

The Information Dimension of Education Financing Decisions: Data Needs, Systems and Strategies

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In its decision in *Campaign for Fiscal Equity v. New York* the New York State Court of Appeals found that the State has failed to systematically ensure New York City schools have the resources to provide an adequate education to all students. The Court ordered the State to enact finance and management reforms by July 30, 2004 that will ensure every New York City school has the resources to provide for an adequate education. In addition, the State is required to measure whether reforms put in place actually provide this opportunity.

The challenges posed in the CFE decision go far beyond financial and legal issues. One critical, though unstated, challenge has to do with the information resources needed to craft and evaluate policy responses to the Court's decision. This paper analyzes this information-related challenge and describes possible responses. It begins with a discussion of the Court's decision from an information strategy and management perspective and briefly assesses the usefulness of existing information systems for meeting these challenges. We then introduce the concept of enterprise information frameworks and show how enterprise approaches might be applied to help the meet the information challenges posed by the case.

I. The Information Challenges in the CFE Decision

The central elements of the information challenge are found primarily in two sections of the Court of Appeals decision:

“In CFE we equated a sound basic education with "the basic literacy, calculating, and verbal skills necessary to enable children to eventually function productively as civic participants capable of voting and serving on a jury" (86 NY2d at 316). We thus indicated that a sound basic education conveys not merely skills, but skills fashioned to meet a practical goal: meaningful civic participation in contemporary society.” (*Campaign for Fiscal Equity v. New York*, p. 8)

And further:

The issue to be resolved by the evidence is whether the State affords New York City school children the opportunity for a meaningful high school education, one which prepares them to function productively as civic participants. This is essentially the question the trial court addressed, and we conclude that the Appellate Division erred to the extent that it founded a judgment for defendants upon a much lower, grade-specific level of skills children are guaranteed the chance to achieve. (*Campaign for Fiscal Equity v. New York*, p. 12)

From an information strategy and management point of view, the essential elements expressed above have serious implications. The most important is the link between the financial and equity issues raised in the case and the educational goals expressed in terms of educational outcomes. The focus on outcomes is central to our analysis as it represents a major shift in focus from traditional performance measures applied to public education.

Schooling can be thought of in terms of *inputs* (what resources and decisions go into the system), *process* (what goes on the school environment to use those resources), *outputs* (achievement, graduation rates, etc.), and *outcomes* (post-schooling results in terms of individual and community benefits). Current policies for educational equity focus almost exclusively on financial inputs. Current policies for educational performance focus almost exclusively on outputs, usually measured in terms of passing rates on certain achievement tests. Very little systematic information is available about how the *processes* of education turn financial inputs into achievement outputs. Finally, CFE focuses attention on outcomes beyond schooling, a subject for which no systematic information is available for New York. These and other elements of the decision can be interpreted to mean that providing constitutionally mandated educational opportunity goes beyond achieving any particular level of financial inputs, or even equitable outputs (i.e., “grade-specific level of skills”), but depends on processes that lead to both academic achievement and responsible civic participation. We argue that these goals are not likely to be supported by the current structure and content of the information resources used for policy making and management of New York’s educational system.

A. Information Needed to Support Education Financing Policy and Management Decisions

Given the Court’s language, policy makers are faced with important decisions for which valid and reliable information is needed for both policy formulation and policy evaluation. This section presents an overview of this challenge from an information strategy and management perspective. The discussion highlights critical information issues implied by the requirements in the *CFE* decision.

1. What kinds of decisions need to be made regarding education financing in New York State?

Prior to the *CFE* decision, the main state-level educational policy and financing issues revolved around the school aid formula. In that context, equity issues are expressed in terms of the distribution of aid in relation to district wealth and tax rates. Except for the few schools under registration review (SURRs), the financial equity measures are not coupled with attention to school performance. By contrast, the decisions implied by CFE pertain directly to the ways in which school financing impacts both student achievement and school performance. If a financing system is to meet the criteria implied in CFE, it must therefore deal in some way with the relationships among:

- definition, measurement, and evaluation of student achievement, school performance, and long-term educational outcomes,
- state level financing policy decisions and allocation schemes,
- local funding levels and allocation schemes,
- decisions and practices that determine the educational content and methods used in the schools, and

- how the allocation and use of resources impact academic achievement, performance, and outcomes.

2. Who are the stakeholders in these decisions?

The current stakeholders in these decisions include various participants in the K-12 education system—students, families, school personnel, teacher unions, school boards, state elected officials, and Education department staff—along with employers, higher education institutions, local taxpayers, and local government officials. The CFE decision does not change the mix of stakeholders in educational policy and administration, but it does change the focus of attention and the nature of the interests at stake. Both have implications for the information needs of stakeholders.

3. What are the information needs of stakeholders?

Two major changes in the information needs of stakeholders are suggested by the CFE decision. Both are linked to the criterion of “productive civic participation” as a measure of the constitutional adequacy of the system’s performance. One is developing measures of student achievement and school performance relative to that criterion, the other is linking those measures to resource allocation and school policy and management decisions. That is, if school systems are to be held accountable for how well their students and graduates meet this criterion, then they must have ways to measure it and link those measures to what happens in schools. Stakeholders need information that will *systematically* answer such questions as:

- What patterns of school spending priorities are associated with higher performance?
- To what extent do academic and other school programs mitigate or reinforce the effects of socio-economic conditions in the community?
- To what extent do non-financial resources or incentives contribute to higher performance?

B. Inadequacies in the Current Information Environment

What approaches to meeting these information needs are available and how well do they address the problems? There are two main issues here: the creation and implementation of relevant measures and the adequacy of existing data resources to support their use.

Regarding the first, there are no generally accepted definitions or standards for what constitutes “a sound basic education” or “productive civic participation.” Nor are there existing data collection mechanisms in place designed to produce such information about students and graduates. Since public education is primarily a state responsibility, the definitions and standards to be developed for this use would presumably be initiated at that level. But the process will also require extensive citizen and professional participation, considerable research, and new legislation and policymaking.

Second, despite their pervasiveness and cost, existing K-12 reporting requirements and information systems do not capture information about the processes of schooling, that is the ways in which revenue, other resources and policies are combined in the school setting to produce results. To return to the simple representation of schooling stated earlier: inputs (people, policies, and resources) are transformed via processes (both managerial and educational) to produce outputs (grades and graduation rates) and outcomes (well-prepared citizens). Current

information resources can be mapped against the elements of this simple formula to determine where gaps exist.

In New York, a variety of reporting mechanisms and information systems are used, and others are in development. In fact, school districts in New York are subject to more than 120 state and federal requirements to submit plans, applications and reports. This proliferation of reporting requirements (and local objection to their cost and questions about their value) have led the State Education Department (SED) to initiate a data reporting consolidation effort with special attention to student identification and achievement (SED, 2003). This effort rests mostly on two existing systems, Local Education Agency Program (LEAP) reporting for elementary and middle schools and System for Tracking Educational Performance (STEP) reporting for high schools. These and a few other major systems handle the bulk of the data collected about New York's K-12 schools. Information about the focus of these systems is shown in Table 1.

Table 1. Selected NYS K-12 Information Systems by Focus of Attention					
System and purpose	Status	Main focus of attention			
		Inputs	Process	Outputs	Outcomes
LEAP – Local Education Agency Program (reports elementary and intermediate school student demographics and assessment test results for grades 4, 5, 8 in math and language arts)	Operational	X		X	
STEP – System for Tracking Educational Performance (reports high school student demographics and Regents test results for grades 9-12)	Operational	X		X	
BEDS – Basic Educational Data System (reports information about school districts including student enrollment and characteristics, professional staff, and certain resources such as libraries and computers)	Operational	X			
Data consolidation and regional data warehouses to reduce the number of separate student-oriented reporting requirements and to make reported data more readily available to users	Under development	X		X	
State Aid Reports – Various reports that document the sources and amounts of revenue available to each school district in the state	Operational	X			

As can be seen in Table 1, K-12 information and reporting systems in New York collect data from all school districts about inputs (e.g., students, teachers, individual schools, school districts and financial factors) and outputs (e.g., scores and passing rates on required achievement tests,

graduation rates, drop out rates). The data collected is almost entirely categorical or quantitative. It is therefore well-suited to discerning trends and making comparisons such as the annual school report cards (SED, 2003b), and for use in research which focuses on discovering statistically significant associations among the variables such as the association between teacher retention and state-mandated testing (Boyd, et al, 2003). In addition, much of the data is now required to comply with the federal No Child Left Behind Act.

The State Education Department itself conducts extensive research using these data and encourages data use by others through its public information dissemination and reporting efforts such as the school report cards and underlying data sets. Under Section 215 of the State Education Law, the Department and Board of Regents produce an annual report to the Governor and Legislature profiling school districts according to key demographic and achievement measures including "enrollment trends; indicators of student achievement in reading, writing, mathematics, science, and vocational courses; graduation, college attendance and employment rates; . . . (and) information concerning teacher and administrator preparation, turnover, in-service education and performance." (SED, 2002). Another annual report, "Analysis of School Finances in New York State School Districts" concerns school expenditures, State Aid, and local financial support with particular attention to per pupil expenditures and five year trends. (SED, 2002b). Special reports are also prepared from this data about issues of current policy concern. Most recently, for example, the Department issued a research report on the educational effectiveness of Charter Schools (SED, 2003c). The report covers school characteristics, student enrollment and achievement, and fiscal impacts. The same data sets are used by academic researchers to investigate the associations between various policies and strategies and performance.

The Department also sponsors and encourages research into educational effectiveness through such programs as its core curriculum and resource guides for math, science and technology, the arts, English, social studies, and other subjects (SED,undated). In addition, a publicly-funded research program produces best practice information and distributes it through the Sharing Success Technical Assistance Center (Westchester Institute, 2002). These are very useful efforts to identify and replicate successful programs, but there are no current efforts to systematically link these practices with the measures of school performance.

Both kinds of information and analysis (broad statistical analyses and single topic investigations) are very useful for knowing *what* is happening *where*. However, neither can reliably explain *how* or *why* certain patterns occur. Nor can they support evidence-based changes in policies or practices that might produce *systematic*, sustainable improvements. The policy and management implications of this information challenge revolve around the need to understand and manage the relationships among the decisions and actions necessary to achieve the desired outcomes. That is, policy making must provide the necessary framework of laws, rules, and resource flows; and managers and other professionals must implement the framework as well as allocate and direct the use of the resources. A useful understanding of the complex web of decisions and actions necessary for this to happen requires information and analytical resources that appear to be beyond the capabilities of existing data and systems.

These inadequacies in current information and analytical resources derive from three main causes. The first is the lack of thorough understanding of the educational process itself. That is, current educational research does not provide models of teaching and learning that show how all the components of the educational enterprise affect the outcomes of schooling. In four years of high school, for example, a student may have classes with 20 or more teachers, sit through more than 3500 class sessions, interact with dozens of other school staff, thousands of different materials, equipment, supplies, and hundreds of other students. And none of this takes into account the impacts of all the out-of-school activities that can contribute to learning. Thus there is little systematic information about what matters and how much.

Of course, much of what happens in schools is strongly influenced by educational policy and management decisions. Consider, for example, high school Regents courses. The mix of policies and decisions that constitute the Regents examinations and the way they are administered are well documented. Though the sources, administration, and scores for the tests may be well understood, their linkage to learning is cloudy and controversial (Arenson, 2003). Moreover, while there are a few targeted studies and many strong opinions and anecdotes, there is no useful research currently available about how the examinations broadly impact teaching and learning activities in Regents classes. These are just a few of the variables and possible impacts contributing to a student's ability to "function productively as a civic participant." That full set of variables is enormous, but current data systems and the analytical methods suitable for using them do little to improve our ability to assess or understand their interdependencies.

The second cause of inadequate information resources is the nature of school management mechanisms. Generally, schools are poorly understood and only partially managed organizations. The educational system has been described accurately as "loosely coupled," meaning that there are only weak administrative control and influence mechanisms linking the components of the system (Telem, 1996; Weick, 1976, 1982). Much of the day-to-day details of teaching and learning are controlled by individual teachers working with minimal input or observation by school administrators. Formal information flows about these activities and their impacts are limited largely to exception handling (student discipline, schedule disruptions, etc.) and narrow managerial concerns for financial controls and rule enforcement. Informal information flows, though usually rich and valuable, are not comprehensively understood or systematically linked to outcomes.

The third cause of inadequacy stems from the nature of the information systems and structures of the educational system. Information systems in K-12 education, from the state level to the individual school, can be characterized as predominately stand-alone applications with narrow functionality within units, levels, or particular administrative areas (e.g., payroll administration, test reporting). Considerable development has been devoted to these academic information systems (Charp, 2003; Kalay & Chen, 2002; Vrasidas) or educational management information systems such as LEAP and STEP in New York. However, extensive as these systems are, they offer little or no integration of information across levels or functions. For example, it would not be possible in most, if not all, school districts to find an integrated information system that would show details of the mathematics instruction a high school senior had received since first grade, or what resources had been devoted to mathematics education for that student. The student's score on a final Regents examination, therefore, could not be linked or analyzed in terms of that

student's educational inputs. Similarly, few if any schools systematically collect information about post-graduation performance of their students or relate that performance to school programs.

II. Alternative Approaches to Improving the Information Environment of K-12 Education

Some research has addressed how schools can explore IT influences on information infrastructure and organizational changes, including policy, security, ownership, governance, leadership, (Anderson, 1998; Berends, 2002; Owens, 2001) but these efforts do not link findings to school reform (Katz, 2002). In a different vein, several approaches to improving the overall information environment for educational policy making and management are in general use around the US. Many of these data development and technology projects are sponsored by the National Center for Education Statistics (NCES) and reported in its Forum on Educational Statistics. (NCES, 1994-2003). They include:

- *Investments in statewide single-purpose information systems.* Such systems are designed to support one program or requirement within the spectrum of K-12 activities. Examples include automated grant application processes, student identification systems, or incident reporting systems.
- *Data warehouses and associated decision support systems.* These efforts, including one in New York, aim to bring information from disparate existing systems into a common repository that would then be available for more kinds of analysis, especially for questions that need information from multiple data sources, such as policy analysis, strategic planning and trend analysis.
- *Systems integration projects.* These initiatives often take advantage of the Web as a way to channel, or even consolidate, formerly separate data reporting streams through an Internet-based gateway. These may pull together multiple automated systems or replace formerly manual reporting processes, or both.
- *Data quality initiatives.* Data quality improvement efforts are often conducted in conjunction with larger system development or integration efforts. They include data standardization, conversion from aggregate to individual level data collection, training, and data audit and validation activities.
- *Enterprise information architecture initiatives.* The use of enterprise concepts in education is quite new compared to their growing adoption in business and government more generally. Enterprise initiatives are distinct from the system improvement efforts described above in that they encompass a comprehensive re-conceptualization of K-12 education as a holistic enterprise, whose goals, structures, processes, actors, information content, and information systems have interdependent relationships, which need to be understood and accounted for in the development of strategies, programs, and systems. According to the project summaries posted on the NCES web site, Hawaii is furthest along in pursuing the development of an enterprise information architecture for K-12 education "to ensure the use of information in support of specific education processes and [to] serve as a guide for future information management and information technology activities" (NCES, 2003).

Of the approaches summarized above, we contend that the most useful for dealing with the issues presented in CFE rest on the concept of enterprise information architecture. This approach includes models of the components of the enterprise itself and models of how its business

processes (i.e., its productive activities) take place. This perspective includes identifying the stakeholders in those processes and their information needs. It also provides for explicit attention to the technologies, data, and organizational arrangements to support those needs. These include links between business processes and information flow, suitability of data structures and data quality, and operational considerations for data collection, management, and use. While the creation and use of a fully mature enterprise information architecture is a multi-year, labor- and resource-intensive endeavor, general enterprise concepts, as discussed below, can be put to use more quickly to help fill the information gaps associated with responding to CFE.

III. Enterprise Information Strategies for K-12 Education

A. Conceptualizing the Educational Enterprise.

In order to assess and develop their information resources to better support instruction, management, policy making, and reform efforts, policy makers and school administrators need a comprehensive framework for analysis of their goals, activities and information resources: in this sense, an enterprise framework. As applied to schools, a mature enterprise framework would describe in detail the content and relationships among goals, core business processes (instruction, administration, etc.) and information resources and technologies.¹ Such a detailed framework begins with a high level conceptualization of the enterprise such as the one shown in Figure 1.

In this enterprise framework, education is seen as a process involving the interaction of demand for education with the supply of educational programs and services. For the educational process to be effective, both demand and supply must be effective. By “effective demand” we mean the direct involvement of students in educational programs and services, with the capacity to attend and achieve. Social demand for education can be transformed into one component of effective demand if the individual student and family act to become involved. Their willingness and ability to do so are influenced by their own resources, as well as their own desires and motivation coming from the social and economic environment.

¹ The term “business process” is used here in the same sense as in the business process analysis literature Koubarakis, M. & Plexousakis, D. 2002. A Formal Framework for Business Process Modeling. Information Systems, 27(5): 299-320.. It refers to all the processes (instruction, transportation, management, etc.) that contribute to the outputs of schooling. This is distinct from the use of the term in most educational management literature, in which “business process” typically refers only to general administrative functions (budgeting, accounting, personnel administration, etc.)

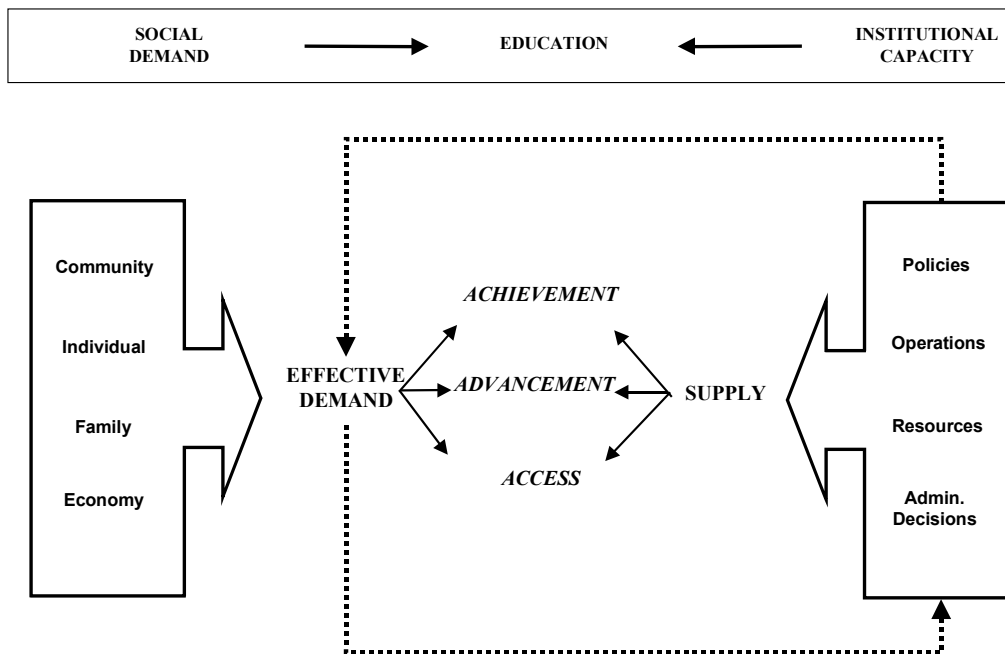


Figure 1 - Macro-level Model for the Educational Enterprise

The other component of the framework is the provision of opportunity to participate in programs and services. This is the result of institutional capacity being transformed into the supply of education through the processes of policy making and implementation. Institutional actions and policies can affect demand directly, as shown by the dotted arrow from “Institutional Capacity” to “Effective Demand.” These effects include such things as school location and capacity, opportunity for parent participation, decentralization, etc. In addition, social demand for educational programs and services can influence institutional capacity through the political process. This line of interaction is shown by the dotted arrow from “Effective Demand” to “Institutional Capacity.”

This framework goes beyond typical models of the educational enterprise that are primarily focused on the institutional and organizational aspects of education. In those models, educational system improvement goals are expressed in terms of equity of financial inputs and achievement measures. In this alternative model the overarching goals are expressed in terms of *access*, *achievement* and *advancement*. These goal areas comprise increasing levels of functionality in education. Providing access is the minimum requirement for a functioning educational system, and attaining access is the minimum requirement for students to participate in it. Lack of access to education obviously precludes obtaining any developmental benefits for the student or society; i.e., access is necessary but not sufficient. Access can lead to achievement, the extent of which will be dependent on the effectiveness of the programs and services plus the capacity and motivation of the students and their families. As with access,

achievement is the result of an interaction between the supply of education provided by the institution, and the capacity and demand provided by the student and family. The same logic applies to advancement. Achievement is necessary but not sufficient for advancement through the levels of education, and into productive lives. Students may attain high levels of achievement in a particular subject without it leading to meaningful advancement. Achievement must be aligned with the needs of the external society as well as with the requirements of advancement to higher levels of education. Advancement is thus the result of an the demands and capacity of the student and society interacting with the forms and processes of educational institutions.

This model of the educational enterprise serves as a guide for information strategies and systems in three ways. First, it identifies the main types of goals of the educational process. Effective access, achievement, and advancement represent broad categories of goals, each of which needs to be expressed by a range of indicators used by policy makers, administrators, and other stakeholders. The categories also provide a basis for identifying and approaching factors that limit, interfere with, or prevent attainment of acceptable levels of access, achievement, and advancement. Since these are generic goals for education, they are applicable for general use, beyond the specifics of the CFE decision.

The second contribution of the framework is its identification of the categories of factors of social demand and institutional capacity that affect the performance of the educational process. It is not enough to simply identify problems or insufficient performance of educational programs and institutions. The analysis should point out possible direction for intervention and remediation to improve the educational process. These should address both the demand and supply sides of the framework, attending to the factors that interfere with both provision of effective education, and with the ability of the student and family to participate in it.

Third, the model supports information architecture development by focusing attention on the educational process rather than the educational institutions and organizations alone. Recent advances in improving the performance of organizations have come from increased attention to and analysis of the key processes on which the organization depends.² The same approach can be applied to education and can be broadened to include processes that may not take place within the ordinary boundaries of educational institutions, such as distance education, a variety of non-formal educational activities, and other possibilities.

Figure 1 is not the only model of the education enterprise that would be useful to policy makers. Many different conceptualizations are possible. However, regardless of their differences, useful enterprise models must include recognition of the variety of actors and environmental forces involved, the goals they seek to achieve, and the processes that tie them together.

B. The Concepts of An Enterprise Information Architecture

Effective use of information resources has the potential to enhance and transform organizational performance (Fayad, Hamu, & Brugali, 2000; Richardson, Jackson, & Dickson, 1990). To exploit that potential, however, organizations must have the capacity to use information resources in a holistic and integrated way. Where the performance of a complex, multi-

² See, for example, Thomas H. Davenport. *Process Innovation*. Boston, MA: Harvard Business School Press, 1993.

organizational system is concerned, as in schools, enterprise frameworks and architectures describe how information technology is related to the overall work processes and outcomes of the organizations or set of organizations. It describes relationships among technical, organizational, and institutional components of the enterprise. These frameworks and architectures are generally created to guide decision making and planning in information technology design, development, implementation and maintenance (Mattison, Bosch, & Fayad, 1998; Mili, Fayad, Brugali, Hamu, & Dori, 2002; Peckham & Maryanski, 1988; Richardson et al., 1990; Toms, 2002).

Enterprise architecture was first conceptualized by Zackman in the 1980s (Zackman, 1987) for business firms and has since been adopted and adapted for use in a wide variety of both public and private settings. The Federal Enterprise Information Architecture program developed for the federal government is a useful example. It contains six “reference models” that together support the achievement of mission goals (Chief Information Officer Council, 2001; GAO, 2002). These include:

- Business reference model – which describes the fundamental functions of the enterprise independent of the agencies that perform them.
- Performance reference model – which provides performance outputs and measures related to business goals and objectives
- Data and information reference model – this model describes the types of data and information that support programs and business functions and the relationships among the types
- Service component reference model – identifies and classifies IT services that can be reused to support operations in different organizations
- Technical reference model – describes how technology and relevant IT standards support service delivery and business operations.

An enterprise information architecture can include descriptions of the enterprise and its information processes on at least three levels. The first is the macro level, showing the relationships among the major components and goals of the enterprise. This level does not show operations or organizational units in detail, but describes overall relationships and their information components. The intermediate level shows a higher level of detail about the components of the enterprise and how their information processes are linked and used. The micro-level shows detailed activity structures and relationships as well as how information and technology are developed and used in the specific productive processes (i.e., teaching and learning activities). At every level, describing the nature and implications of relationships is critical to understanding both the parts of the enterprise and the aggregation of parts into a functioning whole.

C. Using Enterprise Concepts to Fill the Information Gaps of CFE

Our brief analysis here has shown a critical information gap, namely the lack of information about how the processes of education turn resources into results. An enterprise approach can help fill that gap by guiding both near term information gathering and analysis and longer term information systems planning. Table 2 lists some of the questions that an enterprise architecture planning process would address.

Table 2. Considerations for a K-12 Enterprise Information Architecture Planning Process

High level conceptualization and plain language description of the K-12 enterprise	<ul style="list-style-type: none"> • What are the goals of the K-12 enterprise? How can they be measured? • What constitutes progress toward goals and how can progress be measured? • Who are the stakeholders in the enterprise? What are their concerns? • What resources are available to the enterprise? What are their constraints? • What social, economic, political or other constraints shape the enterprise? • What are the fundamental relationships among the entities in the enterprise?
Definition and modeling of core processes	<ul style="list-style-type: none"> • What are the core processes of the K-12 enterprise? • What are the information, resource, and work flows of those processes? Who are the individual and organizational participants? • Do adequate process models already exist? • What conflicts exist among the processes and how can they be reconciled?
Mapping of information resources and needs to core processes	<ul style="list-style-type: none"> • Who are the potential users of the information resources associated with different processes? • What are the characteristics of the needed information, in terms of structures and data models, data quality, timeliness, aggregation, precision, cost, and sensitivity? • What gaps in existing data standards and structures at local and state level prevent analysis of performance and outcomes? • What conflicts in existing data structures, systems and definitions prevent analysis of performance and outcomes? • What are the purposes, analytical resources, and limitations involved in using information for decision making and operational management? Do they support or conflict with one another? • What data quality and security standards exist and what are needed to complete an adequate enterprise-wide level of quality and security? • What information management strategies would be appropriate?
Mapping of information systems and sources to core processes	<ul style="list-style-type: none"> • Can existing management and operations data systems be adapted to serve core processes and analytical needs? • What are the potential barriers or constraints to access, use, or dissemination of existing information? • What new information sources or systems need to be developed to support important processes?
Operational considerations for the planning process	<ul style="list-style-type: none"> • Who should lead the planning process? • Who should participate and how? • What governance issues would have to be resolved? • What organizational and policy mechanisms exist (or are needed) to develop and implement necessary standards and consensus? • What types of costs would be involved? • What organizational changes would be needed for an enterprise information approach to work?

Eventually, a complete enterprise information architecture might be built for K-12 education in New York, but even a rudimentary enterprise information planning process that addresses the key questions in the table can be of substantial value in responding to the requirements of CFE. For example, once goals and measures are defined and core processes are described, existing statistical data sources offer the opportunity to identify significant relationships that need to be more completely understood. By complementing statistical studies with systematic comparative cases studies, a richer more complete picture of these relationships would emerge. Such studies would be especially valuable as a means of evaluating the policy responses to the Court order.

One potentially valuable part of the planning process would be to design a quality assurance-type information model. That is, to monitor and assess system performance it is not necessary to collect information about all students, classes, teachers, etc. A much less costly approach is a sampling model, already used effectively by the National Assessment for Educational Progress (NAEP) to produce the national education report card (NCES, 2004). Well-designed sample-based assessments of CFE policy implementation could provide sufficient process and performance information to help guide the K-12 enterprise to improved quality and equity.

By conceptualizing a holistic K-12 enterprise, policy makers, education professionals, and information technology planners can have a shared mental model to work from. For policy makers, that model offers a way to understand how and where different policy choices might affect the complex web of relationships that comprise K-12 education. For education professionals and IT planners, the focus on core processes encourages mutual understanding of the ways in which educational processes and information resources might work more smoothly together. By its focus on processes and relationships, enterprise thinking more readily encompasses the needs of various stakeholders, organizations, and levels of government as well as the impacts each of them would face under various policy implementations.

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