Numbers in grids of intelligibility
Making sense of how educational truth is told

Thomas S. Popkewitz

In an important book about numbers and social affairs, Theodore Porter (1995) begins by asking: “How are we to account for the prestige and power of quantitative methods in the modern world? … How is it that what was used for studying stars, molecules and cells would have attraction for human societies?” To consider these questions, Porter continues that only a small proportion of numbers or quantitative expressions have any pretence of describing laws of nature or “even of providing complete and accurate descriptions of the eternal world” (Porter, 1995, pp.viii–ix). Numbers, he argues, are parts of systems of communication whose technologies create distances from phenomena by appearing to summarize complex events and transactions. As the mechanical objectivity of numbers appears to follow a priori rules that project fairness and impartiality, numbers are seen as excluding judgment and mitigating subjectivity.

The importance of numbers to contemporary societies is easy to demonstrate, ironically, by citing numbers. One “fact” of numbers is that measuring people and things absorbs 6 percent of the US gross national product (Porter, 1995, p.28). With current US educational reforms stressing the measurement of every child at almost every age to find and then eradicate the “achievement gaps,” the percentage of gross national product spent on education has probably increased. But at a more general level, it is almost impossible to think about schooling without numbers: children’s ages and school grades, the measuring of children’s growth and development, achievement testing, league tables of schools, and identifying equity through statistical procedures about populational representation and success rates.

Porter continues that numbers are a technology of distance and used as a claim of objectivity instantiated by moral and political discourses. Any domain of quantified knowledge, he argues, is artificial through creating uniformity among different qualities of things (Porter, 1995, p.6). That uniformity gives social authority to the interrelation of science and policy.

This discussion extends and refocuses Porter’s notion of the technologies of numbers to consider the politics of schooling. Ignored in most policy studies and research is the paradox of inscribing equivalency and comparability through numbers. The technologies of numbers are embodied in a grid of cultural practices that “act” on teachers’ and children’s lives in classrooms. To talk about
“achievement” and the “achievement gap,” shorthand for numerical differences between children, instantiates particular rules and standards of reason by which experiences are classified, problems located, and procedures given to order, classify, and divide. Exploring the “reason” through which numbers are made sensible and plausible puts focus on the processes of exclusion and abjection in the impulses to include.

The first section considers briefly the historical “making” of numbers as “social facts” inscribed as cultural practices that fabricate kinds of people for acting on others and for acting on one’s self (Hacking, 1999). Fabrication has a double sense. It entails simultaneously practices of inventing fictions about people that respond to things of the world (such as adolescence as a human kind); and the making of that “kind” as theories, programs, and cultural narratives, producing people to navigate and order life itself. The second section examines two particular human kinds assembled through numbers to order who a child is and should be: a research report to identify characteristics of “the effective teacher” in instruction and the Organization of Economic Co-operation and Development (OECD) Program for International Student Assessment (PISA) international comparisons of children’s curriculum knowledge report. Numbers in the making of human kinds as “actors” is pursued in the third section by historicizing the contemporary tropes of neo-liberalism and “markets.” Fourth and finally, I bring the previous sections together to consider the limits of “reason” through numbers as they are deployed in contemporary reforms to define curriculum standards. I argue that the standards of schooling are not about the public statement of outcomes or performance indicators of assessment. The standards of curriculum are in the human kinds produced that exclude and abject in the name of democratic participation.

The discussion of numbers is about the “political” of schooling that is embodied in the systems of reason that order, classify and divide its objects – children and teachers, among others – as human kinds. The investigation is itself a political intervention and a strategy of resistance against the commonsense of policy and research. It is to make fragile the seeming causality of contemporary life through naturalizing what is taken as given and inevitable; thus making possible alternatives other than those currently present (see, e.g. Foucault, 1991; Rancière, 2004). The concept of fabrication provides a way to rethink the political in social life and schooling without re-engaging the unfruitful divisions between text and context; subjective and the objective, discourses and context; or nominalism, relativism and social constructivism vs. realisms that dominate contemporary educational philosophy and social theory.

**Numbers as fabricating kinds of people**

I begin the inquiry into numbers through, first, considering numbers as an “actor” of change. Numbers order thought and action by visualizing “social facts” that in the nineteenth century were thought necessary for republican
government and democracy. While later I raise questions about the limits of this assumption, the purpose of objectivizing and standardizing through numbers was to equalize processes and practices of new republican governments. That equalizing enabled the new systems of planning to tame the uncertainty associated with democratic life in the nineteenth century and to make the citizen necessary for the operation of government. The last part focuses on numbers as a clearing or cultural space through which kinds of people are fabricated. I use the notion of the adolescent to illustrate the making and enacting of a human kind. Throughout, numbers are seen as existing in a set of cultural practices that generate principles about what is thought about, hoped for, and acted on.

**Faith in numbers and making an actor of change**

Historically, belief in the truth-telling capacity of numbers to establish values about social and personal life has not always been the case. Prior to the eighteenth century, truth was expressed through the manners and rhetorical qualities that told of the gentleman (Poovey, 1998). Statistics was an official part of Swedish governance to register the reading ability of the population, but that register was individual and without the probability reasoning that appears in the nineteenth century. As a state function, considerable numerical information was collected by the British government in the first three-quarters of the eighteenth century. That data, however, was not collected in the context of coherent theory about state-craft (Poovey, 1998, p.214). Numbers as representative of observed particulars were devalued through the priority given to Newtonian universals and the invisible laws of nature.

Faith in numbers as a modern “fact” to be trusted arose with the emergence of commerce in double accounting procedures (Poovey, 1998). The innovation of double accounting entailed a ledger that recorded the money received and paid out, what is domesticated today as the checkbook’s register. The double accounting procedures mutated in uneven ways into the sciences of political economy and moral philosophy from the 1790s. British theorists of wealth and society developed a mode of analysis that had no need for numerical data. Only in the political economic theory of Adam Smith, which I discuss later, did numbers appear as a strategy to actualize the philosophized fictions of markets as performative standards, instead of descriptions.

Numbers became visualized as a social fact in the service of democratic ideals during the nineteenth century. Numbers enabled the production of particular kinds of human kinds for government to act on and by which populations were to act as responsible and self-motivated citizens. To understand this quality of governing, we first need to consider numbers as defining a problem space for standardizing its subject and object to stabilize change and its agents. Numbers seemed technical, objective and calculable, and as embodying the idea of giving all equal chance and representation. They standardized the subject of measurement and the act of exchange so that they were no longer seen as dependent on the personalities or the statuses of those involved. The faith in numbers in social
affairs makes possible such notions as transparency through which the performances and outcomes of schools, businesses and government become visible through graphs and flow charts presented as statistical factors to measure change.

The apparently quantitative precision and specific delineations of social and personal life lent authority to the new regimes of government. Modern nations organized around the idea that the citizen would participate in the life of democracy. Yet the very regimes associated with democracy bring forth principles of uncertainty. The future is tied to the wisdom and commitments to civic virtue that reside in the action of the “demo.” The trust in numbers for assessing and planning affairs provided a technology of consensus and harmony in a world that would appear, otherwise, as uncertain, ambiguous, and contentious. The use of numbers and social science were to reduce uncertainty in processes of change and continual assertions of crisis. Notions of decision-making, human interest, and problem-solving ordered and regularized the processes of action through numbers in a world where the future had no guarantees, only conditionalities. Statistics in this historical context, to borrow from Hacking (1990), tamed chance. It gave stability to things in flux, and inscribed an apparent consensus that made things of the world seem amenable to control.

The uniformity given by numbers brings unlike orders in social life into a system of magnitudes that regularize relations among social and psychological components (Rose, 1999, p.206). The regularizing of social and psychological components circulates in the home through a variety of practices, such as the nutrient charts on food packaging and the monthly budgeting of individuals who compare income to expenditure. The mapping of boundaries and the internal characteristics of the spaces to be managed was a strategy to make judgments outside of the subjective.

Before moving to numbers in fabricating human kinds in the next section, three further comments are necessary. First, numbers historically become an actor in processes of change. Their mechanical objectivity enters into and becomes part of the action system of planning, assessing, and making of policy. Second, the inscription of numbers in the systems of reason governing social life was not the logical outcome of disciplinary knowledge; nor was it the result of an evolutionary process from a single origin. Prior to the nineteenth century, statistics were concerned with individual phenomena. It was not until discoveries in physics and the needs of statecraft to monitor large groups for taxes and disease that statistical knowledge emerged through probability theories about large groups (Desrosières, 1991).

Third, the hold of utopian dreams of administration through numbers was continually fraught with multiple outcomes. For example, the system of household taxes in France that existed into the twentieth century counted the doors and windows in a dwelling. To counter this system, peasants redesigned their dwellings with as few openings as possible, which had a long-term effect on their health. Mono-cropped scientific forestry developed from about 1765 to 1800 to bring an administrative grid of straight rows of trees for more efficient growth; such growth was stunted, however, by the second planting because the nutrients
produced with mixed growth were eliminated. And the rational planning of the city in the nineteenth century into grid-like streets created a particular spatial order that also produced concepts to respond to issues produced by that order, such as anonymity, alienation, and feeling of loss of community (Scott, 1998, p.58). The dark images of Expressionism in the 1920s and Fritz Lang’s silent film *Metropolis* testify to this other side of life in the city as well.

**Fabricating kinds of people**

The objectivity of the descriptions lent to numbers obscures how such representations are *inscription devices*. Numbers constitute domains and render them stable forms that can be calculated, deliberated about, and acted on. While the numbers “act” as descriptions of real things of the world, they embody implicit choices about “what to measure, how to measure it, how often to measure it and how to present and interpret the results” (Rose, 1999, p. 199). The collection and aggregation of numbers participate in a “clearing” or space where thought and action can occur (ibid., p.212).

This clearing or space for thought and action is explored in this and the following section through the notion of the fabrication of human kinds made visible in school reform practices: research on the effective teacher, the international assessment of children in PISA, and the notion of markets. I focus on research here on the adolescent to initially explore the space or clearing for acting and reflection embodied through the making of human kinds. Adolescence as a fabrication has dual qualities. It was a fiction used in the child studies of G. Stanley Hall at the turn of the twentieth century. It was brought into the new scientific psychologies to think about the new populations of urban children entering school that older pedagogical forms were no longer considered appropriate (Popkewitz, 2008). That fiction entered into schooling as categories of planning that designed programs and ordered the lives of children. Today, adolescence is not only a way of thinking about the child and organizing parenting, schooling, and medicine. Children “think” of themselves as having adolescent patterns of growth, development, emotion, and cognition. The classification and distinctions, however, are merely of psychology. Adolescence circulates in medicine, public discussions of morality about, for example, sexuality, crime prevention, and drug use that cross national boundaries (Petersson *et al.*, 2007).

As fabrication has a normative meaning about deception or lying, I want to reiterate that my use is as an analytic concept to pursue the governing of schooling. The concept is to think about the categories and distinctions of the child and teacher as simultaneous inventions that create maps for planning that respond to issues of the world; and are rules and standards to constitute what is thought about, hoped for, and done. To stay with the above example, the notion of adolescence is an assessment device that categorizes people which not only permits actions to change social conditions about. It enters and is part of a world through which society, its environment, and the people who become the agents of action are refashioned. The classifications enter into the ways people structure
experience and think about what is practical and useful as they come to think of themselves and their choices within an apparatus created with the fictions (Hacking, 1986; Rose, 1999, p.203).

This double quality of fabrication is illustrated through focusing on the making of kinds of people. Adolescence, the gifted child, the child “at-risk” and the disadvantaged are kinds of people that are made up to respond to social commitments in liberal societies. But the categories are not merely labels assigned, ideas or “discourses” that are epiphenomena of something “real.” Programs and research projects are devised to act on the child, with schemes for remediation and paths of rectification set up to remake the child who is recognized as different. The fictions that are made-up also make up! Modern statecraft and its deployment of numbers are not merely interpretative or descriptive. Numbers simultaneously do something to us!

Fabrications: “the effective teacher” and PISA

At this point I want to bring the argument about numbers and fabrication into two seemingly different reform practices. One is a research project to identify the effective teacher and the other is the PISA international comparative assessment of children’s application of curriculum knowledge. Each entails numbers in creating a space of equivalence through which to judge, assess, and order practices that, in effect, make particular kinds of people. The measurement devices give magnitudes and correlations to particular abstractions (fictions) that work their way into the conduct of the world and have the potential to be materialized as what is taken as real in education.

The effective teacher: an abstraction in search of and being real

A recent article in a leading educational research journal focused on the methodological design for identifying “the effective teacher” who enables successful achievement of “all children” (Day et al., 2008). The research links “value added” dimensions of the life of the teacher to make a more robust relation between the capabilities of the teacher and children’s achievement results. The “effective teacher” is, I argue below, a particular human kind that becomes an actor of change. But that actor is not merely out there to be discovered by the researchers. The characteristics and capabilities of the effective teacher are created through research strategies concerned with empirically creating and correlating factors that can be administered through school reform.

The research assumes that the capacities of the teacher are part of a system of psychological and organizational qualities that enable success in school achievement. The system is described as an integrated “wholist, nuanced understanding of teachers’ work and lives” (Day et al., 2008; p.330) beyond achievement scores; hence “value added.” The wholism is described, for example, as student motivation, school culture and leadership, the biography and career of the teacher, which combine to enable student attainment and achievement.
The abstraction of the effective teacher who produces high student achievement test scores is not something “there” to be touched and felt. It is an invention that is given magnitudes that fill-in what constitutes that abstraction, the “effective teacher”, through thinking about life phases (ibid., tables 3 and 6). The life phases are “a value-added measure” that discursively positions a particular kind of teacher whose quantities and qualities are to be generated through the measurement practices. Later, this same use of an abstraction is explored through Adam Smith’s “markets.”

The research is described as innovative because of its use of a mixed-method approach. The mixed-methods approach is called “the third way” (to adopt a term used in political arenas) and describes the better of two different ideological worlds. The third way is the combining of quantitative and qualitative techniques to identify a more productive approach to improving the quality of instruction.

My concern here, however, is not with the internal adequacy of the techniques applied for measurement or the instrumentations applied in the “methods.” The focus is on the inscription of numbers in a system of reason through which a particular space is cleared for reflection and action. That clearing is the human kind of “the effective teacher.”

The effective teacher is made into an historical “fact” and agent who delivers on the calculated potential of the teacher. The language of certainty appears in this potential as a model of scientific rigor assigned to the right use of numbers: the materialization of the effective teacher is the “contextual value added using multilevel models” (ibid., p.334) that identifies differential qualities that relate “to sustaining commitment, (n=189, 61%) or sustaining commitment despite challenging circumstances (n=39, 13%)” (p.335).

The multiple methods of this “third way” appear as that of the objectivity and neutrality in the numbers. Yet the effective teacher and the mixed methods are not naturally there, but as the authors’ state, tied to “high government priority in raising student attainment”; the measurements are combined with qualitative interviews.

Further, the classifications in which the numbers are placed give shape and fashion to a cultural thesis about who the teacher is and should be. The “added value” qualities of the life phases embody a mode of life that is defined as teachers’ commitment, agency, life-work management, and well-being. Without going into the categories and how they embody assumptions and distinctions (what constitutes management and well-being?), the value-added measures are policing practices that inscribe a harmony and consensus about what is sensible as teaching. The subject, “The Effective Teacher,” is made into an object where the abstraction is given magnitudes and correlations charted as the “Teacher Profession Life Trajectories” and correlated with children’s achievement. The particular kind of human – the effective teacher – statistically joins the different factors that add “value” to efforts to improve achievement scores (ibid., tables 3 and 4; also figure 6).

This set of assumptions and procedures are taken for granted in research. My concern here is with the limits of that thinking through the making of human
kinds. Before this is explored further, the human kind in OECD’s PISA assessment is discussed.

**International assessments and comparable human kinds**

To this point, I have explored numbers in a grid of cultural practices that fabricates human kinds. One human kind was “the effective teacher.” A different kind of human is embodied in international comparisons of students. While international comparisons would seem of a different order for thinking about schooling than research on effective teaching, they overlap by instantiating a way of telling the truth for the political ends. Principles are generated about what is thought about, hoped for, and done. International comparisons of students are part of the new industry in the contemporary landscape of education. Among different international sites that order and differentiate the inputs and output performances of schooling are: OECD’s Program for International Student Assessment (PISA); the Progress in International Reading Literacy Study (PIRLS) conducted by the International Association for the Evaluation of Educational Achievement (IEA); Trends in International Mathematics and Science Study (TIMMS); and the Adult Literacy and Lifeskills Survey (ALL) conducted by Statistics Canada.

PISA embodies a missionary theme about progress and creating a better life. For example, the program aims to provide an international comparison of students’ use of knowledge that is not directed to achievement measures, as was the research on effective teaching (see Day et al., 2008, table 4). The PISA testing of reading, mathematical and scientific literacy focuses on what is defined as the practical ability to apply skills in everyday life situations believed related to labor market core skills, such as literacy and mathematical ability. These skills are further related in the PISA summary to the capabilities and qualities of lifelong learning, a particular human kind that I will discuss briefly below. PISA documents relate its “practical knowledge” to its measurements of whether the child has “motivation to learn,” “self-esteem,” and learning strategies. These different capabilities embody particular modes of living embodied in the assessment process of PISA, inscribed as rules and standards of reflection and action.

My interest in PISA is to recognize that these curricular competences are not merely about what a child knows. They embody principles about modes of living. PISA’s emphasis on psychological categories like “motivation to learn and learning”, are not merely about the child’s solving problems that will “open life opportunities” for children, as they suggest. The idea of motivation, as Danziger (1997) historically explicates, is to design the interior of the child’s desire. Early psychology did not provide explanations of everyday conduct. It was not until the emergence of mass schooling that an interest emerged about removing children’s “fatigue” in learning through calculating and influencing the children’s will, motives, interests, needs and desire. This treatment of inner “thought,” daily life and experience were objects of administration. Motivation became a key player in this administration; it is neither disinterested, impartial nor existing objectively outside of the historical grid through which it is given intelligibility.
The historical configurations that order and classify the psychologies of reflection and action are scaffolded into the very definitions of reform to the present. Today, motivation is articulated and given nuance through notions of self-esteem and efficacy in social and educational planning. When examining the criteria of scientific competences important to PISA, the competences in international school literature are measured through psychologies of the child. The categories have less to do with what constitutes science and more with cultural theses about modes of living. Curriculum learning and motivation relate individual capacities and dispositions to national values about citizenship (McEneaney, 2003).

Further, the principles of “practical knowledge” assume that what is translated and transported into schooling is a reliable, objective representation of disciplinary fields in the school curriculum. The pedagogical principles classify and order what constitutes disciplinary knowledge, how that knowledge is made knowable, and how it is to be acted on: the distinctions through which difference and diversity are made recognizable have little to do with disciplines.

The procedures of classification and ordering are an alchemy through which academic practices (performed in labs, university science buildings, historical societies, etc.) are translated and transformed into the school curriculum (theories of learning, age and grade organizations of children, didactic practices, among others). The practices of translation are never just a copy of the original. The tools of translation provide rules and standards for recognition and enactment (participatory structures) that give school subjects their identities as objects as well as the conditions of their operation in schooling.

School subjects are ordered through psychological “eyes” that generate specific rules and standards about what is known and its conditions of participation. The psychological concepts of motivation, problem-solving and “lifelong learner” order and classify what constitutes teaching school subjects as well as the child. The principles generated in curriculum, I have argued elsewhere, have little relation to the patterns of interaction and communication of the academic fields (Popkewitz, 2004, 2008). The translation tools of curriculum are cultural theses about who the child is and should be. Learning more “content” knowledge, then, is never just that. It embodies learning how to see, think, act, and feel.

The alchemy of disciplinary knowledge in school subjects assumed in PISA has a double quality. If I use science “literacy” examined internationally (McEneaney, 2003), there is a dramatic shift to emphasize greater participation and increased personal relevance and emotional accessibility in the science curriculum. That participation, however, links the child’s “expertise” in solving problems to the iconic stature of professional knowledge. Children’s participation and problem-solving are organized to learn the majesty of the procedures, styles of argument, and symbolic systems that assert the truthfulness of the expertise of science. Yet the conclusions of academic expertise are located outside the bounds of children’s questioning and problem-solving.

PISA assessment of students’ performance and data collected on the student, family and institutional factors that explain differences in performances embodies a particular cultural thesis about modes of living. The different categories for
organizing what children learn, their attitudes, and how they reason to solve problems in the curriculum are related to the notion of lifelong learning. These performance criteria define the child as a particular human kind. A cultural thesis forms about modes of life. The indicators are to create “the development of future scientific personnel” and embody principles that are not merely about learning science or literacy. They are about how a citizen is to live, through embodying abilities to participate in society, and in the labour market, through the manner in which students demonstrate the science competencies that “will enable them to participate actively in life situations related to science and technology” (OECD, 2007, p.3). The human kind entails a permanent condition of making choices with limited resources, with the only thing that is not a choice being making choices (Popkewitz, 2008).

The measurements of PISA and “the effective teacher” do not act directly on people but act on the principles generated, or as clearing spaces where “freedom” realizes its potential. Simons and Masschelein (2008) argue that this new individuality entails the shift from earlier notions of emancipation to empowerment in which individual life becomes a continual learning process. Individuality is in learning as the capacity for appropriations that engage the uncertainties of the present. Virtue is managing effectively the limits and opportunities of the environment through steering one’s performances in a continual feedback loop of self-assessment. The measurements provide constant performance indicators in a continual process of locating one’s self in the world that are analogous to global positioning systems (Simons and Masschelein, 2008). PISA globally positions the child and nation through identifying highest overall performing countries, with Korea, for example, above and the USA below average. Moving around in environmental feedback loops functions as a permanent “global positioning” that provides the criteria to judge someone and one’s self in the choices that are made for seeking to be permanently ‘empowered’” (Simons and Masschelein, 2008).

The technologies of comparing through numbers are navigational tools that bring into view a universe of capabilities to place the child, ordered through standardized properties that enable comparisons (Lindblad, 2008). The quality indicators are about particular kinds of people in which the comparative equivalences through numbers classify practical abilities and everyday life situations. The assessing of students’ performance and collecting of data on the student, family and institutional factors overlap with differences explained in measures of performances in educational policy and practice.

Europe is a discourse and program being transformed through new reterritorialization and scaling of the relation of individuality, the city, state and the EU within processes of globalization (Brenner, 1999). The numbers become an actor as it drives policy through inscribing a seeming naturalness to reflection and action in different national settings (Nóvoa, 2002). The research and assessments create new senses of collective belonging and “homes” through the creation of spaces of equivalences. The comparative measurements of PISA and “the effective teacher” become tools for building a new European space of competitiveness and cohesion. The tools are embodied in establishing equivalences in categories and
distinctions related to children’s achievement that establish “standards” across nation spaces (Grek, 2009; also see Delanty, 1995; Stråth, 2002). PISA becomes part of the space in which European education is to become a “world best” system through the production and use of data that is to signify successful competition and high quality and standards through measureable outcomes. Grek et al., for example, trace how the data production acts as it circulates through different institutions, such as the OECD, and makes new actors that cross border positions as “International Comparisons Programmes Managers” (Grek et al., 2009, p.15). The numbers form a space of governance through the standardization and technologies that transform cognitive schemes of statistics and scientific thinking into spaces of equivalences. Policy and research are classificatory schemes that become a practical category, but now internally focused in a manner that has resonance with Europe’s former “civilizing missions” of colonialization. There is a shift in governance from institutional indicators and audit and performance-monitoring to governance that mixes technical components of measuring and procedures with principles that order the capacities and qualities of individuality (Lascoumes and Le Galès, 2007).

Markets as desired world filled in with numbers

The comparison and creation of equivalent spaces explored above embody principles of life as “systems” that bring human kinds strategically into being. This was given focus in the effective teacher research through the expression of “wholeness” and in PISA through its concern with relating practical knowledge to labor skills. The notion of system circulates in current US reforms, for example, through the use of terms like “systemic school reform”, which seek to link various elements of administration, curriculum, teaching, and evaluation into a seamless and comprehensive approach to school change. Less apparent in discussions of school standards and assessment about instruction is so-called “backward design”, where researchers start with performance outcomes desired and work backward to design curriculum and organizational patterns to produce that outcome. This section focuses on the notion of system as given expression in contemporary education policy and reform research and debates about neoliberalism and markets. The exploration of systems in policy and research debates about neoliberalism and markets is considered historically through numbers that become “actors” acting on contemporary debates.

Systems in contemporary social theory have linguistic and social structural qualities. Linguistically, language can be thought of as embodying structures or systems through which its parts congeal into a whole, organized by a grammar and syntax. Language (discourse) is a system whose principles enable what is said to be understood across particular localities and spaces through its rules and standards of ordering and classifying phenomena. It is this use of system that directs this study of the reason of schooling. My interest is to explore the principles of social systems in theory and policy studies through which numbers are embedded.
Assumed (but not spoken) in the PISA and the effective teacher research are conceptions of social systems.

The notion of systems in the merging of numbers to make human kinds is embodied in the notion of the market that appears in the late eighteenth century and again in today’s debates about neoliberalism.

British theorists of wealth, society and political economy deployed systems to realize a desired world which the philosopher hoped for, but not necessarily through numbers, until the work of Adam Smith. If I again draw on Poovey (1998), the notion of system was embodied in the work of David Hume, Scottish Enlightenment philosopher concerned with the explanation of phenomena through natural causes and laws. Hume wanted to construct a bridge over the gap between the written records of the past and the unrecorded origins of society, which otherwise was only divinely given and belonged only to Providence (Poovey, 1998, p.215). Hume’s naturalist philosophy, Poovey argues, was not interested in empirically exploring the effects of that system through its vestiges of providentialism (ibid., p.264). Hume and other political economists prior to Adam Smith saw notions of equity and equivalence between objects that were less questions of knowledge than of justice with respect to the law governing market exchange. The questions of “the definition and equivalence of goods were posed in cases where conflict arose, and judges had to decide if an item was of satisfactory quality” (Desrosières, 1991, p.199, italics in original). Numbers did not play a part in deciding justice and equity.

The idea of system in social theory was used by Scottish Enlightenment historians and experimental moral philosophers to “see”, calculate and administer things of the world. With the founding of the discipline of economics, theories of wealth and political economy brought numbers into the particular register of equity and equivalence that placed value on numbers. Smith’s Wealth of Nation (1776), in contrast to Hume, wanted to probe the effects of the metaphor of system to see how the theoretical entities of philosophy could actually work by measuring and quantifying things such as rents and profits as well as wages influenced by commodity prices (Poovey, 1998, p.237).

The new sciences of society and wealth drew on conjectural history to describe the origins of modern society and how it went from uncivilized to civilized. The sciences would “solve” the problem of studying the particulars observed so as to standardize in a manner that could be projected into a resemblance of the future. The philosophical operations of abstracting and generalizing markets re-inscribed conjectural history into the philosopher’s hope that its knowledge would lead to action and “if the action was diligently pursued, it could actualize the future of which the philosopher was the first to dream. The idea of what counted inaugurated a future that the philosopher had already imagined and the task of philosophy as an actor of change” (Poovey, 1998, p.273).

The heart of Smith’s moral economy, the “market system” created a new role for numerical representation as descriptors of the products (actual and theoretical) created by institutions. By privileging the abstraction of “markets”, Smith (borrowing from the conjectural historians) could include phenomena
constructing the aggregate and register the significance of these phenomena which could only be known in retrospect and discounting what diverged from type so as to describe “nature” (Poovey, 1998, p.226).

Smith was not interested in calculations about particulars that were considered as doubtful and speculative. He sought theories that generalized, and thus particular numbers were not important. The system to which numbers were applied “embodied [Smith’s] a priori assumptions about what the market system should be” (Poovey, 1998, p.216, italics in origin). Numbers did not exist that were tied to the abstraction of markets, so Smith set up ways of measuring and calculating as if they did exist, to say something about wealth and governing (Poovey, 1998, pp.240–241).

Markets became an historical agent of “human nature,” a philosophical universal that could be named and quantify the effects of the abstraction (Poovey, 1998, p.247). Smith posited the notion of markets as an agent through which the causes of increase in national wealth would be increased through “the invisible hand” of human motives and competition. He viewed the precondition for the existence of a central market as not only the existence and the uniqueness of a system of prices, in general mentioned, but also, more often forgotten, the existence and uniqueness of a system of goods, subject to a common definition.

The significance of Smith’s science of society and wealth was that it was possible to trace the movement from systemic philosophy claims about the universal (human nature) to descriptions of abstractions (the market system) to the quantification of the effects or products of these abstractions (labor, national prosperity) as “social facts” that enable comparisons (Poovey, 1998, p.237). Numbers with magnitudes was to make visible what counted, that is, the self-regulating market system. The numbers would provide useful information about how the system worked. To do that was to assume a consensus about what the truth of numbers rested on (Poovey, 1998, p.243). The seemingly practical question of markets was a theoretical question bound to cultural and social practices that would make the theoretical abstraction significant.

The appeal of Smith’s science of wealth was that its epistemological entities appealed to government officials to consolidate and theorize government’s relations with its subjects at home and abroad for a number of reasons. Political economic facts were to be understood as impartial, transparent, and methodologically rigorous. Further, abstractions like the market system set limits to the kinds of legislative interference, yet enabled mandates for the implementation and enforcement of other kinds of laws and policies (Poovey, 1998, p.217). Numbers increasingly came to be seen as a mode of representation less imbued with providential overtones or theoretical prejudices; and appealed to the British government as not being supported by God (Poovey, 1998, p.265).

Markets, as the applications of numbers, could create facts about human kinds. Smith provided a new basis for linking the theories about subjectivity with apologies for liberal governmentality (Poovey, 1998, p.217). The “invisible hand” of wealth and society is the formation of value and the circulation of visible wealth, and a form of “evidence” presupposes the connection between individual
pursuit of profit and the growth of collective wealth; and shows the incompatibility between optimal development of economic process and the maximization of governmental procedures (Foucault, 2004/2008, p.321).

The notion of markets created a particular kind of human in the theory of wealth and society. The epistemological implications of the historical schema is that it focused on the intersection of subjectivity and sociality, giving importance to domesticity, manners, women, and also in considering commercial society as “the most sophisticated incarnation of human sociality through which the human mind would be collectively revealed.” The abstraction performed as a cultural thesis that enabled “second order abstractions such as labor and happiness that was no longer a universal claim” but a “non-rhetorical (nonsuasive) place for a kind of representation that described what could be as if this potential was simply waiting to materialize” (Poovey, 1998, p.248, italics in original). The market that Smith theorized was to order relations between the self-love and the division of labor in a system in which there is sympathy found that is common to all human beings. This enabled the codification of political economy (Poovey, 1998, p.239). And thus was born the notion of banning government interference in the domain that was seen as essentially self-governing, as it realized something greater than the will of any parties or individuals (Poovey, 1998, p.227).

The market in contemporary discussions is in a different grid of practices from which the wealth of nations was given intelligibility. Contemporary German and American variations of neoliberalism are not a limiting of the state but the state as a founding element (Foucault, 2004/2008). Whereas in Europe debates of liberalism and neoliberalism were about the rule of law, the debate in the USA was about liberalism, and interventionist policies of the state were considered as non-liberal. Neoliberalism and its critiques, Foucault argues, embody similar rules and standards of reason that focus on tests of government actions, validity, fruitfulness, and was wasteful of expenditures (Foucault, 2004/2008, p.246).

Neoliberalism is a method of thought, a grid of economic and sociological analysis and an imagination, and a method of governing that is different from classical liberalism (ibid., p.218). It moved into non-economic phenomena through its recasting of labor as a variable of time into the specifics and objects of labor as a consequence of substitutable choices that relate to the scarce means of allocating for competing ends. Behavior rather than process is important as there is a focus on activity. Labor is capital tied to the individual and the worker is a machine of capital/ability. The individual is *Homo oeconomicus* but not in its classical meaning as the partner of exchange and theory of utility (ibid., p.225). The individual has become an individual entrepreneur that has its own capital, and the producer of its own satisfaction, where innovation and self-improvement becomes an ethical-economic and psychological quality (ibid., pp.229–311). There is, if I return to the earlier discussion of the lifelong learner, a homology between the subjectivity embodied in PISA and the *Homo oeconomicus* of neoliberalism.

Further, and important to contemporary policy debates, the notion of *market* is neither a consequence nor the development of markets. Through Smith’s use
of numbers as ‘abstract spaces’ about markets and neoliberalism, it is possible to think about how numbers are fabrications that are simultaneously fictions and material: made up inscriptions that are acted upon by techniques of social life and “utilized as the basis of organization architecture and divisions of managerial responsibility, and utilized as a grid to realize the real in the form in which it may be thought” (Rose, 1999, p.213). Markets today are no longer the fictions of Adam Smith but “real” in contemporary policy and critical analyses related to defining reform through the calling of neoliberalism.

Numbers, the democratic citizen, and the clearing of spaces in school standards

Would it not be a great satisfaction to the king to know at a designated moment every year the number of his subjects, in total and by region, with all the resources, wealth & poverty of each place; [the number] of his nobility and ecclesiastics of all kinds, of men of the robe, of Catholics and of those of the other religion, all separated according to the place of their residence? … Would it not be a useful and necessary pleasure for him to be able, in his own office, to review in an hour’s time the present and the past condition of a great realm of which he is the head, and be able himself to know with certitude in what consists his grandeur, his wealth, and his strengths?

(Marquis de Vauban, proposing an annual census to Louis XIV in 1686, cited in Scott, 1998, p.11)

I start with this quote by the Marquis de Vauban in 1698 to make the final link between numbers, making human kinds, and governing. The discussion of PISA and the science of wealth and society, for example, continually brought to the fore the conduct of the citizen through the fabrication of human kinds. This section focuses on standards in school reforms as a method of governing, through which numbers are assembled and connected to produce human kinds. My argument about standards for teaching and curriculum in schooling, however, is not about the publically expressed outcomes or performances. The standards of assessment embody cultural theses about who the child is and should be, and who is not that child. The production of human kinds in schools entails a simultaneous process of exclusion and abjection embodied in the impulse for inclusion.

Standards in contemporary US reforms are linked to assessment criteria. The reform emphasis on school standards is to create alignments between assessment and educational aims and curriculum. It is expressed in a popular strategy mentioned earlier of “backward instructional design.” The problem of teaching is first to decide on the appropriate measureable instructional outcomes. Instructional design works backward from that criterion to design teaching to best achieve the outcomes. The reasoning is almost commonsensical: what is assessed should make visible what schools are to teach (curriculum standards) and thus whether schools are doing what they should be doing.
Historically, educational standards and their links to numbers are related to the formation of the modern state in the eighteenth and nineteenth centuries and the new requirements of government. The philosophers of pre-revolutionary France viewed standard measurements as enabling the state to be “revenue-rich, militarily potent, and easily administered” (Scott, 1998, p.32). Standards were invented to the capacity for direct knowledge to what was previously opaque about the territories and populations in the realm. The arbitrary measures of anthropomorphic origin (e.g. the foot) were revisioned into standardization measures that were interconvertible (Porter, 1995, p.23). The state needed to know who fell under its domain to provide less variable and systematic tax systems, but people had no last names to be put into the census and tracked. Measurement was almost random, because each local area had its own system of measurement (a hand, a foot, cartload, basketful, handful, within earshot) that prevented any central administration (Scott, 1998).

In place of measurements tied to things, like the sundial tied to nature’s uneven temporal dimensions, the centralizing state and large-scale economic institutions regulated time as a social phenomenon. The reliable means of enumerating populations, numbers to gauge the wealth, and creation of maps of land resources and settlements were produced to intervene and regulate the people of a realm. Economy of markets, length, weights, volume were socially ordered to administratively respond to the needs of church and state in paying taxes, reporting for military service (calendar), or the timing for observing religious days (Porter, 1995, p.23).

The production of standards was important to Enlightenment notions of the state that used “reason” to promote equality and freedom. The academicians of pre-revolutionary France, for example, saw the standardized measurements of the metric system as important for creating an equal citizen. The French philosophers prior to the French Revolution argued that there could be no equality with unequal measures and sought to standardize through the metric system. Here, we can return to an earlier discussion about numbers as placed “in service of the democratic ideal.” If the citizen did not have equal rights in relation to measurements, then it was assumed that the citizen might also have unequal rights in law. Thus the Encyclopedists writing immediately prior to the French Revolution saw the inconsistency among measurements, institutions, inheritance laws, taxation, and market regulations as the greatest obstacle to making a single people (Scott, 1998, p.32).

Standards and numbers to create the equal citizen were produced in a different grid of practices related to American Progressive education at the turn of the twentieth century. It was linked to the emergence of the modern “planning” or welfare state and the social sciences in the problem of making the citizen who embodied principles that ordered “reason.” Notions of child development, cognition, and learning installed standards that had a double quality. The theories were to make the child legible, easily administrable, and equal. The standards of development and learning to order thought, the mind, and the social interactions of children were also brought into daily life through the practices of pedagogy in the name of the freedom of the future citizen (Popkewitz, 2001).
The notion of equality embodied a double gesture of hope in the future and fear of those who were dangers and dangerous populations to that future. The hopes and fears were instantiated in Edward L. Thorndike’s Connectionist psychologies and psychometrics through establishing standards about who the child was and should be (Popkewitz, 2008). The psychology assembled the more general cultural premise discussed earlier about the self-motivated and self-responsible individual whose participation was necessary for the functioning of the republic. That notion of the individual in Thorndike’s psychology embodied a continuum of value about human kind created through equivalences and difference. The aim of schooling for Thorndike was to provide for freedom through making individuals “captains of [their] own souls” and their minds and “spirit” entrusted to the future as “noble and trustful” (Thorndike and Woodworth, 1901/1962, p.46). The hope simultaneously generated fears about threats to the future through a comparative mode of thought that circulated in the science of pedagogy. Thorndike wrote that the “only cure” for the nation’s ills was for education to “prevent each new generation from stagnating in brutish ignorance, folly and pain” (Thorndike, 1912/1962, pp.142–143). The hope of freedom and happiness, Enlightenment cosmopolitan values about individuality, lay in the science that found the “facts and laws” that decrease discomfort by satisfying the “urge for children [to study] those subjects by … which they may get health, escape poverty, enjoy their leisure hours, and otherwise have more of what a decent, but not very idealist, person wants” (Thorndike, 1912/1962, pp.142–143).

Ignorance and moral disorder were placed into psychological registers of schooling. Education “as a whole should make human beings wish each other well, should increase the sum of human energy and happiness and decrease the sum of discomfort of the human beings that are or will be, and should foster the higher, impersonal pleasures” (Thorndike and Woodworth, 1901/1962, p.46). “[F]ostering the higher, impersonal pleasures” was a narrative of moral order that eliminated or reduced those conditions that prevent progress through “the still appalling sum of error, injustice, misery and stupidity” (Thorndike, 1912/1962, p.72).

The double gestures of hope and fear circulate in contemporary standards and assessment through which numbers are articulated. The differentiation and division are embodied in the call for equity that ensures that “every child matters,” “all children learn,” and, in the USA, “no child left behind.” At one level, the phrase that “all children will learn” is an expression of obligation and commitment towards an inclusive society. The gesture of hope to put all children on an equal footing overlaps with fears of children whose characteristics are different and thus embody a threat to the moral unity of the whole – populations designated as ethnic urban populations and immigrants at the turn of the twenty-first century. The phrase all children, a cultural territory of inclusion, assumes a unity of the whole from which difference is enacted. The all is an erasure of differences and politics of difference.

When school standard documents and research to create more effective teaching for “the child left behind” are examined, the texts are not about all children
but the child who does not fit into that space and whose characteristics and qualities are feared as dangers and dangerous. The process is one of abjection, the placing of the child in unlivable spaces. These spaces embody fears of social-cultural disintegration and moral disorganization. The child is a particular human kind with psychological disabilities of low self-esteem and poor self-concept that overlap with social characteristics of the dysfunctional family – juvenile delinquency, poverty, “at-risk,” and the urban child.8

Further, the very principles generated to fulfill the commitment to the equality of “all children” insert inequality as equality. Ironically, policy and research start with the assumption of inequality even as the goal is equality. But as Rancière (2004) has argued, the very commitment that begins with inequality to achieve equality that potentially compensates by devising well placed strategies, actually (re)envisions equality as inequality. The comparative inscription of difference to address the fundamental wrong produces the precondition of difference, and re-inscribes divisions that are to be erased at every step by the philosophy and social scientist as the shepherd. Rancière argues that this epistemological position embodies a fear of democracy itself.

Some concluding comments: critical inquiry and the problem of change

My focus on historical numbers assembled in a system of reason was to make visible that numbers and issues of assessment are not merely those of quantification. Numbers are inscribed in a grid of practices that perform as “social facts” and as actors. This was explored through different sites of educational policy and research: the notion of markets in the sciences of wealth in the nineteenth century, the effective teacher and the students in PISA measurements as “having practical knowledge”. This way of interpreting numbers was also explored through talk about curriculum standards as not merely about what is given value in school learning. Each measurement device constitutes domains rendered as stable, representable forms that can be calculated, deliberated about, and acted on. Numbers are brought into programs of schooling and theories of teaching that perform as “actor” that order what is thought about, hoped for, and acted on.

The focus on numbers as an “actor” was located in the idea of fabrication and the making of human kinds. In part, the two nuances of fabrication – as fiction and as making – were explored to consider the issue of exclusion, abjection, and inclusion as part of the same phenomenon. The comparativeness brings into focus particular qualities of the “reason” and rationality that appear with European Enlightenment cosmopolitan notions about the emancipatory hope of future and fears of groups and qualities of individuals who threaten that promise of progress (Popkewitz, 2008). I raise this here to suggest that the problem of studies of policy and research is not merely correcting false ideological positions in relation to commitments but to give attention to the limits of a system of reason of contemporary educational reforms and reform-oriented research.
The fabrication of human kinds engages a way of considering the *political* of schooling that is rarely considered in policy studies, school research about social exclusion, and even less in defining issues of measurement and assessment. The latter is frequently expressed as the question of whose knowledge is represented in testing or how that knowledge is biased. While the general question of what knowledge gets sanctified in social institutions is important, that question, by itself, is not sufficient. It is important to consider, I have argued, the principles that historically order, classify, and differentiate what is “seen,” thought about, and acted on so as to constitute the subject. The principles of reflection and action are not just there as part of the nature of phenomena but formed through the historically inscribed rules and standards that differentiate, distinguish, and divide what is constituted as sensible/not sensible as thought and action. At this point, I want to move the focus to the epistemological ordering of social theory. One central set of categories relate to a series of oppositions, such as experience or lived experience, and useful knowledge versus theory; subjective versus the objective and material. Fabrication, as an epistemological concept, is a strategy to think about how such opposites are not separate but intertwined. This strategy challenges a long standing strand in the social sciences that places knowledge within a realist philosophy, and which posits the theories and concepts of research as an epiphenomenon to the materiality of social life. Harvey argues, somewhat paradoxically, for a phenomenological realist in human geography that worries about abstract discourses that are not grounded (connected) to “material circumstances of a lived geography” (Harvey, 2000, p.544). That connection of theories to the “tangible” and the material (read as “real”) is, recalling Rancière’s discussion of the political and the fear of democracy, to enable geographers to lead the way to “remake the world in emancipatory and practical ways” (ibid., p.560). To take as natural the “lived experiences” of geography or the populational categories of “voice” in contemporary reforms imposes distinctions and divisions as questions about bias or the phenomenological/structural concern of “whose knowledge.” This naturalized the very categories, subjects and rules of reason through which comparativeness of human kinds are produced. Unexamined are the cultural practices that order and produce how judgments are made, conclusions drawn, rectification proposed, and the fields of existence made manageable and predictable in school reform. As Joan Scott (1991) argued, experience is itself a theoretical concept and not merely there to be recouped by the researcher. If we think about the political in this manner, as it produced a way of telling the truth, it is possible to approach the contemporary trope of reform and research about producing *useful* knowledge. The idea of being “useful” entails implicitly, if not explicitly, the notion of system and its assumption of consensus and harmony. The providential of nineteenth-century philosophy is (re)visioned, preserved and assembled in different configurations. Poovey argues that the sciences of political economy overlap with moral philosophy in the late 1790s and 1830s to provide performative standards in social affairs (Poovey, 1998, pp.269–278). The consensus and harmony of the system given through the
inscription of notions of markets, for example, polices the present system through the rules and standards of “reason” applied. The very framework of the contemporaneous society which needs to be problematized becomes the terrain in which debate and change are modeled.

The argument should not be read as a modern (or even post-modern) Luddite fearful of numbers. Nor should it be read as moral relativism. Philosophically, relativism is situated and assumes that there is an objective reality that language can theoretically represent faithfully. This discussion, as expressed in the notion of fabrication, rejects this philosophical genre and its dichotomy of nominalism and objectivism for what it elides. My argument has been to address how particular notions of objectivity come into being that recognize different standards of objectivity exist in the sciences about how to get at the truth (Hacking, 1992).^10

So it is possibly the appropriate time to ask or question the question of many policy studies: Who says that discourse is only about discourse?

At the outset of this chapter, I suggested that the focus on “the reason” of schooling is to rethink theories of change, resistance, and the principles of democracy embodied in contemporary scholarship that uses numbers. The strategy is one of a cautious optimism. To make the naturalness of the present as strange and contingent is a political strategy of change or reform; to make detectable the internments and enclosures of the commonsense of schooling is to make them contestable and thus about change itself. Critical thought is directed to “what is accepted as authority through a critique of the conditions of what is known, what must be done, what may be hoped” (Foucault, 1984, p.38). Agency is in the testing of the limits of making visible the particular dogma of the present through a resistance to what seems inevitable and necessary by “modifying the rules of the game, up to a certain point” (Foucault, 1984, p.48). The tracing of epistemological shifts in the cultural theses of schooling provides a tactic by which we may challenge the habitual ways of working and thinking in school reform, teacher education, and the sciences of education.

Notes

1 The quotes around “fact” is to historicize what is constituted as real as its relation to numbers is not just there in the world to recoup or as a testimony to what is discovered. What constitutes facts entails complex assemblages and connections of cultural and social practices that enable truth to be told in the way that it is told. While there may be technical accuracy given by the numbers, my concern is with the reason governing what is said and done.

2 I am using political in a double sense: to work against the grain of the commonsense of working by making visible its rules and standards of thought and action.

3 The word “transparent” in contemporary policy and research in the United States conjures images of distancing, impartiality and the mechanical objectivity of numbers. My dropping of the word in this text is mostly to express my wonderment about the facile quality of its public uses to talk about accountability as if to signal that policy and research will enable a “seeing” through all impediments in order to make visible the real. I would have thought that this chimera was long ago laid to rest by, among others, the Spanish philosopher José Ortega y Gasset when he spoke about history as a system of ideas. My guess is that the hubris of...
the researcher and the policy maker who speaks about transparency is resistant to such arguments.

4 The term “statistics” as a numerical expression of human activity did not emerge from the English context of quantification but from eighteenth-century German related to “cameral statistics” as a science of the description of the State in its most varied aspects. Later and through successive (re)visioning of the word, “statistics” separates the political management of people from the scientific management of things and the autonomy of statistics as a field of knowledge. For example, statistics was a literary term in the eighteenth century, the numerical part of the description of the state in the nineteenth century, and by the twentieth century was tied to mathematical techniques for numerical analysis of data of whatever type (Desrosières, 1991, p.200).

5 Adolescence was a word that existed prior to Hall but brought into the realm of the new sciences of psychology to provide a particular rationalizing and classifying of stages of childhood.

6 I realize the irony of examining systems as a concept deployed through numbers and talking about systems of reason. My excuse is actually twofold. First, the notion of systems of reason is concerned with the principles that historically order “thought” rather than analytical and ahistorical abstractions about the constitution of social and individual life. Second, the attempt to give coherence to different things that do not necessarily seem related requires, at least at the surface level, applying some resets to relations or notion of system.

7 The Scottish Enlightenment philosophers, as David Hamilton (1989) explores, were influential in the development of modern schooling and its notions of “knowledge” in curriculum theory.

8 An ethnographic study of urban education teacher education reforms (Popkewitz, 1998) illustrates the constituting of standards through the making of difference.

9 Harvey, in positing differentiating abstract discourses from something that is not connected to lived experience, is in fact (my realism) engaging in a discourse that by its very existence acts as (again, my realism) abstracted from “lived experience” through the gaze of geography that de facto is given as outside of history – or at least someone else’s lived experience. His argument, I think, would benefit philosophically and theoretically from recognizing the limits of the categorization of difference and identity that he imposes.

10 Hacking discusses these styles of reason or thought, focusing on the conditions through which different sciences and mathematics pursue truth and establish what is objective knowledge without reverting to constructivism or realism.

References


