Educational Adequacy:

What do we expect from our schools, at what level, for whom, and at what cost?

Leading the dialogue about educational process and outcomes

Richard Green Scholar Paper

MASA Fall Conference 2013

10/8/13

Aaron Ruhland

Director of Learning and Accountability

Orono Public Schools

Introduction

Minnesota's legacy of being a national leader in student achievement is in jeopardy. The "state that works" (Time Magazine, 1973), no longer has a stable and predictable system for funding schools, (Minnesota Historical Society, 2007), and high rates of average student achievement are marred by substantial achievement gaps between white students and students of color (Minnesota Department of Education, 2011). Those issues contribute to questions about whether Minnesota is meeting its constitutional obligation to fund a "uniform, thorough, and efficient" system of public schools (Minn. Const. art. XIII, sec. 1). In *Skeen v. State of Minnesota* (1993) the Minnesota Supreme Court ruled that the state finance system was providing sufficient funding for school districts to meet basic needs. A more recent study by Silverstein, et al. (2006) examined educational funding in the state of Minnesota and determined that between 97% to 99% of school districts were not funded at adequate levels. Although the state finance system has not been challenged in court since the *Skeen* decision, legal analyses will rely on scholarship in the area of educational adequacy, including economic models examining the efficiency and effectiveness of the current system. Political, legal, and economic leaders will contribute substantially to these analyses. Educational leaders are poised to guide the conversation about those standards for educational processes and outcomes and how we measure them, reflecting the values and culture of our communities.

This paper seeks to describe challenges that complicate the analysis of educational adequacy, show how those challenges are exemplified in the frameworks currently used to define educational adequacy, and propose how a modified approach might improve analysis and policy development and implementation. The basis for this analysis is a review of the literature in

educational adequacy, political values and culture, as well as policy development and implementation.

The paper is organized into three sections. The first describes three fundamental challenges to adequacy analysis: varied perspectives on the purpose of education, narrow and prescribed assumptions about measuring outputs, and the political factors underlying educational policy. These factors impact the efficacy of adequacy analyses, which are exemplified in the past studies of adequacy in a variety of states facing court challenges to their educational finance system. Section two describes the four most commonly used methods for establishing the cost of adequacy: cost function, professional judgment, successful schools, and evidence-based models and show how those challenges impact adequacy studies (Augenblick, et al. 1997; Odden & Picus, 2000; Odden, Goetz, & Picus, 2010). The final section proposes an integrative approach to analyzing adequacy that involves local citizens and leadership, is inclusive of broader system outputs, and blends models to determine costs. The paper concludes with proposed research questions that could enhance understanding of the relationship between Minnesota's political values and educational outputs and how they might be included in studies of educational adequacy.

Fundamental challenges to adequacy analysis

In the analysis of educational adequacy, how one defines the purpose of education and the intended system outputs is crucial. In general, adequacy studies have relied on a narrow set of outputs that do not reflect the varied purposes of schools. American schools have long served multiple purposes, emphasizing varied outcomes depending upon the community as well as student values and needs. Going back to foundational American values, John Adams, Benjamin Franklin, and Thomas Jefferson supported education as a means to developing democracy and

moral citizens (Viteritti, 2004). In addition to content-based educational skills, schools are also seen as an institution reinforcing morals, ethics, and democratic principles (Wraga, 2001). School emphases include technical and cultural outputs conveying private and public goods, acquired through a complex, interwoven set of processes, requiring varied resource inputs (Mitchell & Mitchell, 2003). School goals are varied and vague, including citizenship, socialization, college readiness, and standardized achievement test performance (Belfield & Levin, 2002). Further complicating analyses are questions about what level of goal attainment should be considered adequate. Communities also differ in the resources outside of school available to children, including family resources, yet adequacy models do not account for those variables directly (Alexander, et al., 2010). Adequacy standards need to account for a substantive level of quality, but courts also must address "whether the education clause establishes a minimum or an optimal education standard or something in between" (Augenblick, et al. 1997, p. 69).

In one of the seminal court cases defining educational adequacy, *Rose v. Council for Better Education (1989),* Kentucky's educational finance system was declared unconstitutional on the grounds that it was not providing an efficient system, including preparing students for citizenship and the labor market (Burbridge, 2008). The ruling was followed by a mandate to define student capabilities that would result from an adequate education (Ryan & Saunders, 2004). In *Claremont v. Governor of New Hampshire* (1997), the New Hampshire Supreme Court ruled that "No other governmental service plays such a seminal role in developing and maintaining a citizenry capable of furthering the economic, political, and social viability of the State," and that "an adequate education should reflect the fact that a broad exposure to the social, economic, scientific, technological, and political realities of today's society is essential for our

students to compete, contribute, and flourish in the twenty-first century" (Reschovsky & Imazeki, 2001, p. 374). In the landmark 2001 New York State Supreme Court ruling, known as the *DeGrasse* decision, adequate educational attainment was defined as meaningful civic engagement and being able to hold jobs above low grade work (Belfield & Levin, 2002). State constitutions vary in the treatment of education and its role, yet these recent interpretations reflect broad perspectives on the purpose and intended outcomes of the system.

A second challenge to how one defines an adequate education is how educational outputs are measured. The measurement of adequate outputs follows a narrow definition of the purpose of education in adequacy analyses. A common process for adequacy analyses is to establish a narrow set of technical outputs and measure them through course attainment and academic achievement on standardized tests (Alexander, 2003; Guthrie & Rothstein, 1999; Kirst & Rhodes, 2010). Alternatively, using a citizenship lens, attainment of adequacy and equality of outcomes can be measured by examining if everyone attains equal freedoms, opportunities, rights, and basic economic opportunities (Satz, 2007). "The estimation of cost functions requires that we have good data on the outputs of schools that are important to citizens. Although test scores are clearly important, other goals of our educational system, while harder to measure may still be of great importance" (Reschovsky & Imazeki, 2001, p. 395). Gordon (1995) notes that a system that effectively measures educational outcomes across diverse populations would utilize more authentic, performance-based, and contextual processes rather than the current reliance on standardized achievement tests. Those tools should include classroom formative and diagnostic assessments that provide important outcome data that can be used to adapt instructional practices and evaluate system outputs (Kirst & Rhodes, 2010). Although these scholars pose relevant questions regarding the measurement of educational outcomes, decades of firm entrenchment in

the utility of standardized tests is a difficult challenge to those who seek a measurement system that accounts for a fuller range of system outputs.

The publication of A Nation at Risk (National Commission on Excellence in Education, 1983) established a rationale for standards-based accountability measured by state-mandated, standardized achievement tests. The federal No Child Left Behind Act (2002) defined more specific elements. This coincided with a shift in analysis of educational finance based on an adequacy versus equity framework (Carnoy, 1983). Standards-based reform assumes that the role of the state is to set standards for educational outcomes and inputs, measure the efficiency and efficacy of those efforts, and hold the system accountable for attaining outcomes and implementing the most effective and efficient inputs and processes (Silverstein, Rose, & Myers, 2006). Researchers have contributed to efficacy studies, and states have altered accountability systems and funding mechanisms in response to those studies (Augenblick, Myers, & Anderson, 1997), yet considerable differences still exist among researchers and policy-makers about the methods and purpose of the analyses (Satz, 2007; Carnoy, 1983). As one examines the prevailing theories and methods used to define educational adequacy, standards-based accountability is evident. Academic and legal scholars note the varied purposes and outcomes of schools as considerations and, in some cases, recognized limitations of existing models.

A third challenge to adequacy analyses are inefficiencies created by differences in political values and culture and how they impact the process of policy development and implementation. The analysis of educational adequacy is viewed through a technical lens, but many of the issues related to adequacy are political, "reflecting the intense attitudes legislators and voters have about school finance because of its magnitude, its scope, and the difficulty of changing existing systems" (Augenblick, et al. 1997, p. 66). State government leaders

implementing policies that promote efficiency versus school districts and professional educators concerned with quality and fraternity is a common source of pressure (Fowler, 2004). This warrants caution in prescribing educative processes or outputs at a state level that may not align with local values, which in turn, may lead to inefficient implementation in the educative process. Technical approaches to calculating costs recognize inefficiency as an issue. The incongruence in the policy development and implementation process is not mentioned as prominently in the studies as a source of inefficiency.

Political values are transcendental values that define broad individual or societal perspectives about issues and they further complicate adequacy analyses. These values encompass political culture, which is a collective way of thinking that generally defies expectations for the political process, goals, and structures. Two broad values distinctions are: economic values including efficiency, quality, and economic growth and democratic values including fraternity, equality, and liberty (Fowler, 2004). Varying political values are consistent with the varying purposes of education in the United States reflecting perceptions of both public and private benefit (Mitchell & Mitchell, 2003). A blending of those two purposes views education as a path to upward social mobility, personal development, and success, which are essential to democracy and economic growth for society (Ntiri, 2001). State Supreme Court cases leading to changes in educational finance systems have also reflected a range of purposes and values.

In *Claremont v. Governor of New Hampshire* (1997), educational purposes included the "social, economic, scientific, technological, and political." The seminal Kentucky Supreme Court case *Rose v. Council for Better Education* (1989), resulted in an adequacy definition that included student capabilities to participate in "citizenship and the labor market." While, some

state Supreme Courts have reinforced a narrower definition of academic proficiency on state tests, exemplified by the Texas Supreme Court case, *West Orange-Cove Consolidated Independent School District, et al. vs. Shirley Neeley, Texas Commissioner of Education, et al.* (2004). The underlying values in these state Supreme Court cases reflect Belfield & Levin's (2002) description of the varied and vague purposes of education.

Different political cultures also prefer different policy orientations valuing choice, quality, efficiency, and/or equity (Heck, 2004). Those political orientations translate into different policy instruments, which are the mechanisms for enacting policy (McDonnell & Elmore, 1987). McDonnell & Elmore (1987) identify four general categories of policy instruments: mandates, inducements, capacity-building, and system-changing. Mandates and system-changing instruments assume that outside intervention is necessary to implement policy change. These two policy instruments are exemplified in education by regulatory requirements such as anti-discrimination laws and system-changing instruments such as vouchers or charter schools. Inducements and capacity-building instruments involve motivating those within the systems in return for improved results and investment in the system for long-term returns such as professional development and research. Understanding political values and cultures, along with the instruments that follow from those orientations provides a lens on how states define adequate educational processes and outcomes. Implementation of policy instruments that do not align with the values of local citizens and leaders may result in inefficient processes and implementation.

Coinciding with political culture and values are perceptions about the value of education, including being a durable good, a direct service, a human capital investment, and a means for conveying a cultural legacy (Mitchell & Mitchell, 2003). These distinctions are broadly

categorized as emphasizing private versus public good measuring technical and cultural outputs. Private goods such as durable products can be measured more easily and are more common components of adequacy models. Durable products are the knowledge and skills accrued by individuals to benefit themselves in society and more specifically the workforce (Mitchell & Mitchell, 2003). Conveying cultural legacy, such as the transmission of democratic values that improve society may not be easily measured in the short or long term. The same can be said about human capital investment, which views the development of individual knowledge and skills as a benefit to society (Mitchell & Mitchell, 2003). Direct services, including taking care of children so that adults may participate in the labor market or addressing health and nutrition are also difficult to evaluate, yet are integral school functions. Mitchell and Mitchell, (2003) describe how using a "political economy perspective" allows one to see the differing values that underlie policy development. "These divergent interests and values not only lead policymakers, professional educators, parents, and community members to misunderstand each other, but also to find each other's policy proposals to be irrelevant or even repugnant to basic values" (Mitchell & Mitchell, 2003, p. 147). Identifying divergent and convergent values across stakeholders is necessary to assure transparency and understanding of factors that impact adequacy, including the desired system outputs.

Timing and conditions also affect policy development processes and products. Policy development occurs when environmental conditions favor change, which is influenced by interactions between government and policy coalitions and individual belief systems (Heck, 2004). In a state policy arena, environmental conditions most favor change when external pressures are high and available revenues are either substantially high or low (Mazzoni, 1991). For the fiscal year 2013, at least 30 states, including Minnesota, are addressing budget deficits,

with total shortfalls projected to be around $49 billion (McNichol, Oliff, & Johnson, 2012). There is a widely held belief that American students are lagging behind international peers, reinforced by international studies showing that American student performance on reading, mathematics, and science exams is below international averages (Schleicher, 2008). In this context individual belief systems of legislators, and their collective thinking, will contribute to the development of specific policy interventions (Heck, 2004). Policy development in the area of educational adequacy will also be impacted by, "two existing policy monopolies, education finance reform and standards-based accountability" (McDonnell, 2010, p. 240). Although the conditions for policy development are likely, policy alternatives will certainly be impacted by the current emphasis on standards and standardized testing as a means to determine adequacy. This may limit the available alternatives and create further incongruence in the policy development and implementation process.

Policy development is impacted most by insiders at the state level including individual legislators connected to educational policy and less so by individuals at the local level including citizens (Marshall, et al. 1986). While the power of various actors differs across states, individual legislators leading education committees and the legislature as a whole generally wielded the most influence over educational policy. The Chief State School Officer was also considered an insider with considerable power and influence. Rounding out the inner circle of those influencing state educational policy were the collection of interest groups including business and teachers unions. Those interest groups closest to the inner circle were more likely to have their values and beliefs reflected in enacted policy (Marshall, et al. 1986). They also understand how to communicate preferred values and behaviors, while understanding that dissonant ideas will not be heard or considered. Ideas are considered within the "assumptive

world" of the "values, and role obligations of key actors, the political culture, the formal structure of power and responsibility, the partisan politics, and the informal processes of the policy world" (Marshall, et al. 1986, p. 277). Policy development may differ depending upon the political culture, action and interaction of the individuals, institutions, and belief systems. In the context of adequacy research, differing values between policy makers and implementers may impact the efficiency and effectiveness of the processes and resources allocated. Missing from the inner circle of policy-making are local citizens and educational leaders, critical stakeholders to local educational policy and process.

Legislatures do not always develop policy in a rational manner, setting goals and allocating appropriate resources. Rather, they pursue policy goals based upon the available resources and political environment (Augenblick, et al. 1997). Policy development in the area of educational adequacy is also impacted by a desire for individual legislators to reduce negative impacts to the school districts they represent (Baker, 2006). Evidence of this is seen in states where base costs have been elevated and weighting deflated to increase the number of "winners" on the formula changes, particularly those represented by powerful legislators. In those cases, educational policies are typically not developed in a context that supports tight linkages of inputs, processes, and outputs. Policy development is inherently fragmented, focused on elections, overwhelming to school districts, and specialized, creating procedural and structural issues impacting efficacy (Fuhrman, 1993). These factors warrant questions about the efficacy of educational policies focused on educational adequacy and whether they truly reflect an educational system that is thorough in meeting needs for the future.

Another factor that creates inefficiencies in the educative process is the loose linkages between the actual policy and its enactment. Effective implementation requires both the will and

capacity of the implementers (Fowler, 2004). Policy development is loosely linked to enactment in part because individuals at varying levels have different interests and motivations driving rational behavior (Firestone, 1989). Educational organizations also function as "loosely coupled" systems both in relation to how schools implement federal and state policy and in the technical implementation of policy at the teacher-student level (Weick, 1976). Loose coupling may be an advantage to local adaptation, but as an indicator of the connections between administrative and technical aspects of policy implementation, a problem for adequacy models. When implementation is supported by a sensemaking process that empowers teachers and promotes collective learning, implementation is more effective and teaching practices are affected (Louis, et al. 2005). Although one can conceive models that account for individual variation, simultaneous implementation of many, diverse state and federal policies complicates adequacy analyses. Firestone (1989) hypothesized that "if one tried to take advantage of the messiness of the educational policy system rather than cleaning it up, constructive, creative approaches might be developed locally" (p. 23). While some adequacy scholars purport that state level analysis should not dictate local implementation, in some cases analyses specify processes and inputs that may limit local adaptations

The combination of political values, policy development, and policy implementation complicate assumptions about adequacy studies because these processes potentially add inefficiencies to the educative process. Incongruence between local values and interests and state policy is a source of inefficiency particularly because loose coupling can lead to poorly supported and implemented policies. Economic analyses, focusing on technical outcomes and measurement processes, may not sufficiently explain or account for the complicating factors associated with political culture, policy development, and policy enactment. Examining where

congruence exists between local and state policy makers, leaders, and citizens, may help to establish where to apply econometric analyses and where to examine processes and outputs at a local level. In the next section, descriptions of existing adequacy models illustrate how different perspectives about the purpose of education, educational outputs, and how the policy development and implementation process impacts analyses.

Methods for establishing the cost of adequacy

Educational adequacy is predominantly defined by economic analysis emphasizing the combination of input, process, and output or outcome variables (Alexander, 2004; Berne & Stiefel, 1999; Odden, 2000). The most prominent analysis of educational adequacy is to use existing state statute and model the cost of inputs to attain statutorily defined achievement outcomes (Chambers, 1999; Clune, 1994; Odden & Picus, 2000). Frequently, those achievement outcomes are defined by student performance on standardized tests (Kirst & Rhodes, 2010). The predominance of economic theory in adequacy models is evident in the four most commonly used methods for establishing the cost of adequacy: cost function, professional judgment, successful schools, and evidence-based models (Hanushek, 2006; Odden & Picus, 2000; Odden, Goetz, & Picus, 2010; Odden, et al. 2010). These models are intended to explain variability in school resources and performance so that adequacy standards can be developed, leading to more efficient and effective processes and outcomes. They are also used to examine if existing resources and processes are sufficient to meet state constitutional requirements to provide an adequate educational system. Yet, there are no models that demonstrate a "straightforward relationship between how much is spent to provide education services and student, school, or school district performance" (Augenblick, 2001). Descriptions of each method highlight the prevalence of economic theory in the field of educational adequacy in attempting to do just that.

Cost function approach

The cost function approach is an econometric model for examining the relationship between inputs and outputs and then assigning a base cost to an adequate education. Personnel costs are a primary determinant of the resources necessary for schools to engage in their work, thus they are prominent in studies that examine educational adequacy from a cost function approach. Jay Chambers (1999) developed specific indices for determining cost factors associated with educational personnel by accounting for discretionary factors used in hiring. Cost estimates included educational preparation, experience, and effort, along with factors such as regional urbanization, location, collective bargaining status, and climate. Chambers (1999) methodology was designed to create a formula from existing salary, discretionary costs, and regional differences in order to predict and evaluate costs in subsequent research and policymaking. Specific data sources included school staffing surveys, city and county demographic and economic data, crime reports, weather service and U.S. Geological climate data, and higher education data about the quality of teachers and administrators graduating from varied institutions. Applying a regression model, a substantial amount of variability was explained, particularly in the case of teachers, where the model explained 72% of the variance in teacher salary. Limitations were noted, including sample sizes for particular occupations and regions, and difficulties parsing out full-time versus part-time school employees and how it impacted salary data. While Chambers (1999) does not associate those costs with outcomes in this study, a foundation was established for economic models accounting for variability in the primary resource inputs for schools. The following examples of cost function studies show how the relationship between inputs and outputs are measured.

Reschovsky & Imazeki, (2001) developed a cost function approach that applied a statistical model accounting for differences in the cost of inputs across districts and schools. Inputs were then linked to an indicator of the resources necessary to attain adequate outputs. Inputs included teacher salaries, student characteristics including disability status, high school or elementary school status, and community characteristics. Although states currently account for cost differentials through categorical aids, other factors contribute to the weighting and calculation of available resources. "We suspect that weights are often determined by political and budgetary concerns, rather than by a careful assessment of the costs associated with meeting any given performance standard" (Reschovsky & Imazeki, 2001, p. 376). Cost function studies apply a consistent standard to account for differences in student costs, resulting in adjusted projections to provide an adequate education.

In the context of standards-based accountability, outcomes or outputs are defined by system performance goals, measured by standardized achievement tests, yet "In most states, the systems of school finance in place today do not explicitly link the availability of funds and the educational performance of students (Reschovsky & Imazeki, 2001, p. 374). Models were developed that shifted from equalization of resources to explicit linkages to standards and standardized tests. Reschovsky and Imazeki (2001) took inputs into account and then established an "average" level of performance for the states of Wisconsin and Texas. Cost indices were developed, identifying a formula to determine the inputs necessary to attain the average performance on state exams. Performance was evaluated by examining standardized test performance for a cohort of students using a value-added model that accounted for other community, family, and student variables. Measures included state exams and also accounted for ACT performance in Texas and advanced course offerings in Wisconsin. Reschovsky &

Imazeki (2001) noted that "Teachers are the single most important factor in the production of education and not surprisingly, teacher salaries account for the largest share of educational expenditures," (p. 381). Other factors also contributed, including inefficiencies, ineffectiveness, and higher levels of spending "because [school districts] provide their students with courses, such as advanced music or the arts, the performance in which is not measured on standardized exams" (p. 383). This model was purported to establish a "cost-adjusted foundation formula designed to guarantee all school districts sufficient funding to provide their students with an adequate education" (p. 375). One could then apply that formula to other schools and districts to determine if adequate resource inputs are available to attain that same level of student achievement.

In a later study examining the Cost of Education Index in Texas, Taylor, et al. (2002) developed a regression model that accounted for 91% of the variation in the cost of teacher salaries. The model included the average salary of teachers in surrounding districts, urbanicity, size and growth patterns in student population, and student poverty. Taylor, et al. (2002) then created a "Cost of Outcomes Index" examining the relationship of those salaries to other environmental factors and costs including energy, facilities, size and geography and ultimately, how they were related to student outcomes. Student outcomes were based primarily upon a value-added analysis of student performance on the Texas Assessment of Academic Skills (TAAS). The model also included performance on the ACT or SAT test of college admissions and student performance in advanced courses defined as Advanced Placement or International Baccalaureate. Taylor, et al. (2002) note that a cost of education index can reliably reflect and predict salary differentials, but is open to criticism because of the omission of potentially important variables. Those include "unobserved teacher characteristics and unmeasured student

outcomes" (p. 281). This study was intended to illustrate the need for changes to the existing cost of education index in Texas, but also illustrates the variables and mechanics by which a cost function analysis tied to student outcomes is conducted.

The Texas cost of education index was challenged in 2004, in the *West Orange-Cove et al. v. Neeley et al.* case. Three hundred Texas school districts, comprising one-quarter of the school aged population, sued the state arguing that adequate resources were not being allocated. Imazeki & Reschovsky (2005) followed up with an analysis using two cost function approaches that resulted in widely disparate estimates of the resources necessary to fund Texas schools. Both econometric approaches used similar data and achievement outcomes, based primarily on proficiency rates in mathematics and reading on the new, more rigorous Texas Assessment of Knowledge and Skills (TAKS). One primary difference in the analyses was how estimates of student proficiency on the TAKS were estimated, since past results were based on the less rigorous Texas Assessment of Academic Skills (TAAS) exams. In the cost function model projecting lower estimates of state funding increases, a one to one ratio of increases on the TAAS to projected increases on the TAKS was applied. In the cost function model projecting higher estimates of necessary funding, cut scores were used based upon a conversion of TASS to TAKS results. The analysis centered around whether school districts were adequately funded to meet the state achievement standards, measured by the TAKS. This is a good example of how even the most technically sound, econometric models can be significantly influenced by decisions made by researchers or policy makers.

Another significant difference between the two approaches was how inefficiencies were treated in the analysis, which is a common consideration in cost-function studies. Efficiency is measured by cost-minimization to achieve established outcomes, but a common issue in cost

function analyses is that "the actual measurement of efficiency is complicated because it is exceedingly difficult to identify and quantify both the goals of each school district and all the factors that influence the achievement of those goals and contribute to school district spending" (Imazeki & Reschovsky, 2005, p. 112). Hanushek (2006) also described that cost-studies failed to account for inefficiencies, instead reinforcing them by incorporating inefficiencies into projected costs to achieve adequate outputs. In a study of Georgia schools, a Quadriform approach was applied, classifying school districts into four categories of efficiency and effectiveness (Houck, et al. 2010). Houck, et al. (2010) postulated that a normative process for comparing relative efficiency would provide necessary feedback about resource adequacy and the relative productivity of schools.

In the *West Orange-Cove et al. v. Neeley et al.* case, two different models were applied to estimate inefficiency. One analysis used an estimate called a Stochastic Frontier that treats all expenditures beyond those necessary to meet the minimum standard as inefficient. The second model used an estimate called a Herfindahl Index, which treats additional costs as necessary to maintain competitive advantage. Imazeki and Reschovsky (2005) described that expenditures such as vocational education, arts, music, science, social studies, or content not aligned with the mathematics and reading TAKS would be considered inefficient, adding that this "misclassification was particularly troublesome" (p. 113) because the state had established mandated content standards in those curricular areas. The stochastic frontier model also did not account for other inputs into the educational process including parental involvement, which would alter the estimated inputs necessary to attain a particular achievement standard and other school costs such as security guards, athletics, and raising graduation rates that are less directly tied to achievement tests. This is a common problem for econometric models because of the

difficulty measuring outputs in specific areas. Rather than representing inefficiencies, local citizens and leaders may have simply prioritized these needs as integral to providing an adequate education.

The second approach in the *West Orange-Cove et al. v. Neeley et al.* case did not make the same assumptions, instead using an estimate of local school competition called a Herfindahl Index, which presumed that efficiency would be impacted by the amount of choice available to parents, bringing market forces into consideration (Imazeki & Reschovsky, 2005). Spending above the minimum in the cost function analyses or on programs that were not measured by the TAKS, was presumed to be affected by competition and choice, and not necessarily a reflection of inefficiency. Unlike the Stochastic Frontier estimate, the Herfindahl Index may take into account local considerations, but it does not account for other outputs of the educational system including the cultural and social aspects of schooling.

Although the underlying assumptions of both cost function approaches were sound, they resulted in two substantially different estimates of funding adequacy, with one estimating that adequate resource were available and the other a several billion dollar shortfall (Imazeki & Reschovsky, 2005). Noting this was the first time a cost function analysis was used in a judicial case, Imazeki & Reschovsky (2005) concluded that econometrics have a place in providing estimates of educational adequacy, but are limited in precision and ease in communicating with policymakers and the courts. The *West Orange-Cove et al. v. Neeley et al.* case also highlights the need to understand what assumptions underlie different cost function models, including the definition of adequate educational outcomes and how they are measured. Mitchell & Mitchell (2003) described that schools serve varied purposes including cultural and technical purposes, but cost function approaches are often limited to technical purposes that can be measured by

quantitative outputs. Additionally, it is possible in a cost function approach that achievement in high poverty districts may be inflated due to a narrowed curriculum and emphasis on state mandated achievement tests at the expense of a well-rounded education, which would reduce the predicted base costs for all districts (Baker, 2006). The series of studies in Texas show the mechanisms and utility of a cost function approach, but also highlight the practical, communicative, and political challenges inherent in the process.

Successful schools approach

The successful schools approach is similar to cost function models, in that analyses examine the relationships between inputs and outputs, accounting for variability in student, school, and community characteristics. Actual schools are identified where students meet state standards at an acceptable, pre-defined level and then real costs are identified. Those costs include salaries, capital expenditures, transportation, special education, other special programs, and any service funded by federal revenue, followed by calculation of a base cost and any adjustments based on student, school, or community characteristics (Augenblick, 2001; Baker, 2006; Hanushek, 2006; Odden & Picus, 2000; Odden, et al. 2010). Modifications to the successful schools approach include examining data to identify schools whose students are performing at higher than predicted achievement levels or attaining comparable outcomes with fewer resources (Baker, 2006). The successful schools approach is viewed as an empirical model for establishing a standard for an adequate education. By using past and existing expenditures, it does not take into account that existing funding strategies and amounts may be unfair, may not account for other outcomes outside of existing models, and do not account for existing inefficiencies (Guthrie & Rothstein, 1999).

In a study of Maryland school expenditures using the successful schools approach, 59 schools were selected that demonstrated average performance on the Maryland School Performance Assessment Program (MSAPP) and other measures including attendance, dropout rate, and course opportunities (Augenblick, 2001). Costs were estimated for those schools in the areas of school instruction, school administration, district administration, and other costs that included student support services, maintenance, and operations. Additional resources, such as funding from booster and parent groups, equipment donations, and volunteer time were also considered, with some schools procuring far greater resources and support in these areas (Augenblick, 2001). A base cost figure and variants for differing student, school, and community characteristics was calculated, yet considerable variation was evident between model schools, and amounts varied further from other models being concurrently applied.

> The fact is that there is no reason to think that different studies would produce the same results unless certain basic characteristics of the studies were exactly the same. For example, studies that use different sets of student performance objectives might be expected to produce different results. But even if two studies use the same performance objectives (as was the case in Maryland given that the two groups undertaking the studies agreed to use the same objectives), it is possible to obtain different results because of the way resources are specified or because of the prices that are used in costing out those resources (Augenblick, 2001, p. 28).

Differences in interpretation of these variables are common in successful schools analyses.

Fermanich, et al. (2006) conducted a successful district analysis in Washington State, adding additional case-study analyses in a sample of the successful districts, examining how resources were used to improved school outcomes. Districts were evaluated and selected based

on criteria related primarily to academic proficiency on the Washington Assessment of Student Learning (WASL) in reading, mathematics, and writing (Fermanich, et al. 2006). Other factors included on-time graduation rate and academic growth. Base costs for the successful districts included costs for regular instruction and categorical and federal programs such as special education, vocational education, compensatory resources for higher concentrations of poverty, and programs for English Language Learners. Results indicate that only five districts in the state met all thirty-six criteria for success, and one-quarter of the districts met thirty out of thirty-six (Fermanich, et al. 2006). Variations in costs were small between the successful districts and between all districts with total expenditures across all categories of spending ranging from $7,000 to $7,300.

Additional case study analysis with a sample of the successful districts provided valuable insight into how resources were used to improve student achievement, with findings revealing that "successful districts made it a priority to focus all available resources on improving teaching and learning" (Fermanich, et al. 2006, p. 19). Specific strategies included focusing on all students, data-driven decision making, rigorous curriculum aligned to state standards, professional development focused on instructional improvement, schedule structures that supported meeting student learning needs, and extended learning opportunities. While the methodology of this successful school approach was comparable to studies by Augenblick, et al. (1997), Augenblick (2001), and Guthrie & Rothstein (1999), went further by examining the educative process used in these schools. Although this is not a prerequisite for the successful school approach, a recent trend in this approach is to combine methods to further understanding about both resource inputs and corresponding educative processes (Baker, 2006; Odden, et al. 2010).

Professional judgment approach

The professional judgment approach uses expert panels to determine the necessary resources to attain specific objectives, resulting in prototype elementary and secondary schools (Augenblick, 2001; Hanushek, 2006; Odden & Picus, 2000; Odden, et al. 2010). Those prototypes are then used to project a state model for allocating foundation resources to the system, and adjustments, weighting, or additional funds necessary to meet varying student needs. The expert panels are typically not given authority to define outcomes, rather they specify educational processes, and then personnel and other process costs are projected. Professional judgment panels may serve in an advisory capacity to the courts or the legislature regarding adequate outputs. A primary advantage of the professional judgment approach is ease of understanding and authenticity. The professional judgment approach may also be able to account for varied input and process factors that are not included in the statistical models that comprise a cost function approach (Guthrie & Rothstein, 1999). A reliance on quantifiable outputs and process variables is one limitation that professional judgment panels may be able to overcome.

The professional judgment approach has been used in constitutional challenges to state funding systems to evaluate adequacy and to develop remedies to systems that required legislative intervention (Hanushek, 2006). One such example is Wyoming, where panels of teachers, counselors, principals, business managers, and superintendents were convened over a one-week period to identify the necessary components of school instruction and operations (Guthrie, et al. 1997). An interesting question was posed to participants, "What in your judgment are key components required to provide effective instruction, to enable students to acquire the prerequisites to enter the University of Wyoming, or to have access to other attractive

post-secondary endeavors?" As a result, the Wyoming legislature developed statutory standards for an adequate education requiring a common set of knowledge, skills, and graduation requirements for students (Guthrie & Rothstein, 1999).

Augenblick (2001) also applied a professional judgment process in the Maryland school finance study. In part, this was done to compare and contrast the projected costs between the successful schools and professional judgment models, but also to address specific considerations regarding the weighting of students in special education or from families receiving free and reduced lunches. Augenblick, (2001) convened professional panels starting with panels that developed prototypes at the elementary, middle, and high school levels, followed by an "expert panel" (p. 12) that reviewed the work and translated the prototypes into district cost estimates. Panels were given pre-determined outcomes including the percent of students expected to pass the Maryland State Performance Assessment Program (MSPAP), attendance rates, and dropout rates. Prior to sending recommendations to the expert panel, process recommendations were made including the prototype school's philosophical approach, resources needed, course offerings, class size, extended learning opportunities, pre-school services, equipment, professional development, technology, student support services, and non-academic activities (Augenblick, 2001).

From those recommendations a base cost amount was calculated for a model elementary, middle, and high school, and adjustments were made based primarily on student characteristics and differences in teacher costs due to community and teacher differences. In rectifying differences between the professional judgment and successful schools approach, Augenblick (2001) recommended that, "it is perfectly appropriate to view the base cost associated with the successful school approach as a floor and the base cost associated with the professional judgment

approach as a ceiling – that is to choose a figure somewhere between the two" (p. 29). While this is not the case in all studies, Augenblick's analysis of the contrasting models in Maryland demonstrates how different processes result in varied estimates of adequate resources.

Another variant of this blended approach was used by Chambers, et al. (2006) in a New York state adequacy study. Chambers et al. (2006) used professional judgment panels as a primary methodology and other methods including public engagement, econometric analysis of teacher costs, research on school effectiveness, and identifying schools that were outperforming predicted models. Expert panels were provided with information from these processes and research about effective schools. Outcomes were defined by existing state statute aligned with the more rigorous Regents Learning Standards. Chambers, et al. (2006) noted the complexity and duration of the processes, which exceeded other examples of professional judgment panels and resulted in recommendations for substantially more resources and programs. Caution was recommended in not allowing panel recommendations about educational process to become state mandates:

> Rather, it is important to note that decisions about how funds are used and the implementation of instructional models should remain in the purview of local decision makers and not be subject to state mandates. Local decision makers are in a better position to understand and respond to the needs of the communities and the students they serve (Chambers, et al. 2006, p. 27).

The professional judgment approach is an authentic and thorough method for including the perspective of professionals in developing the necessary base costs to provide an adequate education. A different process may be necessary to identify and support local decisions about the most effective processes for each school and district.

Augenblick (2001) describes the professional judgment approach used in Maryland as "far better than one based solely on available revenue" (p. 29). He cautioned that although base costs were presented as precise figures, actual costs will vary and should not prescribe individual district expenditures or educative processes. Hanushek (2006) and others have advocated for a more precise, econometric approach adding that costing out studies using the professional judgment and successful schools approaches "inherently fail to provide usable information about the resources that would be required to meet a given student achievement level, at least when the resources are used efficiently and effectively" (p. 258). Others question the precision of statistical models in predicting resource needs, including Guthrie and Rothstein, (1999) "We prefer the professional judgment approach, not because we believe it is more precise than statistical or inferential methods (it may not be more precise), but rather because its imprecision is more transparent" (p. 231). Regardless of one's perspective on precision, the professional judgment approach will continue to be an integral part of adequacy studies as either primary or supporting evidence. A blended model may be best suited to satisfy those who seek statistical precision and those preferring qualitative judgment and transparency.

Evidence-based approach

Evidence-based models are emerging as a method to determine what constitutes an adequate education, with courts more willing to support or mandate research-based practices leading to student achievement such as pre-school education (Ryan & Saunders, 2004). The evidence-based approach to educational adequacy is similar to the professional judgment approach in that it attempts to identify necessary inputs and processes, but it differs by relying on research and best practices to define educational processes and may use expert panels later in the study to provide specific input and feedback (Odden, et al. 2003; Odden, et al. 2010). Evidence-

based approaches align with the shift in emphasis from the level of resources available to how those resources are being allocated (Alexander, 2003). Contrary to professional judgment panels which frequently are comprised of local educators, the evidence-based approach relies on empirical studies by experts in the field to define a set of research based strategies followed by cost estimates. All elements of the evidence-based model are cost out and an aggregate figure is determined that is necessary to fund the system (Odden, et al. 2003). Comparable to other models, adjustments are made to reflect varying students, school, and community characteristics.

Three advantages of this method are that evidence leads to the recommended education processes, that the knowledge of educational experts is leveraged, and that the most current practices are considered (Odden et al. 2003). The evidence-based approach was implemented in New Jersey following the *Abbott by Abbott v*. *Burke*, (1998) State Supreme Court challenge to the education finance system. Rather than designing the different elements of an evidence-based approach, a combination of existing comprehensive, school wide approaches were selected: the Roots and Wings/Success for All design. Implementation of the plan became onerous and lacked effective oversight, resulting in districts continuing with existing practices despite receiving additional revenue, and additional court challenges ensued (Ryan & Saunders, 2004). In addition to implementation challenges, the evidence-based model has been criticized because it does not account for the actual spending or outcomes in the states where it has been implemented (Hanushek, 2006).

Evidence based approaches may rely on existing school-wide models or examine multiple components that comprise school functions separately and then develop an aggregate process and resource model, which is a more recent trend (Baker, 2006). In a 2002 Arkansas Supreme Court case, *Lake View School District No 25 v*. *Huckabee,* the Arkansas system for

funding schools was declared unconstitutional and the legislature was ordered to develop a new system that would address system inequality and inadequacy. A committee, using an evidence-based approach, developed an educational finance model that would meet the court standard and "provide sufficient funding to deploy powerful enough educational strategies so that all students can meet the state's student performance goals in the next 10-15 years" (Odden, et al. 2003, p. 1). Those strategies centered around five principles: provide adequate funding, close the achievement gap, ensure accountability for results, pay teachers based on performance, emphasize early intervention, and base all proposal on evidence based research on what works (p. ii).

The most costly element of the model was to reduce class sizes significantly, to a 1 to 15 ratio in grades K-3 (Odden, et al. 2003). The Arkansas evidence-based model included class size reduction even though it has been contested as a proven strategy to improve student achievement (Hanushek, 2003). Additional staff, including instructional coaches, interventionists, and teachers to provide enrichment and teacher prep time were also included. The strategy for determining salary costs was to use a comparison of teacher salaries in surrounding state and occupations that compete with education for staff. This comprehensive, evidence-based model was a significant departure from past practice and recommendations, required an increase of $847 million in educational spending, a 33% increase over past allocations (Odden, et al. 2003).

The evidence-based approach has a distinct advantage to the other approaches since it is the model that most aspires to align inputs with effective practice. The model also identifies base costs and adjustments comparable to the other approaches. It has been criticized in theory and in application because it lacks effective controls for efficiencies and specific linkages to existing school performance and outcomes (Hanushek, 2006; Ryan & Saunders, 2004).

Determining the effectiveness of specific practices at the local level requires more randomized controlled trials of those strategies and their combinations to assure they are effective across statewide settings (Odden, et al. 2010). Beyond the case of proven effectiveness, incongruence between political values that may underlie particular strategies at the state and local level, along with the typical challenges associated with policy implementation need to be considered when the state considers mandating educative processes as part of the evidence-based model.

Summary of educational adequacy

Although there are four distinct, economic-based methods for determining educational adequacy, one can see the evolving nature of legal and empirical work in the field as a blending of methods and perspectives. While models differ in their treatment of variables and methodologies, they "reveal a surprising degree of consistency across education cost studies over the past decade" (Baker, 2006, p. 197). The treatment of educational outputs is less clearly defined or agreed upon, which is consistent with the varied purposes of education in the United States. Earlier studies, particularly ones using the cost function approach, relied heavily on standardized achievement tests in language arts and mathematics, creating a metric for adequate outcomes based on those state standards and exams. Notably, different studies measured outputs in different ways, making one question how other factors, including political values, impact econometric analyses. Later court cases and processes, including evidence-based approaches were more inclusive of a broader range of educational outcomes as part of an adequate education. Whether one considers outcomes as what is necessary for post-secondary success, the knowledge and skills students need prior to graduation, or course experiences and attainment, the process for establishing and measuring these outcomes is not consistent across studies. However, the treatment of intended outcomes in the analysis of educational adequacy is

abundantly important to the establishment of inputs necessary to fund the system. The educational process should emanate from those intended outcomes.

An inclusive approach to analyzing educational adequacy

The final section of this paper proposes an approach to analyzing adequacy that involves local citizens and leadership, considers local political values, is inclusive of broader system outputs, and blends models to determine costs. The Minnesota constitution specifies the state must adequately fund a "uniform, thorough, and efficient" system of public schools (Minn. Const. art. XIII, sec. 1). A "thorough" system of public schools should reflect the full range of technical and cultural outputs expected by citizens. Adequacy studies should account for that range of outputs when considering the educative process and necessary resources. Citizen and local educational leaders are well-positioned to articulate the varied purposes and values of local schools and should be included in the analysis through local panels. Analysis of educational adequacy should include those outputs and a mechanism to measure success in all facets of technical and cultural outputs.

Past treatment of system outcomes in the econometric models has not accounted for the comprehensive expectations of schools or local values and preferences. Critics of existing approaches have noted those models omit elements ranging from required standards outside of mathematics and language arts, coursework in vocational education, arts, music, science, and social studies, and basic costs such as safety and extra-curriculars. Engaging citizens and local leaders in dialogue about political values and outputs adds transparency and authenticity to existing adequacy models. This process also supports transparency in the concept of a "uniform" system, by identifying the critical elements of the school system. Those elements should lead to adequacy models that assure all students and communities have sufficient resources to address

the identified outputs. An inherent risk in engaging local citizens and leaders in the definition of adequate outputs are that students may be deleteriously impacted by lower or differing standards across communities. The paradox of uniformity and local definitions of educational adequacy may be resolved by accepting certain elements of the educative process need to be uniformly defined at the local level.

Further, engaging citizens from different regions in the state of Minnesota may also support identification of consensus and local outputs, which may help with the development of base costs and revenue sources in later analyses. This process would support identification of a full range of outputs and existing policies that are incongruent with local preferences. In consideration of the "efficient" language in the state constitution, incongruence may contribute to inefficiency as much as lack of economic or regulatory pressure. Differing political values lead to incongruence between enacted policies and policies being implementing at the local level. That incongruence and the structures inherent in the educational system result in loose-coupling between the intentions of state policy-makers and implementation at the local level. Examining the perspective of local citizens and local educational leaders across regions in the state may provide a clearer indication of where congruence is strongest and weakest related to outputs and processes. State policy-makers may elect to implement policies where congruence doesn't exist, but base costs should reflect that inputs and processes may need to be altered in these cases.

The process of establishing base costs and adjustments should leverage the strengths of each adequacy model. The addition of local panels would enhance understanding and transparency about outputs and processes. The professional judgment approach, informed by evidence-based models, could validate consensus factors that would be included in the base cost calculations and adjustments. The analysis of adequate inputs could include cost function

methods that employ econometric indicators of efficiency. If the successful schools model is used, local and professional judgment panels would need to consider what is "successful" including how to measure it and at what level on those indicators. The overall goal of this model would be a more authentic, inclusive, transparent, and accurate method for estimating the inputs and processes necessary to attain the full range of outputs that constitute an adequate education in Minnesota.

Conclusion

The four primary methods for determining Educational Adequacy provide varied and valuable perspectives about whether state funding is sufficient. Without concerted effort that accounts for the full range of expected system outputs and the political factors that complicate and make implementation less efficient, funding estimates will continue to lag necessary resources. Using a combination of the four approaches, nearly all Minnesota school districts were spending less than what was estimated to be necessary to attain state and federal standards (Silverstein, et. al. 2006). Was that estimate inclusive of the full range of educational outputs expected from our schools? The past two legislative sessions ended with additional mandates for all students reading by 3rd grade, achievement gap reduction, all day Kindergarten, new student assessment, and provisions under the "World's Best Workforce" legislation. While designated funding was allocated, was it adequate and did it compensate for per-pupil, inflation adjusted state revenue that has stagnated over the past 10 years? Local educational leaders and citizens have an opportunity to shape the dialogue about what constitutes adequate educational outputs and the resources necessary to attain them. There has not been a more important time to assure that a future-oriented and inclusive process shapes the vision for our state and our communities in achieving ambitious and comprehensive outcomes for all students.

References

Abbott v. *Burke*, 153 N.J. 480, 710 A.2d 450 (1998).

Adams, J. E. (Ed.). (2010). *Smart money: Using educational resources to accomplish ambitious learning goals*. Cambridge, MA: Harvard Educational Press.

Alexander, N. (2003). Considering equity and adequacy: An examination of student class time in New York state public secondary programs, 1975 -1995. *Journal of Education Finance, 28 (3),* 357-381.

Alexander, N. (2004). Exploring the changing face of adequacy. *Peabody Journal of Education, 79(3),* 81–103.

Alexander, N., Schapiro, D., & Choi, W. (2010). *Adequacy condition analysis of Minneapolis: A look at the past five years*. Paper presented at the annual Midwest Political Science Association Conference, Chicago, IL.

Augenblick, J. G., Myers, J. L., & Anderson, A. B. (1997). Equity and adequacy in school funding. *The Future of Children, 7(3),* 63-78.

Augenblick, J. G. (2001). *Calculating the cost of an adequate education in Maryland in 1999-2000 using two different analytical approaches*. Denver, CO: Augenblick & Myers, Inc.

Baker, B. D. (2006). Evaluating the reliability, validity, and usefulness of education cost studies. *Journal of Education Finance, 32 (2),* 170-201.

Belfield, C. R. & Levin. H. M. (2002). The economics of education on judgment day. *Journal of Education Finance, 28 (2),* 183-205.

Berne, R. & Stiefel, L., (1999). Concepts of school finance equity, 1970 to the present. In National Research Council. *Equity and adequacy in education finance: Issues and perspectives*. (pp. 7-33). Committee on Education Finance. Washington, DC: National Academy Press.

Burbridge, L. (2008). Can the impact of adequacy-based education reform be measured? *Journal of Education Finance, 34 (1),* 31-55.

Carnoy, M. (1983). Educational adequacy: Alternative perspectives and their implications for educational finance. *Journal of Education Finance, 8 (3),* 286-299.

Chambers, J. G. (1999). Patterns of variation in the salaries of school personnel: What goes on behind the cost index numbers? *Journal of Education Finance, 25,* 255-280.

Chambers, J. G., Levin, J. D., & Parrish, T. D. (2006). Examining the relationship between educational outcomes and gaps in funding: an extension of the New York adequacy study. *Peabody Journal of Education, 81 (2),* 1-32.

Claremont v. Governor of New Hampshire, 635 A. 2d 1375, NH, (1997)

Clune, W. (1994). The shift from equity to adequacy in school finance. *Educational Policy, 8 (4),* 376-394.

Fermanich, M. , Mangan, M., Odden, A., Picus L., Gross, B. & Rudo, Z. (2006). *Washington learns: Successful district study*. North Hollywood, CA: Lawrence O. Picus and Associates.

Firestone, W. A. (1989). Educational policy as an ecology of games. *Educational Researcher, 18 (7)*. 18-24.

Fowler, F. C. (2004). *Policy studies for educational leaders: An introduction. (2nd ed.)*. Upper Saddle River, NJ: Prentice Hall.

Fuhrman, S. H. (Ed.). (1993). *Designing coherent education policy: Improving the system*. San Francisco, CA: Jossey-Bass.

Fuhrman, S. H. (1993). The politics of coherence. In S. H. Fuhrman, (Ed.). (1993). *Designing coherent education policy: Improving the system*. San Francisco, CA: Jossey-Bass.

Gordon, E. W. (1995). Toward an equitable system of educational assessment. *Journal of Negro Education, 64 (3),* 360-372.

Guthrie, J. W. & Rothstein, R. (1999). Enabling "adequacy" to achieve reality: Translating adequacy into state school finance distribution arrangements. In National Research Council. *Equity and adequacy in education finance: Issues and perspectives*. (pp. 209-259). Committee on Education Finance. Washington, DC: National Academy Press.

Guthrie, J. W., Hayward, G. C., Smith, J. R., Rothstein, R., Bennett, R. W., Koppich, J. E., Bowman, E., DeLapp, L., Brandes, B., & Clark, S. (1997). *A proposed cost based block grant model for Wyoming school finance*. Sacramento, CA: Management Analysis & Planning Associates, L.L.C.

Hanushek, E. A. (Ed.). (2006). *Courting failure: How school finance lawsuits exploit judges' good intentions and harm our children*. Stanford, CA: Hoover Institution Press.

Hanushek, E. A. (2006). Science violated: Spending projections and the "costing out" of an adequate education. In Hanushek, E. A. (Ed.). *Courting failure: How school finance lawsuits exploit judges' good intentions and harm our children.* (pp. 257-311). Stanford, CA: Hoover Institution Press.

Heck, R. H. (2004). *Studying educational and social policy: Theoretical concepts and research methods*. Mahwah, NJ: Lawrence Erlbaum Associates.

Houck, E. A., Rolle, R. A., & He, J. (2010). Examining school district efficiency in Georgia. *Journal of Education Finance, 35(4)*. 331-357.

Imazeki, J. & Reschovsky, A. (2005). Assessing the use of econometric analysis in estimating the costs of meeting state education accountability standards: Lessons from Texas. *Peabody Journal of Education, 80 (3),* 96-125.

Kirst, M. W. & Rhodes, L. (2010). Linking education funding with standards-based reform and community-based resources. In J. E. Adams, (Ed.), *Smart money: Using educational resources to accomplish ambitious learning goals*. (pp. 213- 233). Cambridge, MA: Harvard Educational Press.

Lake View School District No. 25 v. Huckabee, 351 Ark. 31, 91 S.W.3d 472 (2002), cert den. sub. nom. *Wilson, J.L., et al. v. Huckabee, Gov. of Ark., et al*., 538 U.S. (2003).

Louis, K. S., Febey, K., & Schroeder, R. (2005). State-mandated accountability in high schools: Teachers' interpretations of a new era. *Educational Evaluation and Policy Analysis, 27 (2),* 177-204.

Marshall, C., Mitchell, D. & Wirt, F. (1986). The context of state-level policy formation. *Educational Evaluation and Policy Analysis, 8 (4),* 347-378.

Mazzoni, T. (1991). Analyzing state school policymaking: An arena model. *Educational Evaluation and Policy Analysis, 13 (2),* 115-138.

McDonnell, L. (2010). Creating the political conditions for education finance policy change. In J. E. Adams, (Ed.), *Smart money: Using educational resources to accomplish ambitious learning goals*. (pp. 237-265) Cambridge, MA: Harvard Educational Press.

McDonnell, L. & Elmore, R. (1987). Getting the job done: Alternative policy instruments. *Educational Evaluation and Policy Analysis, 9 (2),* 133-152.

McNichol, E., Oliff, P., & Johnson, N. (2012). *States continue to feel recession's impact [Policy Brief]*. Washington, DC: Center on Budget and Policy Priorities.

Minnesota Constitution article XIII, section 1.

Minnesota Department of Education, (2011, November 1st). *Nation's report card shows Minnesota still leading nation in overall math achievement*. St. Paul, MN: Author.

Minnesota Historical Society. (2007). *Public education – The Minnesota miracle*. http://www.mnhs.org/library/tips/history_topics/18public.html

Mitchell, D. E. & Mitchell, R. E. (2003). The political economy of education policy: The case of class size reduction. *Peabody Journal of Education, 79 (3)*. 81-103.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: U.S. Government Printing Office.

National Research Council. (1999). *Equity and adequacy in education finance: Issues and perspectives*. Committee on Education Finance. Washington, DC: National Academy Press.

No Child Left Behind Act of 2001, 20 U.S.C.S. § 6301 et seq. (2002).

Ntiri, D. (2001). Access to higher education for nontraditional students and minorities in a technology focused society. *Urban Education, 36 (1)*, 129-144.

Odden, A. R. (2000). The new school finance: Providing adequacy and improving equity. *Journal of Education Finance, 25 (4),* 467-487.

Odden, A. R., Goetz, M. E., & Picus, L. O. (2010). Merging costs with effective resource strategies. In J. E. Adams, (Ed.), *Smart money: Using educational resources to accomplish ambitious learning goals*. (pp. 141 - 156). Cambridge, MA: Harvard Educational Press.

Odden, A. R. & Picus, L. O. (2000). *School finance: A policy perspective*. Boston, MA: McGraw-Hill.

Odden, A. R., Picus, L. O. & Fermanich, M., (2003). *An evidence based approach to school finance adequacy in Arkansas*. North Hollywood, CA: Lawrence O. Picus and Associates.

Reschovsky, A., & Imazeki, J. (2001). Achieving Educational Adequacy Through School Finance Reform. *Journal of Education Finance 26 (4):* 373–396.

Rose v. Council for Better Education, 790 S.W.2d 186, (1989).

Ryan, J. E. & Saunders, T. (2004). Foreword to symposium on school finance litigation: Emerging trends or new dead ends? *Yale Law & Policy Review, 22 (2)*. 463-480.

Satz, D. (2007). Equality, adequacy, and education for citizenship. *Ethics, 117 (4),* 623-648.

Schleicher, A., Steward, V. (2008). Learning from world-class. *Educational Leadership, 66 (2),* 44-51.

Silverstein, J., Rose, D., & Myers, J. (2006). *Estimating the cost of an adequate education in Minnesota*. Denver, CO: Augenblick, Palaich, and Associates, Inc.

Skeen v. State of Minnesota (1993)

Taylor, L., Alexander, C., Gronberg, T., Jansen, D. & Harrison, K. (2002). Updating the Texas cost of education index. *Journal of Education Finance, 28 (2),* 261-284.

TIME Magazine, (1973, August, 13th) *Minnesota: A state that works*. www.time.com/time/magazine/article/0,9171,907665,00.html

Viteritti, J. P. (2004). From excellence to equity: Observations on politics, history, and policy. *Peabody Journal of Education, 79 (1)*, 64-86.

West Orange-Cove Consolidated Independent School District, et al. vs. Shirley Neeley, Texas Commissioner of Education, et al. Travis County, TX, 250th Judicial District, No. GV-100528, (2004).

Wraga, W. (2001). A progressive legacy squandered: The "cardinal principles" report reconsidered. *History of Education Quarterly, 41 (4),* 494-519.