A STATE-OF-THE-ART APPROACH TO SCHOOL FINANCE ADEQUACY IN KENTUCKY

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Kentucky's SEEK school finance program was the first in the country to be designed to provide an "adequate" funding base for each school within the state. In response to the Kentucky Supreme Court's ruling in Rose v. Council for Better Education, [790 S.W. 2d 186 (Kent. 1989)], which stated that the funding system must be adequate, substantially uniform and provide an equal opportunity for all children in Kentucky, the General Assembly created a comprehensive new educational system. Among its components were: content standards that prescribed the curriculum to be taught all students; a new testing system that measured student learning related to those content standards; an aligned accountability system that offered rewards for schools making progress towards those standards, help for struggling schools, and sanctions for schools continuously failing to make progress; and, the SEEK school finance formula designed to provide the needed educational resources – that were both equitably distributed and adequately funded.

Last year, the authors conducted a 10 year analysis of the equity of the SEEK formula, concluding that equity had actually improved over the ten year period, and finding that in the 2000-2001 school year, the Kentucky SEEK formula met the benchmarks of several statistical measures for school finance equity (Picus, Odden & Fermanich, 2001). We further concluded that when the fiscal numbers were adjusted by weights used to reflect different student needs and by a geographic price of education index (that quantified the varying purchasing power of the educational dollar across geographic regions in Kentucky

holding quality of education resources constant), the equity statistics beat the benchmarks by even wider margins. We concluded that while not perfect, the SEEK school finance formula was equitable according to standard definitions (Odden & Picus, 2000).

The SEEK formula is supposed to be adequate as well as equitable. However, the method used by the Kentucky Legislature to determine the initial "adequate" base SEEK revenue relied on what is essentially a "pragmatic" approach. As we understand it, the method used in 1990 was essentially to define "adequate" as all state funds that were then expended for public schools, increased by an estimated additional cost for all state mandates that at that time were unfunded, as well as all local dollars then spent for schools. For the 1990-91 year, that produced a SEEK Base Guarantee of $2,305 per pupil. This value rose to $2,994 per pupil for 2000-2001, which was just short of keeping pace with inflation over those eleven years. In 2000-2001 terms, a fully inflation adjusted SEEK Base Guarantee would have been $3,160 per pupil (as the CPI rose by about 29 percent over the 1990s). Nevertheless, it would be fair to say that based on the methodology used in 1990, the SEEK base was about as adequate in 2001 in real terms as it was a decade before in 1990-91.

But the adequacy issue today is not really whether the SEEK base has been appropriately adjusted by some inflation figure or is adequate relative to the 1990-91 base. Rather the adequacy question today is whether the SEEK base provides sufficient funding for each school in the state to deploy powerful enough educational strategies to meet the state's 2014 goals. Those goals seek to have all students performing at or above the proficiency level on the state's student testing system by 2014. This is a more complex and more substantive definition of adequacy than was used in 1990. Today,

adequacy in Kentucky requires a more direct link between the funding base and educational strategies that have potential to allow Kentucky's students to meet or exceed the state's established proficiency levels. Since 1990, a variety of methods have been developed in different parts of the country that can help identify this linkage in both programmatic and fiscal terms. Today, a number of alternative methods for determining adequacy have been developed by the school finance community.

To help Kentucky policy makers better understand the many complex issues surrounding establishment of an adequacy level, the first section of this report describes the four primary methods for determining adequacy that have been developed over the past decade, and identifies the states currently using them. Section two then takes one of the approaches – the state-of-the-art approach, an approach with which these authors have been associated (e.g., Odden, 2000) – and identifies how it would be used to determine adequacy in Kentucky. Section three then begins to assess the adequacy of the SEEK formula using the state-of-the art approach, which builds educational strategies and programs up from each of the 1,233 Type A schools in Kentucky. In the early months of 2003, our team will use a second methodology – the professional judgment approach – to measure school finance adequacy in Kentucky. The results of that approach will be presented in March or April of 2003.

1. Approaches to School Finance Adequacy

Determining whether a state's school finance system is adequate is the newest and most dominant issue in school finance across the country (Ladd & Hansen, 1999). To be adequate, the school finance formula must provide a sufficient amount of funds so that

schools can teach all – or at least all but the most severely disabled – students to state and district proficiency standards. This approach has great appeal for both policymakers and the courts; it seeks to link a funding level to a system performance level, a long sought goal.

But attractive though the adequacy goal is, it is not easy to define in specific, programmatic and dollar terms. Nevertheless, over the past ten years, education policy analysts have created four different methodologies for determining school finance adequacy (Ladd & Hansen, 1999; Odden & Picus, 2000):

- Economic cost function approach
- The successful district approach, i.e., identifying expenditure levels in districts/schools that meet performance benchmarks
- Professional consensus approach
- Cost of effective school wide strategies, or the state-of-the-art approach.

Except for the cost function approach, different states are using various versions of the other three methods. Each is described in detail below.

Economic Cost Function Approach

The first approach relies on econometric techniques known as cost functions to estimate an adequate level of resources for schools. This method employs regression analysis with expenditure per pupil as the dependent variable, and student and district characteristics as well as *desired* performance levels as the independent variables. The question this approach seeks to answer is: how much money per pupil is needed to produce a given level of student performance? The result produces an adequate expenditure per pupil for the average district. This figure could be used, for example, as

the Base Guarantee portion of the SEEK formula. That amount is then adjusted by one overall "index" to account for differences in pupil need and educational prices, as well as diseconomies of both large and small size across districts. The expenditure level is higher (lower) as the expected performance level is increased (decreased). The index adjustment would replace all current SEEK add-ons, except for transportation.

No state currently uses this approach to determine adequacy, though cost function research has been conducted in New York (Duncombe, Ruggiero & Yinger, 1996; Yinger, 2001), Wisconsin (Reschovsky & Imazeki, 1999), Texas (Imazeki & Reschovsky, 1999; Reschovsky and Imazeki, 2002) and Illinois (Reschovsky & Imazeki, 2000). The Reschovsky and Imazeki cost function research found that the adequate expenditure levels in Wisconsin and Texas were close to the median spending levels in those states, when selecting state average performance as the student proficiency target. These studies indicated that there was substantial variation in the average adequacy level due to student and district needs, ranging from a low of 49 percent to a high of 460 percent of the average in Wisconsin, and a low of 75 percent to a high of 158 percent of the average in Texas. In both states, the adequate expenditure level estimated for large urban districts was 3-4 times the level estimated for the average district.

Reschovsky and Imazeki (2001) produced an overall assessment of the utility of the cost function approach, arguing that it is the only approach, using data from all districts, which links a specific spending level to a specific performance level and thus is the preferred approach in a standards-based environment. The approach is limited however, by extant management, governance and education strategies, and does not capture efficiencies that could be produced by more dramatic re-engineering or

restructuring. Further, the system is so complicated that state policymakers shy away from using it, as too few legislators or members of the taxpaying public understand how it works. Moreover, the procedure produces cost figures just at the *district* level. It has not been used at the *school* level, and conceptually it may not be possible to do so. Ultimately, it is the school level at which adequacy levels need to be determined.

The Successful District Approach, Or Linking Expenditure Levels in Districts/Schools That Meet Performance Benchmarks

This method, which is being used in part by Ohio (Alexander, Augenblick, Driscoll, Guthrie & Levin, 1995; Augenblick, 1997), Illinois (Augenblick, 2001; Hinrichs & Laine, 1996), Maryland (Augenblick, 2001), and Mississippi, identifies districts that have been successful in teaching their students to state proficiency standards, and sets the adequacy level at the weighted average of the expenditures of such districts. Usually, atypical districts are eliminated from such analysis. Unfortunately, atypical districts generally include all *big city districts*, as well as very wealthy and very poor districts, and often very small rural districts as well. The result is that the districts identified in the analysis are usually non-metropolitan districts of average size and relatively homogeneous demographic characteristics, which generally spend below the state average.

One major criticism of this approach is that the adequate expenditure level is not relevant to big city districts, even when adjustments for pupil needs and geographic price differentials are added to the base. This is because the districts identified as meeting the state standards under the successful district approach are often relatively small (approximately 3,000 students) school districts with a relatively homogeneous student population, making it hard to adjust the model to fit a large district of over 50,000

students with high percentages of poor and minority children. This approach also lends itself to manipulation. Though analysts suggest that the adequate expenditure level should be the weighted average of all the expenditures of the districts meeting the performance benchmark, some policymakers have suggested using the average of only the bottom half of that sample, using an unweighted average, or even using the value of just the lowest expenditure district in the sample – in order to drive down the value of, and thus the state cost of, the adequate foundation expenditure level.

Finally, these two different systems – cost function approach and successful district approach – produce widely varying estimates of an adequate expenditure level, suggesting that more research is needed to determine why the large differences emerge. While both the successful district and cost function approaches link spending levels to performance levels, which is what many policymakers want, neither of these two approaches indicate how funds distributed to school districts would be used. They theoretically identify an adequate revenue level, but are silent on the types of educational strategies those funds could support. The next two approaches attempt to remedy this shortcoming.

Professional Consensus or Judgment Approach

A third approach to determining school finance adequacy is known as the professional consensus or professional judgment approach. Under this methodology, the state creates several teams of local education leaders who independently identify effective school wide strategies and their key ingredients – numbers of professional staff and other resources. The ingredients are then priced out and added up to determine the adequate fiscal base for a school; the base can then be adjusted for the differing

characteristics of students and districts. Originally developed by Jay Chambers and Tom Parrish as the Resource Cost Model (Chambers & Parrish, 1983, 1994,) the professional consensus model (Guthrie & Rothstein, 1999) is being used in Oregon (Calvo, Picus, Smith & Guthrie, 2000), Maine, Maryland (Management Analysis & Planning, 2001a; Augenblick, 2001) and Wyoming (Guthrie, 1997; Management Analysis and Planning, 2001b). Adequacy studies using this approach are being conducted or have just been completed in a number of other states including Kansas (Augenblick, Meyers, Silverstein & Barkis, 2002), Montana (Meyers & Silverstein, 2002), Nebraska, New York and South Carolina.

The basis of this approach is to bring together a group of educational professionals, ask them to identify the components of a "prototype" school that they believe would enable the professional staff to teach the students at that school to some predetermined standards level. Though this approach usually identifies effective educational strategies to some degree, and so provides a stronger linkage between funding levels and possible education programs, its major limitation is that it depends on the judgments of educational professionals in identifying strategies rather than research that actually shows a linkage between the strategy and student performance. Further, it sometimes provides for little differentiation between strategies for the average school and strategies for schools with higher concentrations of at-risk students (see for example, Management Analysis and Planning, 2001a).

Nevertheless, it is becoming one of the most popular methods states are using to determine school finance adequacy. In the first three months of 2003, the authors plan to

organize a series of professional panels in Kentucky and to conduct a professional judgment approach to identify school finance adequacy for the SEEK formula.

The State-of-the-Art Approach[1]

The fourth approach takes research findings often though not always embodied in a high performance, or a comprehensive school design, identifies all the ingredients needed for all research identified educational strategies, determines a cost for each of those ingredients, and then uses that figure to determine an adequate spending base for each school. This system was developed in part because it identifies a set of specific educational programs and strategies that represent state-of-the-art knowledge about education effectiveness and puts a dollar figure on their costs. It combines many of the advantages of the preceding methods:

1. Because each comprehensive school design draws upon research that links several educational strategies to student performance, this method has a pragmatic orientation;
2. By drawing upon the compilation of strategies incorporated into several comprehensive school designs, it taps the craft wisdom of some of the best educators in the country who have compiled research on individual educational strategies into comprehensive, school wide strategies;
3. When used, this approach provides schools with a funding level that allows them to deploy any of a large number of school wide educational strategies. Each of those strategies represents the best of what both research and top practitioners claim are the most effective educational strategies and represent current state-of-the-art professional knowledge in education.

[1] This section draws from Odden, Archibald & Fermanich, forthcoming.

Odden (1997) identified the costs of seven school wide designs that were created by the New American Schools. In subsequent analyses he showed how via resource reallocation, they were affordable at schools spending at the average or median level of expenditure per pupil in the United States (Odden & Busch, 1998; Odden & Picus, 2000). His analysis, however, did not include adequate planning and preparation time for teachers and did not standardize costs across various designs, so his 1997 cost figures are underestimated.

Implementation of this approach in New Jersey. New Jersey adopted this approach to adequacy in 1998 when its Supreme Court concluded that state's school finance system was adequate because it provided more than sufficient funds for schools to adopt and fund via resource reallocation an enriched version of the most expensive comprehensive school design – the Roots and Wings/Success for All design. Since Roots and Wings, along with the Modern Red Schoolhouse, are the most expensive school designs now on the market, funding in New Jersey was not only adequate for these designs, but there was enough money for any of the other school wide educational designs as well (Odden, 1998).

When New Jersey districts began to implement the court's decision, however, they discovered that each school design apparently had a different cost. This was somewhat problematic because it was not possible and in some cases illegal for districts to provide different funding levels to schools (assuming common numbers of students and student needs) just because a school had chosen a design that was more expensive than another. Upon further analysis, though, the state discovered that the different costs actually represented different levels of service and different combinations of individual program

elements. By standardizing levels of service for each program element and insuring that each design had all relevant program elements, the state produced a structure that simultaneously provided both a common way to resource all schools and to insure adequate revenues for six different designs that the state had approved, with the most expensive – Roots and Wings – the default design.

Building on this approach, Odden (2000) suggested a funding structure for a school that could accommodate all extant school designs, that ensured that each had similar service levels in all program elements, and that included all relevant program elements, including: a strategy for students who are struggling to learn to proficiency standards; planning and preparation time for teachers; sufficient professional development; and adequate computer technologies.

Section 2 provides more detail for the state-of-the-art approach and shows how it uses both research findings and craft wisdom from the practitioner creators of "comprehensive school designs," which themselves are compilations of research and best practice knowledge, into cohesive school-wide strategies (Stringfield, Ross & Smith, 1996; Northwest Regional Educational Laboratory, 1998).

Pricing the ingredients: The last step in both the professional consensus and the state-of-the-art approach is appropriately pricing all ingredients, and setting teacher salaries. This is a step that usually uses a statewide average teacher salary, but such a strategy potentially understates or overstates what districts and the state might need to pay for quality teacher talent.

There are two approaches to estimating a teacher salary that reflect what it actually takes in dollar terms to recruit and retain teaching talent. The first is to apply to

the state's average teacher salary a cost-of-education-index that has been developed by the National Center for Education Statistics. This district level index quantifies the different prices school districts in a state – such as Kentucky – must pay for a given set of teacher qualities. This adjustment insures equal purchasing power of teacher salary dollars across geographic regions in the state.

But this cost-index approach just quantifies price differences across regions/districts within a state; it does not indicate what the state average *should be* in relationship to the labor markets for teacher talent within which a state's districts compete for those teachers. A second pricing strategy, which this study is not able to deploy, is to determine salary benchmarks by labor market regions in a state; this approach would identify not only the salary benchmark for beginning-teachers, but also benchmarks for mid-career and top-career teacher salaries. And the benchmarks would be calculated for the various labor markets within which the state's districts compete for teachers.

Assessing the Adequacy of SEEK

All four of the above methods could be used to determine the adequacy of the SEEK spending base. As stated above, the authors will conduct a Professional Judgment approach to determining school finance adequacy early in 2003. This report presents analyses of school finance adequacy using the State-of-the-Art approach. The advantages of the state-of-the-art approach are at least three-fold:

1. It can provide a dollar estimate for adequacy
2. It draws from the best research and the best craft wisdom
3. It is clear about the key program elements that should be included in the overall educational strategy at each school site.

We should note that the analysis in the next section will include current SEEK dollars from the base allocation, both Tier 1 and Tier 2 add-ons, and additional dollars for at-risk students, and the moderately disabled. In calculating the percent poverty in a school, however, our goal is to use the number of students eligible for *free and reduced* lunch, so we take a somewhat broader view of poverty, as the SEEK at-risk add-on only uses free lunch students. We also are assuming that it is the low income, ESL students who need extra help, so our strategy for struggling students, by expanding the number of poverty students who are included, indirectly incorporates those ESL students who need extra help.

2. Applying the State of the Art Approach to Adequacy to Kentucky

The state-of-the-art approach identifies a set of ingredients that are required to deliver various elements of a high quality instructional program, and then determines an adequate expenditure level by placing a price on each ingredient and aggregating to a total cost. The difference between this model and the professional consensus approach is that the school design is more explicitly based on research and extant models of comprehensive school designs rather than the professional judgment of educators on the level of resources needed to meet a pre-determined performance goal. It proceeds the following way:

Pre-School

Research shows that high quality preschool, particularly for students from lower income backgrounds, has significant long-term impacts on student academic achievement, as well as other desired social and community outcomes (Barnett, 1995,

1996, 2000; Karoly, Greenwood, Everingham, Hoube, Kilburn, Rydell, Sanders, Chiesa, 1998; Slavin, Karweit & Wasik, 1994). Thus, the state school finance system should allow each district to provide preschool for at least every child aged 3-4 from a family with an income below approximately 1.5 times the poverty level. The most straightforward way to do this would be to allow districts to include children aged 3 and 4 in their pupil counts for state aid. For the purposes of this analysis, a typical, high quality pre-school program would provide one licensed teacher and one teacher aide for each group of 15 preschool students.

Full Day Kindergarten

Research further shows that full-day kindergarten, particularly for students from low-income backgrounds, also has significant, positive impacts on student learning in the early elementary grades (Slavin, Karweit & Wasik, 1994). Thus the state-of-the-art approach would allow each district to count each kindergarten student as a full 1.0 student in the formula in order to provide a full-day kindergarten program – in comparison to the 0.5, half day program that is allowed in the SEEK program today.

School Size

Research on school size is clearer than research on class size; the optimum size for elementary schools is 300-600 and the optimum size for secondary schools is 600-900 (Andrews, Duncombe & Yinger, 2002; Lee & Smith, 1997; Raywid, 1997/1998). Thus, no elementary school unit should be larger than 500 to 600 students and no secondary school unit should be larger than 900 to 1,000 students. (High schools of this size should be divided into two "schools-within-a-school.") Given the current stock of large school buildings, this means creating several independent "schools" within these larger

buildings, each with a separate student body, separate principal and separate entrance, if possible (see also Murphy, Beck, Crawford, Hodges & McGaughy, 2001). For secondary schools, research also finds that curriculum offerings should emphasize a large core of academic classes for all students (Bryk, Lee & Holland, 1993; Lee, Croninger & Smith, 1997; Newman, 1997). It also means no construction of large school buildings in the future. All subsequent cost figures are for a school unit of 500 students, as nearly all comprehensive school designs recommend that large schools be divided into quasi-separate education units of about 500 students.

Principal

Each school unit needs a principal. All comprehensive school designs include a principal, but few if any include assistant principal positions. Drawing on the above findings, the designs recommend that instead of one school with a large number of students, school buildings with large numbers of students should be sub-divided into school units within the school, with each unit having a principal. So one principal is required for each group of 500 students.

Instructional Facilitators/School-Based Coaches/Mentors

In addition, most designs call for school-based instructional facilitators, and the technology intensive designs also require a technology coordinator. Further, several designs suggest that while one facilitator might be sufficient for the first year, in subsequent years an additional facilitator would be needed. In addition, the technology designs recommend a full time facilitator, who spends at least half-time as the technology expert. Thus, drawing from all programs, we conclude that about 2.5 facilitators are needed for each school unit of 500 students. These individuals would coordinate the

instructional program, provide ongoing coaching and mentoring (which is necessary for teachers to change and improve their instructional practice), and would include the technological expertise to fix small problems with the computer system, install all software, and connect computer equipment so it can be used for both instruction and management issues.

Class Size

Research on class size shows that small classes of *15* (not 18, not 20, and not a class of 30 with an instructional aide or two teachers) in *kindergarten through grade 3* have significant, positive impacts on student achievement in mathematics and reading (Gerber, Finn, Achilles & Zaharias, 2001; Grismer, 1999; Mishel & Rothstein, 2002). The impact is larger for students from low income and minority backgrounds. Thus, class sizes should be 15 in grades kindergarten through grade 3. Class sizes in other grades should be no larger than an average of 25, which is about the national average and the size on which most comprehensive school reform models are based.

Planning and Preparation Time/Collaborative Professional Development

Teachers need some time during the regular school day for collaborative planning and ongoing curriculum development and review. Indeed, the major way to provide job-imbedded, professional development is to provide for and use a significant portion of planning and preparation time within the normal school day [see Odden & Archibald (2001) for examples]. Schools also need to teach art, music, library and physical education. Providing each teacher one period a day for collaborative planning and curriculum development requires an additional 20 percent allocation of teachers to those needed to provide the above class sizes.

Such professional development should provide between 100-200 hours of professional development annually for each teacher, should include extensive coaching in the teacher's classroom, should cover all faculty in a school, focus heavily on the content that each teacher teaches, and be aligned with state/district content standards and aligned tests (Birman, Desimone, Porter & Garet, 2000; Cohen & Hill, 2001; Desimone, et al., 2002a; Desimone, et al. 2002b; Garet, Birman, Porter, Desimone & Harmon, 1999).

Extra Help Strategy for Struggling Students

Every school should have a powerful and effective strategy for struggling students, i.e., students that must work harder and need more time to achieve proficiency levels. Such students generally include those from lower income backgrounds, those struggling to learn English, and those with learning and other mild disabilities. The most powerful and effective strategy is individual one-to-one tutoring, provided by licensed teachers (Shanahan, 1998; Wasik & Slavin, 1993). From the practice of many comprehensive school designs, a ratio of one fully licensed teacher tutor for every 20 percent of students in poverty, with a minimum of one for every school, is the standard. Thus, school units of 500 students should have from one to five teacher tutors. Schools could deploy these resources in ways other than individual tutoring, though quite a bit of research shows tutoring to be the most effective strategy.

This allocation would cover the needs of students from low income backgrounds, students whose native language is not English and are learning English, and the learning disabled. Schools should be free to use the resources for whatever strategy they select, but should be held accountable for having these students learn to proficiency levels.

Students with more severe disabilities, and with speech and hearing impairments, would need to be funded on a program and service basis. The extra costs for all low-incidence, high cost, severely disabled students should be fully borne by the state. This study assumes the costs of programs for these students are the same as is currently spent across the state.

Student Support/Family Outreach

Schools also need a student support, family outreach strategy. Various comprehensive school designs provide different ways to provide this program entity. In terms of ingredients, the more needy the student body, the more comprehensive such a strategy needs to be. The general standard is one licensed professional for every 20-25 percent of students from a low-income background, with a minimum of one for each school.

Ongoing Professional Development and Training

All school faculties need ongoing professional development. Research on the costs of effective professional development – professional development that produces change in classroom practice that leads to improved student achievement – and the costs of professional development to implement comprehensive school designs finds that school units of 500 students need about $4,000 per teacher for ongoing professional development (Miles, Odden, Archibald & Fermanich, 2002; Odden, Archibald, Fermanich & Gallagher, 2002), in addition to time provided by a daily planning and professional development period during the day. However, this figure includes one of the above instructional facilitators. Dropping this amount would decrease the need for professional development dollars to about $2,000 per teacher, or about $50,000-$70,000 per school unit. Together with the instructional facilitators, this would allow each school unit to provide for 100-200 hours of professional development per teacher each year,

including stipends for 2 week summer institutes and the use of some amount of external professional development providers.

Technology

Finally, over time schools need to embed technology in their instructional program and school management strategies. Based on the school designs that included such technology and the assumption that schools were starting from essentially a zero-base technology capability, the costs initially were estimated to be about $250 per pupil, or $125,000 per school for the purchase, updating and maintenance of hardware and software, which for the next decade or so at least would be viewed as an annual operating cost (Odden, 1997).

However, Kentucky has invested heavily in a statewide technology infrastructure, as well as computers in all classrooms. The state has created a statewide network, and local area networks for all school buildings. In addition, all buildings have Internet access; further, there is a computer for each teacher (and superintendent) with email and Internet access, and one computer for every five students. The Office of Technology of the Kentucky Department of Education estimates that this system will cost $214 per student to maintain and upgrade, and an additional $50/pupil to decrease the student/computer ratio from five-to-one to three-to-one (i.e., to increase the number of computers in each classroom).[2]

[2] According to the Office of Technology of the Kentucky Department of Education, the $214 per pupil costs for maintaining and upgrading existing technology includes the following components:

Category	Amount Per Pupil ($)	Percent of Total (%)
Operations	62	29.0
Maintenance	72	33.5
Incremental Replacement	77	36.0

Summary

In sum, school units of 500 students would need the resources identified in Table 1. If a secondary school had 1,000 students, the resources listed in Table 1 would be doubled. The figures would need to be prorated for schools with fewer students, but schools should not have fewer than 250-300 students, except in sparsely populated, rural areas. The figures in Table 1 include full-day kindergarten programs. The resources are sufficient for schools to deploy any of a dozen or more comprehensive school reform strategies (Analt, Goertz & Turnbull, 1999; Odden, 1997, 2000; Odden and Picus, 2000).

It is relatively straightforward to compare the staffing in each of Kentucky's schools with the numbers in the table; differences would indicate whether the state and district systems were adequate, at least in terms of numbers. The next section conducts this analysis. Note that there are no instructional aides in the model, in part because no comprehensive school design includes instructional aides but primarily because research generally shows they do not add value (Achilles, 1999; Gerber, Finn, Achilles & Boyd-Zaharias, 2001).

New Technologies	3	1.5
Total	214	100.0

Expenditures in Operations and Maintenance include items like student workstation repair, teacher workstation repair, instructional software improvements, classroom printer repair, instructional fileserver repair, school management software improvements, initial/ongoing technology integration professional development, student technology leadership services, Internet services, telephone communications to parents, distance learning service, help desk services, e-mail services, enterprise data system access and school financial management services.

Incremental replacement represents a framework for replacement of various technology components on a scheduled basis over time, in accordance with the life cycle of each item or service. These include items like student workstations, teacher workstations, instructional fileservers, assistive and adaptive technology, school laser printers, classroom color printers, wireless networks, student hand held devices, high speed fiber networks, desktop conferencing, and digital projection devices.

New technologies includes products and services that are more discretionary in nature, products and services that are today only marginally available or affordable, and products and services which are perceived as needs in the planning horizon.

Table 1
School Level Resources Required for an Adequate Education Program
For Prototype State-of-the-Art School of 500 Students

Elementary **School Unit of 500 Students**	***Secondary*** **School Unit of 500 Students**
1 Principal	1 Principal
2.5 Full time instructional facilitators, coach	2.5 Full time instructional facilitators, coach
29 Teachers; class size of 15 in K-3, otherwise 25	20 Teachers; class sizes of 25
6 Art, music, physical education, library, etc. teachers	4 Art, music, physical education, library, etc. teachers
1-5 Teacher Tutors; 1 for each 20 % students from low income background with a minimum of 1	1-5 Teacher Tutors; 1 for each 20 % students from low income background with a minimum of 1
1-5 Positions for student/family support; 1 for each 20-25 % students from low income background with a minimum of 1	1-5 Positions for student/family support; 1 for each 20-25 % students from low income background with a minimum of 1
$60,000 for professional development	$60,000 for professional development
$125,000 for computer technologies	$125,000 for computer technologies
Secretarial support, lunch and food support, and operations and maintenance	Secretarial support, lunch and food support, and operations and maintenance

The ingredients (teachers and aides) for preschool for children aged 3 and 4 from lower income backgrounds need to be added to Table 1. The easiest way to do this would be to allow each district to count each such pre-school student in determining the number of students in the district for state aid purposes. A weighting might be needed, however, because preschool standards from the National Association for the Education of Young Children suggest the staffing should be about one teacher and one instructional aide for each class of 15 students. Fully trained and licensed preschool teachers then could and should be employed and paid according to the district's salary structure. It would be

wise, however, to allow neighborhood institutions to provide preschool programs, along with the public schools (if there was space) as is the case with Head Start.

Our analysis of expenditure reports (see next section for details) showed that Kentucky school districts now spend about $46 million for pre school educational services. We also were able to determine that there are about 37,000 children aged 3 and 4 who reside in homes with an income equal to or less than 150 percent of the poverty income. At the end of the report, we estimate the additional costs of providing preschool programs for all these students.

As noted, we are not conducting a detailed study of special education funding adequacy. However, in contrast to our 2001 adequacy report (Odden & Picus, 2001) – where we suggested that the current Kentucky weights of 2.35 for severely disabled children, 1.17 for moderately disabled children and 0.24 for speech and hearing impaired children (which equates to an approximate overall weight of 1.10) might be somewhat low – new research suggests that overall weight may be more on target. A recently completed, nationally representative sample of disabled students and their costs by Chambers, Parrish and Harr (2002) estimates that across the United States, the overall additional weight in 2000-2001 of 0.90. This figure is lower than the 1.30 weighting factor identified through previous research between 1975 and 2000. It is also slightly lower than the overall weight of 1.10 in use in Kentucky today. To the degree possible, our analysis in the next section includes the resources for students with moderate needs, but excludes those children with severe disabilities and the speech impaired, which under the assumptions of our analysis would continue to be funded using the current system and funding levels.

Finally, we note once again that our model includes full day kindergarten for all students, compared to the current half-day program supported by the state.

3. Adequacy in Kentucky, 2001-2002

This section analyzes the adequacy of program and fiscal resources in Kentucky, building a model of adequacy from the school building up to the district level and then to the state. We use the ingredients specified in the state-of-the-art model described in the previous section to structure our analysis.

The method for determining the change in state support for K-12 education required to fund the state-of-the-art school adequacy model in Kentucky consists essentially of three parts. The first consists of determining, at the school level, how much districts and schools are currently spending on core instructional services. The second part consists of determining the costs of implementing the model in Kentucky's schools. The third part indicates the degree to which the state-of-the-art approach to adequacy requires greater or fewer resources and the magnitude of those differences. All data used in this analysis are from the 2001-2002 fiscal year and were provided by the Kentucky Department of Education (KDE). Data provided by the KDE include:

- School enrollment by grade level
- School counts of students eligible for the Federal free and reduced-price lunch program
- District and school salaries and full time equivalent (FTE) positions by job class
- District and school staff and non-staff expenditures categorized according to the state's chart of accounts.

Estimating Current School and District Expenditures

Our goal was three-fold: 1) to identify core instructional expenditures at the school site for the 2001-2002 school year; 2) to calculate the costs of adequate resources determined by the state-of-the-art approach; and 3) to calculate the difference to show how much more (less) the state would need to spend to adequately fund educational services in the state. To conduct this analysis, we first had to determine which schools to use, and the expenditures and staff to include in the analysis.

Generally, we sought to identify the following school level staff and expenditures:

- Principals and other administrators
- Regular classroom teachers
- Art, music, physical education, library and other specialist teachers
- Extra staff for students with special needs including students from low income backgrounds, moderately disabled, ESL, etc.
- Pupil support staff including guidance counselors, social workers, community liaisons, etc.
- Instructional aides (but excluding aides working in lunchrooms or hallways, as well as aides assigned to the multiply handicapped)
- Expenditures for school-based professional development and technology.

Our state-of-the-art model focused exclusively on school level, core instructional resources. We used current expenditures for secretarial, custodial, food services, transportation or any other non-core staff assuming they would remain the same under the new model. This decision will be relaxed for Phase 2 of our study where the professional judgment panels will make recommendations as to the appropriate staffing

levels for these functions as well. Central office services were assumed to remain the same for this analysis as well. Thus, we first needed to determine the level of the resources identified above at each school in Kentucky.

We would not have been able to conduct this analysis unless Kentucky had developed its sophisticated, detailed, and on-line fiscal accounting system of school and district level staffing and expenditure reporting. This data system provided the types of school-level data we needed to conduct the analysis. Although the data system did not provide every piece of information we ideally needed, it provided the bulk of such data and we were able to construct good estimates of data items missing or not reported at the school level, as we discuss below.

Data on both district and school staffing and expenditures were obtained from two sources. A statewide database provided district and school level staffing data, including job class, FTE, and salary information. A second database (AFR02) provided data on all district and school financial transactions coded according to the state's chart of accounts. The following provides further explanation of how the specific staffing and expenditure data were derived and used in our analysis.

Schools included in the analysis. In the 2001-2002 school year, Kentucky had 176 school districts and approximately 1,741 school units, including "regular" elementary, middle, and high schools, as well as alternative, special education, vocational, early education, and homebound schools and programs. Kentucky classifies its schools under the codes A1 through A6, and B1, according to how schools are administered and the types of students served. This study addressed only schools

classified as A1. These schools are under the administrative control of a principal and are not operated by or as part of another school.

Specialized programs such as alternative, special education, and vocational schools; day treatment centers; and juvenile detention centers were excluded from the analysis. These schools and programs were excluded for several reasons, including very small enrollments and specialized staffing requirements. Many of these schools were also not freestanding programs with their own administrative, clerical and maintenance staff, but were instead a subunit under the administrative control of another school. Further, our state-of-the art model did not address the educational resource needs of these specialized schools. Finally, complete data were not available for many of these programs. An exception was made in the case of two large alternative schools (Liberty Alternative High School in the Jefferson County School District and Pulaski Central Alternative School in the Pulaski County School District) because they had large enrollments and staffing similar to conventional schools.

The result produced a total of 1,233 schools/units that were included in our analysis. This represents 71 percent of all schools and 98.5 percent of all students in Kentucky's 176 school districts.

Programs and functions included in the analysis. Our analysis addressed only the core instructional programs of schools. Non-instructional functions such as clerical support, food service, security, transportation, and operations and maintenance were assumed to remain constant under the model. Also left untouched were certain categorical and instructional support programs, including low incidence special education, speech and language disabilities, homebound, media/library, gifted and

talented, health services, adult and family education, and administration other than site-based principals, vice-principals and other site administrators. Preschool staff were also excluded from the study. We present estimates of the costs of providing pre-school programs for children aged 3 and 4 in families with an income below 150 percent of the poverty level at the end of this document. The core instructional staff positions included in the analysis for comparison to the estimated staffing costs required by the adequacy model are listed in Table 2.

Table 2
School Positions Included in Adequacy Analysis

Job Class	Job Name
250	School Psychologist
270	School Social Worker
1010	School Principal
1020	School Vice Principal
1030	Local Vocational School Principal
1040	Local Vocational School Vice Principal
1050	Guidance Counselor
2030	Primary Classroom Instructor
2040	Elementary Classroom Instructor
2050	Middle School Classroom Instructor
2060	High School Classroom Instructor
2070	Job Training Instructor
2080	Local Vocational School Instructor
2095	Exceptional Child Instructor
7301	Community Relations Specialist
7312-7314	Instructor I – III
7317, 7319	Instructional Monitor I – II
7318, 7320	Instructional Assistant I – II
7321	Instructional Assistant – High School
7342	School/Home/Community Liaison
7526	Computer Lab Technician
7882	Social Worker
--	Extended School Services Staff

School staffing costs. The costs of school level instructional staff included in this analysis for comparison with the staffing required under the state-of-the-art adequacy model were obtained from the statewide staffing database. The positions listed in Table 2 were selected within each school using state job class codes, and the corresponding FTE and actual salary amounts were then summed to the school level. These positions were then aggregated into six staffing categories in an effort to retain some useful information about school staffing patterns while reducing the number of job classifications. The

actual salaries for the positions in each of the six staffing categories were used in the analysis. The six general staffing categories consisted of the following positions:

1. AD – administrative positions, including principals and vice principals.
2. TE – non-categorical classroom teachers, including primary, elementary, middle school, and high school classroom instructors; job training instructors; and local vocational school instructors.
3. SE – exceptional child instructors
4. SS – student support staff, including school psychologists, school social workers, social workers, guidance counselors, community relations specialists, and school/home/community liaisons.
5. CP – computer lab technicians
6. IA – instructional aides, including instructors I-III, instructional monitors I-II, instructional assistants I-II, and high school instructional assistants.

The costs of fringe benefits were added to the actual salaries by multiplying total salaries by the estimated fringe benefit percentages calculated for each district for professional and classified staff.

Our comparative analysis did not include the approximately $55 million annual expenditure for substitute teachers; we left these resources in the system so that schools could continue to provide substitute teacher services. However, we wanted to include one additional category of school-level teacher resources that we were not able to identify by school: extended day school services (ESS). What we did was identify the expenditures for this category of staff at the district level and then subtract those expenditures from our estimates of the district-level costs of the state-of-the-art model.

Finally, there were also small numbers of staff that we would have liked to identify, but could not, such as staff who were hired or who left after September 15 (the date the staffing files were produced). But expenditures for these staff constituted small percentages of the total expenditures on all staff, licensed and classified.

Professional development, technology, and total district/school expenditures. Estimated current expenditures by school for professional development and technology were obtained from the AFR02 database. Expenditures for professional development were identified using project codes 1400-1409. Expenditures identified as being through the central office or district wide (location codes of 000 or 001) were allocated to schools on the basis of enrollment.

Current technology expenditures were identified using a two-step process. Expenditures using KETS Phase II grant funds were identified using project codes of 1621 and 1622. Other technology spending was identified using the following object codes (where project did not equal 1621 or 1622):

- 0434 Computer Repairs & Maintenance
- 0444 Computer Rental
- 0533 On-Line Network
- 0619 Computer Related Supplies
- 0648 Software
- 0734 Computers and Related Equipment

KETS Phase II technology expenditures identified as being through the central office or district wide (location codes of 000 or 001) were allocated entirely to schools on the basis of enrollment. Twenty percent of non-KETS technology expenditures with

location codes 000 or 001 were retained at the central office, under the assumption that a portion of technology spending was required for central administration or other district wide uses. The remaining 80 percent was allocated to schools on the basis of enrollment.

Baseline core education expenditures. A baseline of total district- and school-level spending (excluding federal funds, see below) was obtained by summing the amounts in the year-to-date expenditure field of the AFR02 database to the district level. All balance sheet object codes of 0999 and higher were excluded from this total. Fund transfers were also excluded by deleting line items with a function code of 5200. The net baseline expenditure amount totaled $3.9 billion.

Several adjustments were made to the staffing and/or expenditure file due to either substantive or data issues. These are outlined below.

Federal funding adjustment. Because this analysis pertains only to state and local spending, expenditures from federal funds were deleted from both the staffing and expenditure files. In the expenditure file this was accomplished by deleting all line items with project codes of 2000-6999. The total of federally funded expenditures deleted from the file was $324.5 million. The method for identifying federally funded staff in the staffing file was somewhat less direct.

The staffing file from which FTE and salary data by school were obtained did not include chart of account codes, such as project codes, that could aid in identifying federally funded staff. A file of federally funded staff was subsequently provided by the Department. The salary and FTE amounts from this file, totaling 10,240 FTE and $221.6 million in salary expenditures, were subtracted from the corresponding salary and FTE totals in the original staffing file to obtain staffing data net of federally funded staff.

Central office/district wide instructional staff adjustment. The analysis discovered that there were a large number of instructional staff positions with central office or district wide location codes (e.g. classroom teachers, special education teachers, school psychologists, and aides). Net of federally funded staff, these totaled 1,960 FTE and $ 74.6 million in salary. It was assumed that a majority of these staff worked in schools, either as itinerant staff or as staff assigned to multiple schools but located at the central office for administrative purposes. It was also assumed that a portion of these staff were assigned to the central office to perform administrative functions, such as project management, curriculum writing, or special education case management. Based on prior experience with working with district budgets and discussions with KDE staff, it was decided to allocate 75 percent of these staff to schools based on enrollment and retain the remaining 25 percent centrally. This resulted in a total of 1,470 FTE and $56.0 million in staff salaries being allocated to schools. Centrally located instructional staff included in this reallocation included school psychologists; school social workers; guidance counselors; teachers (classroom instructors) of various types; community relations specialists; and instructional aides, monitors, and instructors.

Special education staff adjustment. Our analysis assumed that no changes will be made to current low-incidence or speech-language special education programming under the state-of-the-art adequacy model.

However because the model included resources for extra help for struggling students, staffing for programs for children with moderate disabilities would be counted under the model and were to be included in the aggregate current school staffing costs to be compared against the proposed expenditures under the adequacy model. Therefore, it

was necessary to break out special education professional and classified staff by the three program levels of speech-language, moderate, and low-incidence. Only speech-language staff could be clearly identified in the staffing database for exclusion from the analysis, so a method had to be found for allocating the remaining special education staff (exceptional child instructors and aides) between moderate and low-incidence programs.

According to KDE information, programs for the moderately disabled are staffed at a 12:1 student-instructor ratio and low-incidence programs at a 6:1 ratio. Using these staffing ratios and statewide counts of students served in the two disability categories, it was estimated that 60 percent of exceptional child instructors were required for programs for the moderately disabled and 40 percent for low-incidence programs. A total of 1,972 FTE exceptional child instructors (representing $ 86.7 million in total compensation), the estimate of the number serving low-incidence disabled students, was subtracted from school staffing totals.

No additional instructional aide positions were excluded from the analysis. An analysis of the federal staffing file found that there were 2,134 FTE of instructional aides funded through Federal IDEA funds. The assumption was made that aides working in low-incidence programs were more likely to be federally funded. Since all Federal staff were already excluded from the analysis, it was assumed that most, if not all, aides working in low-incidence programs had already been excluded from the analysis.

Missing school-level professional development and technology expenditure data. Several districts did not report school-level expenditures for either professional development, technology, or both. The most serious problem was in district 275, Jefferson County. The largest district in the state, Jefferson County not only did not

report these expenditures by school, but also it did not report any expenditures in these program areas at all. The KDE was able to obtain school-level professional development expenditures from the district, but because the analysis had also allocated central office professional development spending to schools these data would not be compatible with other districts. Instead, spending in these areas in Jefferson County schools was estimated using statewide per pupil averages of $17 per student for professional development and $53 per student for technology.

Estimating Costs Under the State-of-the-Art Model

Table 3 lists the ingredients required by the instructional program of the State-of-the-Art model for elementary and secondary schools with an enrollment of 500 students for Kentucky. To estimate the appropriate number of specialized staff, such as the principal, instructional facilitator, tutor, and student and family support staff in schools smaller or larger than 500 students, these staffing numbers were generally prorated up or down depending on a school's enrollment, but with minimum configurations for small schools as described below. The same is true of expenditures for professional development and technology. The following describes the specific criteria used in each case.

- **Principal** – 1.0 FTE position up through 500 students, prorated up for enrollments over 500.
- **Instructional facilitator** – prorated up or down from 2.5 FTE for 500 students based on enrollment, with a minimum of 1.0 FTE for each school regardless of size.

- **Teacher Tutor** – 1.0 FTE for each 20 percent of students eligible for the Federal free and reduced lunch program with a minimum of 1.0 FTE for each school regardless of size.
- **Classroom teachers** – based on a class size of 15 in grades K-3 (assumes all-day kindergarten in all schools) and 25 in all other grades.
- **Art, Music, and Physical Education Teachers** – equals 20 percent of the total number of regular classroom teachers.
- **Student and Family Support** – 1.0 FTE for each 25 percent of students eligible for the Federal free and reduced lunch program with a minimum of 1.0 FTE.
- **Professional Development** – prorated up or down from $60,000 for a school of 500 with a minimum of $30,000.
- **Technology** – $214 per student[3], the estimate for maintaining the current technology system at 1 computer for every 5 students. A minimum of $37,450 per school is assumed to aid small schools. Approximately $32 million more per year, or about $50 per student, would be required to reduce the ratio to 1 computer for every 3 students.

[3] See footnote 2 for the derivation of the figure of $214 per pupil

Table 3

School Level Resources Required for an Adequate Education Program in Kentucky

Elementary **School Unit of 500 Students**	***Secondary*** **School Unit of 500 Students**
1 Principal	1 Principal
2.5 Full time instructional facilitators, coach, with a minimum of 1	2.5 Full time instructional facilitators, coach, with a minimum of 1
29 Teachers; class size of 15 in K-3, otherwise 25	20 Teachers; class sizes of 25
Art, music, physical education, library, etc. teachers totaling 20% of the number of classroom teachers	4 Art, music, physical education, library, etc. teachers totaling 20% of the number of classroom teachers
1-5 Teacher Tutors; 1 for each 20 % students from low income background with a minimum of 1	1-5 Teacher Tutors; 1 for each 20 % students from low income background with a minimum of 1
1-5 Positions for student/family support; 1 for each 25 % students from low income background with a minimum of 1	1-5 Positions for student/family support; 1 for each 25 % students from low income background with a minimum of 1
$60,000 for professional development, with a minimum of $30,000	$60,000 for professional development, with a minimum of $30,000
$214 per student for computer technologies	$214 per student for computer technologies
Secretarial support, lunch and food support, and operations and maintenance	Secretarial support, lunch and food support, and operations and maintenance

Staff costs were calculated using the statewide average salary of $57,358 for principals, the average statewide teacher's salary of $37,964 for all other professional positions, and the average fringe benefit rate for professional staff of 19.7 percent. The fringe benefit rate includes state-paid Teacher Retirement of 13.105 percent, any additional teacher retirement expenditures reported by the district, state-paid health and life insurance ($234 and $24 per employee respectively), any additional district-provided

insurance expenditures as reported by the district, and Medicaid payments of 1.45 percent.

Once a school's expenditures were determined using the above criteria, these amounts were adjusted using the Geographic Cost of Education Index developed by the National Center for Education Statistics to account for the geographic variation in the costs of personnel and other goods and services. This national index was adjusted so that the Kentucky mean equaled 1.0.

Results of the Adequacy Analysis

Table 4 provides the district by district as well as the statewide results for the adequacy analysis. The key findings in the table are the following:

1. In 2001-2002, Kentucky state government, districts and schools spent $3.9 billion from state and local sources (excluding federal sources) on current operating expenditures for all aspects of schools, or an average of $6,020 per pupil.
2. Of this total, $1.9 billion was spent for core instructional services.
3. Total resources for core instructional services using the state-of-the-art approach would require expenditures of $2.468 billion, or an increase of $565 million.
4. To provide for an adequate education program, Kentucky would need to increase current expenditures from the 2001-2002 average of $6,020 to $ 6,893, or an increase of about $873 per pupil.
5. The costs of expanding pre-school services to all children aged 3 and 4 in families with incomes below 150 percent of the poverty level would be approximately $175 million. We determined this figure in the following way. There are 37,000 such children. We allocated 1 teacher at $38,000 and one aide at $19,000 for each

of 15 such students. Adding benefits, these student and salary figures produced a total cost of $169 million. We then added another 25 percent for instructional supplies, operations, maintenance, administration, etc., which brought the total to $221 million. Subtracting the $46 million now spent, the extra costs for pre-school would be roughly $175 million.

In sum, the state-of-the-art approach to school finance adequacy would require Kentucky to increase spending by about $565 million for K-12 students and an extra $175 million for preschool students, or a total of $740 millions compared to what it spent on current operating expenditures ($3.9 billion) for the 2001-2002 school year.

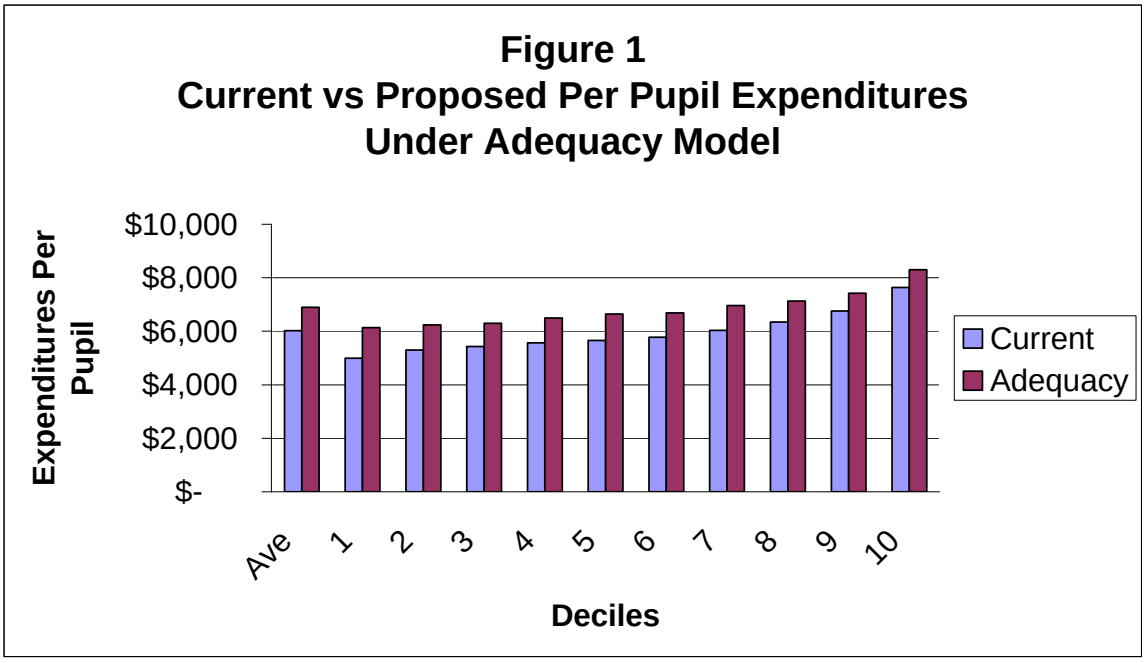
The numbers in Table 4 (Attached) show that every district except for Anchorage would be eligible for additional funding under the state-of-the-art approach to school finance adequacy before additional funds were provided for early childhood education programs. The exact distribution of the early childhood funds would be based on the distribution of children eligible for the program.

Table 5 shows the differences between current expenses and the expenditures required under the adequacy approach by deciles of state/local current operating expenditures per pupil in 2001-2002. The results are pretty much as one would predict. The largest increases for an adequate program are for the lowest spending districts while the smallest increases are for the highest spending district. The lowest spending districts on average would require an increase of $1,141 per pupil, or 22.9 percent, while the highest spending districts would require a smaller increase, but still a hike of $667 per pupil, or 8.7 percent. Figure 1 shows these comparisons graphically.

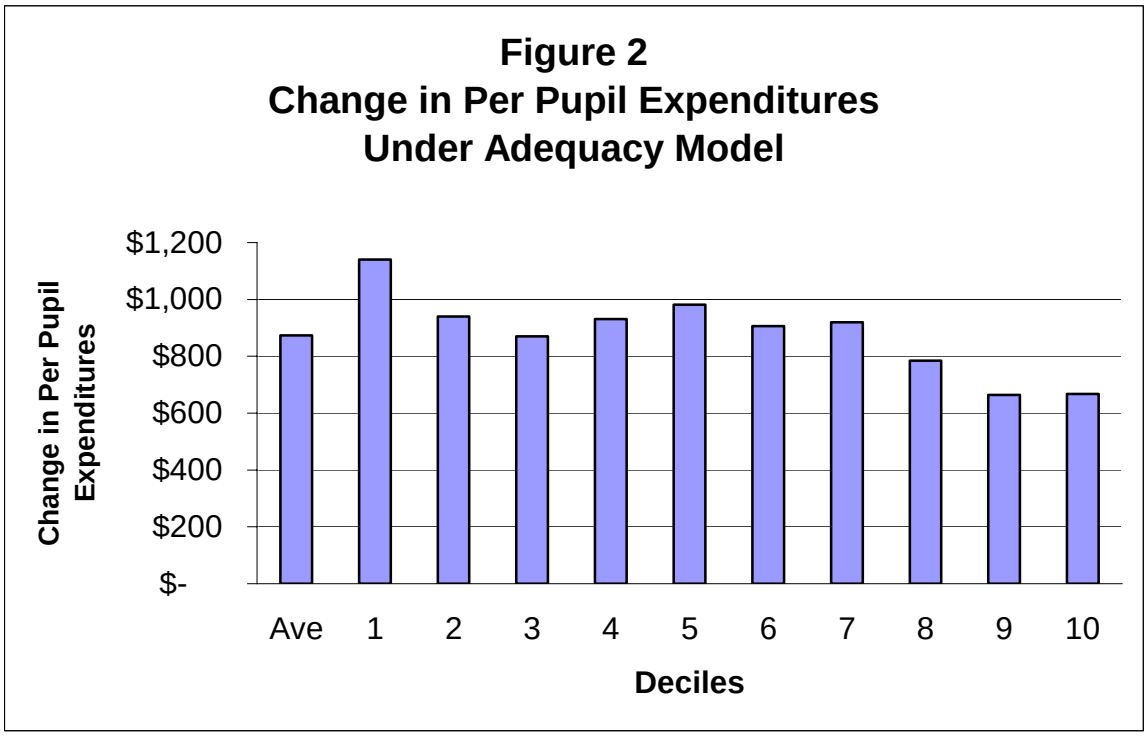
Table 5

Kentucky State-of-the-Art Adequacy Model
Spending by Deciles

Decile	Average Enrollment Per District In Decile	Average Current Spending Per Pupil In Decile ($)	Average Proposed Spending Per Pupil In Decile ($)	Average Change Per Pupil In Decile ($)	Percent Change In Decile (%)	Number of Districts In Decile
1	3,679	4,990	6,130	1,141	22.9	16
2	3,191	5,296	6,236	940	17.8	21
3	3,206	5,426	6,297	871	16.0	21
4	2,826	5,568	6,498	931	16.7	23
5	3,806	5,659	6,640	981	17.3	17
6	4,499	5,777	6,682	906	15.7	14
7	2,149	6,035	6,955	920	15.2	31
8	1,860	6,346	7,131	785	12.4	19
9	5,929	6,757	7,421	664	9.8	10
10	24,922	7,635	8,303	667	8.7	4
State Average	3,675	6,020	6,893	873	14.5	



Both Table 5 and Figure 1 also show that there are spending per pupil differences in Kentucky, even though our previous analysis found that differences in expenditures were within standard fiscal equity benchmarks. We should note, however, that the figures in Table 5 and Figure 1 use unadjusted enrollment counts so the pupil counts do not reflect differences in education need (though the resources provided by the state-of-the-art funding model do). Of equal importance is the fact that as current per pupil expenditures increase, the additional per pupil resources needed to reach adequacy under this approach decline as described above. Figure 2 shows this graphically.



Tables 6, 7 and 8 display the impact for a prototypical elementary, middle and high school. The data in these tables are not statewide average figures, but are for actual schools that represent approximate statewide averages for size, percentages of poverty,

and other student needs. Before reviewing the tables, the reader should know that the state's staffing file did not allow us to separate "regular" from "specialist" teachers such as those teaching physical education, art, music, etc. (PAM). Thus, all of these instructional positions are included in the "classroom teachers" row in the "Current" column of each chart, but are divided into two groups – classroom teachers and PAM teachers – in the "State-of-the-Art" column.

A review of the three tables shows the following general results:

1. The state-of-the-art model requires the largest increases for elementary schools, and suggests a small decrease in high school resources.
2. The state-of-the-art model requires substantial increases for both professional development and technology expenditures for all three school levels.

Table 6 shows that the largest increase in resources for elementary schools are for "classroom teachers." This is undoubtedly caused by two elements of our adequacy model: full day kindergarten (as compared to the current half day state supported program) and class sizes of 15 in Kindergarten through grade three. The model requires 14.4 additional teachers for this elementary school of 420 students. Expenditures for professional development and technology are about doubled (compared to current expenditures) for this prototypic elementary school.

For the prototypical middle school of 631 students and a 51 percent poverty rate, Table 7 shows that the school would need an additional 5.4 instructional staff, and substantial increases in professional development and technology resources.

For the prototypic high school of 975 students and a 39 percent poverty rate, Table 8 shows that instructional staffing resources would remain about the same, and that

expenditures for both professional development and technology would increase by several thousand dollars.

Table 6
Elementary School Example Under State-of-the-Art Model

Enrollment: 420
Free/Reduced Lunch: 59%

	Current		State of the Art		Difference	
Category	FTE	Compensation ($)	FTE	Compensation ($)	FTE	Compensation ($)
Principal	1.0	71,514	1.0	68,661	-	(2,853)
Instructional Facilitator	-	-	2.1	94,754	2.1	94,754
Classroom Teachers	17.1	662,265	24.3	1,103,415	7.2	441,150
PAM Teachers	-	-	4.9	220,683	4.9	220,683
Special Education Teachers	2.4	95,333	-	-	(2.4)	(95,333)
Tutors	-	-	2.5	112,692	2.5	112,692
Total Teachers	19.5	757,598	33.8	1,531,543	14.3	773,945
Family Support Professionals	1.2	55,793	2.0	90,153	0.8	34,360
Instructional Aides	2.2	24,071	-	-	(2.2)	(24,071)
Total Staff	23.9	908,976	36.8	1,690,358	12.9	781,382
Professional Development		8,221		50,040	-	41,819
Technology		53,807		89,238	-	35,431
Total Non-Staff		62,028		139,278		77,250
School Total	23.9	971,004	36.8	1,829,636	12.9	858,632

Examples taken from actual schools selected on basis of state average enrollment and poverty by school level. Current school staff represent only staff included in reallocation and consist of actual salaries and district benefit levels. ESS staff hired after September 15 were excluded because data were not available. State of the Art model staff costs consist of the sum of state average salaries and district benefits and are adjusted by the district GCEI.

Table 7
Middle School Example Under State-of-the-Art Model

Enrollment: 631
Free/Reduced Lunch: 51%

	Current		State-of-the-Art		Difference	
Category	FTE	Compensation ($)	FTE	Compensation ($)	FTE	Compensation ($)
Principal	2.0	165,534	1.0	97,192	(1.0)	(68,342)
Instructional Facilitator	-	-	3.2	160,821	3.2	160,821
Classroom Teachers	27.0	1,372,604	25.2	1,286,575	(1.8)	(86,029)
PAM Teachers	-	-	5.1	257,315	5.1	257,315
Special Education Teachers	4.4	202,861	-	-	(4.4)	(202,861)
Tutors	-	-	3.2	165,211	3.2	165,211
Total Teachers	31.4	1,575,465	36.7	1,869,922	5.3	294,457
Family Support Professionals	3.4	166,877	2.6	132,169	(0.8)	(34,708)
Instructional Aides	2.2	47,032	-	-	(2.2)	(47,032)
Total Staff	39.0	1,954,908	40.3	2,099,282	1.3	144,374
Professional Development		10,727		75,720	-	64,993
Technology		34,103		135,034	-	100,931
Total Non-Staff		44,830		210,754		165,924
School Total	39.0	1,999,738	40.3	2,310,036	1.3	310,298

Examples taken from actual schools selected on basis of state average enrollment and poverty by school level. Current school staff represent only staff included in reallocation and consist of actual salaries and district benefit levels. ESS staff hired after September 15 were excluded because data were not available. State of the Art model staff costs consist of the sum of state average salaries and district benefits and are adjusted by the district GCEI.

Table 8
High School Example Under State-of-the-Art Model

Enrollment: 975
Free/Reduced Lunch: 39%

	Current		State of the Art		Difference	
	FTE	Compensation ($)	FTE	Compensation ($)	FTE	Compensation ($)
Principal	3.0	180,796	2.0	132,754	(1.0)	(48,042)
Instructional Facilitator	-	-	4.9	219,668	4.9	219,668
Classroom Teachers	50.9	2,283,178	39.8	1,757,338	(11.1)	(525,840)
PAM Teachers	-	-	7.8	351,467	7.8	351,467
Special Education Teachers	5.1	186,998	-	-	(5.1)	(186,998)
Tutors	-	-	3.9	173,495	3.9	173,495
Total Teachers	56.0	2,470,176	56.4	2,501,968	0.4	31,792
Family Support Professionals	3.4	160,680	3.1	138,796	(0.3)	(21,884)
Instructional Aides	4.6	50,862	-	-	(4.6)	(50,862)
Total Staff	67.0	2,862,514	61.5	2,773,518	(5.5)	(88,996)
Professional Development		19,791		117,000	-	97,209
Technology		75,140		208,650	-	133,510
Total Non-Staff		94,931		325,650		230,719
School Total	67.0	2,957,445	61.5	3,099,168	(5.5)	141,723

Examples taken from actual schools selected on basis of state average enrollment and poverty by school level. Current school staff represent only staff included in reallocation and consist of actual salaries and district benefit levels. ESS staff hired after September 15 were excluded because data were not available. State of the Art model staff costs consist of the sum of state average salaries and district benefits and are adjusted by the district GCEI.

In sum, the state-of-the-art approach to specifying school finance adequacy in Kentucky would:

- Require an additional $740 million, $175 million to expand preschool services, and $565 million for K-12 programs, or an increase in spending of $873 per pupil.

- Increase resources for elementary schools, mainly because of its requirement for class sizes of 15 for kindergarten through grade 3 and for full-day kindergarten.
- Increase expenditures for professional development, to a level that research shows is required to change classroom instructional practice in ways that boost student academic achievement.
- Increase expenditures for technology, largely to provide the estimate of $214 for replacing, upgrading and maintaining computer technologies now in the schools, with the current ratio of one computer for every 5 students. Hiking the computer to student ratio to 1:3 would require an additional $50 a student, or an additional $32 million.

We believe that the $740 million additional figure is a solid estimate of what is needed for Kentucky to provide adequate education resources for all of its students in all of its schools to maximize the possibility of the state's reaching its 2014 goal of having all students perform to the proficiency standard of the state's student testing system.

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