

**Alternative Assessment Programs:  
What Are the True Costs?**

**An Analysis of the Total Costs  
of Assessment in Kentucky and Vermont**

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**ALTERNATIVE ASSESSMENT PROGRAMS:  
WHAT ARE THE TRUE COSTS?  
AN ANALYSIS OF THE TOTAL COSTS  
OF ASSESSMENT IN KENTUCKY AND VERMONT**

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**INTRODUCTION**

At the March 1996 education summit in New York, President Clinton, the nation's governors, and a select group of chief executive officers from large companies agreed that a critical component of education reform was the need to hold schools accountable for student learning. Although the exact methods for doing this were not specified, it seems certain that a major component of this effort will include some form of assessment. While it is doubtful that we will see a national standardized test, the importance of assessment programs will continue to grow in the foreseeable future.

Although generally not asked, an important question is how much will this effort cost? On the surface, the costs of assessment appear relatively low. Picus, Tralli, and Tacheny (1995) point out that a simple analysis of state level expenditures for assessment in Kentucky and North Carolina shows assessment represents less than 1% of total K-12 expenditures in each state. Yet, as Picus (1994) suggests, this analysis may mask the true cost of assessment programs. Two factors are at the root of this suggestion. First, new assessment techniques including performance assessments and the development of more short answer and essay type questions make scoring of these tests more complex and labor intensive than traditional multiple choice tests. Second, even when the full costs of newer assessment instruments are calculated, they often ignore the "economic" costs of that assessment to the school systems across a state. For example, states do not reimburse schools for the time it takes to administer these tests, nor is the time local school officials spend preparing for the tests, administering the tests, and using the results included in the cost estimates of assessment

programs. Yet as Haney, Madaus, and Lyons (1993) point out, these costs are not only substantial, they probably represent the bulk of the costs of any testing system.

How important are issues of cost? It is difficult to say, but one of the many, criticisms levied against California's CLAS (California Learning Assessment System) tests before they were discontinued after only two years, was concern over the high cost. Yet the state appropriation of approximately \$32 million represented less than two-tenths of 1% of the \$26 billion in total outlays for K-12 education during the last year of the CLAS assessment.

The purpose of this report is to provide a first detailed analysis of the "economic" or opportunity costs of the testing systems in two states, Kentucky and Vermont. Using a framework developed by Picus (1994), this study looked closely at the amount of time local school officials spent supporting the assessment programs in their respective states in 1995-96, and estimates the value of that effort. As the results show, when the full "economic" costs of an assessment system are estimated, the costs of assessment programs are considerably higher than they appear when only state level appropriations are considered.

The next section of this paper provides additional background on testing in general and on cost issues specifically. This is followed by a description of our methodology. Next, individual sections on Kentucky and Vermont provide estimates of the costs of those states' assessment programs. For Vermont, both district and state data are provided. For Kentucky, only district level estimates are provided as the state level assessment costs are detailed in our earlier work (Picus, Tralli, & Tacheny, 1995). In those sections, detailed analyses of the actual costs and the "economic" costs of assessment are provided. Finally, the last section of this document provides some conclusions and policy recommendations based on our findings.

## **BACKGROUND**

Tests are being widely touted as instruments of educational reform and renewal. State minimum competency testing has increased dramatically over the last several decades from one program in 1972 to 34 programs in 1985 (Haney, Madaus, & Lyons, 1993). Many states have been shifting from traditional,

multiple-choice testing formats to alternative forms of student assessment. These new assessment methods include performance assessment, authentic testing, and portfolio review. Critics of traditional multiple-choice assessments see this testing method as part of the cause of low educational standards because multiple-choice testing reinforces rote learning rather than complex thinking and active learning (Nickerson, 1989; Wiggins, 1991). Wiggins (1992) argues that performance assessment is a better method of determining a student's higher order thinking skills than the use of traditional multiple-choice tests. Higher order thinking is often nonalgorithmic, complex, involves the application of multiple criteria and uncertainty, and potentially has multiple solutions. Some research documents the negative effects of standardized testing on both teaching and learning (Shepard, 1991; Smith, 1991). In order to assess more sophisticated cognitive skills, many researchers promote the use of alternative assessment methods as a means of educational reform (Barone, 1991; Krechevsky, 1991; Wiggins, 1989).

Surveys show that teachers spend considerable time teaching to test objectives, test-taking skills, and even specific test items (Haney, Madaus, & Lyons, 1993). For this reason, it is suggested that the tests become "worth teaching to" (Wiggins, 1992). Tests may be used as instruments to improve teaching and learning through focusing instruction on areas deemed important, such as higher-order thinking skills. National and state projects have been implemented towards these goals.

The New Standards Project, a joint effort of the National Center on Education and Economy and the University of Pittsburgh's Learning Research and Development Center, is a nationwide assessment project which includes 18 states and six school districts, and was begun in 1991. This program has received a lot of attention with its focus on assessment through performance tasks, projects, and portfolios of student work. The aim of the program is to make thinking, problem solving, and communication skills "count" by creating and fostering assessments designed to elicit them (Viadero, 1994a). The National Council on Education Standards and Testing (NCEST), a commission convened at the national level, endorses an assessment system that consists of multiple methods of measuring student progress (Koretz, Madaus, Haertel, & Beaton, 1992). One objective of Goals 2000, an act legislated by Congress in 1994, is for students to "demonstrate the ability to reason, solve problems, apply knowledge, and write and communicate effectively" (National Education Goals Panel, 1994,

p. 9). These aims are similar to those of many states that have implemented new assessment methods.

Over the past several years, numerous state level programs have been implemented that reflect more “authentic” testing practices. Kentucky’s assessment system was developed to “elicit authentic performances through which students can accurately demonstrate their ability to develop, understand, and use knowledge” (Foster, 1991, p. 35). The California Learning Assessment System (CLAS) included authentic, performance-based assessment methods in order to provide a more “in-depth picture” of student abilities (California Department of Education, 1993). The North Carolina Standard Course of Study (SCS), the state-adopted curriculum, includes portfolio assessment in the first and second grades, as well as open-ended testing in the later grades. Vermont has also implemented a portfolio program through voluntary participation. State education agencies are increasingly seeking alternative assessment strategies.

Despite the importance placed on assessment systems, it is surprising how small a portion of state education funding is devoted to the development, implementation, and evaluation of student assessments. As Picus (1994) suggests, simple analysis of state level expenditures for assessment programs may mask the true cost of these assessment programs, both the newer forms of assessment and more traditional multiple-choice methods. Cost information is vital to solid policy making. Administrators and policy makers at the state and district level need this information in order to assess the viability of implementing new testing practices. In addition, other stakeholders, such as students, teachers, parents, and taxpayers, have an interest in the cost of implementing and maintaining new educational programs. Although several states have implemented new assessment programs, there has been little research on the costs of developing and implementing these new systems.

The purpose of this study is to take a careful look at the costs of assessment programs at the district level. It follows a similar study analyzing assessment costs at the state level in North Carolina and Kentucky (Picus, Tralli, & Tacheny, 1995).

## METHODOLOGY

### Conceptual Framework

The assessment of true economic costs includes estimates of the benefits foregone from the next best alternative and comparing the benefits received with the costs incurred. However, many of the benefits of educational assessment are difficult to identify, hard to measure, and not easily valued in monetary terms. In addition, knowledge of costs is hampered by the multiplicity of possible benefits and the numerous, and sometimes contradictory, goals of assessment systems. For instance, the goal of providing information on student performance and providing better educational experiences for students may not coincide (Snow, 1989; Taylor, 1994).

Costs and expenditures are not synonymous terms. Monk (1995) distinguishes between these two terms. Costs are “measures of what must be foregone to realize some benefit,” while expenditures are “measures of resource flows regardless of their consequence” (p. 365). Expenditures are generally easier to track since accounting systems typically report resource flows by object, e.g., instruction, administration, transportation. Typically, most cost analyses in education focus on these measurable expenditures and ignore the more difficult measures of opportunity. The goal of this report is to move one step beyond past work and estimate these economic costs as well.

### Analysis of Expenditures

In considering expenditures for an assessment program, Picus (1994) provides both a comprehensive list of the elements needed to estimate the expenditures for any alternative assessment program and a list of ingredients that need to be considered in the identification of opportunity costs at the district and school level. On the expenditure side, he relies on Levin’s (1983) ingredients approach, identifying all of the individual items that are purchased as part of an assessment program and summing them to provide a complete picture of the total expenditures for the program. Picus uses a three-dimensional matrix to help identify all of these expenditures.

The first dimension of the matrix relates to the *components* of the assessment program, and includes such things as the development, production,

administration, and scoring of the test instruments. The second dimension has to do with the *level* at which the expenditures are incurred. Expenditures may be necessary at any one of a number of levels including the state, school district, school, or classroom, or even the private test market. The third dimension of this matrix deals with the specific *kinds* of items purchased for each component at each level, be it personnel, test materials, computer resources, or travel and food for training sessions.

Figure 1 is a matrix showing these three dimensions of *component*, *level*, and *kind* of expenditure. The cost of the resources needed for each of the ingredients of the program can be placed into different cells of this matrix. To get an accurate estimate of the expenditures for any assessment program, it is necessary to identify all of the components, levels, and kinds of expenditures that must be made. Brief definitions of these expenditure categories are provided below.<sup>2</sup>

**Development expenditures.** These expenditures are cash outflows for the purpose of developing performance assessment items. They will probably be high in the initial phase of performance assessment program development, but they can be expected to decrease as developers move up the learning curve and additional items are banked for future use. Development expenditures include all outlays for determining assessment design concept, task development, pilot studies, production, and on-going task development. Note that this study includes production expenditures in the development expenditure category since these two resource outflows were difficult to separate as distinct categories.

**Training expenditures.** These are cash outflows for the purpose of teaching individuals to administer, score, interpret, and use new assessment practices as instructional tools. Training expenditures are a function of the complexity of the assessment, the number of assessment items, and location of training sessions.

**Management expenditures.** These expenditures are cash outflows associated with coordinating and overseeing the development and implementation of the assessment program.

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<sup>2</sup> See Picus (1994) for more information on how expenditures and costs are measured.

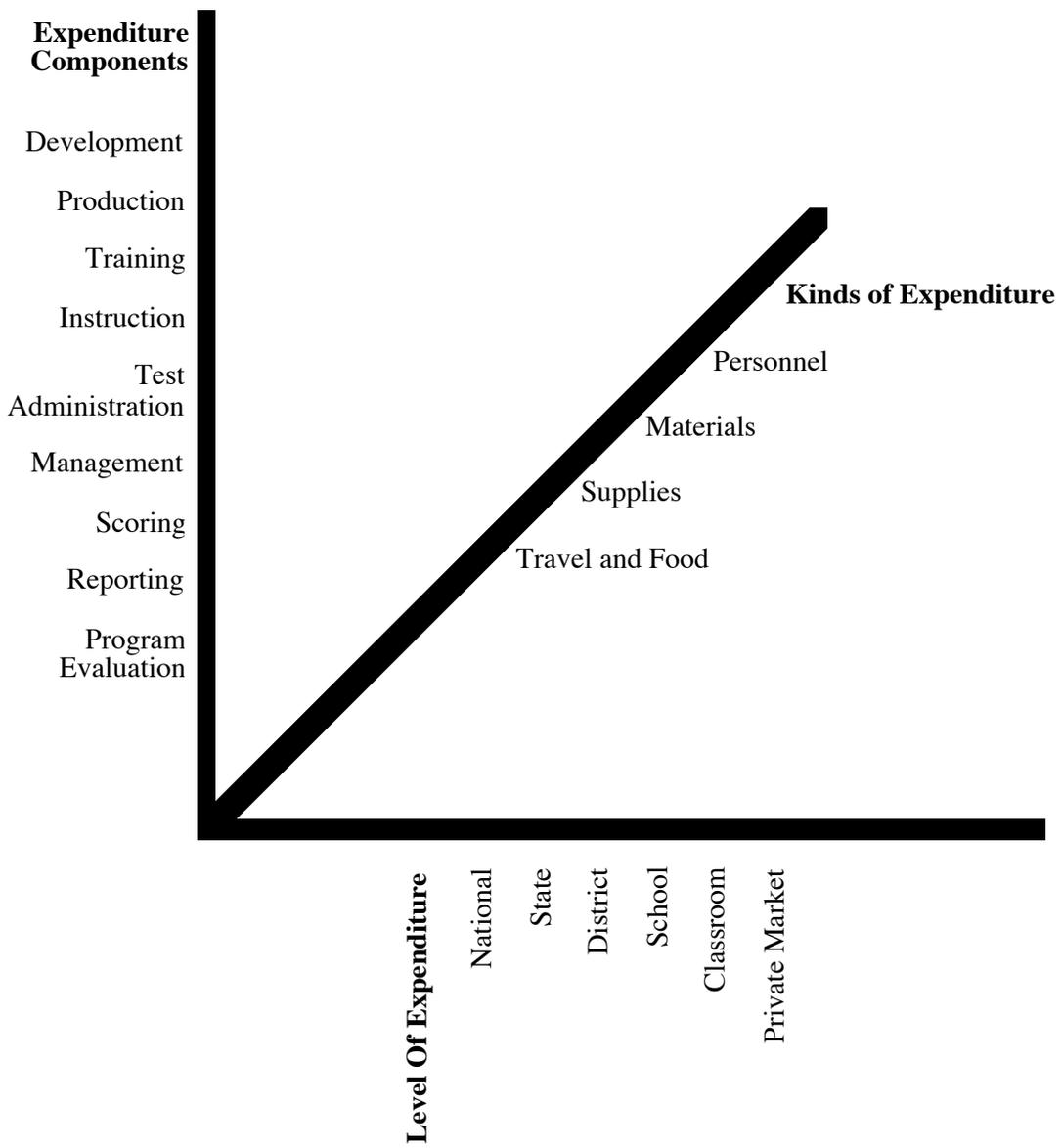


Figure 1. Expenditure dimensions.

**Test administration expenditures.** These are cash outflows for implementing the performance assessment. This includes delivery of the test and test materials to the test site, monitors and facilitators for the test, and delivery of test and test materials to the scoring site.

**Scoring expenditures.** These expenditures are cash outflows involved with scoring the performance assessment tests. Note that this does not include expenditures for development of scoring rubrics or scorer training. Development of scoring rubrics is included under the development expenditure category. Scorer training is included under the training expenditure category. Scoring expenditures are a function of the method of assessment, the number of assesses and assessors, the time for review, the complexity of the assessment instrument, and the region or population being tested.

**Evaluation expenditures.** These are cash outflows involved with assessing the strengths and weaknesses of the assessment instruments, including validity, reliability, and attainment of strategic goals.

**Reporting expenditures.** These expenditures are cash outflows involved with reporting performance assessment information. Stakeholders requiring information include students, parents, interested citizens, educators, evaluators, researchers, and administrators. Reporting costs are a function of the level of comparison (individual, school, district, state), the number of report recipients, congruence with existing reporting mechanisms, and the method of reporting results.

### **Analysis of Economic or Opportunity Costs**

The more difficult problem is development of estimates of the opportunity or economic costs associated with the assessment programs. As Picus, Tralli, and Tacheny (1995) point out, at the state level, analysis of expenditures provides an accurate estimate of the state-level costs of assessment. However, because state assessment systems, in many if not all instances, change the behavior of local school officials, it is important to understand how districts and schools respond to the assessment system and determine what changes in the way they operate are made. The most obvious place to identify the costs associated with new or alternative assessment programs is in the changes in behavior on the part of district personnel.

Generally not compensated by the state, central office staff, principals, and teachers may devote considerable amounts of time to the assessment program that previously was devoted to alternative activities. While it is not always possible to evaluate the benefits of such behavioral changes (the hope being that the behavioral changes associated with the assessment program will lead to improved student performance), it is possible to estimate how much time individuals spend in these activities and then estimate the value of that time. As the data below show, these costs represent the single largest component of the total costs of assessment programs.

Some 70 to 80% or more of total school district expenditures are for personnel (Picus & Fazal, 1995). Thus, it makes sense that most, if not all, of the opportunity costs a district experiences in implementing an assessment system will be in this area. Moreover, other expenditures are more likely to be budgeted and accounted for in the district's financial management system. Personnel costs, however, particularly those for school site administration and for teachers, will be the same regardless of what assessment activities are expected of those individuals. Thus, a district's assessment coordinator (if there is one) may be budgeted for as part of the assessment system and can be treated as a direct expenditure. However, the time spent by principals, counselors, teachers, school clerical staff and others on assessment matters are unlikely to be budgeted and accounted for as assessment expenditures, and will represent a substantial part of the "costs" of assessment.

For example, as detailed below, each school in Kentucky is expected to have an assessment coordinator. These individuals are typically counselors, teachers, or, in small schools, the principal him or herself. In no instance did we find a case where some portion of those individuals' salaries are accounted for under the assessment program expenditures. Rather, reporting of salary expenditures remains the same despite the change in responsibilities.

To estimate the value of the time spent on assessment activities by school district personnel, we relied on interviews and questionnaires that sought to measure the amount of time devoted to different assessment activities. These estimates, which varied widely, were then compared to the costs of an average teacher for each state, and aggregated to derive state wide estimates of the costs of state assessment programs. In both states, questionnaires were distributed to teachers who were directly impacted by the assessment program, while

interviews were conducted with both teachers directly impacted and teachers who were indirectly impacted due to the fact that they did not teach one of the grade levels and/or subject matters where the testing occurred. This issue is somewhat complicated in Kentucky since the state encourages schools to use old KIRIS multiple-choice and short-answer exams as “practice” for students in other grades, something that we found happens in most schools.

As the data presented below show, in both Vermont and Kentucky there was considerable variation in the time estimates provided by our relatively small sample of teachers. This variation leads to a fairly wide range in our cost estimates. Although more narrow estimates would be desirable, the estimates presented probably reflect the wide variation in the way assessments are implemented in different districts across a state. Similarly, the estimates that are provided do offer a good picture of the magnitude of these costs imposed by assessment systems.

### **Data Collection**

Four states were initially considered for analysis of costs related to developing and implementing alternative assessment programs: California, Kentucky, North Carolina, and Vermont. California and Kentucky were chosen because they had recently changed from more traditional testing systems to state-of-the-art alternative assessment programs. North Carolina, which has a more traditional assessment system, provides a baseline for the costs of rigorous traditional assessment programs. Finally, Vermont is unique in instituting a portfolio assessment system where none existed previously.

Our first work provided an analysis of state costs in Kentucky and North Carolina (Picus, Tralli, & Tacheney, 1995). California and Vermont were not included in this initial analysis. The California Learning Assessment System (CLAS), which was only administered for two years, was subsequently cut from the state’s budget. The tests which were eventually to provide individual, school, and district information on student learning using multiple-choice, short answer, essay, and performance assessment testing methods proved to be very controversial and funding for their continued support was vetoed by Governor Wilson in 1994. We made numerous attempts to obtain cost information from state officials. Unfortunately, our efforts corresponded with the period of greatest controversy making it impossible to meet with, and collect data from, officials of

the California Department of Education. When funding for future years was vetoed, we felt continued efforts would be both difficult and would not yield as valuable information as other potential avenues of study.

North Carolina has opted for a more traditional assessment system, although the testing program includes open-ended questions. This analysis did not include North Carolina because it is assumed that the majority of the new-assessment cost is state-level and, therefore, district- and school-level costs were not analyzed. The state level costs were analyzed in our earlier work (Picus, Tralli, & Tacheny, 1995). Due to the costs of travel to Vermont, we elected to include state costs in this report.

The information in this document on Kentucky and Vermont was gathered through a variety of sources. Data were collected from the following individuals:

- Employees in the State Department of Education,  
Chief state school officer,  
Director of assessment program,  
Other personnel involved in the development of assessment instruction, training, scoring, dissemination, and management;
- Officials of state fiscal and budget offices;
- Legislative staff,  
House education committee,  
Senate education committee,  
Fiscal committee staff,  
Legislative research or analysis staff;
- Representatives of education interest groups,  
Teachers,  
Administrators,  
Board members,  
Parents;
- Staff of independent task forces or commissions;
- Private sector representatives, such as test publishers.

Data were also collected through document review of budgets and program information, both internal and external. Copies of the teacher questionnaire that was used, as well as the interview protocols are included in Appendix A.

In both states, our estimates of the opportunity costs are based on estimates of time devoted to the assessment system in 1995-96. Consequently, the detailed estimates provided below are for the 1995-96 school year and may somewhat underestimate the costs of development. We believe, however, that they accurately reflect the total investment each state's K-12 educational system is making in assessment now that the systems are in place.

### **Unit of Analysis**

Expenditure comparisons are sensitive to the unit of analysis. Typically, expenditures are evaluated in terms of per pupil measures. In this analysis, however, expenditures are broken down by three different units of comparison:

- expenditure per student enrolled,
- expenditure per student tested, and
- expenditure per test administered.

Expenditure per student enrolled is the total expenditure for the assessment program divided by the number of K-12 public-school students in the state. Expenditure per student tested is the total expenditure divided by the number of students actually taking tests. Students were often given more than one test, so a final calculation gives the expenditure per test administered.

Some economies of scale can be expected. Assessment programs with more students involved will have smaller associated expenditure per student, expenditure per student tested, and expenditure per test administered because fixed costs can be distributed over more units. In addition, those involved with the new assessment methods can be expected to become more efficient with new methodologies over time. Flexer and Gerstner (1993) found that classroom teachers became more efficient with their time devoted to performance assessment as the school year progressed.

The time period evaluated is also important. Most development costs will occur at the beginning of implementation of a new program (Monk, 1993). Although development of testing items is continuous, the up-front costs are

significantly larger due to a learning curve on task and item development, and the initial need for a large number of items. The percentage of raw items that survive subsequent refinement and pilot testing can be expected to increase over time. As a task and item bank is filled, there is not the need to develop the large number of items required in the first years of program development and implementation.<sup>3</sup>

### **Basic Assumptions**

A number of basic assumptions are necessary before an analysis of this type can be undertaken. The basic assumptions for our cost estimates in Kentucky and Vermont are described in the following paragraphs.

#### **Assumptions About the Value of Time**

The first, and possibly most critical assumption in a study of this nature is how to value the time individuals spend on assessment activities. The most logical assumption is to value an individual's time at their salary. This makes a great deal of sense for time spent as part of an individual's job responsibility during work hours. If the time is spent outside of work, it might be more appropriate to use a figure that represents the value of lost leisure time. However, the use of a typically lower value for leisure time is a somewhat controversial issue. It is hard to determine what figure to use, and not all economists agree with the use of such a figure. Instead, they argue that the time should be valued at the same rate as work time.

For this study, all time spent on the assessment program, not specifically paid for by either the state or a local school district, is valued at the average wage of individuals holding the position being considered. That is, a teacher's time is valued at the average salary of teachers in his or her state, a principal at the average salary of principals, etc. The use of average salaries to estimate costs seems to make the most sense, because, regardless of where the time came from, it is being used to do what any educator would consider part of his or her job.

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<sup>3</sup> If the assessment instruments must be made public, the development costs increase dramatically. For example, Texas has estimated that the cost of making the items used on the Texas Assessment of Academic Skills public would cost the state \$6 million a year (Clark & Picus, 1995).

## **Assumptions About Salary Estimates**

The quality of the cost estimates presented here is directly related to the quality of the salary estimates used in the analysis. For the purpose of this study, we have relied on the data collected annually by the Education Research Service (ERS, 1996) on school personnel salaries. ERS data are provided on a regional basis rather than a state-by-state basis. Although this is something of a drawback, the ERS data are based on surveys of school districts to ascertain salary levels, and ERS provides not only an average salary for a greater range of educational positions than any other data source, but it also provides high and low estimates for many positions. These salary estimates are used in developing cost ranges for this study.

## **Assumptions About Time**

An equally important issue is how to treat time. Specifically, in the case of teachers, many of our estimates are based on hours spent on individual tasks. The obvious way to value those hours is to determine an hourly wage and use that figure. The problem is, what denominator do you use to estimate the value of a teacher's hourly wage? For the purpose of this study, we have assumed that a teacher works an average of 180 days a year, and an average of seven hours a day. This means that a teacher works 1,260 hours a year, and a teacher's hourly wage can be estimated by dividing the annual salary by 1,260.

There are valid reasons to disagree with the use of a 7-hour day. As a result, we also display estimates based on average hourly teacher wages calculated under the assumption of a six and a half-hour and an 8-hour day as well. The shorter the estimated work day, the higher a teacher's estimated hourly wage, and the greater the estimated cost of the time devoted to the assessment program.

A second issue is how to estimate the value of the time spent by other school personnel on assessment activities. Since all of our estimates of personnel time, other than for teachers, are based on percentages of time, we have simply used those percentage estimates to value the time spent on assessment activities by non-teacher school and district personnel. Thus, if we estimate that 10% of a superintendent's time is spent on assessment activities, then the value of that time is 10% of the average superintendent's salary in the state.

## **Assumptions About Number of Personnel Involved**

Since both the Kentucky and Vermont assessment programs do not impact all children each year, it is necessary to estimate how many teachers are actually involved in the testing program. Obviously, the estimated number of hours spent working on performance tasks, the KIRIS tests or the portfolios in either state is higher for teachers of grades where the assessments take place. To get a good estimate of the number of teachers at each grade level, counts of the number of students were used and teachers assigned on the basis of state reported pupil-teacher ratios. As a result, the counts of teachers directly impacted by the assessment may vary somewhat from actual practice. We are not aware of a better way to estimate the number of teachers involved.

These assumptions are used in the development of the cost estimates that follow. Other assumptions are identified in the discussion, if necessary.

## **Limitations and Delimitations**

In instances where programs that accomplish the same goals are compared, and each have identical efficiencies in their operation, expenditures provide an adequate basis for analysis and program comparison. If the benefits to be derived from the two programs differ, however, then this approach will overstate the cost of the program with greater benefits. For instance, if one assessment program provides greater student learning, the added benefits should be subtracted from total expenditures to account for the incremental benefit when its costs are compared to other assessment programs. Similarly, a reduction of negative effects, such as misuse of student and teacher time for extraneous testing, is an additional benefit that must be accounted for. To the degree that performance assessment is superior to conventional assessment, and the degree that performance assessment replaces prevailing counterproductive practices, some portion of the expenditures are absorbed. Totaling expenditures may overstate the social costs of implementing an assessment program. This analysis does not make assumptions about factors that may cause an overstatement of costs, if they exist. Rather, expenditures at the state-level are assumed to reflect state costs.

Numerous difficulties revolve around the determination of costs for educational services. Education project goals can be difficult to quantify (Haney,

Madaus, & Lyons, 1993), and they may be contradictory (Taylor, 1994). Opportunity costs associated with the time devoted to a new program are especially hard to determine. The opportunity cost of the additional time devoted to the new program should be determined for all participants: students, teachers, administrators, volunteers, and parents. Determining an opportunity cost for students, volunteers, and parents is especially problematic.<sup>4</sup> For the purpose of determining state-level costs, expenditures are assumed to adequately represent the cost of new assessment. However, estimates have been made of teacher-time devoted to the new assessment programs in order to determine the opportunity cost of additional time devoted to these programs. However, estimates of time devoted to the new assessments were not made for students, volunteers, and parents.

Monk (1993) points out two other problems with the use of expenditures as a proxy for costs in performance assessment programs. First, the involvement of the state may be viewed as a serious limit on the market's ability to efficiently produce the correct mix of educational outcomes. The state provision of resources to testing and assessment may not be the same as that which the free market would apply. Expenditures on performance assessment may not be aligned with social priorities, and reflect inefficiency in the use of public resources. Second, costs will be absorbed to the degree that performance assessment reform programs substitute for other educational practices. Economic costs may be overstated to the degree to which substitution effects occur in local staff development, use of classroom time for performance assessment, and the utilization of assessment information.<sup>5</sup>

Stecher (1995) reports that the costs of hands-on science assessments in which students construct, observe, measure, manipulate, and otherwise interact with objects and equipment are considerably higher than the costs of written

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<sup>4</sup> Haney, Madaus, and Lyons (1993) calculate the cost of student time devoted to testing and test preparation using net present value analysis. They use the net present value of foregone wages as the measure of opportunity cost of student time. Using foregone wages and net present value analysis is fraught with uncertainties, including the correct wage to be attached to student time, and the appropriate discount rate to be applied to the future cash flows. Similar problems occur with valuing volunteer and parent time.

<sup>5</sup> In-service training is generally provided to classroom teachers prior to and during the school year. New assessment training could become part of on-going in-service programs. With respect to classroom instruction, performance assessment can be integrated more easily into instruction, as opposed to being solely a testing function. To the extent that performance assessment provides good information to teachers and students, time may be saved from pointless testing practices.

constructed-response assessments. The added cost is primarily due to the additional equipment and materials needed for scientific experimentation. Therefore, the expenditures reported in this study do not necessarily reflect the resources needed to develop and implement assessment programs in other subject areas.

In summary, these expenditure numbers may be difficult to generalize to other state, local, and school assessment programs. Numerous variables preclude quick comparisons. Educational entities differ in number of students, current testing systems in place, and curriculum guidelines. In addition, the number of grades tested, the number and types of subjects tested, the types of assessment, and the information desired will all impact costs and expenditures for implementing new assessment programs.

Kentucky and Vermont have both implemented new comprehensive assessment systems. The Kentucky system replaced multiple-choice and short-answer testing methods with a combination of performance assessments, portfolios, and traditional open-ended and multiple choice tests. Vermont, which did not have state-level testing, implemented a portfolio assessment program. Although the Vermont program is voluntary, in keeping with the state's emphasis on local control, most schools in the state are using portfolio assessment as suggested by the state.

The assessment systems of Kentucky and Vermont are different in many respects. First, the Kentucky assessment program is mandated by the state, while the Vermont portfolio program is voluntary. Second, Kentucky mandates many more tests than Vermont does. Third, testing in Kentucky is explicitly used for school and district accountability, while testing in Vermont has been ostensibly used to improve teaching. For these reasons, comparisons must be made between the states cautiously. The analysis below separates the data for the two states.

## **KENTUCKY**

### **Background**

Kentucky's approach to assessment includes a combination of transitional multiple-choice and short-answer tests, which provide validity and stability, as well as performance assessments and portfolio requirements. One of the system's

goals is that the new authentic tests will promote better instructional practices as teachers teach to the new tests (Foster, 1991). Noncognitive indicators are also used to assess schools and districts.<sup>6</sup> An interim testing program was administered in the 1991-1992 school year which provided baseline data for determining future performance. Testing is mandatory in the 4th, 8th, and 12th grades. However, legislation in 1994 moved the 12th grade performance assessment to the 11th grade. In addition, beginning in 1995, the 4th-grade writing portfolio was moved to the 5th grade to reduce the demands on 4th-grade teachers who were having difficulty putting together both sets of portfolios for their students.

The assessment system currently used in Kentucky is one of nine components in a massive, system-wide program to reinvent the state's educational system. The Kentucky Supreme Court decision in *Rose v. Council for Better Education* in 1989 overturned the state's entire educational system and resulted in the state's legislature passing the Kentucky Education Reform Act of 1990 (KERA). KERA was organized around three major themes: curriculum, governance, and finance. KERA contains nine specific objectives for improvement (Legislative Research Commission, 1990):

1. assessment, rewards, and sanctions;
2. equalization of expenditures and prohibition of nepotism;
3. family resource and youth service centers;
4. pre-school programs;
5. primary school programs;
6. extended school services;
7. school-based decision making;
8. professional development; and
9. technology in education.

The first goal resulted in the creation of the Kentucky Instructional Results Information System (KIRIS) to develop a performance-based assessment program. The new assessment system includes portfolios in mathematics and

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<sup>6</sup> The following non-cognitive indicators have been identified as potentially informative (Kentucky Instructional Results Information System, 1993): attendance; drop out; retention; physical and mental barriers to learning; and transition to work, post-secondary education, and the military.

writing, and testing that involves the application of knowledge to real-life problems. Testing is mandated in the 4th, 8th, and 11th grades.

Test development committees were formed in each content area: reading, mathematics, science, and social studies. The committees were made up of classroom teachers, resource teachers, consultants, administrators, curriculum coordinators, university professors, Kentucky education association representatives, and Kentucky Department of Education personnel. The framework was taken from both the Kentucky learning goals and the National Assessment of Educational Progress (NAEP). The new assessment system was field tested. The basic elements of all of the test questions are developed by teachers, and then fine-tuned and field-tested by the staff of an outside contractor.

Kentucky has contracted with Advanced Systems in Management and Evaluation (ASME), a New Hampshire firm, to develop and manage the new statewide assessment system. The \$29.5 million, five-year contract was the largest of its kind in the United States (Viadero, 1994b). ASME has provided the bulk of the development responsibilities, although the Kentucky Department of Education provided some management resources, primarily in the form of personnel time. Development expenditures include both the resources for initial design and implementation of the assessment program, as well as expenditures for the continuous development of assessment items.

Training goals of test administration, scoring, interpretation, and use of assessment instruments in related instructional strategies overlapped in Kentucky. In particular, training in how to score the assessment instrument had a great deal of overlap with training in related instructional strategies related to the new program. The training to implement the new assessment system was pyramidal. Regional coordinators trained 15 to 20 cluster leaders in his or her region. The cluster leaders, in turn, trained the teachers at the school level.

Management of the new assessment program was primarily a function of Kentucky's Department of Education, which oversaw the progress of ASME. ASME, however, also had internal management functions.

Test administration, which includes the costs of delivery of materials both to and from school sites, as well as the personnel costs associated with test security, was the responsibility of ASME. Student portfolios are evaluated by teachers at the school site. ASME periodically checks the results for accuracy and reliability.

ASME provides all personnel, equipment, and supplies necessary to score the performance assessments, multiple-choice tests, and short-essay questions.

Students are classified into one of four performance levels (Kentucky Department of Education, ND). Students performing at Level I “do not have sufficient mastery of knowledge and skills in this subject area to be successful at the next grade level.” Students performing at Level II “demonstrate inconsistent mastery of knowledge and skills in this subject area and are minimally prepared to be successful at the next grade level.” Students performing at Level III “consistently demonstrate mastery of grade level subject matter and skills and are well prepared for the next grade level.” Students performing at Level IV “perform in a superior manner clearly beyond that required to be proficient at grade level work.”

The assessments are not used to make student-level decisions, although students learn their scores. The test results are used to assess how well schools are doing. Assessment results are used to guide the system of rewards and sanctions at the school level. The state is undertaking two independent evaluations of the new assessment system. One is by the legislature’s Office of Accountability and the other is by Western Michigan University and Kentucky Institute for Education Research in Frankfurt.

Assessment results are reported at the student, school, and district levels. Student reports include item-level reports for multiple-choice items in each of the four content areas, item-level reports for performance-based tasks, student summary reports, and parent letters. Initial reports were not made on the writing portfolio performance. At the school and district levels, a single student assessment curriculum report is prepared with numbers and percentages of students at each performance level in each curricular area.

In Kentucky, testing is used for school and district accountability. Each school has a “threshold” and a “baseline” for test results, which determine rewards or sanctions:

- Schools with achievement greater than 1% above the threshold receive a financial reward;
- Schools with achievement below the threshold, but above the baseline are required to develop an improvement plan;

- Schools with achievement ranging from the base line to 5% below the baseline are assigned a “distinguished educator” to develop a plan; and
- Schools with achievement more than 5% below the baseline are placed on probation.

School and district evaluations are based on both cognitive and non-cognitive indices. The cognitive measures are student test scores. Test scores are reported at the student, school, and district levels. The non-cognitive measures include attendance, drop-out rates, and proportion of successful post-graduate transitions.

Tables 1, 2, and 3 summarize our earlier findings on the state level expenditures for the Kentucky assessment program. Table 1 shows our estimate of annual state level expenditures between 1991-92 and 1995-96 for the Kentucky assessment system by component as identified in the framework. Table 2 provides a percentage breakdown of these figures, showing that the two largest uses of funds went to development and scoring. Noteworthy in these data are the increases in scoring costs as the system comes on line, and the decreases in expenditures for management as the state becomes more familiar with the operation of the assessment program, and fewer resources need to be devoted to managing the entire testing program. Table 3 shows that between 1991-92 and 1994-95 the state spent an average of \$10.84 per student enrolled for assessment. When only the students actually tested are considered, the state spent an average of \$45.70 per student tested, and an average of \$7.51 per test actually administered.<sup>7</sup>

### **Cost Analysis**

The new assessment system in Kentucky replaced a system that relied solely on traditional testing. The old system used the CTBS, Benchmark 4 Version, in the 3rd, 5th, 7th, and 10th grades. As discussed earlier, KERA established a new system of student evaluation. The new assessment system consists of three parts: the KIRIS short-answer and multiple-choice testing, performance tasks, and student portfolios.

For our analysis of local district expenditures and costs, we analyzed local school district budgets, and surveyed district personnel to ascertain how the

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<sup>7</sup> For more details on these figures, see Picus, Tralli, and Tacheny, 1995.

Table 1

## Kentucky State-Level Component Expenditures (Thousands of \$)

Component	1991-92	1992-93	1993-94	1994-95	1995-96	5-year total
Development	1,247	1,855	2,020	2,158	2,271	9,551
Training	216	391	925	990	1,042	3,564
Management	1,394	1,382	1,513	150	235	4,674
Test administration	501	654	713	763	804	3,436
Scoring	895	1,580	2,233	2,387	2,513	9,608
Evaluation	25	27	30	32	0	114
Reporting	<u>424</u>	<u>436</u>	<u>476</u>	<u>509</u>	<u>536</u>	<u>2,380</u>
Totals	4,703	6,325	7,910	6,989	7,401	33,327

Source. Picus, Tralli and Tacheny, 1995.

Table 2

## Kentucky Performance Assessment State-Level Component Expenditures Percentage (%)

Component	1991-92	1992-93	1993-94	1994-95	1995-96	5-year avg.
Development	27	29	26	31	31	29
Training	5	6	12	14	14	11
Management	30	22	19	2	3	14
Test administration	11	10	9	11	11	10
Scoring	19	25	28	34	34	29
Evaluation	1	0	0	0	0	0
Reporting	<u>9</u>	<u>7</u>	<u>6</u>	<u>7</u>	<u>7</u>	<u>7</u>
Totals	100	100	100	100	100	100

Source. Picus, Tralli and Tacheny, 1995.

Table 3

## Kentucky Expenditure Per Student Enrolled Expenditure Per Student Tested Expenditure Per Test Administered 1991-92 to 1993-94

Component	1991-92	1992-93	1993-94	3-year total
Average daily enrollment	569,713	582,054	594,859	1,746,626
Number of students tested	131,250	140,000	143,100	414,350
Total tests administered	787,500	840,000	892,500	2,520,000
Total assessment cost (\$)	4,702,561	6,325,094	7,909,988	18,937,643
Cost per student enrolled (\$)	8.25	10.87	13.30	10.84
Cost per student tested (\$)	35.83	45.18	55.28	45.70
Cost per test administered(\$)	5.97	7.53	8.86	7.51

Source. Picus, Tralli and Tacheny, 1995.

assessment system was implemented in their district, and to understand how much time was devoted to assessment activities. With the exception of the largest districts in the state, few expenditures were actually accounted for under the budget category “assessment.” For example, in one district of 4,500 students, the total budget for assessment amounted to only \$19,000. The balance, obviously, was funded in staff assignments accounted for under different budget categories.<sup>8</sup>

It was often difficult for central office staff to identify the proportions of their time devoted to different parts of the assessment system. Teachers had similar difficulties, although with some effort, they were able to provide answers to our survey form. As a result, in the sections that follow, we begin with estimates of the time spent by teachers for assessment activities. Although Picus’ (1994) conceptual framework identifies a number of cost categories, we were, in reality, only able to distinguish among four different cost categories with the data we collected. Specifically, the discussion that follows includes an analysis of costs in the following general categories:

1. development
2. management
3. test administration and scoring
4. evaluation and reporting

We begin with an analysis of personnel time for each of these categories, follow with an estimate of the costs of that time, and conclude with some estimates of where teachers and other personnel found the time they estimate they spend on the Kentucky assessment system.

### **Estimates of Personnel Time**

Our cost estimates are derived by totaling the estimated number of hours spent by teachers, aggregating those figures to the state level, and combining them with our estimates of central office staff resources devoted to assessment to arrive at estimates of the total cost of staff time devoted to the Kentucky assessment system at the district level. These figures are combined with the

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<sup>8</sup> For estimates of the time assignments see the section on test administration.

state level data in Tables 1, 2, and 3 to develop a total estimated cost for the Kentucky assessment system for the 1995-96 school year.

To understand the true costs of the assessment system, we interviewed district office staff, school principals, counselors, and teachers to determine the number of hours per year they spent on the KIRIS test, the performance task assessment, and the portfolios. In addition, a survey (see Appendix A) was administered to a number of teachers to get a better sense of both the time they spend on assessment activities, and what activities they modify to find that time. Estimates of time spent by other district and school officials are also provided in these sections.

### **Development and Training**

**Teachers.** Table 4 provides an estimate of the time spent by teachers in 1995-96 for preparation of assessment materials and for training. There was a substantial range in the estimated number of hours spent by teachers in material preparation and training. As a result, we provide both the average and median number of hours reported by teachers. The large difference between these numbers is attributed to a few outliers, i.e., a few teachers that spend significantly more time on the new assessments than do most of the other teachers.

As the data show, teachers spent the fewest number of hours on the performance tasks, which is not surprising since these tests are administered over a period of one or two days by state personnel who come to the local school site. However, most teachers also indicated that the use of performance tasks as part of the testing program has changed their teaching and testing strategy considerably, focusing more on performance tasks and less on traditional multiple choice tests and quizzes. It seems possible that the estimates of time spent on the performance task preparation and training may underestimate the true amount of time spent by teachers if they did not include the changes in their own teaching strategies resulting from the performance task component of the assessment system.

More teacher time is spent on the KIRIS multiple choice and short answer tests and on the portfolios for materials and training. As Table 4 shows, the median time spent on the KIRIS test for preparation of materials was 37.5 hours and another 6 hours for training. For the portfolio tests, the median was 27.5 hours for material preparation and 7.5 for training.

Table 4

Reported Annual Hours Spent Preparing Assessment Materials and Training by Kentucky Teachers, 1995-96

Category	Hours per teacher by test		
	KIRIS	Performance tasks	Portfolios
Preparing assessment materials			
Average hours per year	72.2	76.2	73.9
Median hours per year	37.5	6.0	27.5
Training			
Average hours per year	23.4	38.2	19.3
Median hours per year	6.0	3.8	7.5

These figures represent a substantial amount of time. It should be remembered however, that they were derived from teachers in the 4th, 5th, 8th, and 11th grades, where the testing takes place. It is highly unlikely that other teachers spend as much time on the assessments as these teachers do. Estimates of time spent by other teachers are provided below in the general cost section where total time is estimated and costs analyzed.

**Other school staff.** Each school is required to have an assessment coordinator. These individuals are generally counselors who devote part of their time to assessment issues. Most of their time is focused on test administration, although in our interviews they indicated that they often participate in training activities and are asked to provide information to the state as it seeks to improve the system. In general, this amounted to no more than 5% of their time. Similarly, principals' time was generally focused on test administration and reporting issues, and less on development and training issues now that the assessments are well established. They estimated that approximately 5 to 7% of their time is devoted to material preparation and training.

## Management

At the state level, virtually all of the management expenditures are within Kentucky's Department of Education, or a part of the ASME contract costs. While the Department of Education did not hire additional personnel to perform

the various management tasks related to the new assessment program, an expenditure is associated with the time that employees redirect to the new assessment function. ASME expenditures were 74% of expenditures in 1991-1992, 80% of expenditures in 1992-1993, and 83% of expenditures in 1993-1994. Conversely, Kentucky Department of Education personnel time and materials dedicated to the new assessment program accounted for 26%, 20%, and 17% of resource outflows over this time period (Picus, Tralli, & Tacheny, 1995). The largest component of Department of Education expenditures was for employee salaries and fringe benefits, which accounted for more than 80% of their expenditures in the first three years.

The state-level expenditure figures in Table 1 for 1994-1995 and 1995-1996 reflect ASME contract expenditures, and estimated management expenditures for the Kentucky Department of Education. State Department of Education costs are based on analysis of the department's budget and discussions with staff as to the portion of responsibilities devoted to the KIRIS system. The state-level assessment costs represent a very small portion of total state K-12 education expenditures. For example, in 1993-94, the \$7.9 million spent on assessment represented less than one-half of 1% (0.45%) of state K-12 education expenditures, and 0.28% of total school district revenue.

The most obvious management costs to be anticipated at the district level are for the time of school superintendents. While it is hard to get an accurate portrayal of how much time each superintendent in the state spends on assessment, the individuals we interviewed indicated that they spent approximately 10 to 12% of their time dealing with assessment issues. Among the activities they identified as being part of their assessment related activities were the following:

- talking with both staff and the general public about the assessment and its importance to Kentucky education;
- working with staff on the implementation of the different assessment instruments and considering their impact on district curriculum;
- developing their district's approach to dealing with the assessment;
- understanding the results and their importance for improving instruction.

One superintendent provided a more specific breakdown of his time allocations which yielded the following detailed estimate of how the 10 to 12% was actually distributed.

- 4 to 5% for “conceptual work”
- 2% is spent for working directly with personnel on assessment related issues. He said the reason “this is so low” is that he delegates a lot of that responsibility to other district level staff, saying, “I’m the lead person, and they follow through.”
- 3 to 5% is allocated for public relations activities, which he indicated is most when the results are reported each year.

For the purpose of this analysis, superintendent time is considered management. The estimates of the costs of this time as part of the assessment system are provided below in the cost summary section.

Very little teacher time, if any, is spent on management functions, per se. While there are a number of “management” type tasks associated with insuring that the tests are administered properly and that the scores reported, these are, in reality costs of administration and are accounted for in the next section on test administration.

### **Test Administration**

**Teachers.** There are three major components of Kentucky’s assessment system. The multiple choice and short-answer examinations are commonly referred to as the KIRIS test, and are administered by ASME for the state. While there are a number of expenditures related to the KIRIS test at the state level, including the contract with ASME, a great deal of the administration and implementation of the KIRIS tests is done by officials of local school districts who must insure that all of the children are tested and abide by the rigid security procedures put in place to insure the integrity of the tests. These activities consume a considerable portion of the time of central office staff as well as of staff at the school sites.

Portfolio assessment is coordinated primarily at the school level. The state audits the portfolio scores in a sample of schools, but the bulk of the work in developing and scoring the portfolios is done at the school sites. Table 5 shows that for our sample of teachers the median number of hours spent on portfolios was 41 hours a year, 40 hours working with students, and one hour dealing with

Table 5

Reported Annual Hours Spent Working With Students and  
Administering Required Assessments by Kentucky Teachers, 1995-96

Test	Hours per teacher by test		
	KRIS	Performance tasks	Portfolios
Working with students			
Average hours per year	122.9	90.7	130.0
Median hours per year	37.5	12.5	40.0
Administering test			
Average hours per year	46.7	19.3	49.2
Median hours per year	18.0	3.0	0.0
Other administrative			
Average hours per year	45.0	19.1	20.3
Median hours per year	6.0	0.0	1.0

administrative tasks. In addition to these time estimates from teachers who are assigned grade levels and/or subject matter courses where portfolios are required, time must also be allocated for other teachers who provide some portfolio materials for students and who help score the portfolios. In our sample districts, we found that in all instances where departmentalized instruction took place, teachers in courses where portfolios were not required (all non-math and English classes) were required to work with their students to provide one portfolio sample to the teachers of math and English. This helped spread the workload somewhat, but did not absolve the math and English teachers from spending considerable amounts of time putting the portfolios into final form with the students.

The KIRIS tests also consume a great deal of teacher time. Table 5 shows that the median number of hours spent working with students on matters related to the KIRIS tests was 37.4 hours a year. Another 18 hours per year were spent administering the test, and some 6 more related to administrative issues.

Although the median number of hours per year spent dealing with performance tasks was considerably smaller, there were still a total of 15 hours per year per teacher devoted to working with students and providing help in the administration of the tests. Since the tests are given by state personnel, this time is actually time spent identifying the students who will take the test, and adjusting

instructional activities to accommodate the fact that some students are missing from class and in the case of teachers forced to shift to another classroom due to the testing taking place in their regular classroom, adjustments for that inconvenience (which most indicated was not a major problem).

Whether looking at the average or the median values, teachers are clearly spending considerable classroom time working with students and administering the mandated Kentucky assessments. Although teachers are compensated for their time in the classroom, this time can still be seen as a cost since this is time that can potentially be used for other curricular purposes.

One thing that was clear from our interviews was a general concern among teachers about the amount of time spent on the assessment system, particularly the portfolios. Many of the teachers we interviewed expressed concern that the focus on portfolios reduced the amount of time available for content. They generally felt it would be better to cover more of the curriculum content of their course material, and spend less time on the portfolio work, which many indicated was very repetitive for students seeking to make a piece of school work of sufficient quality to put into his or her portfolio.

There were fewer concerns with the more traditional KIRIS testing program, although one of the schools we visited had just received permission to administer the CAT-5 test to all its students. They did this because they did not feel that the parents were getting enough information under KIRIS, and because their teachers wanted more information as well.

**Other school site staff.** In addition to the time spent by teachers, it is necessary to account for the time other school and district level personnel spend on the assessment system. Each school in Kentucky is required to have an assessment coordinator. In most schools, this individual is one of the school's counselors. In smaller schools, the principal often holds this position. Our interviews indicated that counselors who serve as assessment coordinators estimate that 20 to 25% of their time is focused on the administration of the three components of the assessment system, and most of that on the KIRIS tests. The least demanding of the three assessments on local school staff is the performance tests which are generally administered by the state and only require the school staff to provide a room for the assessments to take place, and to insure that the students randomly selected are available at the right times.

Principals estimated that they spend approximately 20% of their time on assessment administration activities. One principal we interviewed also served as her school's assessment coordinator. She indicated that she spends approximately 30% of her time devoted to administering the assessment system in her school.

**Central office staff.** Central office staff spend considerable time on assessment activities as well. For example, in the district where we were able to spend the most time, the director of curriculum and staff development estimated that she spends approximately 25% of her time on assessment, the district's two curriculum coordinators spend approximately 15% of their time each on assessment. The director's secretary spends approximately 30% of her time on assessment, and the district's pupil personnel coordinator spends some 10% of his time on assessment activities. Even the district's assistant superintendent for business indicated that a small portion of his time was spent on assessment issues, although it was less than 5%. None of this is accounted for in the district's assessment budget, which for this district was only \$19,000 a year, but in other parts of the district's central office budget.

In our interviews, these general estimates seemed relatively consistent across districts. The only exception we would expect to find is that in the largest districts in the state, it is likely that a full-time assessment coordinator or staff member may be employed to manage the assessment activities of the district. In that case, it is likely that the expenditures for those individuals would be accounted for under assessment in the districts' budgets. For the most part, given the relatively small size of the average Kentucky district, the model described above seems to be the observed pattern.

It is difficult to divide the time central office staff spend on the various components of the assessment system as identified in the conceptual framework. Consequently, all of these costs are identified under test administration.

## **Scoring**

**Teachers.** For this study, teachers were surveyed to determine the number of hours per year they spent scoring the KIRIS Test, the performance task assessment, and the portfolios. Table 6 lists the number of hours per year that teachers spent scoring each type of assessment. As Table 6 shows, there is a large difference between the average hours per year and the median hours per

Table 6

Reported Annual Hours Spent Scoring Assessments by Kentucky Teachers, 1995-96

Test	Hours per teacher by test		
	KIRIS	Performance tasks	Portfolios
Average hours per year	40.3	45.6	50.2
Median hours per year	0.0	0.0	27.5

year that teachers spent on scoring the assessments. The KIRIS test and performance task numbers showed a very skewed distribution. While most teachers indicated that they spent no time scoring the KIRIS tests and performance tasks, which was to be expected as it is not their responsibility, other teachers indicated significant time spent on scoring these two types of tests. It is not clear why they indicated this was the case. Most teachers indicated that they spent at least some time scoring student portfolios. Since the teachers who were asked to respond to our questionnaire were those working in areas where portfolios were required, we anticipate that these numbers represent the variation in scoring time for teachers who are responsible for portfolio development.

In the middle and high schools that we visited, all used one of their pupil free days to score portfolios. All of the teachers would meet in the school library (or other facility) and spend the day scoring portfolios. The teachers we interviewed indicated that it took them an average of one hour per portfolio that was scored.

**Other staff.** Principals indicated that they spend a considerable amount of time dealing with the assessment results, both in terms of working with their staff to improve instruction based on the results, and in talking with parents who are interested in the test results. They estimated that they spend approximately 5 to 10% of their time on these tasks. Assessment coordinators spend somewhat less time on these tasks, focusing on working with teachers to interpret the results, but having less contact with the public. They estimated that approximately 5% of their time is devoted to these tasks.

## Estimating Opportunity Costs From Personnel Time

The first step in estimating the opportunity costs associated with the Kentucky assessment program is to estimate the value of the time spent by district personnel on assessment activities. These time estimates combined with estimates of the salaries of different personnel categories are combined and aggregated across the entire state to provide rough estimates of the value of the time spent on the assessment program. The estimates provided below show ranges of costs. While more precise estimates would be desirable, short of interviewing all educational personnel in the state, a perfectly accurate estimate is impossible. Given the relatively limited resources for this study, the sample collected is used instead to provide a state estimate. A number of assumptions are necessary to reach the conclusions provided below. As a result, cost estimates are provided as ranges of values.

### Estimating the Opportunity Costs of the Kentucky Assessment Program

Table 7 summarizes the salary values used to estimate the value of time spent by school personnel in 1995-96. In addition to these figures, benefits were estimated at a rate of 15% of salary for all staff. Tables 8A and 8B summarize the

Table 7  
1995-96 Salary Estimates Used in This Analysis

Position	Salary estimate (\$)		
	Average	Low	High
Superintendent*	93,908		
Assessment directors*	57,513		
Other central office staff	44,487	35,858	54,035
Clerical staff*	20,000		
Principals			
Elementary	54,769	48,744	59,591
Intermediate	57,944	54,128	61,072
High School	62,852	58,947	65,462
School assessment coordinator	37,372	27,508	45,522
Teachers	32,217	23,102	45,197

\* Salary Categories for which only the average was reported.

Source. ERS (1996).

distribution of staff time to the various components of the assessment system as described above. Table 8A summarizes the median reported teacher estimates of time spent on assessment tasks for 1995-96. Medians are reported here, and used in the following analysis because the wide variation in the teachers' estimates of the time spent on various activities led to highly skewed distributions as shown in Tables 4 through 6.

Table 8A breaks the teacher time estimates into a number of different categories. The values in each column represent the different components of the assessment system and correspond to the parts of the previous section: development, test administration, and scoring. Management does not appear in this table because management tasks were assigned to superintendents only as described above.

Table 8A  
Summary of Median Estimated Teacher Time Devoted to the Kentucky Assessment Program, 1995-96: Number of Hours Per Year by Cost Component and Assessment Instrument

Grade level	Estimated number of hours per year by component						Scoring	Total
	Development		Test administration					
	Prepare materials	Training	Working with students	Administering test	Other admin. tasks			
<b>KIRIS</b>								
Elementary	7.5	5.3	17.5	4.5	0.0	0.0	34.8	
Intermediate	78.0	6.0	39.0	15.0	32.0	0.0	170.0	
High school	36.0	18.0	39.0	21.0	19.5	0.0	133.5	
<b>Performance tasks</b>								
Elementary	4.3	3.8	12.0	39.0	0.0	3.8	62.9	
Intermediate	20.0	6.0	20.0	2.0	0.0	8.0	56.0	
High school	2.0	0.0	8.0	0.0	0.0	0.0	10.0	
<b>Portfolios</b>								
Elementary	48.0	9.8	146.0	20.0	3.0	28.0	254.8	
Intermediate	30.0	6.0	30.0	0.0	0.0	30.0	96.0	
High school	25.0	6.0	25.0	0.0	12.0	25.0	93.0	
<b>Total</b>								
Elementary	59.8	18.9	175.5	63.5	3.0	31.8	352.5	
Intermediate	128.0	18.0	89.0	17.0	32.0	38.0	322.0	
High school	63.0	24.0	72.0	21.0	31.5	25.0	236.5	

In addition to displaying teacher time estimates by component, Table 8A also divides these estimates into the three parts of the Kentucky assessment system: the KIRIS short-answer and multiple-choice tests, the performance tasks, and the portfolios. These estimates are further broken into estimates at the elementary, intermediate, and high school levels, and totals across the three parts are also provided. Totals by row for each level and each part of the system, as well as the total system are provided in the right-hand column of Table 8A.

The figures in the bottom right corner of Table 8A show that the median time spent on the assessment system amounts to 352.5 hours for elementary teachers, 322.0 hours for intermediate teachers, and 236.5 hours for high school teachers. This represents a substantial amount of time devoted to assessment activities, and suggests that the costs of the assessment system are dramatically higher than a simple review of budget appropriations indicates. On the basis of a 7-hour day and 180-day year, this represents 28% of an elementary teacher's time, 25.6% of an intermediate teacher's time, and 18.8% of a high school teacher's time. It should be pointed out here that these figures are for teachers in grades where the portfolio and KIRIS testing are required.

Table 8B summarizes the estimates of other central office and school site staff time by component. As indicated above, central office staff time has been allocated entirely to test administration since it is difficult to break the figures down any further. As with the teachers, the column summarizing the range of total time spent on the assessment program shows that it consumes a considerable portion of many individuals' time.

### **The Cost of Teacher Time: Estimates for One Teacher**

Tables in Appendix B provide a variety of estimates of the total opportunity costs for one teacher. Tables B1 through B3 assume that teachers earn the average salary in Kentucky of \$32,217 per year, and benefits average 15% of salary. Table B1 assumes a 7-hour day, 180 days a year, which translates into an hourly cost of \$29.40 per hour for salary and benefits. Table B2 displays the same data, but for the low range of Kentucky teacher salaries of \$23,102, or a total of \$21.08 per hour for salary and benefits. Table B3 is identical to the first two, only it uses a high salary estimate of \$45,197, or an hourly rate of \$29.40 for salary and benefits. Tables B4, B5, and B6, identical to B1, B2, and B3, only they

Table 8B

Estimated Percentage of Time Devoted to Components of the Kentucky Assessment System by Central Office Staff and School Site Personnel, 1995-96

Personnel category	Estimated percentage of time devoted to each component (%)									
	Development		Test administration		Scoring		Management		Total	
	Low	High	Low	High	Low	High	Low	High	Low	High
Central office										
Superintendents							9	12	9	12
Assessment coord. <sup>a</sup>			25	30					25	30
Curriculum coord.			12	17					12	17
Pupil personnel			10	12					10	12
Clerical			30	35					30	35
School site										
Principals	5	7	20	30	5	10			30	47
Assessment coord.	5	7	20	25	5	10			30	42

<sup>a</sup> Assumes the district does not have a full time assessment coordinator.

assume an 8-hour day, and Tables B7, B8, and B9 are the same again, with the assumption of a 6.5-hour day.

Table 9 provides a summary of the data presented in Tables B1 through B9 for total opportunity costs of one teacher under the various assumptions represented. Table B1 shows that at the average teacher salary, and an assumption of a 7-hour day, the opportunity costs for one teacher for all three components of the Kentucky assessment system range from a low of \$6,954 for a high school teacher to \$10,365 for an elementary teacher. For the latter, the bulk of this opportunity cost is in the portfolio assessment program. Interestingly, higher costs occur for the KIRIS test at the intermediate and high school levels. This is most likely because, in schools with departmentalized instruction, effort undertaken to administer KIRIS is much more extensive than in elementary schools where students can simply sit for the test in their own classroom.

Table 9

Summary of Total Opportunity Costs for One Teacher for the Kentucky Assessment System

Table	Hours/day	Salary level (\$)	Hourly salary & benefits <sup>a</sup> (\$)	Opportunity cost for one teacher (\$)		
				Elementary	Intermediate	High school
9A	7	32,217	29.40	10,365	9,468	6,954
9B	7	23,102	21.08	7,433	6,789	4,987
9C	7	45,197	41.25	14,541	13,283	9,756
10A	8	32,217	25.73	9,069	8,285	6,085
10B	8	23,102	18.44	6,503	5,941	4,363
10C	8	45,197	36.09	12,723	11,623	8,536
11A	6.5	32,217	31.67	11,162	10,197	7,489
11B	6.5	23,102	22.71	8,004	7,312	5,370
11C	6.5	45,197	44.42	15,660	14,305	10,506

<sup>a</sup> Assumes a benefit rate of 15% of salary.

If the assumptions regarding teacher salary change, or if one assumes a longer or shorter work day for teachers, these figures will be different, as shown in the other eight tables in this set. For example, the highest estimates are derived from assuming a 6.5-hour work day for teachers and an average salary of \$45,197 (Table B9). In this case, estimated opportunity costs for an elementary teacher of \$15,660 are more than twice those for the same teacher using an average salary of \$23,102 and an 8-hour work day. Similar differences occur at other grade levels.

### The Cost of Teacher Time: Estimates for All Teachers

**Teachers of Grades 4, 5, 8, and 11.** To estimate the total opportunity cost of teacher time for the Kentucky assessment system, it is first necessary to estimate the number of teachers impacted by the assessment system and then determine the estimated total cost. Not all teachers are directly impacted, so it is necessary first to estimate the number with assignments in grades and/or subject fields where the impact of the assessment system is the greatest. In 1995-96, this would be the 4th- and 5th-grade teachers (with portfolio responsibilities), 8th-grade teachers, and high school teachers of math and English. To estimate the number of teachers, we relied on imputation based on the pupil-teacher ratio as

reported by the National Center for Education Statistics, and grade-level enrollment data provided to us by the Kentucky Department of Education.<sup>9</sup>

For 1995-96, the estimated pupil-teacher ratio in Kentucky is 17.6 pupils per teacher. There are a total of 50,008 pupils in 4th and 50,231 pupils in 5th grade. Using an average of 17.6 to 1, this means that there were approximately 5,695 teachers responsible for portfolios in the 4th and 5th grades.<sup>10</sup> Using the same logic, there are an estimated 2,988 8th-grade teachers (52,581/17.6). Estimating the number of high school teachers responsible for math and English classes is more complex. To estimate the number of teachers impacted directly by the portfolios, we estimated the total number of high school students (grades 9 through 12) in the state and divided that by the pupil-teacher ratio of 17.6 to 1. This resulted in a total of 11,158 high school teachers. However, not all of these individuals teach math and science to 11th graders. In our site visits, we found that approximately 11 to 12% of teachers in an average high school taught math and approximately 15% taught English. Using an estimate of 25% of high school teachers leads to an estimated 2,789 high school teachers across the state who deal on a regular basis with the portfolios and other assessments.

The problem with these estimates is that they are based on what appears to be a very small class size of 17.6 pupils per teacher. Most teachers we interviewed indicated that class sizes were 24 or 25, or even higher. This discrepancy is not surprising, nor is Kentucky different from other states in finding such differences. It is the result of differences in teacher assignments. When special education programs, alternative assignments, and other factors are considered, larger class sizes are common. Picus (1994) analyzed the 1987-88 Schools and Staffing Survey and found that, across the United States, the pupil-teacher ratio calculated from pupil and teacher counts by district and school averaged around 16 to 1, but that teacher self-reported class size averaged approximately 50%

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<sup>9</sup> One of the problems we encountered in estimating the number of teachers who are impacted by the assessment system is the different ways in which intermediate programs are offered. Some school districts have K-8 elementary schools, while others use either middle or junior high schools. More important than the name or type of school is the way instruction is organized. It is the eighth grade that causes the most difficulty as schools with departmentalized instruction are likely to treat the testing process differently than are schools with self-contained classrooms for the eighth grade. Moreover, many schools use a combination of the two arrangements making a complete picture nearly impossible. Consequently, for this analysis, we use the same pupil-teacher ratio method for estimating the number of teachers at the eighth grade as is used for the fourth and fifth grades.

<sup>10</sup> This was calculated as follows:  $(50,008 + 50,231) / 17.6 = 5,695.4$ .

higher, or 24 to 1. Given that teachers tended to report class sizes of approximately 24 to us during our site visits, and the averages found by Picus, the estimated number of teachers by grade level were recalculated also using the 24 to 1 pupil-teacher ratio. This resulted in approximately 4,177 4th- and 5th-grade, 2,191 8th-grade, and 2,046 high school teachers. In the estimates that follow, the number of teachers estimated with the lower pupil-teacher ratio of 17.6 to 1 represent a high cost estimate, and those calculated 24 to 1, a low cost estimate.

The range of cost estimates by grade level, test type, and activity are displayed in 18 tables in Appendix C. Table 10 provides a summary of the different estimates used in each of the 18 tables in Appendix C. Table 11 summarizes the total opportunity costs for each of the 18 options presented in the tables in Appendix C. Table 11 shows that the estimated range of opportunity costs for teachers varies from a low of \$49.1 million (Table C10), to a high of \$161.2 million (Table C17). The difference, which is substantial, is due to the considerable differences in the estimates of teacher salary, number of hours in a teacher's work day and the pupil-teacher ratio used to generate each total. If only the average teacher salary of \$32,217 is used, then the total opportunity costs vary from a low of \$68.5 million (Table C8) to a high \$114.9 million (Table C13).

Perhaps more interesting than these totals is the distribution of the opportunity costs across grade levels and individual test instruments. Table 11 shows that the single largest component of these opportunity cost estimates is for the portfolios at the elementary grades. The single most important reason for this is that beginning in 1995-96, the portfolios were done in the 4th and 5th grades. As a result, there are approximately twice as many elementary teachers involved on a regular basis with the portfolios at the elementary level than there are at either the intermediate or high school levels.

In addition, elementary teachers indicated that they spend considerably more time on portfolios than do their intermediate and high school counterparts. This is likely the result of the self-contained nature of elementary instruction compared to the more frequent use of departmentalized instruction at the intermediate and high school levels. As we learned in our site visits, most middle and high schools rely on teachers outside of the math and English classrooms to provide portfolio samples to the math and English teachers to help relieve the burden on those teachers, and in all of the schools we visited, all of the teachers help score the portfolios. Estimates of these costs are considered next.

Table 10

## Summary of Parameters for Teacher Opportunity Cost Estimates

Table number	Teacher salary (\$)	Hours per day	Hours per year	Hourly salary & benefits (\$)	Pupil-teacher ratio
C1	32,217	7	1,260	29.40	17.6
C2	32,217	7	1,260	29.40	24.0
C3	23,102	7	1,260	21.08	17.6
C4	23,102	7	1,260	21.08	24.0
C5	45,197	7	1,260	41.25	17.6
C6	45,197	7	1,260	41.25	24.0
C7	32,217	8	1,440	25.73	17.6
C8	32,217	8	1,440	25.73	24.0
C9	23,102	8	1,440	18.44	17.6
C10	23,102	8	1,440	18.44	24.0
C11	45,197	8	1,440	36.09	17.6
C12	45,197	8	1,440	36.09	24.0
C13	32,217	6.5	1,170	31.67	17.6
C14	32,217	6.5	1,170	31.67	24.0
C15	23,102	6.5	1,170	22.71	17.6
C16	23,102	6.5	1,170	22.71	24.0
C17	45,197	6.5	1,170	44.42	17.6
C18	45,197	6.5	1,170	44.42	24.0

**Costs for other teachers.** The Kentucky assessment program impacts other teachers as well. For example, in the intermediate and high schools we visited, one pupil-free day a year is devoted to scoring the portfolios. In addition, all teachers at the intermediate schools with departmentalized instruction and at the high schools, time is required for the KIRIS tests and a small amount of time for the performance tests. Unfortunately, good data on the number of teachers at each school do not seem to exist in Kentucky, requiring estimates of the number of teachers in the intermediate and high schools. There are approximately 35,000 teachers in Kentucky. If one assumes roughly half teach in schools with grades seven through 12, then there are 17,500 teachers involved in the one day portfolio scoring activity. At an average annual salary of \$32,217, this amounts to approximately \$179 a day (assuming an 180-day school year), or an opportunity cost of \$3,132,500.

Table 11

## Summary of Total Opportunity Costs for Teachers 1995-96

Summary of Total Estimated Opportunity Costs for Teachers by Test, 1995-96 (1,000 of \$)													
Table <sup>a</sup>	KIRIS			Performance tasks			Portfolios			Total			Grand Total <sup>b</sup>
	Elem.	Inter.	HS	Elem.	Inter.	HS	Elem.	Inter.	HS	Elem.	Inter.	HS	
C1	5.827	14.934	10.946	10.532	4.919	0.820	42.662	8.433	7.625	59.020	28.286	19.392	106.699
C2	4.273	10.951	8.030	7.724	3.607	0.601	31.290	6.184	5.594	43.288	20.741	14.226	78.256
C3	4.178	10.708	7.849	7.551	3.527	0.588	30.589	6.047	5.468	42.318	20.281	13.904	76.504
C4	3.064	7.852	5.758	5.538	2.586	0.431	22.435	4.434	4.011	31.038	14.872	10.200	56.110
C5	8.175	20.953	15.359	14.776	6.902	1.150	59.857	11.832	10.699	82.809	39.688	27.208	149.705
C6	5.996	15.364	11.267	10.837	5.061	0.843	43.902	8.676	7.849	60.736	29.102	19.990	109.798
C7	5.099	13.070	9.580	9.217	4.305	0.718	37.336	7.380	6.674	51.653	24.755	16.971	93.380
C8	3.740	9.584	7.028	6.760	3.157	0.526	27.384	5.412	4.896	37.885	18.152	12.450	68.487
C9	3.654	9.367	6.866	6.605	3.085	0.514	26.758	5.289	4.783	37.018	17.742	12.163	66.923
C10	2.680	6.868	5.037	4.845	2.262	0.377	19.626	3.878	3.509	27.160	13.009	8.923	49.083
C11	7.152	18.332	13.437	12.928	6.039	1.006	52.370	10.352	9.361	72.450	34.723	23.805	130.979
C12	5.246	13.442	9.858	9.482	4.428	0.738	38.410	7.591	6.867	53.139	25.462	17.463	96.063
C13	6.276	16.087	11.792	11.345	5.299	0.883	45.956	9.084	8.214	63.577	30.471	20.889	114.937
C14	4.604	11.796	8.650	8.321	3.886	0.648	33.706	6.661	6.026	46.631	22.343	15.324	84.298
C15	4.501	11.536	8.456	8.135	3.800	0.633	32.954	6.514	5.890	45.590	21.850	14.979	82.420
C16	3.301	8.459	6.203	5.967	2.786	0.465	24.170	4.777	4.321	33.438	16.022	10.989	60.449
C17	8.803	22.564	16.539	15.912	7.433	1.239	64.457	12.741	11.522	89.172	42.738	29.299	161.210
C18	6.457	16.545	12.133	11.671	5.450	0.908	47.276	9.343	8.452	65.404	31.338	21.494	118.236

<sup>a</sup> See Table 13 for a description of the estimate parameters for each of the tables identified in this column.

<sup>b</sup> Rows may not sum to grand total due to rounding.

In addition, these teachers devote part of each day during the KIRIS testing to assessment activities as well. In schools where all grades are tested, this impacts all of the teachers. In schools where only the 8th or 11th graders are tested, fewer teachers are impacted. If it is assumed that all schools test all children, and there are six half-days of testing, then there are three more days devoted to the assessment system. This would represent another \$9.4 million.

The performance tests have a much smaller direct impact on teacher time. A few students are taken from class for a few hours one day a year. The tests themselves are actually administered by a state team, and the only real impact on local school staff is the time it takes to coordinate the student assignments. This is accounted for below under the discussion of school site assessment coordinators.

What this ignores is the time teachers spend working on performance type tasks in regular classroom instruction. From our interviews this appears to be substantial. It is impossible, however, to accurately distinguish how much time this represents and, more importantly, how much should be directed toward the assessment system and how much should simply be considered part of instruction. For the purpose of this report, we have not included the time teachers spend on direct instruction, even if it has changed in response to the assessment system, as a cost of the assessment program.<sup>11</sup>

At the elementary level, these costs are much lower. The 4th- and 5th-grade teachers we talked with indicated that they had virtually full responsibility for portfolio development and scoring. This is a result of the self-contained nature of classrooms at that level. Moreover, elementary teachers had fewer total portfolios to prepare and score since their responsibility was for the 20 to 25 portfolios of

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<sup>11</sup> There is no doubt that one of the purposes of the Kentucky assessment system was to change teaching strategies to focus more on problem solving and creative thinking. From our interviews, it was clear that most teachers, in response to the portfolios and the performance tests have made substantial changes in their approach to instruction. While the changes, and the time invested in making those changes could be considered, at least in part, an opportunity cost of the assessment system, determining how much time each teacher spent revising his or her instructional programs, and how much of that was in above and beyond time they would have spent making changes anyway, was impossible. Teachers we interviewed were unable to reconstruct the time they spent in such activities accurately, and in many instances had difficulty understanding what we were really trying to get at. As a result, we have ignored these “costs” in this report.

students assigned to their classroom. As a result, the only opportunity costs for the elementary grades are those identified above for 4th- and 5th-grade teachers.

Similarly, the self-contained nature of elementary schools leads to less interference with the rest of the school when the KIRIS standardized tests are administered. The tests are administered by the 4th-grade teachers (and in schools where “practice” tests are utilized, other teachers as well) during regular class hours during the test dates. This time was also accounted for above in the KIRIS estimates of the 4th- and 5th-grade teachers.

### **Estimating the Opportunity Costs for Other District and School Staff**

Teachers are not the only school or district level staff with responsibility for the assessment program. As Table 8B shows, a substantial amount of time is also devoted to the assessment system by other district and school officials. Table 12 provides a summary of the estimated costs of these staff for the entire state. The salary data are based on the figures presented in Table 7, and the time estimates are based on those described in Table 8B. In addition, all salary figures have been increased by 15% to account for benefits. Thus the data presented in Table 12 represents the total value of personnel time devoted to each part of the assessment system.

The figures in Tables 12 represent our estimates of the costs for all schools and districts in Kentucky. The assumptions behind the data in each table are detailed below.

#### **School Level Staff**

There are two individuals at each school, other than teachers, who have considerable responsibility for the assessment program: the principal and the school assessment coordinator. Table 12 displays the estimated range of opportunity costs for each of these individuals at the 1,225 schools in Kentucky that are part of the accountability system. The table uses the average salary figures from Table 7 and combines them with the high and low estimates of the percentage of time devoted to each of the components of the assessment system.

For principals, the average salary of \$57,944 was used to compute the value of the time they spent on assessment activities. As Table 8B shows, principals estimated that they spend between 30 and 47% of their time doing work directly related to assessment. There are 1,225 schools in Kentucky that are part of the

Table 12

## Summary of Estimated Opportunity Costs (Salary and Benefits) For District and School Level Staff Other Than Teachers, Kentucky Assessment System, 1995-96

Personnel category	Estimated opportunity costs for personnel time devoted to each component (\$)				Total
	Development	Test administration	Scoring	Management	
School-level personnel					
Principals <sup>a</sup>					
Low	4,081,431	16,325,722	4,081,431		24,488,583
High	5,714,003	24,488,583	8,162,861		38,365,447
Assessment coordinators					
Low	2,632,390	10,529,561	2,632,390		15,794,342
High	3,685,346	13,161,951	5,264,781		22,112,078
District-level personnel					
Superintendents					
Low	-	-	-	1,710,628	1,710,628
High	-	-	-	2,280,836	2,280,836
Assessment directors <sup>b</sup>					
Low	-	2,877,087	-	-	2,877,087
High	-	3,452,505	-	-	3,452,505
Other central staff					
Low	-	1,614,612	-	782,971	2,397,583
High	-	2,287,366	-	939,565	3,226,931
Clerical staff <sup>b</sup>					
Low	-	1,200,600	-	-	1,200,600
High	-	1,400,700	-	-	1,400,700

*Note.* Data for low and high estimates of time are based on Table 8B. Data for low and high estimates of salaries are based on Table 7. These are combined to provide the cost estimates displayed in this table. In addition, figures include 15% for personnel benefits.

<sup>a</sup> Assumes a total of 1,225 schools in Kentucky.

<sup>b</sup> Does not include estimated average direct costs of \$132,250 to \$143,750 in direct costs for assessment directors, and \$46,000-\$57,500 for clerical staff in the state's two largest school districts.

accountability program. Thus, the proportion of time, multiplied by the average salary plus benefits, multiplied by the number of schools, provides the values displayed in Table 12. As the rows relating to principals shows, this time can be valued at between \$24.5 and \$38.4 million for 1995-96.

Each school is also required to have an assessment coordinator. As described above, schools typically assign this responsibility to a guidance counselor. While this reduces the capacity of the counseling department, it also avoids having to provide a teacher with adequate release time to do the many tasks associated with coordinating all of the assessment activities. Assuming the same 1,225 schools, an average salary of \$37,372, and one assessment coordinator per school, the estimated value of the time spent by these individuals in working with the assessment system amounts to between \$15.8 and \$22.1 million for 1995-96.

### **District Level Staff**

At the district level, as described above and displayed in Table 8B, a number of individuals are involved in the assessment system. Below, estimates of the value of the time individuals in each of these groups spend on assessment are provided.

**Superintendents.** Superintendents indicated that they spend between 9 and 12% of their time on assessment activities. Given an average salary of \$93,908 a year, the total value of their time for work focused directly on the assessment system amounts to between \$1.71 and \$2.28 million. These figures were calculated by multiplying the average salary (plus benefits) of school superintendents by the number of districts (176) and the estimated percentage of time they indicated they spend on assessment activities.

**Assessment coordinators and other central office staff.** Each district in Kentucky is required to have an assessment coordinator. With the exception of the largest districts in the state, it is unlikely that any district has a full-time individual assigned that responsibility. Rather, it most likely becomes the responsibility of one or more people in the central office. We found that in addition to the individual assigned responsibility for the assessment program, the district's curriculum coordinators also played a role in the assessment program, helping with the administration of the assessments, and with interpretation of the results.

We assume that only the two largest districts in the state have full-time assessment coordinators. Jefferson County has more than 96,000 students, and Fayette County has some 34,000 students. The next largest district, Hardin County, only has 14,000 students, and we have assumed that it and the smaller districts do not have a full-time assessment coordinator. Rather, for all of the districts except the two largest (a total of 174 districts), we have assumed that

there is a person in the central office who spends between 25 and 30% of his or her time on assessment activities (see Table 8B). In addition, we found that on average, there was one curriculum coordinator for every 2,500 students in our sample districts. That would translate to some 263 curriculum coordinators across the state, each of whom devotes between 12 and 17% of their time to assessment activities.

Using an average salary of \$57,513 for assessment directors, we estimated the range in the value of time spent by assessment coordinators on assessment activities was between \$2.9 and \$3.4 million. For other district staff we included both curriculum coordinators who deal with test administration and pupil personnel coordinators who appeared to have mostly management roles in the assessment program. The estimated range in the value of the time spent by curriculum coordinators at an average salary of \$44,487 was between \$1.6 and \$2.3 million.

We discovered through our site visits that most districts have a pupil personnel coordinator or person in a similar type position who also devotes part of his or her time to the assessment program. We found that this ranged from 10 to 12% of their time. While it seems likely that large districts will make greater use of pupil personnel positions than would the smallest districts in the state, we have assumed that these differences will average out across all districts. Thus, the estimated opportunity costs for pupil personnel staff were calculated by assuming between 10 and 12% of the time of one central office staff person at an average salary of \$44,487. Under these assumptions, the value of the time of pupil personnel staff devoted to assessment activities ranged from \$782,971 to \$939,565. Thus, the total value of time of other central office staff for the assessment program ranged from \$2.4 to \$3.2 million.

There is one final personnel category that must be considered, clerical staff at the central office level. As Table 8B shows, in our sample districts, the individuals we interviewed indicated that clerical time devoted to the assessment program amounted to between 30 and 35% of one full-time person. Assuming that the two largest districts each have one full-time clerical position devoted to assessment, at a direct cost of between \$20,000 and \$25,000 each for a total of \$40,000 to \$50,000, we have assumed that the remaining 174 districts have one person earning an average of \$20,000 devoting between 30 and 35% of their time

to the assessment program, total costs would range from \$1.04 million to \$1.22 million.

In addition to the estimates of opportunity costs associated with the various components of the Kentucky assessment program, districts incur some direct expenditures on behalf of the assessment program. In the state's two largest districts, we estimated the costs of staff (assessment coordinators and clerical staff) to be between \$178,250 and \$201,250. In addition, we found, in our sample districts, that districts spent in direct appropriations approximately \$4.25 per student for assessment. Assuming this figure is similar to the spending patterns of other districts in the state, then total direct assessment costs across the state would be \$2.8 million.

### **Total Assessment Costs in Kentucky—1995-96**

This section summarizes the total estimated 1995-96 costs of the Kentucky assessment program. Table 13 displays the cost estimates contained above, beginning with the state level estimates made in our earlier work (Picus, Tralli, & Tacheney, 1995). The first three rows of Table 13 display our estimates of direct expenditures for Kentucky's assessment system for 1995-96, which are approximately \$10.4 million. The next part of Table 13 displays the high and low estimates of the opportunity costs of the Kentucky assessment system. These estimates range from a low of \$110 million to a high of \$244 million. These costs represent a tremendous amount of time and effort on the part of teachers and other district staff working to implement the assessment program, and are from 11 to 24 times greater than the direct costs of the assessment system. However, even the high estimate only represents some 7.6% of the estimated \$3.2 billion spent for K-12 education in Kentucky in 1995-96. The lower estimate is only 3.4% of total current expenditures.

The last part of the table provides estimates of the total estimated costs per pupil, per student tested, and per test administered. These figures are substantially higher than the direct costs reported in our earlier work (Picus, Tralli, & Tacheney, 1995) where we estimated the costs per test administered, for example, to be approximately \$7.51.

One final analysis was conducted from the data collected from the Kentucky teachers. Teachers responding to our survey were asked to indicate where the

Table 13

## Total Estimated Costs of Kentucky's Assessment System, 1995-96

Category	Estimated costs (\$)	
	Low	High
Direct expenditures		
State expenditures <sup>a</sup>	7,401,000	7,401,000
District expenditures	2,978,250	3,001,250
Sub-total direct expenditures	10,379,250	10,402,250
Opportunity costs		
School level		
Accountability teachers	49,083,000	161,210,000
Non-accountability teachers	12,532,500	12,532,500
Principals	24,488,583	38,365,447
School assessment coordinators	15,794,342	22,112,078
District level		
Superintendents	1,710,628	1,710,628
Assessment coordinators	2,877,087	3,452,505
Other central office staff	2,397,583	3,226,931
Clerical staff	1,200,600	1,400,700
Sub-total opportunity costs	110,084,323	244,010,789
Total costs Kentucky Assessment Program	120,463,573	254,413,039
Total number of students	658,896	658,896
Total students tested	141,957	141,975
Total tests administered	851,850	851,850
Total cost per student enrolled	182.83	386.12
Total cost per student tested	848.59	1,791.96
Total cost per test administered	141.41	298.66

<sup>a</sup> See Picus, Tralli, and Tacheny (1995) for derivation of this figure.

time they spent on the assessment program came from. Specifically, did they do that work after school? during preparation periods? through release time? in class? or some other method? Table 14 summarizes the responses to this question. As the table shows, most of the work done on assessments was done after school. What is not clear is whether this means teachers put in more time than they did before, or if they simply changed what it was they worked on for school after school hours. Our initial assumption was that this represented additional work, which most, but not all of the teachers interviewed said that was the case.

Table 14

## Where Teachers Find Time for Assessment Activities in Kentucky

Statistic	Percent of time spent on assessment from each source (%)				
	After school	During preparation period	Release time with a substitute	During class	Other
Mean	52.6	23.2	3.9	18.8	1.6
Std. Dev.	33.2	23.8	10.0	24.8	4.7
Median	50.0	20.0	0.0	10.0	0.0
Minimum	0.0	0.0	0.0	0.0	0.0
Maximum	100.0	100.0	40.0	100.0	20.0

The second most significant source of time for working on the assessment system was teacher preparation periods. Again, it is not clear if teachers used this time on assessment activities in place of other instructional activities or if it replaced time that was relatively unstructured. Here, not surprisingly, most teachers indicated that the other instruction related things they did during their preparation periods simply did not get done as quickly, or as well as a result of the time spent on the assessment system.

## VERMONT

This section provides an analysis of the costs of assessment in Vermont. To conduct this work, we interviewed principals and teachers and district level staff in four school districts. Questions were aimed at determining costs at the school-level, both expenditures and opportunity costs including time committed to the Vermont Portfolio Program (VPP). As the discussion that follows will show, the bulk of expenditures for the VPP are not direct expenditures, but can be classified as opportunity costs that result from teacher and district staff time devoted to the portfolio assessments. Because of the strong tradition local control and the resulting large number of school boards representing one or two schools which are then combined into 60 Supervisory Unions, even at the district, or supervisory union level, there are few direct expenditures for assessment in Vermont.

## **Background and Portfolio Development**

Prior to the 1980s, Vermont did not have a state-level assessment program. Vermont began development of the portfolio assessment system in 1988, and was the first state to make portfolios the backbone of a statewide assessment program (Koretz, Stecher, & Deibert, 1992). The purpose of the new Vermont Portfolio Program (VPP) was to provide rich data on student performance, to encourage better teaching, to adopt higher standards, to coexist with the state's tradition of local control, and to encourage greater equity of educational opportunity (Koretz, McCaffrey, Klein, Bell, & Stecher, 1993). Numerous researchers have examined the problems inherent in systems with multiple and potentially incompatible goals. The portfolio program that emerged was intended to be a compromise among the many goals for the system (Koretz, Stecher, & Deibert, 1992). The VPP was not designed to produce student-level scores for use outside of schools, rather the intent has been to provide performance information for aggregates such as schools, districts, and supervisory unions. Some districts and schools opted out of the program.

VPP is an unusual assessment program in that non-standardized tasks, through student portfolio projects, are reported at the state level. Unlike many other authentic assessment programs, students do not respond to a uniform prompt. Rather, students determine the portfolio items submitted for evaluation with broad criteria allowed. Because of the novel assessment approach, the VPP was seen as a long-term and decentralized development effort. The state decided to begin with portfolio assessments in the 4th and 8th grades in the subjects of mathematics and writing. By the 1995-96 school year, however, the writing portfolio was moved to the 5th grade.

Development of the program came from the teachers rather than the state. Committees of teachers were given the primary responsibility for the development of the VPP. Separate mathematics and writing committees were formed, so the portfolio program evolved differently for each of these subject areas. Teachers retain wide latitude in implementing the portfolio program.

A limited pilot implementation began in the 1990-91 school year, and the system was implemented state-wide in the 1991-92 and 1992-93 school years (Koretz, Stecher, Klein, & McCaffrey, 1994a). During the two-year implementation between 1991 and 1993, many critical decisions were still being

made on the portfolio project and, therefore, implementation and development efforts overlap. “From the outset, the Vermont Department of Education anticipated a long and decentralized development process in which committees of teachers, with the help of outside consultants and substantial trial and effort, would gradually build the assessment” (Koretz, Stecher, & Deibert, 1992; p. vii). Therefore, the demarcation between development and implementation of the program is not clear.

In the pilot year, the Vermont Department of Education selected 48 schools to pilot the 4th- and 8th-grade mathematics and writing assessments. Ninety other schools participated to varying degrees in the pilot study. All of the mathematics portfolios were scored by a single group of eight specially trained raters (Koretz, Stecher, & Deibert, 1992).

The state sponsored regional workshops at the beginning of the pilot school year. Koretz, Stecher, and Deibert (1992) report that all of the 4th-grade teachers and approximately three-fourths of the 8th-grade teachers attended the statewide orientation workshop and at least one regional workshop held later in the school year. Most teachers attended two or three regional workshops in mathematics, and most 4th-grade teachers attended one or two additional workshops in writing. Approximately half of the principals attended one of the workshops. At the school level, the report found that communication was limited in scope and duration. Although more than half of the 4th-grade teachers participated in at least one local school meeting to discuss the VPP, the total time devoted to these meetings was typically only two or three hours. More than half of the teachers of both 4th and 8th grades received no support from other teachers at their schools.

In the spring of 1992, Koretz, Stecher, and Deibert (1992) found that an overwhelming majority of Vermont principals provided release time for out-of-school activities. Principals interviewed during the 1992-93 school year stated that the support they provided to teachers on behalf of the VPP, primarily in the form of release time, had not decreased (Koretz, Stecher, Klein, & McCaffrey, 1994b). Ninety-two percent of the principals surveyed indicated that they provided special support to their teachers participating in the portfolio project. About 75% of the principals provided release time for teachers to attend state-sponsored training sessions. Another 13% of the principals mentioned giving their teachers time to attend state meetings, network meetings, and scoring sessions. Finally, 13% of the principals provided opportunities for teachers to spend time

discussing the portfolio project with other teachers in their school, district, or supervisory union. In terms of within-school activities, 29% of the principals gave their teachers release time to work on their portfolios outside of class, 8% provided trainers for additional on-site development sessions, and 6% held portfolio training sessions for teachers in other non-portfolio subject areas. Most of the release time was provided by having substitutes cover teachers' classes, although some principals excused teachers from other duties in order to work on portfolios or provided time off for extra personal time spent on the portfolios.

The principals we interviewed for this study indicated that the state assumed financial responsibility for the initial time to train the teachers. According to these principals, teachers in the affected grades and subjects were given from two to five in-service days in preparation for the VPP, as well as the opportunity to attend week-long institutes during the summer and other network training offered at the local level. In terms of supplementing or supplanting other in-service activities, most principals said that the initial training was in addition to other activities, although some said that the training was in lieu of other activities. Most interviewees did not indicate any other start-up costs beyond teacher training. The cost for supplies and materials for the VPP start-up were generally considered negligible, with only one principal assigning an annual dollar value to the supplies and materials start-up costs at \$1,000.

Teachers interviewed for this study said that many of the training opportunities during the developmental period were, and still are, optional. Differential use was made of the optional training provided by the state. This is also true today; network training is not mandatory and some teachers participate while some do not. According to the teachers, the state paid for all of the initial training, including substitutes for release time. Only one respondent actually gave a time period for training during the initial implementation years. According to this respondent, there were approximately two days of training for the first several years, with a state-paid substitute. According to this same respondent, training time has decreased to only one-half to one day per year.

The teachers we surveyed were asked how many hours per school-week or school-year they spent preparing materials. On average, teachers spent 54.5 hours per year preparing materials for the VPP. However, because of outliers in these responses (as found in Kentucky above) the median time was significantly less at 39.0 hours per year. Koretz, Stecher, and Deibert (1992) found that 30% of

the 4th-grade teachers and 45% of the 8th-grade teachers attended either the summer or fall Math Institutes, and approximately half of the teachers participated in some form of network training activity at their local school. Sixty-four percent of the 4th-grade teachers and 81% of the 8th-grade teachers participated in more than one formal staff development activity. Another survey of teachers done by the Vermont Superintendents' Association (ACSU, 1995a)<sup>12</sup> found that 63% of the respondents "felt they had sufficient training to carry out their responsibilities and a majority felt that the regional networks had been helpful in providing training (61%), disseminating information (62%), and providing support (53%)" (p. 2).

### **Management**

The VPP was designed to be a bottom-up reform effort. Information was sent from the state to the classroom teachers, for the most part by-passing the intermediate levels of supervisory unions and schools. As a result, management of the program has primarily taken place at the state and classroom levels. Although principals have found the portfolio program burdensome, the burden has not been borne by the principals. Rather the burden has been primarily borne by the classroom teachers implementing the portfolio project (Koretz, Stecher, & Deibert, 1992).

The Vermont Superintendents' Association (ACSU, 1995) suggested that there was a serious concern among superintendents over the State Department of Education's ability to manage the assessment process. Less than 25% of the superintendents felt that their districts had the training, funds, or time to effectively implement the portfolio program. Superintendents expressed concern about understanding the future direction of the program, as well as the state timelines for implementation. The survey also assessed teacher opinions on the new authentic assessment program. Teachers expressed dissatisfaction with management of the program: only 16% felt they received useful feedback from the state regarding portfolio results, and only 18% thought the program was well managed. In addition, 71% of the teachers felt they did not understand the future direction of the program.

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<sup>12</sup> Forty-two superintendents and 464 teachers from 43 supervisory unions responded to the survey done by the Vermont Superintendents' Association (VSA) Assessment Committee. For the teacher respondents, the breakdown by grade level was 176 4th-grade, 135 5th-grade, and 114 8th-grade teachers.

The principals we interviewed for this cost study had mixed responses regarding who was responsible for the VPP at their school. Half of the principals said that they were responsible for managing the VPP program, and half said that teachers were in charge of the VPP. In schools where the principal indicated teachers were responsible, one teacher was usually assigned the task of getting the requested portfolios to the state. In schools where the principal was a more direct participant in the process, he or she generally took responsibility for insuring that the sample of portfolios that was to be submitted to the state was put together properly.

Principals ranged widely in the number of hours dedicated to the portfolio program from 2.5 to 45 hours per year. On average, principals spent 15.4 hours per year on managing the VPP.<sup>13</sup> Teachers surveyed for this study reported an average of 6.3 hours per year spent on management-type duties associated with the VPP. The median, which was less, was only 5.0 hours per year. These hours may be compensated, such as during the teachers' preparation periods, or they may be on the teachers' personal time.

### **Test Administration**

The portfolio program has been extended beyond the grades targeted by the state in many schools. Koretz, Stecher, and Deibert (1992) reported that about half of the schools had extended the portfolio beyond the state-targeted grades, 13% reported that they hoped to extend the program beyond the target grades, and 9% reported that all of the teachers in the school were keeping portfolios.

None of the principals interviewed for this study said that they participated in administering the portfolio project in the classroom. This was the responsibility of the teachers. However, estimates for the cost of supplies and materials for the VPP averaged \$2.91 per student.

Teachers have raised concerns about covering the material in the curriculum and managing the paperwork associated with the mathematics portfolios. Koretz, Stecher, and Deibert (1992), found that the most significant problem teachers reported about the mathematics portfolios was the time required to produce work

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<sup>13</sup> Interestingly, principals indicated that they spent much more time with other assessments. The average time spent on other assessments was 97.6 hours, with a range of 5.5 hours to 120 hours per year. These assessments include the Vermont Uniform Assessments, CTBS, and NAEP testing.

for the portfolios, time that had to be taken away from other aspects of the curriculum. In addition, time was constrained by the mechanics of producing and managing the portfolios, and lack of time for working on portfolio entries. The concern with time was also an issue with teachers surveyed by the Vermont Superintendents' Association (ACSU, 1995a): only 17% felt they had adequate time to carry out the requirements of the program.

Although teachers surveyed following the pilot implementation year raised concerns about inadequate training to complete the portfolio program, during the 1991-92 year approximately three-quarters of the teachers reported that the training had prepared them adequately to work with the mathematics portfolios (Koretz, Stecher, & Deibert, 1992).

Koretz, Stecher, and Deibert (1992) also reported that teachers and students devoted considerable effort to portfolios, both in and outside of class. Teachers averaged six hours per week working on the portfolios: approximately two to three hours per week preparing for portfolios, two to three hours per week in classroom portfolio activities, and about one hour per week scoring or evaluating the portfolios. Overall, they found that teachers spent approximately 30.1 hours a month on activities related to the VPP. In a survey done the following school year (Koretz, Stecher, Klein, & McCaffrey, 1994b), teachers did not indicate a change in the time demands of the portfolio program.

The teachers administer and manage the student portfolios in their own classrooms. Every teacher interviewed for this study said that there was limited uniformity in determining what pieces go into the students' portfolios, although they all stated that it was a student decision. In addition, there was no consensus on rules regarding collaboration and revision, or which tasks belong in the portfolio.

All of the teachers we talked to found that the VPP had elicited positive changes in methods of teaching, use of time in the classroom, and topics addressed. Teachers reported that they spent, on average, 84.0 hours a year working with students and administering the VPP. The median was somewhat less at 78.0 hours. This time can be assumed to occur in the class during normal school hours with students and, therefore, does not represent an unpaid cost to the individual teachers. However, it may represent an opportunity cost in that other curriculum may not be covered during the time the teachers are working with students on their portfolios.

In responding to our survey, teachers indicated their work on portfolios was not monitored. In addition, teachers received very little help from volunteers or teacher aides. Teachers said that they could not identify any significant costs to them of the portfolio assessment other than their time. The time problems are discussed below.

The 1991-92 survey by Koretz, Stecher, and Deibert (1992) reported on student time commitments. Students spent about three and one-half hours per week on portfolios: approximately two hours doing portfolio tasks, one hour in revision, and one-half hour organizing their portfolios. Their results for the classroom time spent on portfolio activities by students are summarized in Table 15. The table shows that on average, teachers spent approximately 13.7 hours per month on portfolio activities. Assuming a nine-month school year, this amounts to something on the order of 123.3 hours a year devoted to portfolio activities. Teachers reported that time was a major problem in mathematics, both in terms of finding time to cover the full mathematics curriculum and finding time to prepare the portfolio lessons.

Koretz, Stecher, Klein, and McCaffrey (1994a) reported that teachers spent an average of 30 hours per month working on mathematics portfolios, excluding training time, with 11 hours of the time consumed on performing or revising portfolio tasks, and the remainder of the time spent on finding tasks, organizing and managing portfolios, other preparation, and scoring. Administrators reported committing substantial resources in the form of substitute teachers from the school budget for release time for training. About half of the respondents noted difficulty finding appropriate tasks. Others reported stress about appropriate uses of portfolio scores, the rapid implementation of the program, and inadequate, tardy, and inconsistent information from the state.

Table 15  
Student Classroom Time Spent on Portfolio Activities: Hours per Month

Activity	Grade 4	Grade 8	Overall
Doing portfolio tasks for the first time	7.8	5.3	7.1
Revising or rewriting portfolio tasks	4.1	2.2	3.6
Organizing/managing portfolios	3.0	2.3	2.8
Total classroom time	15.0	9.9	13.7

*Source.* Koretz, Stecher, and Deibert, 1992.

## **Scoring**

In the 1991-92 school year, scoring for the state-level reporting was done by the students' own teachers, with volunteer teachers providing second ratings for a sample of portfolios. The state-level scoring was done by teachers other than the students' own at regional meetings. Advanced Systems Management, an outside contractor, scored the uniform tests and arranged for a sample of portfolios to be drawn from each class for calibration to a common standard. Koretz, Stecher, and Deibert (1992) found that the vast majority of teachers participated in "Preparation for Scoring workshops during the 1991-92 school year.

In the 1992-93 school year, all scoring for state-level reporting was done by teachers other than the students' own at a statewide meeting. Samples of student portfolios in mathematics and writing were selected for scoring because of resource constraints. According to Koretz, Stecher, Klein, and McCaffrey (1994a), only a sample of approximately 1,700 student mathematics portfolios and 1,700 student writing portfolios in each grade were scored. Their estimate of the 1993 costs of honoraria and room-and-board for the scorers was \$13 per math portfolio. From the sample of portfolios selected to be scored, a random sample of portfolios was selected for rescoring by second raters. More than 160 raters handled 7,000 portfolios over a five day scoring session.

None of the principals interviewed for this study indicated involvement with VPP scoring. Teachers interviewed for this study were found to score their students' portfolios to varying degrees. In addition, some schools had set procedures for passing portfolios on to the next grade, while other schools did not play a role with what was done with student portfolios outside of the classroom. In terms of the teacher survey, teachers reported spending an average of 27.1 hours per year on scoring; the median was 20.0 hours. However, the range of time was substantial, from a low of zero to a high of 58.8 hours per year.

## **Evaluation and Reporting**

Teachers and principals interviewed for this study were asked about their time commitment to evaluation and reporting the VPP. Half of the principals indicated that they informally discussed portfolio results with teachers. One-quarter of the principals said that they were not involved in evaluation, and one-quarter estimated an average of 5.5 hours per year were spent on evaluation.

None of the principals indicated spending time with reporting VPP results. At this time, none of the schools in this study were reporting school-level portfolio scores.

In the 1990-91 pilot year, teacher concerns centered on insufficient training in guidelines for implementing the portfolios, inadequate number of sample activities, lack of clarification on the criteria to be used to judge the portfolios, and interpretation of the scores (Koretz, Stecher, & Deibert, 1992).

In a 1991-92 survey of teachers and principals in approximately 80 schools, Koretz, Stecher, Klein, and McCaffrey (1994a) found that teachers and principals characterized VPP as a worthwhile burden. The burdens cited were diverse: difficulties with state program administration, adapting to the rapid pace of implementation, record-keeping and logistics, and overall time demands. Substantial time and resource commitments were reported by both teachers and administrators. However, the study reported that many educators found the program to be a powerful and positive influence on instruction. The study also found substantial variations in implementation of the portfolio program in terms of novelty and complexity of portfolio tasks, type and amount of outside assistance for tasks, and amount of revision allowed. Finally, the study found that low rater reliability precluded most of the intended uses of the scores. (Although VPP was not intended to provide student-level scores for external use, their reliability affects the quality and validity of aggregate scores.)

In a study of Vermont's 1991-92 portfolio assessment program done by Koretz, McCaffrey, Klein, Bell, and Stecher (1993), rater reliability was on average low in both mathematics and writing. Rater reliability is "the extent of agreement between raters about the quality of students' work" (p. 2). The low level of rater reliability precluded highly reliable scores, and according to the researchers, seriously limited the uses of the assessment results. The low rater reliability may be attributed to a variety of reasons, including variability of tasks used and complicated scoring system. The uniform writing assessments, which provide uniform prompts from which students respond, had reliability measures within the normal range for standardized performance assessments in writing. However, one positive finding of this study was that teachers' own evaluations of the students' writing appeared unbiased, i.e., they did not rate their own students' portfolios more positively than did volunteer teacher-raters.

Koretz, Klein, McCaffrey, and Stecher (1993) reported on the reliability of the Vermont portfolio scores in the 1992-93 school year. The VPP was altered in many ways for this school year, including conducting scoring at a single site for state-level portfolio reporting and calibration training sessions for the raters, which resulted in an increase in reliability in mathematics portfolio scoring. However, the scoring reliability of the writing portfolios did not improve substantially and was considerably slower than in mathematics. In addition, score reports at the supervisory union level were not found to be especially informative because they showed very little variation and had large margins of error. The researchers also questioned validity of the portfolio assessment because of the different rules about authorship and selection of tasks, time allowed for revision of students' work, and different guidelines on outside help.

Conflict between the two goals of quality measurement of student performance and instructional improvement. Tension exists between these two goals and "an assessment program designed primarily to meet one of these goals would look quite unlike a program designed to meet the other" (Koretz, Stecher, Klein, & McCaffrey, 1994a, p. 26). The Vermont Superintendents' Association supports the continued use of portfolios at the classroom level, but it does not support the continued use of supervisory union portfolio sampling for the purpose of creating composite scores that compare schools and supervisory unions to each other (ACSU, 1995b).

The measures of reliability and validity do not reflect the other purpose for which the VPP was implemented: to improve teaching and student learning. According to Abruscato (1993), "the long-term success of the Vermont portfolio system will depend on whether the teachers involved believe that it is important, useful, and capable of being implemented efficiently" (p. 476).

### **Cost Analysis**

The analysis of the costs of the VPP follows the same logic established above for the analysis of the costs of the Kentucky assessment system. In 1995-96, there were 117,830 students enrolled in Vermont's K-12 public education system (Vermont State Board of Education, 1996). The state-wide average class size was 18 students, and there were 177 school days averaging 6.48 hours in length. The state's 5,973 classroom teachers earned an average of \$35,059 a year for a 184 day contract, providing up to eight professional development days (Center for

Rural Studies, 1996). There were a total of 350 public schools in the state, located in 60 supervisory unions. According to the Vermont Board of Education (1996), there were 429 public school administrators in the state, of which 62 were superintendents, 296 were principals, and the balance were either business managers or vocational education center directors.

The state appropriation for assessment in fiscal year 1995-96 was \$884,000 out of a total education budget of \$204 million (State Board of Education, 1996). The funds for assessment include personnel services, operations, and grants for assessment. The State Board of Education requested \$1,082 million for the fiscal year 1997 for the assessment program, although the Governor's budget only provided for funding at the level of \$894,000. This represents the full state cost of the assessment program.

Local direct costs are also quite low. The superintendents we talked with generally indicated that they did not have a separate budget for assessment because virtually all of the responsibility for the VPP was assigned to the schools by the state. They estimated that the cost of supplies and materials averaged \$2.91 per student enrolled in a school. This would amount to approximately \$342,885 for the entire state. Thus, total direct costs for the VPP appear to be approximately \$1.2 million. This amounts to \$49 per student in grades 4, 5, and 8, the grades where portfolios are utilized.

Like the findings from Kentucky presented above, the VPP's opportunity costs represent the largest "expense" in Vermont. Table 16 shows the estimated annual time the teachers spent on various components of the VPP. The table shows that the average amount of time devoted to the VPP was 214.11 hours and the median, 154.0 hours.

The Center for Rural Studies (1996) estimates that the average school day in 1995-96 was 6.48 hours long. There were 177 days in the school year, and the average teacher earned \$35,059, or \$30.57 an hour. Assuming a benefit rate of 15%, the total hourly cost of a teacher averaged \$35.16. Table 17 estimates the cost of one teacher's time by assessment component for 1995-96.

There are approximately 8,400 4th graders, 8,400 5th graders, and 7,600 8th graders, or a total of 24,400 students impacted most heavily by the VPP. Assuming an average class size of 18 (see Center for Rural Studies, 1996; p. 2),

Table 16

Estimates of Number of Hours Per Year Spent by Vermont Teachers on Different Components of the Vermont Portfolio Program, 1995-96

Component	Number of Hours Per Year		
	Average	Standard deviation	Median
Preparing materials	54.5	83.1	39.0
Working with students	83.9	45.9	78.0
Administering test	0.01	0.3	0.0
Scoring	27.1	19.1	20.0
Training	42.3	77.8	12.0
Other administrative	6.3	7.0	5.0
Total	214.11	—	154.0

Table 17

Cost of One Teacher's Time Devoted to the VPP: Wages and Benefits = \$35.16 Per Hour

Component	Estimated cost of one teacher's time			
	Average		Median	
	Hours	Cost (\$)	Hours	Cost (\$)
Preparing materials	54.5	1,916.22	39.0	1,371.24
Working with students	83.9	2,949.92	78.0	2,742.48
Administering test	0.01	0.35	0.0	0.00
Scoring	27.1	952.84	20.0	703.20
Training	42.3	1,487.27	12.0	421.92
Other administrative	6.3	221.51	5.0	175.80
Total	214.11	7,528.11	154.0	5,414.64

there would be a total of 1,355 teachers in those three grades. Assuming the average times reported accurately reflect the time spent by other teachers, Table 18 displays the estimated total value of the time teachers spend on the VPP. The table shows that the estimated value of the time of these teachers is between \$7.3 and \$10.2 million.

Table 18

Cost of All Teacher's Time Devoted to the VPP, Grades 4, 5, and 8: Wages and Benefits = \$35.16 Per Hour

Component	Estimated cost of all teachers' time Grades 4, 5, and 8			
	Average		Median	
	Hours per teacher	Cost (\$)	Hours per teacher	Cost (\$)
Preparing materials	54.5	2,596,478	39.0	1,858,030
Working with students	83.9	3,997,147	78.0	3,716,060
Administering test	0.01	476	0.0	0.0
Scoring	27.1	1,291,093	20.0	952,836
Training	42.3	2,015,248	12.0	571,702
Other administrative	6.3	300,143	5.0	238,209
Total	214.11	10,200,586	154.0	7,336,837

The only other personnel who seem to spend time on the VPP are principals. As indicated above, there are 296 principals in Vermont. ERS estimates that the average salary of a principal in that state is \$67,832. Principal time on VPP ranged from 2.5 to 45 hours per year. Using the higher figure, and assuming a work year of 1,700 hours for a principal, the value of the time of one principal would amount to \$1,795, or a total of \$531,484 for all principals in the state.

The total costs of the VPP are summarized in Table 19. Our estimates range from a low of nearly \$9.1 million to a high of almost \$12 million for 1995-96. This represents approximately, 1.14 to 1.5% of total expenditures for K-12 education. The figure is considerably lower, as a percent of total expenditures, than the similar figures reported above for Kentucky. The difference is undoubtedly due to the fact that Kentucky's system is mandatory and a central part of that state's education reform and accountability system, whereas the Vermont Portfolio Program is voluntary.

Table 19  
Summary of Total Costs for the VPP

Category	Estimated cost (\$)	
	Low	High
Direct costs		
State Department of Ed.	884,000	884,000
District costs	342,885	342,885
Sub-total direct costs	1,226,885	1,226,885
Opportunity costs		
Teachers	7,336,837	10,200,586
Principals	531,484	531,484
Sub-total opportunity costs	7,868,321	10,732,070
Total estimated costs	9,095,206	11,958,955

### Program Benefits

A survey of superintendents and teachers found strong support for the VPP (ACSU, 1995a). Eighty-two percent of the superintendents supported the state’s decision to develop an authentic assessment program and 73% felt that the VPP “provided teachers with valuable information to help them improve their instructional practices” (p. 1). Sixty-nine percent of the teachers expressed continuing support for the state’s decision to develop an assessment program that incorporated authentic assessment, and 70% found the VPP helpful in terms of instructional practices. In addition, nearly 70% of the teachers found portfolios useful in communicating with students about their performance.

Koretz, Stecher, Klein, McCaffrey, and Deibert (1993) also looked at the positive attributes of the portfolio project in Vermont. They found positive changes in attitudes regarding mathematics and learning. Teachers reported that both they and the students were generally more enthusiastic about mathematics as a result of the portfolios.

Principals interviewed for this study were asked to list the benefits of the VPP. Three-fourths stated that portfolios had had a tremendous impact on instruction, and were a positive teaching tool. Other comments, which were not as prevalent across principals, included the following.

- Portfolios show student evolution and processes.
- Portfolios offer the advantage of not being comparative, rather they show what a student can do.
- Teachers have embraced the portfolio concept and support the program.
- Students enjoy working on the portfolios.

The principals interviewed for this study were generally enthusiastic about the portfolio program.

Teachers interviewed for this study saw a variety of benefits to the portfolio program, both to the teachers and the students. There was no consensus, however, on what these benefits were. Two student benefits were recognized by many of the teachers. First, the mathematics portfolio emphasis on problem solving was viewed as good for student learning. Second, many teachers said that students get a sense of accomplishment by seeing their progress. Mentioned by one-third of the teachers, the most prevalent comment was that the VPP is a good teaching tool and helps drive more relevant thinking. The change in curriculum is seen by many teachers as a benefit to both the students and the teachers.

### **Problems**

As mentioned earlier, there are problems with score reliability and validity. Principals interviewed for this study were asked to list the problems and negative attributes of the VPP. Overwhelmingly, principals voiced concern with portfolio scoring: reliability, validity, and lack of feedback. The new state emphasis on accountability, rather than teaching, was mentioned as a concern by half of the principals. Some mentioned the VPP being a burden to the teachers and some the disarray of the VPP at the state level.

Teachers also were asked in both the surveys and interviews to list problems and negative attributes. Two problems were mentioned often. First, teachers complained that they received no feedback from the state on the portfolios submitted. Thirty-eight percent of the surveyed and interviewed teachers mentioned feedback as a problem. Second, many teachers stated that finding time was a problem with the VPP. Fifty-four percent of the teachers mentioned that portfolios take a lot of time. There was no overwhelming comment on negative effects on students, although many teachers mentioned that many students were

not developmentally ready to do some of the portfolio projects and that scoring was subjective.

## CONCLUSION

Koretz, Madaus, Haertel, and Beaton (1992) estimate that Advanced Placement exams, which are similar to some types of performance assessment, cost \$65 per subject test, while commercial standardized tests cost from \$2 to \$5 per subject test. Stecher (1995) reports that the cost of the complete 5-hour CTBS battery of multiple-choice tests is \$2.80 per student, with the cost increasing significantly when open-ended written responses are included in the assessment. He reports that the CTB writing test costs \$4.80 per student for a single prompt. The General Accounting Office (U.S. General Accounting Office, 1993) estimated that the total operational cost of a national “performance-based” assessment system at \$33 per student.

Stecher (1995) also analyzed the cost of performance assessment in science, and found the per student cost of one performance task ranged from \$17 to \$85, depending on whether best-case or worst-case assumptions were used, as well as the number of students tested. In addition, he reports that approximately four tasks would be needed to produce a student score with a reliability comparable to the ITBS Science Subtest.

In all of these analyses, except the GAO report, the cost estimates are based on the direct costs of the assessment program. The GAO is the only other organization we are aware of that has attempted to estimate the opportunity costs of personnel time, in attempting to determine the full costs of assessment programs.<sup>14</sup> The GAO study, however, did not focus specifically on state assessment programs that included portfolios, an important factor in the higher cost estimates identified in the present study.

As the analysis above shows, particularly the analysis of Kentucky’s assessment program, when all of the economic or opportunity costs are included in the analysis, there is a dramatic increase in assessment costs. Some of these costs, however, may be considered costs of curricular reform rather than costs of

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<sup>14</sup> An earlier version of this technical report failed to appropriately acknowledge that the GAO study did include estimates of opportunity costs. Our thanks to Richard Phelps for bringing this point to our attention.

assessment. Our research showed that teachers reported instructional changes. In mathematics, teachers increased time devoted to teaching topics of problem solving, patterns and relationships, and mathematical communication (Koretz, Stecher, & Deibert, 1992). Teachers also report changes in instructional practices. In mathematics instruction, teachers reported that students spent more time working in small groups and in pairs than in the past (Koretz, Stecher, Klein, McCaffrey, & Deibert, 1993).

With fiscal retrenchment and recession affecting many states and local economies, policy makers will increasingly be concerned with costs associated with new educational programs. Although many of the assessments are being touted as new alternatives to traditional multiple-choice tests, testing via essay and oral examination has a much longer history than multiple-choice examinations which were a creation of the twentieth century because of the expense of using and the difficulties in standardizing these kinds of assessment when used with large numbers of people (Haney, Madaus, & Lyons, 1993). Godfrey and Conboy (1994) state that knowledge of costs of activities, including hidden costs, is necessary for cost control.

It is much more problematic to compare cost estimates for different types of pupil assessment programs than to determine the cost for a single program. Such comparisons require controls for differences in the nature and magnitude of the benefits being generated. As this study focused on expenditures, a comparison between the Kentucky and Vermont programs should not be made. In addition, these two programs were implemented with different purposes in mind and, therefore, the costs and outcomes are expectedly different.

In comparison with more traditional multiple-choice examinations, performance assessment and portfolio requirements are time-intensive since fewer tasks can be administered in a single time period and they take longer to score and evaluate. Fewer tasks give a smaller base on which to judge score reliability and validity (Burger, 1994; Mehrens, 1992; Viadero, 1994a). The cost of implementing new testing methodologies will depend on the level to which the state wants accountability.

For instance, Vermont's portfolio assessment system was not designed to provide information at the individual level, rather the information is collected and reported at the school and district levels. On the other hand, California's CLAS

assessment was intended to eventually provide information at the individual level, which requires much more testing information. Likewise, the North Carolina testing was developed to provide student-level information, while the Kentucky assessment was developed primarily to provide information at the school and district level for accountability purposes.

Although innovative types of performance-based assessments focus on higher-order and complex cognitive skills, researchers caution that cost, practicality, comparability, generalizability, objectivity, and administrative convenience should be considered before development and implementation of a program (Koretz, Madaus, Haertel, & Beaton, 1992). The numbers presented in this paper provide cost estimates for specific programs implemented in two states. Generalizations should be made cautiously, as economies of scale, level of information desired, testing systems in-place, and testing methodologies will all affect the cost and expenditures of developing and implementing new assessment programs at the state-level. What is surprising is, given the tremendous emphasis placed on assessment systems to measure school accountability, the relatively minuscule portion of educational expenditures devoted to this important and highly visible component of the educational system.

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## APPENDIX A— Teacher Survey Forms

### Teacher Questionnaire Study of Kentucky Assessment Costs

Please answer the following questions based on your experience with the Kentucky Instructional Results Information system (KIRIS) during the past year.

Please tell us what grade you taught this year \_\_\_\_\_

For each question, please indicate how many hours per **school week** *or* per **school year** you devoted to each task for the following assessments.

If you taught at the secondary level, what subject(s) did you teach?  
\_\_\_\_\_

Task	Multiple Choice/ Short Answer		Performance Tasks		Portfolios	
	Weekly	Annual	Weekly	Annual	Weekly	Annual
1. Preparing materials related to the assessment program for classroom use.						
2. Working with students specifically on assessment related tasks.						
3. Administering the test.						
4. Scoring						
5. Participating in training activities directly related to the assessment.						
6. Engaging in other administrative tasks related to the assessment.						

**PLEASE TURN THIS SURVEY OVER**

The following questions are designed to give us an idea of where you found the time to participate in these assessment activities.

7. In general, did the time you spent on assessment activities come from: (mark one answer for this category)

- \_\_\_\_\_ Working after school
- \_\_\_\_\_ Working during your preparation period
- \_\_\_\_\_ Release time with a substitute
- \_\_\_\_\_ During class hours (non preparation time)
- \_\_\_\_\_ Other (Please indicate)  
\_\_\_\_\_  
\_\_\_\_\_
- \_\_\_\_\_ A combination of these (Please answer question 8)

8. If the time came from a combination of sources, please try to estimate the percentage of time from each category (your total should add to 100%)

- \_\_\_\_\_ % Working after school
- \_\_\_\_\_ % Working during your preparation period
- \_\_\_\_\_ % Release time with a substitute
- \_\_\_\_\_ % During class hours (non preparation time)
- \_\_\_\_\_ % Other (Please indicate)  
\_\_\_\_\_  
\_\_\_\_\_

9. What positive effects can you identify from these assessments for **students**?

For **teachers**?

10. What negative effects can you identify from these assessments for **students**?

For **teachers**?

**THANK YOU VERY MUCH FOR TAKING THE TIME TO FILL THIS OUT.**

## Teacher Questionnaire Vermont Assessment Cost Study

Please answer the following questions based on your experience with the Vermont Portfolio Project in Math and Writing during the past school year.

For each question, please indicate how many hours per **school week** *or* per **school year** you devoted to each task for the following assessments.

Please tell us what grade you teach this year \_\_\_\_\_  
taught last year \_\_\_\_\_

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Task	Math Portfolio		Writing Portfolio		Uniform Math Test		Uniform Writing Test	
	Weekly	Annual	Weekly	Annual	Weekly	Annual	Weekly	Annual
1. Preparing materials related to the assessment program for classroom use.								
2. Working with students specifically on assessment related tasks.								
3. Administering the test.								
4. Scoring								
5. Participating in training activities directly related to the assessment.								
6. Engaging in other administrative tasks related to the assessment.								

**PLEASE TURN THIS SURVEY OVER**

The following questions are designed to give us an idea of where you found the time to participate in these assessment activities.

7. In general, did the time you spent on assessment activities come from: (mark one answer for this category)

- \_\_\_\_\_ Working after school
- \_\_\_\_\_ Working during your preparation period
- \_\_\_\_\_ Release time with a substitute
- \_\_\_\_\_ During class hours (non preparation time)
- \_\_\_\_\_ Other (Please indicate)  
\_\_\_\_\_  
\_\_\_\_\_
- \_\_\_\_\_ A combination of these (Please answer question 8)

8. If the time came from a combination of sources, please try to estimate the percentage of time from each category (your total should add to 100%)

- \_\_\_\_\_ % Working after school
- \_\_\_\_\_ % Working during your preparation period
- \_\_\_\_\_ % Release time with a substitute
- \_\_\_\_\_ % During class hours (non preparation time)
- \_\_\_\_\_ % Other (Please indicate)  
\_\_\_\_\_  
\_\_\_\_\_

9. What positive effects can you identify from these assessments for **students**?

For **teachers**?

10. What negative effects can you identify from these assessments for **students**?

For **teachers**?

**THANK YOU VERY MUCH FOR TAKING THE TIME TO FILL THIS OUT.**

**APPENDIX B**  
**Estimates of Teacher Time Costs—Alternative Assumptions**

**Table B1**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**Average Teacher Salary, 7 Hours Per Day**

Average Salary = \$32,217  
 Annual Hours = 1,260

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$29.40

Grade Level	Estimated Cost for One Teacher by Component (\$)						Total
	Development		Test Administration			Scoring	
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	221	156	515	132	0	0	1,023
Intermediate	2,294	176	1,147	441	941	0	4,999
High School	1,059	529	1,147	617	573	0	3,925
<b>Performance Tasks</b>							
Elementary	126	112	353	1,147	0	112	1,850
Intermediate	588	176	588	59	0	235	1,647
High School	59	0	235	0	0	0	294
<b>Portfolios</b>							
Elementary	1,411	288	4,293	588	88	823	7,492
Intermediate	882	176	882	0	0	882	2,823
High School	735	176	735	0	353	735	2,735
<b>Total</b>							
Elementary	1,758	556	5,160	1,867	88	935	10,365
Intermediate	3,764	529	2,617	500	941	1,117	9,468
High School	1,852	706	2,117	617	926	735	6,954

**Table B2**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**Low Estimated Teacher Salary, 7 Hours Per Day**

Average Salary = \$23,102  
 Annual Hours = 1,260

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$21.08

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	158	112	369	95	0	0	734
Intermediate	1,645	127	822	316	675	0	3,584
High School	759	380	822	443	411	0	2,815
<b>Performance Tasks</b>							
Elementary	91	80	253	822	0	80	1,326
Intermediate	422	127	422	42	0	169	1,181
High School	42	0	169	0	0	0	211
<b>Portfolios</b>							
Elementary	1,012	207	3,078	422	63	590	5,372
Intermediate	633	127	633	0	0	633	2,024
High School	527	127	527	0	253	527	1,961
<b>Total</b>							
Elementary	1,261	399	3,700	1,339	63	671	7,433
Intermediate	2,699	380	1,877	358	675	801	6,789
High School	1,328	506	1,518	443	664	527	4,987

**Table B3**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**High Estimated Teacher Salary, 7 Hours Per Day**

Average Salary = \$45,197  
 Annual Hours = 1,260

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$41.25

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	309	219	722	186	0	0	1,436
Intermediate	3,218	248	1,609	619	1,320	0	7,013
High School	1,485	743	1,609	866	804	0	5,507
<b>Performance Tasks</b>							
Elementary	177	157	495	1,609	0	157	2,595
Intermediate	825	248	825	83	0	330	2,310
High School	83	0	330	0	0	0	413
<b>Portfolios</b>							
Elementary	1,980	404	6,023	825	124	1,155	10,511
Intermediate	1,238	248	1,238	0	0	1,238	3,960
High School	1,031	248	1,031	0	495	1,031	3,836
<b>Total</b>							
Elementary	2,467	780	7,240	2,619	124	1,312	14,541
Intermediate	5,280	743	3,671	701	1,320	1,568	13,283
High School	2,599	990	2,970	866	1,299	1,031	9,756

**Table B4**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**Average Teacher Salary, 8 Hours per Day**

Average Salary = \$32,217  
 Annual Hours = 1,440

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$25.73

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	193	136	450	116	0	0	895
Intermediate	2,007	154	1,003	386	823	0	4,374
High School	926	463	1,003	540	502	0	3,435
<b>Performance Tasks</b>							
Elementary	111	98	309	1,003	0	98	1,618
Intermediate	515	154	515	51	0	206	1,441
High School	51	0	206	0	0	0	257
<b>Portfolios</b>							
Elementary	1,235	252	3,756	515	77	720	6,556
Intermediate	772	154	772	0	0	772	2,470
High School	643	154	643	0	309	643	2,393
<b>Total</b>							
Elementary	1,539	486	4,515	1,634	77	818	9,069
Intermediate	3,293	463	2,290	437	823	978	8,285
High School	1,621	617	1,852	540	810	643	6,085

**Table B5**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**Low Teacher Salary, 8 Hours per Day**

Average Salary = \$23,102  
 Annual Hours = 1,440

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$18.44

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	138	98	323	83	0	0	642
Intermediate	1,439	111	720	277	590	0	3,136
High School	664	332	720	387	360	0	2,463
<b>Performance Tasks</b>							
Elementary	79	70	221	720	0	70	1,160
Intermediate	369	111	369	37	0	148	1,033
High School	37	0	148	0	0	0	184
<b>Portfolios</b>							
Elementary	886	181	2,694	369	55	517	4,701
Intermediate	553	111	553	0	0	553	1,771
High School	461	111	461	0	221	461	1,716
<b>Total</b>							
Elementary	1,103	349	3,238	1,172	55	587	6,503
Intermediate	2,362	332	1,642	314	590	701	5,941
High School	1,162	443	1,328	387	581	461	4,363

**Table B6**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**High Teacher Salary, 8 Hours per Day**

Average Salary = \$45,197  
 Annual Hours = 1,440

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$36.09

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	271	191	632	162	0	0	1,256
Intermediate	2,815	217	1,408	541	1,155	0	6,136
High School	1,299	650	1,408	758	704	0	4,819
<b>Performance Tasks</b>							
Elementary	155	137	433	1,408	0	137	2,270
Intermediate	722	217	722	72	0	289	2,021
High School	72	0	289	0	0	0	361
<b>Portfolios</b>							
Elementary	1,733	354	5,270	722	108	1,011	9,197
Intermediate	1,083	217	1,083	0	0	1,083	3,465
High School	902	217	902	0	433	902	3,357
<b>Total</b>							
Elementary	2,158	682	6,335	2,292	108	1,148	12,723
Intermediate	4,620	650	3,212	614	1,155	1,372	11,623
High School	2,274	866	2,599	758	1,137	902	8,536

**Table B7**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**Average Teacher Salary, 6.5 Hours per Day**

Average Salary = \$32,217  
 Annual Hours = 1,170

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$31.67

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	237	168	554	142	0	0	1,102
Intermediate	2,470	190	1,235	475	1,013	0	5,383
High School	1,140	570	1,235	665	617	0	4,227
<b>Performance Tasks</b>							
Elementary	136	120	380	1,235	0	120	1,992
Intermediate	633	190	633	63	0	253	1,773
High School	63	0	253	0	0	0	317
<b>Portfolios</b>							
Elementary	1,520	310	4,623	633	95	887	8,069
Intermediate	950	190	950	0	0	950	3,040
High School	792	190	792	0	380	792	2,945
<b>Total</b>							
Elementary	1,894	598	5,557	2,011	95	1,007	11,162
Intermediate	4,053	570	2,818	538	1,013	1,203	10,197
High School	1,995	760	2,280	665	997	792	7,489

**Table B8**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**Low Teacher Salary, 6.5 Hours per Day**

Average Salary = \$23,102  
 Annual Hours = 1,170

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$22.71

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	170	120	397	102	0	0	790
Intermediate	1,771	136	886	341	727	0	3,860
High School	817	409	886	477	443	0	3,031
<b>Performance Tasks</b>							
Elementary	98	86	272	886	0	86	1,428
Intermediate	454	136	454	45	0	182	1,272
High School	45	0	182	0	0	0	227
<b>Portfolios</b>							
Elementary	1,090	223	3,315	454	68	636	5,786
Intermediate	681	136	681	0	0	681	2,180
High School	568	136	568	0	272	568	2,112
<b>Total</b>							
Elementary	1,358	429	3,985	1,442	68	722	8,004
Intermediate	2,907	409	2,021	386	727	863	7,312
High School	1,431	545	1,635	477	715	568	5,370

**Table B9**  
**Estimated Cost of One Kentucky Teacher's Time For Assessment Activities:**  
**High Teacher Salary, 6.5 Hours per Day**

Average Salary = \$45,197  
 Annual Hours = 1,170

Benefit Rate = 15.0%  
 Hourly Salary and Benefit = \$44.42

Grade Level	Estimated Cost for One Teacher by Component (\$)						
	Development		Test Administration			Scoring	Total
	Prepare Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	333	235	777	200	0	0	1,546
Intermediate	3,465	267	1,733	666	1,422	0	7,552
High School	1,599	800	1,733	933	866	0	5,931
<b>Performance Tasks</b>							
Elementary	191	169	533	1,733	0	169	2,794
Intermediate	888	267	888	89	0	355	2,488
High School	89	0	355	0	0	0	444
<b>Portfolios</b>							
Elementary	2,132	435	6,486	888	133	1,244	11,319
Intermediate	1,333	267	1,333	0	0	1,333	4,265
High School	1,111	267	1,111	0	533	1,111	4,131
<b>Total</b>							
Elementary	2,657	840	7,796	2,821	133	1,413	15,660
Intermediate	5,686	800	3,954	755	1,422	1,688	14,305
High School	2,799	1,066	3,199	933	1,399	1,111	10,506

**APPENDIX C**

**Estimates of Total Opportunity Costs of All Kentucky Teachers, 1995-96—Detailed Tables**

**Table C1  
Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96  
Average Estimated Teacher Salary, 7 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,255,748	887,395	2,930,078	753,449	0	0	5,826,668
Intermediate	6,852,082	527,083	3,426,041	1,317,708	2,811,110	0	14,934,024
High School	2,951,878	1,475,939	3,197,867	1,721,929	1,598,934	0	10,946,546
<b>Performance Tasks</b>							
Elementary	719,962	636,245	2,009,196	6,529,887	0	636,245	10,531,536
Intermediate	1,756,944	527,083	1,756,944	175,694	0	702,778	4,919,443
High School	163,993	0	655,973	0	0	0	819,966
<b>Portfolios</b>							
Elementary	8,036,784	1,640,843	24,445,218	3,348,660	502,299	4,688,124	42,661,928
Intermediate	2,635,416	527,083	2,635,416	0	0	2,635,416	8,433,331
High School	2,049,915	491,980	2,049,915	0	983,959	2,049,915	7,625,684
<b>Total</b>							
Elementary	10,012,493	3,164,484	29,384,492	10,631,996	502,299	5,324,369	59,020,133
Intermediate	11,244,442	1,581,250	7,818,401	1,493,402	2,811,110	3,338,194	28,286,798
High School	5,165,786	1,967,918	5,903,755	1,721,929	2,582,893	2,049,915	19,392,196
<b>Grand Total</b>	<b>26,422,721</b>	<b>6,713,652</b>	<b>43,106,648</b>	<b>13,847,327</b>	<b>5,896,302</b>	<b>10,712,478</b>	<b>106,699,127</b>

**Table C2**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Average Estimated Teacher Salary, 7 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	921,029	650,860	2,149,067	552,617	0	0	4,273,572
Intermediate	5,024,401	386,492	2,512,201	966,231	2,061,293	0	10,950,618
High School	2,165,486	1,082,743	2,345,944	1,263,200	1,172,972	0	8,030,345
<b>Performance Tasks</b>							
Elementary	528,056	466,654	1,473,646	4,789,348	0	466,654	7,724,359
Intermediate	1,288,308	386,492	1,288,308	128,831	0	515,323	3,607,262
High School	120,305	0	481,219	0	0	0	601,524
<b>Portfolios</b>							
Elementary	5,894,582	1,203,477	17,929,355	2,456,076	368,411	3,438,506	31,290,408
Intermediate	1,932,462	386,492	1,932,462	0	0	1,932,462	6,183,878
High School	1,503,810	360,914	1,503,810	0	721,829	1,503,810	5,594,173
<b>Total</b>							
Elementary	7,343,667	2,320,992	21,552,067	7,798,041	368,411	3,905,161	43,288,340
Intermediate	8,245,171	1,159,477	5,732,971	1,095,062	2,061,293	2,447,785	20,741,759
High School	3,789,601	1,443,658	4,330,973	1,263,200	1,894,801	1,503,810	14,226,043
<b>Grand Total</b>	<b>19,378,440</b>	<b>4,924,127</b>	<b>31,616,010</b>	<b>10,156,304</b>	<b>4,324,505</b>	<b>7,856,756</b>	<b>78,256,141</b>

**Table C3**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Low Estimated Teacher Salary, 7 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	900,380	636,268	2,100,886	540,228	0	0	4,177,761
Intermediate	4,912,989	377,922	2,456,495	944,806	2,015,585	0	10,707,797
High School	2,116,516	1,058,258	2,292,893	1,234,635	1,146,446	0	7,848,748
<b>Performance Tasks</b>							
Elementary	516,218	456,192	1,440,607	4,681,973	0	456,192	7,551,183
Intermediate	1,259,741	377,922	1,259,741	125,974	0	503,896	3,527,274
High School	117,584	0	470,337	0	0	0	587,921
<b>Portfolios</b>							
Elementary	5,762,429	1,176,496	17,527,388	2,401,012	360,152	3,361,417	30,588,893
Intermediate	1,889,611	377,922	1,889,611	0	0	1,889,611	6,046,756
High School	1,469,803	352,753	1,469,803	0	705,505	1,469,803	5,467,667
<b>Total</b>							
Elementary	7,179,026	2,268,956	21,068,880	7,623,213	360,152	3,817,609	42,317,837
Intermediate	8,062,341	1,133,767	5,605,847	1,070,780	2,015,585	2,393,508	20,281,827
High School	3,703,904	1,411,011	4,233,033	1,234,635	1,851,952	1,469,803	13,904,336
<b>Grand Total</b>	<b>18,945,271</b>	<b>4,813,734</b>	<b>30,907,760</b>	<b>9,928,627</b>	<b>4,227,689</b>	<b>7,680,920</b>	<b>76,504,000</b>

**Table C4**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Low Estimated Teacher Salary, 7 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	660,384	466,671	1,540,895	396,230	0	0	3,064,180
Intermediate	3,602,530	277,118	1,801,265	692,794	1,477,961	0	7,851,668
High School	1,552,668	776,334	1,682,058	905,723	841,029	0	5,757,812
<b>Performance Tasks</b>							
Elementary	378,620	334,594	1,056,614	3,433,995	0	334,594	5,538,418
Intermediate	923,726	277,118	923,726	92,373	0	369,490	2,586,432
High School	86,259	0	345,037	0	0	0	431,297
<b>Portfolios</b>							
Elementary	4,226,456	862,901	12,855,469	1,761,023	264,153	2,465,432	22,435,436
Intermediate	1,385,588	277,118	1,385,588	0	0	1,385,588	4,433,883
High School	1,078,242	258,778	1,078,242	0	517,556	1,078,242	4,011,060
<b>Total</b>							
Elementary	5,265,459	1,664,167	15,452,979	5,591,249	264,153	2,800,027	31,038,034
Intermediate	5,911,844	831,353	4,110,579	785,167	1,477,961	1,755,079	14,871,982
High School	2,717,170	1,035,112	3,105,337	905,723	1,358,585	1,078,242	10,200,169
<b>Grand Total</b>	<b>13,894,473</b>	<b>3,530,632</b>	<b>22,668,894</b>	<b>7,282,139</b>	<b>3,100,699</b>	<b>5,633,348</b>	<b>56,110,185</b>

**Table C5**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**High Estimated Teacher Salary, 7 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,761,891	1,245,069	4,111,078	1,057,134	0	0	8,175,173
Intermediate	9,613,890	739,530	4,806,945	1,848,825	3,944,160	0	20,953,350
High School	4,141,665	2,070,833	4,486,804	2,415,971	2,243,402	0	15,358,674
<b>Performance Tasks</b>							
Elementary	1,010,151	892,691	2,819,025	9,161,831	0	892,691	14,776,389
Intermediate	2,465,100	739,530	2,465,100	246,510	0	986,040	6,902,280
High School	230,093	0	920,370	0	0	0	1,150,463
<b>Portfolios</b>							
Elementary	11,276,100	2,302,204	34,298,138	4,698,375	704,756	6,577,725	59,857,298
Intermediate	3,697,650	739,530	3,697,650	0	0	3,697,650	11,832,480
High School	2,876,156	690,278	2,876,156	0	1,380,555	2,876,156	10,699,301
<b>Total</b>							
Elementary	14,048,141	4,439,964	41,228,241	14,917,341	704,756	7,470,416	82,808,859
Intermediate	15,776,640	2,218,590	10,969,695	2,095,335	3,944,160	4,683,690	39,688,110
High School	7,247,914	2,761,110	8,283,330	2,415,971	3,623,957	2,876,156	27,208,438
<b>Grand Total</b>	<b>37,072,695</b>	<b>9,419,664</b>	<b>60,481,266</b>	<b>19,428,647</b>	<b>8,272,873</b>	<b>15,030,263</b>	<b>149,705,408</b>

**Table C6**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**High Estimated Teacher Salary, 7 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,292,259	913,197	3,015,272	775,356	0	0	5,996,084
Intermediate	7,049,543	542,273	3,524,771	1,355,681	2,892,120	0	15,364,388
High School	3,038,310	1,519,155	3,291,503	1,772,348	1,645,751	0	11,267,066
<b>Performance Tasks</b>							
Elementary	740,895	654,745	2,067,615	6,719,749	0	654,745	10,837,749
Intermediate	1,807,575	542,273	1,807,575	180,758	0	723,030	5,061,210
High School	168,795	0	675,180	0	0	0	843,975
<b>Portfolios</b>							
Elementary	8,270,460	1,688,552	25,155,983	3,446,025	516,904	4,824,435	43,902,359
Intermediate	2,711,363	542,273	2,711,363	0	0	2,711,363	8,676,360
High School	2,109,938	506,385	2,109,938	0	1,012,770	2,109,938	7,848,968
<b>Total</b>							
Elementary	10,303,615	3,256,494	30,238,869	10,941,129	516,904	5,479,180	60,736,191
Intermediate	11,568,480	1,626,818	8,043,709	1,536,439	2,892,120	3,434,393	29,101,958
High School	5,317,043	2,025,540	6,076,620	1,772,348	2,658,521	2,109,938	19,960,009
<b>Grand Total</b>	<b>27,189,137</b>	<b>6,908,851</b>	<b>44,359,198</b>	<b>14,249,916</b>	<b>6,067,545</b>	<b>11,023,510</b>	<b>109,798,157</b>

**Table C7**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Average Estimated Teacher Salary, 8 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,098,993	776,621	2,564,316	659,396	0	0	5,099,326
Intermediate	5,996,737	461,287	2,998,368	1,153,219	2,460,200	0	13,069,811
High School	2,583,395	1,291,697	2,798,678	1,506,980	1,399,339	0	9,580,089
<b>Performance Tasks</b>							
Elementary	630,089	556,823	1,758,388	5,714,762	0	556,823	9,216,885
Intermediate	1,537,625	461,287	1,537,625	153,762	0	615,050	4,305,349
High School	143,522	0	574,088	0	0	0	717,610
<b>Portfolios</b>							
Elementary	7,033,553	1,436,017	21,393,723	2,930,647	439,597	4,102,906	37,336,443
Intermediate	2,306,437	461,287	2,306,437	0	0	2,306,437	7,380,599
High School	1,794,024	430,566	1,794,024	0	861,132	1,794,024	6,673,770
<b>Total</b>							
Elementary	8,762,635	2,769,461	25,716,427	9,304,804	439,597	4,659,729	51,652,653
Intermediate	9,840,799	1,383,862	6,842,430	1,306,981	2,460,200	2,921,487	24,755,759
High School	4,520,941	1,722,263	5,166,790	1,506,980	2,260,471	1,794,024	16,971,469
<b>Grand Total</b>	<b>23,124,374</b>	<b>5,875,587</b>	<b>37,725,648</b>	<b>12,118,766</b>	<b>5,160,267</b>	<b>9,375,240</b>	<b>93,379,882</b>

**Table C8**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Average Estimated Teacher Salary, 8 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	806,057	569,613	1,880,799	483,634	0	0	3,740,103
Intermediate	4,397,206	338,247	2,198,603	845,616	1,803,982	0	9,583,653
High School	1,895,169	947,584	2,053,100	1,105,515	1,026,550	0	7,027,918
<b>Performance Tasks</b>							
Elementary	462,139	408,402	1,289,691	4,191,494	0	408,402	6,760,128
Intermediate	1,127,489	338,247	1,127,489	112,749	0	450,995	3,156,968
High School	105,287	0	421,149	0	0	0	526,436
<b>Portfolios</b>							
Elementary	5,158,762	1,053,247	15,691,235	2,149,484	322,423	3,009,278	27,384,429
Intermediate	1,691,233	338,247	1,691,233	0	0	1,691,233	5,411,945
High School	1,316,090	315,861	1,316,090	0	631,723	1,316,090	4,895,853
<b>Total</b>							
Elementary	6,426,958	2,031,263	18,861,724	6,824,612	322,423	3,417,680	37,884,659
Intermediate	7,215,927	1,014,740	5,017,324	958,365	1,803,982	2,142,228	18,152,566
High School	3,316,546	1,263,446	3,790,338	1,105,515	1,658,273	1,316,090	12,450,207
<b>Grand Total</b>	<b>16,959,430</b>	<b>4,309,448</b>	<b>27,669,386</b>	<b>8,888,493</b>	<b>3,784,677</b>	<b>6,875,998</b>	<b>68,487,432</b>

**Table C9**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Low Estimated Teacher Salary, 8 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	787,619	556,584	1,837,777	472,571	0	0	3,654,550
Intermediate	4,297,700	330,592	2,148,850	826,481	1,763,159	0	9,366,782
High School	1,851,450	925,725	2,005,737	1,080,012	1,002,869	0	6,865,793
<b>Performance Tasks</b>							
Elementary	451,568	399,060	1,260,190	4,095,616	0	399,060	6,605,494
Intermediate	1,101,974	330,592	1,101,974	110,197	0	440,790	3,085,528
High School	102,858	0	411,433	0	0	0	514,292
<b>Portfolios</b>							
Elementary	5,040,758	1,029,155	15,332,307	2,100,316	315,047	2,940,442	26,758,026
Intermediate	1,652,962	330,592	1,652,962	0	0	1,652,962	5,289,477
High School	1,285,729	308,575	1,285,729	0	617,150	1,285,729	4,782,912
<b>Total</b>							
Elementary	6,279,945	1,984,799	18,430,273	6,668,503	315,047	3,339,502	37,018,070
Intermediate	7,052,636	991,777	4,903,786	936,678	1,763,159	2,093,751	17,741,788
High School	3,240,037	1,234,300	3,702,900	1,080,012	1,620,019	1,285,729	12,162,996
<b>Grand Total</b>	<b>16,572,618</b>	<b>4,210,875</b>	<b>27,036,959</b>	<b>8,685,194</b>	<b>3,698,225</b>	<b>6,718,983</b>	<b>66,922,854</b>

**Table C10**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Low Estimated Teacher Salary, 8 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	577,679	408,227	1,347,918	346,607	0	0	2,680,431
Intermediate	3,151,359	242,412	1,575,680	606,031	1,292,865	0	6,868,347
High School	1,358,217	679,108	1,471,401	792,293	735,701	0	5,036,720
<b>Performance Tasks</b>							
Elementary	331,203	292,691	924,287	3,003,931	0	292,691	4,844,802
Intermediate	808,041	242,412	808,041	80,804	0	323,216	2,262,514
High School	75,456	0	301,826	0	0	0	377,282
<b>Portfolios</b>							
Elementary	3,697,146	754,834	11,245,486	1,540,478	231,072	2,156,669	19,625,685
Intermediate	1,212,061	242,412	1,212,061	0	0	1,212,061	3,878,596
High School	943,206	226,369	943,206	0	452,739	943,206	3,508,726
<b>Total</b>							
Elementary	4,606,028	1,455,751	13,517,691	4,891,016	231,072	2,449,359	27,150,918
Intermediate	5,171,461	727,237	3,595,782	686,835	1,292,865	1,535,278	13,009,457
High School	2,376,879	905,478	2,716,433	792,293	1,188,440	943,206	8,922,729
<b>Grand Total</b>	<b>12,154,368</b>	<b>3,088,466</b>	<b>19,829,906</b>	<b>6,370,144</b>	<b>2,712,376</b>	<b>4,927,843</b>	<b>49,083,103</b>

**Table C11**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**High Estimated Teacher Salary, 8 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,541,494	1,089,323	3,596,820	924,896	0	0	7,152,533
Intermediate	8,411,280	647,022	4,205,640	1,617,554	3,450,781	0	18,332,276
High School	3,623,580	1,811,790	3,925,545	2,113,755	1,962,773	0	13,437,444
<b>Performance Tasks</b>							
Elementary	883,790	781,024	2,466,391	8,015,769	0	781,024	12,927,997
Intermediate	2,156,738	647,022	2,156,738	215,674	0	862,695	6,038,868
High School	201,310	0	805,240	0	0	0	1,006,550
<b>Portfolios</b>							
Elementary	9,865,562	2,014,219	30,007,752	4,110,651	616,598	5,754,911	52,369,694
Intermediate	3,235,108	647,022	3,235,108	0	0	3,235,108	10,352,344
High School	2,516,375	603,930	2,516,375	0	1,207,860	2,516,375	9,360,916
<b>Total</b>							
Elementary	12,290,846	3,884,565	36,070,963	13,051,317	616,598	6,535,935	72,450,224
Intermediate	13,803,126	1,941,065	9,597,486	1,833,228	3,450,781	4,097,803	34,723,488
High School	6,341,266	2,415,720	7,247,161	2,113,755	3,170,633	2,516,375	23,804,910
<b>Grand Total</b>	<b>32,435,238</b>	<b>8,241,350</b>	<b>52,915,609</b>	<b>16,998,300</b>	<b>7,238,012</b>	<b>13,150,113</b>	<b>130,978,622</b>

**Table C12**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**High Estimated Teacher Salary, 8 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,130,609	798,964	2,638,089	678,366	0	0	5,246,028
Intermediate	6,167,709	474,439	3,083,854	1,186,098	2,530,342	0	13,442,442
High School	2,658,245	1,329,123	2,879,765	1,550,643	1,439,883	0	9,857,659
<b>Performance Tasks</b>							
Elementary	648,216	572,842	1,808,975	5,879,169	0	572,842	9,482,045
Intermediate	1,581,464	474,439	1,581,464	158,146	0	632,586	4,428,099
High School	147,680	0	590,721	0	0	0	738,401
<b>Portfolios</b>							
Elementary	7,235,901	1,477,330	22,009,198	3,014,959	452,244	4,220,942	38,410,573
Intermediate	2,372,196	474,439	2,372,196	0	0	2,372,196	7,591,026
High School	1,846,004	443,041	1,846,004	0	886,082	1,846,004	6,867,133
<b>Total</b>							
Elementary	9,014,726	2,849,136	26,456,262	9,572,494	452,244	4,793,784	53,138,645
Intermediate	10,121,368	1,423,317	7,037,514	1,344,244	2,530,342	3,004,781	25,461,567
High School	4,651,929	1,772,163	5,316,490	1,550,643	2,325,964	1,846,004	17,463,193
<b>Grand Total</b>	<b>23,788,023</b>	<b>6,044,617</b>	<b>38,810,266</b>	<b>12,467,381</b>	<b>5,308,550</b>	<b>9,644,569</b>	<b>96,063,406</b>

**Table C13**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Average Estimated Teacher Salary, 6.5 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,352,705	955,911	3,156,311	811,623	0	0	6,276,551
Intermediate	7,381,137	567,780	3,690,568	1,419,449	3,028,159	0	16,087,093
High School	3,179,795	1,589,897	3,444,778	1,854,880	1,722,389	0	11,791,739
<b>Performance Tasks</b>							
Elementary	775,551	685,370	2,164,328	7,034,065	0	685,370	11,344,685
Intermediate	1,892,599	567,780	1,892,599	189,260	0	757,040	5,299,278
High School	176,655	0	706,621	0	0	0	883,276
<b>Portfolios</b>							
Elementary	8,657,311	1,767,534	26,332,655	3,607,213	541,082	5,050,098	45,955,894
Intermediate	2,838,899	567,780	2,838,899	0	0	2,838,899	9,084,476
High School	2,208,191	529,966	2,208,191	0	1,059,932	2,208,191	8,214,470
<b>Total</b>							
Elementary	10,785,567	3,408,816	31,653,294	11,452,901	541,082	5,735,469	63,577,129
Intermediate	12,112,635	1,703,339	8,422,066	1,608,709	3,028,159	3,595,938	30,470,847
High School	5,564,641	2,119,863	6,359,589	1,854,880	2,782,320	2,208,191	20,889,484
<b>Grand Total</b>	<b>28,462,842</b>	<b>7,232,019</b>	<b>46,434,950</b>	<b>14,916,491</b>	<b>6,351,561</b>	<b>11,539,598</b>	<b>114,937,461</b>

**Table C14**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Average Estimated Teacher Salary, 6.5 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	992,142	701,114	2,314,998	595,285	0	0	4,603,539
Intermediate	5,412,340	416,334	2,706,170	1,040,835	2,220,447	0	11,796,125
High School	2,332,686	1,166,343	2,527,076	1,360,733	1,263,538	0	8,650,375
<b>Performance Tasks</b>							
Elementary	568,828	502,685	1,587,427	5,159,138	0	502,685	8,320,764
Intermediate	1,387,779	416,334	1,387,779	138,778	0	555,112	3,885,782
High School	129,594	0	518,375	0	0	0	647,968
<b>Portfolios</b>							
Elementary	6,349,708	1,296,399	19,313,696	2,645,712	396,857	3,703,997	33,706,368
Intermediate	2,081,669	416,334	2,081,669	0	0	2,081,669	6,661,341
High School	1,619,921	388,781	1,619,921	0	777,562	1,619,921	6,026,104
<b>Total</b>							
Elementary	7,910,678	2,500,198	23,216,121	8,400,135	396,857	4,206,682	46,630,670
Intermediate	8,881,788	1,249,001	6,175,618	1,179,612	2,220,447	2,636,781	22,343,248
High School	4,082,200	1,555,124	4,665,371	1,360,733	2,041,100	1,619,921	15,324,448
<b>Grand Total</b>	<b>20,874,666</b>	<b>5,304,323</b>	<b>34,057,110</b>	<b>10,940,481</b>	<b>4,658,404</b>	<b>8,463,383</b>	<b>84,298,367</b>

**Table C15**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Low Estimated Teacher Salary, 6.5 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	970,001	685,467	2,263,335	582,001	0	0	4,500,804
Intermediate	5,292,883	407,145	2,646,442	1,017,862	2,171,439	0	11,535,772
High School	2,280,175	1,140,087	2,470,189	1,330,102	1,235,095	0	8,455,648
<b>Performance Tasks</b>							
Elementary	556,134	491,467	1,552,001	5,044,005	0	491,467	8,135,074
Intermediate	1,357,150	407,145	1,357,150	135,715	0	542,860	3,800,019
High School	126,676	0	506,706	0	0	0	633,382
<b>Portfolios</b>							
Elementary	6,208,006	1,267,468	18,882,684	2,586,669	388,000	3,621,337	32,954,163
Intermediate	2,035,724	407,145	2,035,724	0	0	2,035,724	6,514,318
High School	1,583,455	380,029	1,583,455	0	760,058	1,583,455	5,890,452
<b>Total</b>							
Elementary	7,734,140	2,444,402	22,698,020	8,212,674	388,000	4,112,804	45,590,041
Intermediate	8,685,757	1,221,435	6,039,316	1,153,577	2,171,439	2,578,584	21,850,109
High School	3,990,306	1,520,117	4,560,350	1,330,102	1,995,153	1,583,455	14,979,482
<b>Grand Total</b>	<b>20,410,204</b>	<b>5,185,953</b>	<b>33,297,686</b>	<b>10,696,353</b>	<b>4,554,593</b>	<b>8,274,843</b>	<b>82,419,632</b>

**Table C16**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**Low Estimated Teacher Salary, 6.5 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	711,448	502,756	1,660,044	426,869	0	0	3,301,117
Intermediate	3,881,094	298,546	1,940,547	746,364	1,592,244	0	8,458,794
High School	1,672,728	836,364	1,812,122	975,758	906,061	0	6,203,032
<b>Performance Tasks</b>							
Elementary	407,897	360,467	1,138,316	3,699,527	0	360,467	5,966,673
Intermediate	995,152	298,546	995,152	99,515	0	398,061	2,786,426
High School	92,929	0	371,717	0	0	0	464,647
<b>Portfolios</b>							
Elementary	4,553,264	929,625	13,849,512	1,897,193	284,579	2,656,071	24,170,244
Intermediate	1,492,728	298,546	1,492,728	0	0	1,492,728	4,776,731
High School	1,161,617	278,788	1,161,617	0	557,576	1,161,617	4,321,213
<b>Total</b>							
Elementary	5,672,608	1,792,848	16,647,872	6,023,589	284,579	3,016,538	33,438,034
Intermediate	6,368,974	895,637	4,428,427	845,879	1,592,244	1,890,789	16,021,950
High School	2,927,274	1,115,152	3,345,456	975,758	1,463,637	1,161,617	10,988,892
<b>Grand Total</b>	<b>14,968,856</b>	<b>3,803,637</b>	<b>24,421,755</b>	<b>7,845,226</b>	<b>3,340,459</b>	<b>6,068,943</b>	<b>60,448,876</b>

**Table C17**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**High Estimated Teacher Salary, 6.5 Hours Per Day, Pupil-Teacher Ratio of 17.6 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,897,289	1,340,751	4,427,008	1,138,374	0	0	8,803,422
Intermediate	10,352,703	796,362	5,176,351	1,990,904	4,247,263	0	22,563,583
High School	4,459,946	2,229,973	4,831,608	2,601,635	2,415,804	0	16,538,965
<b>Performance Tasks</b>							
Elementary	1,087,779	961,293	3,035,663	9,865,904	0	961,293	15,911,933
Intermediate	2,654,539	796,362	2,654,539	265,454	0	1,061,816	7,432,710
High School	247,775	0	991,099	0	0	0	1,238,874
<b>Portfolios</b>							
Elementary	12,142,651	2,479,125	36,933,897	5,059,438	758,916	7,083,213	64,457,240
Intermediate	3,981,809	796,362	3,981,809	0	0	3,981,809	12,741,788
High School	3,097,185	743,324	3,097,185	0	1,486,649	3,097,185	11,521,526
<b>Total</b>							
Elementary	15,127,720	4,781,169	44,396,568	16,063,716	758,916	8,044,506	89,172,595
Intermediate	16,989,051	2,389,085	11,812,699	2,256,358	4,247,263	5,043,624	42,738,081
High School	7,804,905	2,973,297	8,919,891	2,601,635	3,902,452	3,097,185	29,299,365
<b>Grand Total</b>	<b>39,921,675</b>	<b>10,143,551</b>	<b>65,129,159</b>	<b>20,921,709</b>	<b>8,908,631</b>	<b>16,185,315</b>	<b>161,210,041</b>

**Table C18**  
**Estimated Opportunity Cost For All Kentucky Teachers in Grades 4, 5, 8, and 11 in 1995-96**  
**High Estimated Teacher Salary, 6.5 Hours Per Day, Pupil-Teacher Ratio of 24 to 1**

Grade Level	Estimated Opportunity Costs for All Teachers 1995-96 (\$)						
	Development		Test Administration			Scoring	Total
	Preparing Materials	Training	Working With Students	Admin-istering Test	Other Admin. Tasks		
<b>KIRIS</b>							
Elementary	1,391,568	983,374	3,246,991	834,941	0	0	6,456,873
Intermediate	7,591,289	583,945	3,795,645	1,459,863	3,114,375	0	16,545,117
High School	3,271,800	1,635,900	3,544,449	1,908,550	1,772,225	0	12,132,923
<b>Performance Tasks</b>							
Elementary	797,832	705,061	2,226,508	7,236,151	0	705,061	11,670,613
Intermediate	1,946,484	583,945	1,946,484	194,648	0	778,594	5,450,156
High School	181,767	0	727,067	0	0	0	908,833
<b>Portfolios</b>							
Elementary	8,906,032	1,818,315	27,089,182	3,710,847	556,627	5,195,186	47,276,188
Intermediate	2,919,727	583,945	2,919,727	0	0	2,919,727	9,343,125
High School	2,272,083	545,300	2,272,083	0	1,090,600	2,272,083	8,452,149
<b>Total</b>							
Elementary	11,095,432	3,506,750	32,562,681	11,781,939	556,627	5,900,246	65,403,675
Intermediate	12,457,500	1,751,836	8,661,856	1,654,512	3,114,375	3,698,320	31,338,399
High School	5,725,649	2,181,200	6,543,599	1,908,550	2,862,825	2,272,083	21,493,905
<b>Grand Total</b>	<b>29,278,581</b>	<b>7,439,786</b>	<b>47,768,135</b>	<b>15,345,000</b>	<b>6,533,827</b>	<b>11,870,650</b>	<b>118,235,979</b>