guilty of 'creative writing' (Knoll 2009: 383). In this regard, both Null's (2004) and Knoll's (2009) analyses also seem to miss the fundamental point: Even if there were competing and contradictory definitions of 'social efficiency' amongst US educational leaders in the early 1900s, and even if contemporary curriculum scholars erred in over-identifying 'social efficiency' with the conservative versions more closely aligned with scientific management, the reality is that the structures of school and curricular reform associated with Taylorism and efficient, factory-like production, did in fact become hegemonic in the US (Callahan 1964; Apple 1979/2004). Further, the logics of scientific management can not only be found in modern day educational structures, but also can clearly be traced directly back the school reform movements of the early 1900s (Au 2009b). Thus, despite the mistaken conceptualization of 'social efficiency' by contemporary curriculum scholars, the claims regarding the ideological and structural links between the more conservative notions of 'social efficiency' and the organization of schools and the curriculum still hold true. Indeed, the current analysis explicitly seeks to illustrate these links.

High-stakes testing and the standardization of teaching in the US

While the use of standardized testing in education in the US has been relatively consistent since the early 1900s, it has only been in the more recent decades where their use has risen to dominance such that, within modern day systems of educational accountability, high-stakes, standardized testing is now the central tool used for educational reform there (Kornhaber and Orfield 2001). This is largely due to the passing of the No Child Left Behind Act of 2001 (hereafter, NCLB), the federal US law mandating high-stakes

testing in mathematics and reading/language arts that uses the threat of loss of federal funding for failing schools and districts (US Department of Education 2002). Thus, despite the tension that exists between the 50 US states and the federal US government—where each state has their own state-level departments of education, their own content standards, and their own tests (Eisner 2001), and despite the lack of national curriculum in the US (Porter *et al.* 2009), NCLB effectively established high-stakes testing as an officially mandated practise nationally there. Subsequently, even as individual US states and school districts may have their own specific assessments, high-stakes, standardized testing has become a common practise nationwide.

When we look at the research on how high-stakes testing is affecting US classroom practises, it becomes quite clear that such testing is promoting the standardization of teaching that both disempowers and deskills teachers. For instance, due to the pressures exerted through policies associated with high-stakes testing, teachers are teaching to the tests with increasing regularity, consistency, and intensity. The most prevalent finding in the empirical research in the US is that high-stakes testing narrows the instructional curriculum because, to varying degrees, teachers shape the content norms of their curriculum to match that of the tests (see, e.g. Taylor *et al.* 2001, Abrams *et al.* 2003, Pedulla *et al.* 2003, Jones and Egley 2004, von Zastrow 2004, Rosenbusch 2005, Crocco and Costigan 2007). For instance, in one US nationwide survey 71% of the districts reported cutting at least one subject to increase time spent on reading and math as a direct response to the high-stakes testing mandated under the No Child Left Behind (NCLB) legislation (Renter *et al.* 2006). These findings are bolstered by another US nationwide survey of 349 school districts nationwide, where it was reported that 62% of districts reported increased instructional time devoted to the tested subjects of math and English/language arts in elementary school since 2002, including a 37% increase in time spent on math and a 46% increase in time spent on English/language arts education (CEP 2007). In this way, high-stakes testing is having the net effecting of standardizing the content of the curriculum in teachers' classroom practises in the US.

This zero-sum curriculum, where tested subjects dominate and non-tested subjects are edged out or are entirely pushed out of the curriculum altogether, is not the only impact of high-stakes testing on classroom practises in the US, however, because high-stakes testing is also functioning to standardize the curricular form of how knowledge is taught in US classrooms. Curricular form refers to the organization of meaning and action, including the order in which we are introduced to content and the very form that knowledge itself takes, in the curriculum (Apple 1995). In the case of high-stakes testing in the US, as the content of the curriculum moves to match what the tests require, the structure of curricular content knowledge similarly shifts towards the fragmentation demanded by the tests. As one US teacher in the research of Luna and Turner (2001: 83) explains, 'You know, we're not really teaching them how to write. We're teaching them how to follow a format. … It's like … they're doing paint-by-numbers'. Or, as another US teacher in Vogler's (2005: 19) study remarks:

> My choice of instructional delivery and materials is completely dependent on preparation for this test. Therefore, I do not use current events, long-term projects, or creative group/corporate work because this is not tested and the delivery format is not used. All my tests reflect the testing format of the subject area tests- multiple-choice and open ended questions.

Knowledge learned for US high-stakes tests is thus transformed into a collection of disconnected facts, operations, procedures, or data mainly needed for rote memorization in preparation for the tests (see, e.g. Clarke *et al.* 2003, Vogler 2005, Toch 2006, Crocco and Costigan 2007, McGuire 2007, McCarthey 2008). Consequently, students are increasingly learning knowledge associated with lower level thinking, and they are often learning this knowledge in fragmented chunks within the context of the tests alone. In this way, high-stakes testing is effectively restricting the way knowledge itself is structured in teachers' practises in US schools.

Additionally, in teaching to the tests in content and curricular form, teachers in the US are also adopting pedagogical strategies that more closely align to the forms of knowledge and content contained on the high-stakes tests. In US classrooms this translates into teachers adopting more teacher-centred pedagogies, such as lectures, to meet the content and form demands of the tests (see, e.g. Taylor *et al.* 2001, Gayler 2005, van Hover & Heinecke 2005, Vogler 2005, Au 2007 , Crocco and Costigan 2007). Pedagogy is thus increasingly reduced to figuring out how to dispense what McNeil (2000: 5) describes as, 'packaged fragments of information sent from an upper level of the bureaucracy'. This pedagogical trend towards what Smith (1991: 10) calls 'multiple choice teaching' in the US also manifests in increased time doing test drills and practicing for the types of information, questions, and test-taking skills that the tests require (see, e.g. Luna and Turner 2001, Hillocks 2002, CEP 2007) where, according to Renter *et al.* (2006), many US districts are becoming 'more prescriptive about how and what teachers should teach' (p. 99). As one US teacher in Crocco and Costigan's (2007) study remarks, the test '… really shapes the way I run the class … I have to cut out certain cooperative activities because they're time consuming. It definitely affects my teaching. It's always in the back of your mind' (p. 521). While never absolute, this limited control of pedagogy exerted vis-à-vis US high-stakes testing creates the conditions where teachers are increasingly compelled to change their pedagogies to match the types of learning and memorization associated with the tests, even though they feel that they are being pushed to teach in ways they know are contradictory to constructivist, student-centred, best practises (see, e.g. Abrams *et al.* 2003, Agee 2004, Brimijoin 2005, van Hover and Heinecke 2005, Crocco and Costigan 2006). In this regard, high-stakes testing in the US not only standardizes the content of the curriculum as well as the forms such content takes in the classroom, it also works to standardize teachers' pedagogies as they work to deliver test-driven curriculum in an efficient manner.

While the above research evidence points to some of the key ways that US teachers' practises are in essence being standardized by high-stakes testing, teaching in the New Taylorism is perhaps best illustrated through the rise of scripted curriculum in US schools. Under such programmes, teachers are mandated to use pre-packaged curricular materials that require no

creative input or decision-making on the part of the teachers, literally providing verbal scripts that define and limit what teachers can say as they teach. Most notable is the 'Reading First' initiative within the NCLB Legislation in the US. For this initiative the federal government has promised to fund only those reading programmes that are grounded in what NCLB calls 'scientifically-based' or 'evidence-based' research: those reading programmes based on direct instruction and phonics which the Bush Administration claimed had been 'scientifically' proven to be effective (Berlak 2003, Eisenhart and Town 2003, Smith 2004, Altwerger 2005). Despite the fact that the 'science' behind this research is suspect and easily refutable (Coles 2000, 2003, Garan 2005, Land and Moustafa 2005), because of the US government's definition, by and large only those programmes that apply completely scripted, direct phonics instruction were eligible to receive federal monies. Thus, teachers in many low performing US districts have been required to use commercially packaged reading instruction programmes such as Open Court, which tell teachers exactly what page to be on for each day as well as every word and line they are allowed to say while teaching reading, all in preparation for the high-stakes testing (Meyer 2002, Berlak 2003, Gerstl-Pepin and Woodside-Jiron 2005, Land and Moustafa 2005, McCarthey 2008).

We can see the stringent language of such curricula by looking at the *Houghton Mifflin Reading: A Legacy of Literacy* (Cooper *et al.* 2003), California Teacher's Edition, grade 1, textbook as an example. This reading textbook gives day-by-day instructions for teachers, pre-structuring all activities and leaving little to no room for their own planning or creativity (e.g. projects, group instruction, etc.). The scripted instruction starts from the beginning, where in the introduction teachers are directed to:

> Read aloud the first page and stop before the last paragraph. Say: *Your state is California. California has set standards for me and you to help you learn this year. Let's learn more about these standards.* Now read the last paragraph … These pages give examples of standards and … they are posted in the books. Explain that, for each story, the standards tell children what they are learning.
>
> Say: *When you come into school, you don't get to your classroom all of a sudden. You walk there, one step at a time. Standards are the same way. You don't have to know them all at once. You'll learn them as you go.* (n.p., original emphasis)

Such scripted direction continues throughout the text. For instance, as part of a section on 'Opening Routines', the book tells the teacher the script for how to teach the blending of phonemes: 'Say: *I'm going to say a rhyme. Listen carefully to the last word of the rhyme! I will say sounds in it. You blend the sounds together and say the word'* (T21, original emphasis). In another section on phonics, teachers are similarly directed:

- Say *cat*. Ask: *What sound do you hear at the beginning of cat? What letter should I write in the first box?* Write *c*.
- Ask: *What sound do you hear next in cat?* Call on a child to come to the board and write *a* in the second box.
- Ask: *What sound do you hear at the end of cat? What letter should I write in the last box?* Write *t*. (T27, original emphasis)

The textbook itself is teeming with similar examples of both highly scripted instruction and page-by-page directions for what each teacher must be covering in what order and on what day. While it is true that the enacted curriculum can and does often differ from the officially mandated curriculum (Gehrke *et al*. 1992) and teachers resist bureaucratic authority imposed by school systems (Carlson 1988a), it is also true that teachers are facing sharper penalties—including termination (see, e.g. Jaeger 2006)—for resisting such scripted curriculum, and teachers are largely falling into line in response to the pressures exerted by both testing and school administration, as the research discussed here generally illustrates. Thus, this example, as well as those discussed above, represent prime examples of outside experts conceiving the 'best', most efficient methods of teaching reading and of teachers being coerced to use these methods under threat of policy-designed sanctions—a process that Coles (2003) calls the end of wiggle room in reading instruction.

Such scripted curriculum programmes have not just been relegated reading and Language Arts instruction in the US, however. Cwikla's (2007) research describes a case where a scripted direct instruction (SDI) mathematics programme was implemented with the specific goals of raising test scores and providing easy evaluation of teaching by administrators. The script for this mathematic s programme was so rigid that, 'If a student had a question, the SDI instructed teachers to repeat the script just previously read' (p. 562). Crocco and Costigan (2007: 522) suggest that, 'the degree of prescription seems to have reached unprecedented levels' not only in English/Language Arts instruction in the US, but also in the teaching of history instruction in response to high-stakes tests in some states, with one US teacher in their study commenting that:

> I am told that I must have certain artifacts in my classroom. I am told how to structure my lessons. I am told how to comment on a student's paper. I am treated as if I were incapable of doing these things on my own. (p. 522)

Such scripted curricula makes teachers 'alienated executors of someone else's plans' (Apple 2000: 118) and represent the pinnacle of teaching in the New Taylorism as an extension of a US education policy built mainly upon high-stakes tests.

High-stakes testing and the logics of the new Taylorism

Writing 20 years ago, Apple and Jungck (1990: 234) observed that:

> With control over content, teaching, and evaluation shifting outside the classroom, the focus is more and more only on those elements of social studies, reading, science, and so forth that can be easily measured on standardized tests. Knowledge that and occasionally low-level knowledge how are the primary foci. Anything else is increasingly considered inconsequential.

In this work and other analyses completed during the late 1980s (see, e.g. Apple 1995; originally published 1987), Apple perhaps over-estimated the impact of systems of external accountability on the work of US teachers at

that time, simply because such systems had yet to become dominant within US school systems and education policy. However, relative to the level of standardization of teaching and the curriculum within high-stakes test-influenced educational environments in contemporary times, Apple's analysis is almost prescient since it so sharply explains how test-driven teaching and scripted curriculum epitomize the basic logics of Taylorism and scientific management. Specifically, he frames this process in terms of technical control and de-skilling of teaching.

As Apple (1995) explains, technical control is a type of control that is rooted within the organization and arrangement of one's work. In industry, technical control manifests in many ways and can be illustrated by an assembly line, where the tasks of the assembly-line workers' jobs are determined by the structure of the assembly line itself: Certain stations require specific tasks, the overall order and form of which have been determined by engineers or managers. As evidenced by the research discussed above, technical control operates through the curricular structures being directly shaped by the norms and expectations associated with high-stakes testing (Au 2007) as US teachers are compelled to rely less and less upon their own knowledge and expertise in the educative process and instead are required to take direction from outside educational 'experts' who develop the standardized tests and/or pre-packaged curriculum. Further, technical control also brings with it a process of 'de-killing', where, as Apple (1995: 132–133) explains:

> Skills that teachers used to need, that were deemed essential to the craft of working with children—such as curriculum deliberation and planning, designing teaching and curricular strategies for specific groups and individuals based on intimate knowledge of these people—are no longer necessary. With the large-scale influx of pre-packaged material, planning is separated from execution. The planning is done at the level of the production of both the rules for use of the material and the material itself. The execution is carried out by the teacher.

Again, such de-skilling is readily apparent in the research on the effects of high-stakes testing and pre-packaged, scripted curricula in the US, discussed above, where teachers have seen their curricular decision-making power severely diminished and are essentially being instructed on what to teach and how to teach it—across all subject areas. In a true expression of means-ends rationality, teaching under the New Taylorism has increasingly become a technical operation, one where many of the more complex skills associated with teaching (e.g. curriculum planning and knowledge of students and communities) are rendered less and less acceptable relative to high-stakes, standardized testing. Mahiri (2005), in his analysis of the implementation of a scripted literacy curriculum, explains it thusly:

> Moment-to-moment, the curriculum controls teachers' and students' time and activities, and it does not require a trained and skilled teacher with disciplinary, pedagogical, and cultural knowledge to implement it as long as the students submit. Standardized teaching and learning correspond to standardized tests. Specifically, teaching and learning become Taylorized. Rigidly enforced and timed, piecemeal tasks are required of teachers and students, with few accommodations for diverse styles of learning or teaching. Administrators would be able to come into classrooms and check to see that their

> 'workers' are on the precise lesson, page, and the exact task prescribed for a given time slot. (p. 82)

Whether associated with scripted curriculum or test-driven teaching, such examples illustrate what Apple and Jungck (1990: 229) refer to as 'separation of conception from execution', a key aspect of the technical control associated with high-stakes testing, because it allows parts of the labour process (in this case, teaching) to be broken up into atomistic elements where teachers, as labourers, not only lose significant amounts of control of the teaching process as a whole, but also lose control over aspects of their very own labour.

Power and control within the New Taylorism of high-stakes testing, however, do not simply evaporate when usurped from US teachers. Rather, systems of high-stakes accountability evacuate power and control from the classroom level, concentrating them in the upper echelons of the bureaucratic hierarchies of US schools, districts, and state educational agencies (McNeil 2000, Au 2009b). Thus, just as standardization of factory production in the early 1900s allowed for increased control over the process of production itself that in many ways also allowed for control over both producers (labour) and products (Braverman 1974, Noble 1977, Carlson 1988b), the standardization of teaching through testing allows for increased managerial and administrative control over teachers (labour) and students (products) in the process of education (Apple 1986, Apple and Beyer 1988). Consequently, within systems of standardized testing, as Berlak (2000: 190) observes:

> It becomes possible to instil more discipline into the 'delivery system'. Authorities can identify the teachers, schools and local districts that fail to produce, and institute marketplace remedies, privatization, vouchers, charter schools and other policies that encourage schools to compete for students and resources. …

Systems of high-stakes, standardized testing are therefore aimed at discipline as part and parcel with control and standardization (Vinson and Ross 2003). Such discipline is in fact embedded as one of the operating principles of such testing.

In this regard, standardized testing must be seen as a tool for marking deviance from the standardized norm (Berlak 2000, Hanson 2000, Lipman 2004, Smith 2004), one that allows essentially operates as a tool for surveillance. Functionally, to make sense of standardized test scores policies using high-stakes testing must determine who is 'passing' and who is 'failing' in order to determine who deserves sanction or reward (Lipman 2004, Smith 2004). As Smith (2004: 154) explains:

> [C]ounting the number of children depends on first constructing categories, the meaning and boundaries of which are ambiguous. The process of 'counting as' depends on a dynamic of interests, ideologies, and political tactics of the persons involved. The accountability movement teeters on a fragile system of categories such as pass and failed, or 'exceeds the standard', or 'approaches but does not reach the standard'. Typically political entities perform this task and make such categorizations—not by technical or statistical procedures, but by political processes.

Through the very political and ideological process of setting up the categories of interpretation of standardized test results, educational managers (e.g. administrators and policymakers) are able to monitor educational production and highlight those who do not fit within the boundaries regulated by the tests. High-stakes testing thus creates a visible subject as an extension of disciplinary power, a visibility which, using Foucault's (1995: 187) analysis,

> … assures the hold of power that is exercised over them. It is the fact of being constantly seen, of being able always to be seen, that maintains the disciplined individual in his subjection. And the examination is the technique by which power, instead of emitting the signs of its potency, instead of imposing its mark on its subjects, holds them in a mechanism of objectification. In this space of domination, disciplinary power manifests its potency, essentially, by arranging objects.

Systems of high-stakes, standardized testing place individuals within an ever increasing web of surveillance (Hanson 2000) that works, in part, because categorically-defined deficiencies, according to Lipman (2004: 176), are made 'visible, individual, easily measured, and highly stigmatized within a hierarchical system of authority and supervision'. Taylorizing educational production through the use of high-stakes tests serves no point if there is no framework within which standardization takes meaning. Thus, disciplinary categories of test-determined 'winners' and 'losers' are created to distinguish some students and teachers from others, and such designations are then used to ensure standardization, maintain control over teaching, and discipline those teachers who either challenge or fall outside of the test-established norms.

Standardized testing and the educational assembly line

While Taylorism and scientific management clearly operate vis-à-vis the technical control and de-skilling of teachers, discussed above, it is equally important to recognize that these logics are also embedded within the fundamental structure of standardized tests themselves. Specifically, these logics, in their embrace of standardization, are based upon the inter-related processes of decontextualization, objectification, and commoditization necessitated by the use of high-stakes, standardized tests themselves. In essence, standardized tests are a technology (Madaus 1994, Ellis 2008), a tool used to measure and compare students and teachers in very specific ways. As discussed above, this tool measures everything against a standard, which by extension also means it measures deviance from the standard as well (hence the surveillance and discipline associated with systems of high-stakes testing). In order to make such distinctions between normal and deviant (e.g. to assert that student X has met a tested standard, but that student Y has not), one has to assume that such assessments can be applied universally, fairly, and objectively to different populations and individuals in different contexts. Our ability to infer meaningful comparisons of individuals across different contexts using standardized tests thus rests on our assumption of the universal objectivity of the test itself. Such universal objectivity,

however, depends upon the denial of certain amounts of local context, local variability, or local difference, so that a standard norm can be established as a common measurement for all individuals.

Hence, standardization, in order to maintain a claim to objectivity, has to assume that local, individual conditions and local, individual factors make no difference in either student performance or test-based measurement. Indeed, the assumed validity of objective measurement provided by standardized tests rests upon this denial of individual differences: The tests are considered objective because they supposedly measure all individuals equally and outside of any potential extenuating contextual circumstances. Thus, when students (and teachers, schools, districts, states, and countries) are measured by standardized testing and compared to other students, they are necessarily decontextualized in order to make such comparisons possible. Indeed, it is through such decontextualization that claims to objective measurement are maintained. In the process, students and teachers are literally 'objectified' and turned into abstract numbers (Au 2009b).

The objectification of students and the numerical abstraction of learning is part of a process where, as Lipman (2004: 172) explains:

> Students, as well as teachers, with all their varied talents and challenges, were reduced to a test score. And schools, as well as their communities, in all their complexity—their failings, inadequacies, strong points, superb and weak teachers, ethical commitments to collective uplift, their energy, demoralization, courage, potential, and setbacks—were blended, homogenized, and reduced to a stanine score …

This reduction to a numerical score is a key requirement of systems of standardized testing, because it enables the perpetuation of the means-ends rationality associated with scientific management and Taylorization of teaching. In the process of the quantification of student knowledge and understanding, students themselves are necessarily quantified as a number. This quantification lies at the heart of the measurement itself, which turns real people and real social conditions and contexts into easily measurable and comparable numbers and categories (De Lissovoy and McLaren 2003). Further, the process of reducing students to tests scores, essentially abstracting a number with which to define them in relation to other students, requires that their individuality be omitted, that their variability be disregarded, where students, as McNeil (2005: 103) explains, are reduced 'to one or two characteristics common to the larger universe of objects'. Standardized tests thus, by definition, literally objectify students by reducing them into decontextualized numerical objects for comparison. This objectification is the key link to understanding the fundamental connections between systems of standardized testing and the application of the logics of scientific management and Taylorism to teaching in contemporary times. By reducing students to numbers, standardized testing creates the capacity to view students as things, as quantities apart from their human qualities.

The decontextualization, objectification, and subsequent quantification of students through standardized testing do not stand alone, however. These inter-related processes also make high-stakes, standardized testing an ideal tool for the New Taylorism because turning students (and, by extension,

teachers and teaching) into decontextualized, numerical objects also frames students-as-products and places education firmly within the paradigm of factory production. In this way, standardized testing essentially commoditizes students, teaching, and education, and, through this commoditization, standardization enables systems of education to be construed as systems of commerce operating along the logics of capitalist production which require products (commodities) to be made, assessed, compared, and exchanged on the market (Brosio 1994). Indeed, as Apple (2006) argues, such standardization is a requirement for the marketization of education because comparison of educational commodities within systems of school 'choice' require a standard from which comparisons may arise. Thus, we see how high-stakes, standardized testing, at its functional core is foundational to the view that schools are factories where teachers-as-labourers work on an efficiently Taylorized educational assembly line 'producing' students-as-commodities, and whose value as teachers, students, and schools is measured and compared vis-à-vis the tests.

Conclusion

In this paper I have argued that modern regimes of high-stakes, standardized testing in the US represent a form of New Taylorism built upon the curricular legacy of scientific management from the early 1900s. In the process, I have contended that standardized tests themselves, as a form of measurement, contribute to the implementation of New Taylorism in teaching through the inherent decontextualization and commoditization that such testing requires. In doing so, I hope to have outlined how the standardization of US teaching due to high-stakes testing is connected to issues of control over classroom practises, with teachers' power being increasingly usurped through both policy and curricular structure. Noted US education policy conservative Moe (2003) explains the rationale behind teaching in the New Taylorism quite clearly when he states:

> The movement for school accountability is essentially a movement for more effective top-down control of the schools. The idea is that, if public authorities want to promote student achievement, they need to adopt organizational control mechanisms—tests, school report cards, rewards and sanctions, and the like—designed to get district officials, principals, teachers, and students to change their behaviour in productive ways. … Virtually all organizations need to engage in top-down control, because the people at the top have goals they want the people at the bottom to pursue, and something has to be done to bring about the desired behaviours. … The public school system is just like other organizations in this respect … (p. 81)

The intentions of systems of test-based reforms are clear in the structures and outcomes in that they are designed to negate 'asymmetries' between classroom practise and the goals of those with political and bureaucratic power (Wößmann 2003). Thus, it seems evident that test-based systems of high-stakes accountability are relatively successfully in increasing control of teachers' practises by tightening of the loose coupling between policy-makers' intentions and the institutional environments created by their policies (Burch

2007). Or, framed differently, high-stakes testing can be seen as increased control over teachers and their practises by policymakers and state authorities as standardization control, discipline, and surveillance over the process of educational 'production'. In the true fashion of scientific management and Taylorism, and in the spirit of John Franklin Bobbitt, systems of high-stakes, standardized testing are a form of 'steerage from a distance' (Menter *et al.* 1997; see also, Apple 2006), with the state using its management structure and regulatory power to guide the actions of local actors.

It is important, however, to recognize that teachers do still have some control over their own practises and that these levels of control vary relative to specific state laws and policies, and specific administrative mandates at the district and school levels. Comparative studies of differing US states, for instance, find that the higher the stakes, the more teachers focus their teaching on the tests (Clarke *et al.* 2003, Debray *et al.* 2003, Pedulla *et al.* 2003, Hampton 2005), which means that lower performing US states are feeling the most intense pressure due to high-stakes testing and accountability systems (Nichols *et al.* 2005). Further, even where high-stakes pressures do exist, teachers are resisting the test-influenced norms. For instance, Perreault (2000) finds that teachers often create space for what they consider to be 'real teaching' in the face of the high-stakes testing pressures, but that this usually requires some sort of deception on the part of the teacher. Such resistance can be difficult, however, because those teachers who outright challenge the New Taylorism established by the tests can face severe punishments, including the loss of their jobs (see, e.g. Jaeger 2006, Crocco and Costigan 2007). However, I do not intend to be overly romantic regarding teacher freedom in my analysis. Given that teachers are quite capable of teaching in ways that are racist, sexist, classist, homophobic, ablest, etc., the regulation and control of teacher practise should not be viewed as inherently negative in and of itself. Indeed, high-stakes assessments in the US, both historically and in contemporary times, have been framed as tools for improving teaching, raising standards, and providing equitable educational access for poor students and students of colour (Lemann 1999, Sacks 1999). The irony has been that, despite rhetorical claims to the contrary, the research evidence finds that such testing has functionally served to exasperate racial and class inequality in education (Darling-Hammond 2007, Au 2009b).

The above point, however, does point to a central issue with regards to the analysis done here: The original context for the ascendancy of scientific management in education was significantly different from the current context of today's New Taylorism. The application of Taylorism and factory-like organization to school structures came at a time of rapid expansion of public education in the US, which was experiencing a massive influx of immigrants and a rise in enrolment (Callahan 1964, Chapman 1988). In addition to other ideological factors (Cuban 2004), schools were thus largely interested in standardization as a means of efficient operation similar to the expanding US industrialization of the time, and the standardization of assessments—specifically the rigid and limited forms of knowledge and learning they measure—reflect this legacy quite clearly (Au 2009b). Today's New Taylorism takes place in a distinctly different context. As opposed to

the earlier age of industrialization, we are currently amidst an era of neoliberal globalization, an era that has in many ways re-shaped the guiding assumptions of both labour and learning (Castells 1993, Collin and Apple 2007). This shift in the economy has created significant tensions between the expectations associated with the new economic structures and the school systems in the US that still reflect the 'old' industrial economies from 100 years ago (Kalantzis and Cope 2000). Thus, for instance, there are segments of the US New Middle Class who find themselves in the contradictory position of supporting antiquated forms of standardized assessment because such assessments still provide upward mobility for their children, despite the fact that modern day schooling built around standardized testing simply does not prepare their children for the intellectual rigors demanded within the globalized economy (Au 2008).

The most important difference, however, lays in the function of the old vs the New Taylorism. Whereas the application of scientific management in the early 1900s was used to expand public education to the growing masses of students, today's New Taylorism is serving the opposite function: It is being used as a lever to attack and potentially even shrink US public education (Apple 2006). In the current context, high-stakes testing and the controlling aspects of contemporary US education policy effectively work to construct public education in the US as a nearly complete failure (Nichols and Berliner 2007). As such, US public education becomes a 'problem' that can only be 'fixed' vis-à-vis the privatization of schooling through market mechanisms such as charter and voucher programmes (Lipman 2004, Hursh 2007) or the movement of public education monies towards private providers of supplemental educational services (Burch 2006)—none of whom are subject to democratic governance. Thus, unlike the scientific management associated with the industrial economy, the New Taylorism in the US today is perhaps best understood as a part of an educational accountability movement that extends from the current context which has been fundamentally shaped by a conservative modernization that has sought to privatize public schooling, attack unions generally (and teachers' unions specifically), and structure school knowledge along a culturally and religiously conservative political agenda (Apple 2006, Kumashiro 2008). To this end, while systems of educational accountability and improving teacher practise are, in the abstract, important for the betterment of all, the New Taylorism illustrates how such 'reform' movements in our current context are used more as tools to advance conservative politics than as part of a process of democratization in education (Au 2009a).

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