Differing Systems Perspectives on Educational Quality

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Abstract: “Educational quality” has a nice ring to it, but what does it mean? This paper will argue that two distinct categories of educational quality systems can be specified. One category addresses educational quality on the input side — HF/E design factors that influence how well the educational system performs in educating its students, and/or in terms of operational effectiveness. The second category addresses beneficial output quality outcomes beyond performance of the educational system itself, for student careers and trajectories across the lifespan, for societies, for local, regional, and national economies and governance, and/or for other modes of sociotechnical systems performance. With both of these categories, an array of different quality systems perspectives are summarized—some directly applicable to educational systems, some applicable to other systems domains yet arguably with relevance to educational systems. No two quality systems addressed in this summary specify identical ---or even closely similar ---sets of quality performance criteria, underscoring the point that different observers have different views of quality. This suggests that there is no general set of quality criteria applicable to all educational systems. The implication is that different systems should assume a degree of responsibility for deciding what quality criteria are most relevant for assessing their own quality performance.

Keywords: educational quality, quality systems, quality performance, context specificity

1. Introduction

We all know quality when we experience it, but describing and explaining it is a more difficult task (Sallis, 2002). Many people find quality an enigmatic concept. It is perplexing to define and often difficult to measure. One person’s idea of quality often conflicts with another’s; typically, experts often come to different conclusions when discussing what separates a higher from a lower quality school, college or university (Sallis, 2002).

The idea that educational systems might benefit from the application of quality principles and practices is not new. For example, two professional journals dedicated to this idea --- “Quality in Higher Education” and “Quality Assurance in Education” --- have been published for 21 and 23 years respectively. A brief survey of key observations by selected reviews in these journals offers the following insights into the current status of quality in education.

► The above two journals deal exclusively with the issue of quality in higher education. I am not aware of any professional journals devoted to the issue of quality in elementary (ages 5-12) or secondary (ages 13-18) schools.

► Pratasavitskaya and Stensaker (2010) observe that: (1) application of quality management (QM) models in higher education is mainly an externally driven process related to increased demands for accountability and efficiency; (2) QM models have been broadly applied to business and industry, but there is a concern that such models may add little to the improvement of teaching and learning; (3) studies of QM in higher education are quite heterogeneous, typically based upon case studies; and (4) few such studies build upon more established theories or perspectives in the field.

► Blanco-Ramírez and Berger (2014) point out that: (1) nearly every nation has developed a national system for quality assurance in higher education; (2) nevertheless, there is no consensus about models of quality in higher education --- quality typically is viewed as a complex concept that frequently remains undefined and is often mystified; (3) thus far, quality in higher education has been explored in isolation from access, relevance, and investment --- that is, the concept of value is largely absent from conceptual discussions about quality in higher education; and (4) a close examination of such quality practices reveals that many of these practices fail to articulate what quality really means.
This report surveys a number of different perspectives on educational quality systems, some with direct others with indirect relevance to education, and applicable to elementary and secondary, as well as post-
A scheme for categorizing these perspectives first is introduced. A selective sample of these perspectives then is reviewed, followed by some general conclusions.

1.1 Categorization of System Performance Quality Perspectives

Educational quality factors specified with the different perspectives addressed here are grouped into two categories. Input quality factors comprise those elements of educational quality that influence how well the educational system performs in educating its students, and/or in terms of operational effectiveness. Output quality factors influence longer-term outcomes beyond performance of the educational system itself—i.e., beneficial quality outcomes for student careers and trajectories across the lifespan, for communities and societies, for local, regional, and national economies and governance, and/or for other modes of sociotechnical systems performance (the Thomas B. Fordham Institute perspective (2013) on educational quality similarly uses an input vs output categorization of educational quality factors, but its meanings of these two terms differ from those noted above). Duncan (2015, p. 10) references an essentially identical input versus output scheme used by multiple systems for ranking the quality of post-secondary academic institution performance.

A further categorization scheme applied here is a breakdown of quality systems directly applicable to assessing educational systems performance, versus those developed for assessing the quality performance of other types of systems, but nevertheless indirectly applicable to educational systems.

Table 1 summarizes the different quality systems addressed in this report, broken down by input versus output categories, and direct versus indirect relevance to educational systems performance.
2. Differing Perspectives on Assessing the Quality Performance of Educational Systems

Details of the criteria applied to quality system assessment by each of the quality systems specified in Table 1 are discussed further in Sections below.

2.1. Different Approaches to Assessing Input Quality Performance of Educational Systems

Direct, Input Quality Systems. Criteria advocated by the quality systems listed in Table 1 for assessing the direct, input quality performance of educational systems are discussed in the following paragraphs.

Educational Ergonomic Analysis. Educational ergonomics is that field of ergonomics concerned with the influence on learning performance of ergonomic design factors in the performance environment. The seminal work on this topic is that of Smith and Smith (1966) (disclosure: these authors are my father and mother), who were the first to characterize the field in a comprehensive manner, and to delineate various lines of supporting evidence. Subsequent work has served to validate and extend the field (Kao, 1976; Smith, 2007, 2013; Smith et al., 2014, Chap. 4; Stone, 2008)

Educational ergonomic analysis, directed at elementary and secondary school systems, shows that the following ergonomic design factors have a strong influence on student academic achievement.

► cooperative learning;
► environmental design of school classrooms;
► longer school days and/or school year;
► later school day start times (for high school students);
► physical activity;
► teaching quality;
► community socioeconomic status; and
► early childhood education (also represents an output quality factor, see next section).

Given the effect of these factors on student performance, this analysis supports the following conclusions: (1) a quality educational system is one that addresses most if not all of the foregoing factors; and (2) these factors support input quality performance of educational systems in a direct manner. It also is worth noting that: (1) among the foregoing factors, community socioeconomic status has the most prominent and robust influence on student academic achievement; and (2) early childhood education also supports output quality performance of educational systems.

Malcolm Baldridge National Quality Award. The Malcolm Baldridge National Quality Award is the most prestigious quality system in the U.S. (asq.org/learn-about-quality/malcolm-baldridge-award/overview/overview). Since 2001, the Baldridge program has conferred nine educational quality awards at the elementary, secondary, and post-secondary levels. Criteria for a Baldridge National Quality Award in education focus on performance quality results of an educational system (i.e., direct, input system quality factors) in six areas:

► student learning outcomes;
► customer satisfaction and engagement;
► product and service outcomes, and process efficiency;
► workforce satisfaction and engagement;
► budgetary, financial, and market results; and
► social responsibility.

Principles of Useful, Effective Instruction. Koedinger et al. (2013) identify 30 design principles of useful, effective instruction, grouped into three categories, that address three different functions of instruction:

► memory (supported by six instructional design principles);
► induction (support and guidance of learning (supported by 11 instructional design principles); and
► understanding (supported by 13 instructional design principles).

It is assumed here that instructors that adopt these principles in their teaching support educational system quality, and that these principles therefore represent direct, input educational system quality factors.

Rating Criteria for Educational Systems Performance. Table 1 references three different sets of standards that have been promulgated for rating the performance of educational systems. Each set is directed at systems performance at the direct, input level. Many more such systems exist, so the selection in Table 1 should be considered as a selective sample of the constellation of such systems. It is assumed here
that compliance by an educational system (at some specified level) with one of the performance standards summarized below suggests quality performance by the system.

Ratings criteria for each system are summarized below.

**Common Core Standards.** The common core standards (www.corestandards.org/about-the-standards/), directed at K-12 grade levels, are the most widely recognized system in the U.S. for rating educational system performance. Adopted by about three-fourths of U.S. states, they comprise English Language Arts Standards, and Mathematics Standards. The English Language Arts Standards focus on:

► reading;
► writing;
► speaking & listening;
► language; and
► media & technology.

The Mathematics Standards focus on:

► mathematical practice; and
► mathematical content.

**Magnet Schools of Excellence Standards.** As the name suggests, these standards (www.magnet.edu/awards/2014-merit-awards-program) address the educational performance of K-12 magnet school systems. These standards focus is on:

► student academic achievement;
► curriculum and teaching;
► community engagement;
► professional development; and
► commitment to diversity.

**College/University Performance Standards.** As Duncan (2015) points out, a number of rating systems have been promulgated for grading the performance of educational systems at the college or university level (the U.S. News and World Report system may be familiar to some readers). I choose here to focus on what is termed the Academic Ranking of World Universities (ARWU) rating system, first promulgated by a faculty member at Shanghai Jiao Tong University in 2003 (www.ShanghaiRanking.com). This was the first college/university rating system developed, has served as the model for all subsequent such systems, and remains the most widely used and influential such system.

Four rating criteria are used by the ARWU system, with different weightings applied to each criterion:

► quality of education;
► quality of faculty;
► research output; and
► per capita academic performance.

It is evident from these criteria that the ARWU system is a direct, input rating system for post-secondary educational system quality, and that post-secondary institutions that achieve high rankings may be assumed to feature high quality system performance. One important criticism has been levelled against this system however: an institution that specializes in teaching, but not research, may receive a low ARWU ranking, but nevertheless may feature high quality system performance.

**Thomas B. Fordham Institute Criteria for Educational Quality.** The Thomas B. Fordham Institute (TBFI) (Thomas B. Fordham Institute, 2013) is characterized as an ideologically conservative American non-profit education policy think tank. The TBFI criteria promulgated for educational quality rank quality performance at the state level (not the school district or individual school level), based on state law and/or policy governing educational systems in the state (edexcellence.net/publications/the-state-of-state-science-standards-2012). The TBFI state rankings are based upon the following five direct categories of educational quality—all but the last of these represent input quality factors.

► teacher quality;
► education input;
► education output;
► education efficiency; and
► education social impact.

Within each of these categories, criteria for statewide educational quality performance are specified, as follows.
Teacher quality is based on teacher credentials, teacher responsibility for student achievement, and hiring/firing policy.

Education input is based on teacher salaries, pupil/teacher ratios, and education cost per student.

Education output (using the TBFI meaning that differs from that used elsewhere in this report) is based on percent 4

Education efficiency is based on cost per student per percent 4

Education social impact (an output quality factor, using the meaning used elsewhere in this report) refers to per capita income, percent of the population with college degrees, and the average number of library books checked out per capita.

The TBFI analysis also observes that median family income (statewide) is positively related to all of the quality performance measures cited above.

In line with the characterization noted above, Hassard (2013) offers a biting criticism of the TBFI as nothing more than a mouthpiece for conservative propaganda concerning educational quality.

Systems for Assessing Organizational Quality. Numerous rating systems have been developed to assess the operational effectiveness and quality of organizational systems. Although such systems primarily target manufacturing production systems, Table 1 suggests that criteria promulgated for rating the quality of organizational systems performance generally are relevant for assessing the organizational performance of educational systems in particular. As such, they are categorized as indirect systems, primarily focusing on input quality, but in some cases also output quality. Three of these systems have been promulgated by three of the most esteemed professionals in the history of the quality field, namely Deming (2000), Juran (1964), and Crosby (1979). Criteria advocated by these four systems for assessing organizational performance quality are discussed in the following paragraphs.

Total Quality Management Principles of Deming. W. Edwards Deming (2000) is credited with launching the total quality management (TQM) movement, aimed at production systems but applied by Sallis (2002) to educational systems. In support of this movement, Deming advocated fourteen principles for transforming business effectiveness. Those directly applicable to improving the performance quality of educational systems are as follows—the first two principles focus on output quality, the remainder on input quality.

1. Emphasize constancy of intention and purpose to improve the service offered by the educational system, with the aim of advancing the objectives of quality in educational system performance.

2. Constantly improve the system, in order to refine system quality and reduce costs. This idea of continuous improvement represents the key principle of TQM. The ideal of perfect quality performance is a pipe dream—there always is room for improving systems quality.

3. Emphasize training (of both teachers and managers) both on and off the job.

4. Institute and emphasize leadership. The aim of supervision should be to help managers and teachers do a better job.

The ‘Juran Trilogy’ Principles of Quality. Joseph Juran, along with Deming, was an early evangelist for quality (Juran, 1964). After WWII, the two both worked with different companies in Japan (but not together) to encourage production system quality improvements in the country. These efforts subsequently resulted in dramatic improvement in the quality of Japanese products, an outcome that, in turn, galvanized quality improvement efforts among U.S. companies. He was among the first to call attention to the cost of poor quality, embodied in what is called the ‘Juran trilogy’ principles of managerial quality performance, namely: quality planning, quality control, and quality improvement. The first two principles focus on input quality, the last on output quality. Arguably, the applicability of these quality systems criteria to the management of educational systems is obvious.

Crosby’s ‘Doing It Right the First Time’ (DIRFT) Quality Principles. Philip B. Crosby, the third quality professional whose work became widely recognized in the decades after WWII, is perhaps best known for his DIRFT quality principles (Crosby, 1979), developed to address quality problems among production operations. His 1979 book was a timely publication because of the crisis in quality among North American manufacturers, who at the time were losing market share to Japanese products largely due to the superior quality of the Japanese goods. Crosby’s criteria for achieving quality system performance may be summarized as follows.

► management commitment;
► employee involvement;
cooperative worker-manager relationships; 
- rewards for people; and 
- time, energy, and determination.

These principles, all focusing on input quality, arguably are equally applicable to the management of educational systems.

London School of Economics Organizational System Ratings. As a final example of a rating system for organizational system quality, my favorite is a system advocated by van Reenen and colleagues at the London School of Economics, applied in a survey of 11,300 midsized firms in 34 countries (Bloom et al., 2012). This is by far is the largest sample size for any organizational rating system that I am aware of. The project graded the surveyed firms using a 5-point scale, based on three rating criteria, namely how the firms:
- monitored their operations; 
- set targets; and 
- rewarded performance.

These criteria all focus on input quality. However, the key results from this analysis are that a one-point increment in the rating grade resulted in the following outcomes, all focusing on output quality:
- a 23% increase in productivity; 
- a 14% increase in market capitalization; and 
- a 1.4 percentage point growth in annual sales.

This survey did not survey educational systems. Again however, the rating criteria arguably are relevant to educational systems quality.

ISO 9000 Total Quality Management Standard. The ISO 9000 total quality management standard (Peach, 1995; en.wikipedia.org/wiki/ISO_9000) is the most widely adopted quality system, with over a million organizations certified to the system worldwide, and over 25,000 certified systems in the U.S. Almost all of the customers for this standard are production systems, not educational systems. Yet Sallis (2002) points out that principles and practices of total quality management can be applied to educational systems.

Certification criteria for the ISO 9000 standard with relevance to educational systems, all focusing on input quality, are as follows:
- management responsibility; 
- statistical techniques; 
- quality system (quality manual; quality procedures; quality planning); 
- document and data control; 
- quality records; 
- training; 
- contract review; 
- design control; 
- purchasing; 
- process control; 
- corrective & preventive action; and 
- internal quality audits.

Relative to non-certified organizations, organizations certified to the ISO 9000 standard exhibit higher levels of productivity and competitiveness, and longer term stability and market viability (all output quality factors).

Some higher educational systems have certified to the ISO 9000 standard (see Lundquist (1997) for an early review). This approach has attracted both support and pointed criticism (Encabo, 2014), and does not appear to have been widely adopted (Blanco-Ramírez and Berger, 2014). One possible reason is that the criteria cited above are deemed not entirely appropriate for educational systems, as suggested by the observation of Friesen (2013): “The arrival of a kind of educational version of ISO9000 will not be the same thing as the imposition of a set of common benchmarks and metrics for groups of educational institutions.”

2.2. Different Approaches to Assessing Output Quality Performance of Educational Systems

Summaries of direct and indirect quality systems in the preceding section (as also noted in Table 1) have criteria relevant to both input and output quality. Investment in adult workforce education is cited in Table 1 in the direct output category because of observations in the report by Standard & Poor’s (2014) that:
- If the U.S. added another year of education to the American workforce, U.S. potential GDP would likely be $525 billion, or 2.4% higher, in five years. 
- A more educated workforce would benefit from higher wages.
A clear and strong correlation exists between the educational attainment of a state's workforce and median wages in the state, with more educated individuals more likely to participate in the job market and earn more, and less likely to be unemployed.

Education of today's workforce is an investment in the health and livelihood of future generations, with greater parent education positively correlated to a child's health, cognitive abilities, academic achievement, and future economic opportunities. Education not only benefits workers today, but also children tomorrow.

3. Commonalities in Criteria for Quality Performance Among Different Quality Systems

Across the eight educational quality systems summarized in Section 2.1, a total of 38 different criteria for educational quality performance are specified. However, as indicated in Table 2, there are only two criteria specified by more than one quality system, namely student achievement and teaching quality. Neither of these criteria is specified by all eight educational quality systems referenced in the section.

Across the five organizational quality systems summarized in Section 2.1, indirectly relevant to educational systems quality, a total of 27 different criteria for organizational quality performance are specified. As indicated in Table 2, there are four criteria specified by more than one quality system, including the basic criterion for designing and implementing a quality system, specified by all five organizational quality systems.

4. Discussion and Conclusions

This report offers differing systems perspectives on the concept of educational quality by summarizing a series of quality systems with criteria whose putative aim is to support the quality of educational system performance. This analysis encompasses elementary and secondary as well as higher educational institutions. Seven such quality systems are described with criteria directly relevant to educational system quality. Most of these criteria comprise input quality factors that influence how well the educational system performs in educating its students, and/or in terms of operational effectiveness. Some represent output quality factors that influence longer-term outcomes beyond performance of the educational system itself. In addition, five organizational quality systems are described with criteria directed at supporting the quality performance of organizational systems, yet whose relevance to educational system quality is assumed.

The sample of quality systems addressed is admittedly selective; however, it is assumed here that this sample provides a reasonably representative cross-section of both educational and organizational quality system perspectives. Based on this assumption, the analysis provided supports the following conclusions.

1. No two perspectives introduced here specify identical ---or even closely similar ---sets of quality performance criteria. This relates to the point raised in the Introduction that different observers have different views of what quality means.

2. Out of a total of 38 different criteria for educational quality performance specified, there are only two criteria specified by more than one educational quality system.

3. Out of a total of 27 different criteria for organizational quality performance specified, there are four criteria specified by more than one organizational quality system. However, the criterion for designing and implementing a quality system is specified by all five organizational quality systems.

4. Conclusions 2 and 3 suggest that the concept of quality receives markedly less attention in the domain of education, relative to recognition accorded to this concept by organizational systems generally. This is particularly true for elementary and secondary schools. Thus, the ISO 9000 quality system has over a million certified organizations worldwide, and over 25,000 certificants in the U.S., but no comparable U.S. or international body for highlighting the importance and value of educational quality exists, as Blanco-Ramirez and Berger (2014) point out.

5. Yet it can be argued that educational systems potentially have a lot to learn from the quality field, in terms of standardizing processes, making management more efficient, and reducing costs, even if teaching and learning do not necessarily benefit.

6. However, there is no general ‘magic bullet’ for achieving educational quality. This suggests that individual or small groups of educational systems should develop their own criteria for developing quality standards.
5. References

Table 2. Commonalities in criteria for quality performance among different quality systems.

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<thead>
<tr>
<th>Quality System Category</th>
<th>Quality Performance Criterion</th>
<th>Quality System</th>
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<tbody>
<tr>
<td>Direct</td>
<td>Student Achievement</td>
<td>Malcolm Baldridge National Quality Award in Education; Magnetic Schools of Excellence Standards; Thomas B. Fordham Institute Criteria for Educational Quality</td>
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<tr>
<td></td>
<td>Teaching Quality</td>
<td>Educational Ergonomic Analysis; Bloom et al. (2012); Thomas B. Fordham Institute Criteria for Educational Quality</td>
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<tr>
<td>Indirect</td>
<td>Designing and Implementing a Quality System</td>
<td>Bloom et al., 2012; Crosby, 1979; Deming, 2000; Juran, 1964; Peach, 1995</td>
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<td></td>
<td>Management Commitment</td>
<td>Crosby, 1979; Peach, 1995</td>
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<td></td>
<td>Rewarding Performance</td>
<td>Crosby, 1979; Bloom et al., 2012</td>
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<tr>
<td></td>
<td>Training</td>
<td>Deming, 2000; Peach, 1995</td>
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Friesen (2013). "Quality Education: ISO 9000 for the Classroom?" (www.academia.edu/4165006/Quality_Education_ISO_9000_Standards_for_the_Classroom)


Magnetic Schools of Excellence Standards (www.magnet.edu/awards/2014-merit-awards-program)

Malcolm Baldridge National Quality Award in Education (asq.org/learn-about-quality/malcolm-baldridge-award/overview/overview)


