REPORT TO THE LEGISLATURE

PREPARED BY:
SELECT SCHOOL FINANCE RECALIBRATION
COMMITTEE

DECEMBER 2010

Wyoming State Legislature

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DATE: December 31, 2010

TO: Members, 2011 Wyoming Legislature

FROM: Senator Hank Coe, CoChair, Select School Finance Recalibration Committee

Representative Del McOmie, CoChair, Select School Finance Recalibration Committee

On behalf of the Select School Finance Recalibration Committee, and in accordance with 2010 Wyoming Session Laws, Chapter 39, Section 334, this report contains studies undertaken by and on behalf of the Select Committee and findings forwarded by the Select Committee pertaining to 2010 school finance recalibration. Select Committee findings and recommendations are also submitted through legislation to be introduced in the 2011 general session.

Summary documents included within this report include a summary of Select Committee findings and a summary of a proposed block grant model monitoring process forwarded by the Select Committee. The findings summary provides a brief description of study efforts, study content and ultimate Select Committee findings forwarded to the Legislature. The monitoring process, which is referenced in legislation forwarded to the legislature, provides a mechanism for future legislative oversight and monitoring of block grant model cost-based funding levels, which expands upon the existing process for employing an external cost adjustment to the block grant model.

The following reports are included by tabbed attachment to this Select Committee final report to the 2011 legislature:

- TAB A - 2010 Cost of Education Study
  Lawrence O. Picus and Associates

- TAB B – 2010 Labor Market Study Process Summary and
  Summary of Labor Market Study Findings

- TAB C – Public Teachers in Context: A Comparable Wage Analysis of Wyoming Teacher Salaries
  Dr. Lori Taylor

- TAB D – Teacher Labor Markets in Wyoming
  Dr. Christiana Stoddard

- TAB E – Analysis of School Districts' Salaries Final Report
  Neville Kenning and Lisa Bailey, Hay Group, Inc.

- TAB F – Accountability in Wyoming Based on Student Performance
  Lawrence O. Picus and Associates

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SELECT COMMITTEE ON SCHOOL FINANCE RECALIBRATION

FINDINGS ON THE RECALIBRATION OF THE EDUCATION RESOURCE BLOCK GRANT MODEL

December 2010

Pursuant to 2010 Wyoming Session Laws, Chapter 39, Section 334, 2010 recalibration was to be approached such that the pre-2010 Wyoming Education Resource Block Grant Model (school funding model) is forwarded to the extent the model components remain cost-based as determined by Lawrence O. Picus and Associates, consultants establishing the 2005 school funding model. This approach purposely did not undertake a complete full-scale recalibration of each model component which would result in a completely new model. In addition, 2010 legislation required a review of school district use of block grant resources and an understanding of how district use of model resources aligns with educational strategies underlying cost-based model components. Further, this review was to analyze the impact of district use of resources on student achievement.

Much of the recalibration effort was informed by significantly enhanced data generated by school districts and the Department of Education. The Select Committee initiated recalibration by conducting an in-depth review of the school funding model as it exists currently. A tutorial was presented by staff which included a discussion of the major drivers of education funding under the current model.

The next major Select Committee effort was to understand how districts deploy resources generated by the school funding model to provide education programs in Wyoming schools. Model resources are provided to districts primarily through a block grant and as a result, districts are not required to use resources in the same manner or at the same level generated by the model. The Department of Education submitted a report to the Select Committee on district use of model resources. This report was based upon data reported by school districts, and provided a comparison of district use of model resources with how the model allocates resources to districts. Similar information was provided through a multi-year study conducted by consultants Lawrence O. Picus and Associates. This study effort collected school data in the field, and used the data collection to understand school district use of resources. Also, this effort further examined educational strategies deployed by school districts and compared such deployment with model resources. Both reports indicated district use of resources does not generally align with model-based strategies. The Department study further indicated that district allocation of resources has not significantly changed during the four year period following implementation of the 2005 model recalibration recommendations. Significant findings were that elementary schools are staffed at levels below model resources, resulting in larger class sizes than resourced by the model. Additionally, the use of professional aides in lieu of model resourced certified teachers is prevalent, especially among the larger elementary schools.

Recalibration was guided by a "desk review" of school funding model components to revalidate the cost-basis of the model and to ensure components remain adequately resourced to maintain model cost-based integrity. The desk review was conducted by Picus and Associates, consultants to the legislature, to identify the appropriateness of current model component funding in light of the current status of educational funding research and the status of the current educational environment and practice. The desk review concluded that the funding level of the current model exceeds the Supreme Court's requirement that the model be cost-based. Initial findings were provided for each model component, but on whole model resources significantly exceed cost-based levels.

In addition to the desk audit, results of a labor market study were provided to Select Committee members. The labor market study was initiated to determine if model and actual salary levels for school teachers are at levels sufficient to allow school districts to attract and retain high quality employees. Further, the study purpose included identifying labor market indicators available to provide information on the competitiveness of total compensation levels, salaries and benefits, for all district employees. Findings indicate both beginning and average teacher salaries top national salaries when cost of living adjustments are included, and teacher salaries at the high-end of district salary schedules top national salaries without adjusting for cost of living. Further, non-teacher salaries compared well with and often exceeded similar positions within the state and region. However, labor market study findings indicate that teacher quality, by available measures, has not improved in the state over the past five to ten years. Although nearly seventy-five percent of all new teachers are from out-of-state, these teachers do not possess qualifications that are significantly distinguishable from the current workforce.

Based upon the desk audit and statutory directives, and when combined with other information received and provided during the course of its study, the Select Committee focused on a technical recalibration of the school funding model. Technical recalibration involved necessary refinement of the model as opposed to a complete model recalibration as occurred during the 2005 effort. Similarly, based upon statutory directive and upon information received, the Select Committee determined the recalibration effort would include a focus on educational accountability tied to student achievement. The accountability recommendations will be contained and forwarded in legislation separate from recalibration recommendations. A Select Committee work plan was adopted in July 2010 which provided a work schedule outlining both recalibration and accountability activity and timelines.

TECHNICAL RECALIBRATION RECOMMENDATIONS

The Committee has adopted the following technical refinements to the model which generally result in little to no fiscal impact:

- The assessment component of the model is refined such that in the future, this model component is not adjusted by the external cost adjustment. The current level of funding for assessment exceeds the current cost identified by the consultants, and the consultants suggest the cost is unlikely to rise.

- Elementary principal funding is adjusted such that elementary schools receive one assistant principal prorated for every 288 ADM beyond the initial 288 ADM. Previously, the model resourced principals rather than specific assistant principals. This refinement aligns this component with the prototypical methodology used at the middle school and high school levels.

- The pupil support staff component is amended such that guidance counselors will be disaggregated into a separate category allowing additional transparency within the model.

- Funding is increased within the funding model to provide for additional retirement contributions in alignment with 2010 legislative increases in "employer" retirement contributions.

- The model is revised such that a grades 5-to-8 school is considered a middle school rather than resourcing the fifth grade separately as an independent elementary school. This aligns resources at this grade band with the prototypical methodology used in the model.

- Instead of funding based on a specified dollar amount and to enhance funding consistency, the funding of instructional facilitators is based upon a percentage of full funding capped at 60%. The 60% cap is based upon school year 2006-2007 levels. Any unused funds during any school year are required to revert to the foundation program account.

- Funding for small districts with a total ADM of 147 or less will be adjusted to ensure that schools receive funding for one teacher for every grade level. This small district funding will replace the current scheme whereby districts comprised exclusively of very small schools receive an additional .5 teacher resources per seven ADM.

- To enhance the efficiency and predictability of school district and state cash flow in distributing school foundation account payments as generated by the school funding model, as well as addressing the appropriate equitability of district resources, revenues currently available to school districts are redirected to the foundation program account.

FINDINGS

The Select Committee on School Finance Recalibration submits the following findings on the education resource block grant model to the 2011 Wyoming Legislature. These findings are further refined through three separate legislative proposals prepared for introduction in the 2011 general session.

1. The Select Committee accepts the final reports of the consultants employed to provide evidence and research to the Select Committee.

2. The Select Committee finds that the recommendations contained in the final report of the consultants provide a constitutional, cost-based level of funding.

3. Notwithstanding finding #2, which if implemented would result in an overall reduction to the present level of funding, the Select Committee recommends the Legislature sustain the current level of model funding which is above that level established as cost-based.

4. As such, the Select Committee recommends no change to components of the model other than the specifically adopted technical changes noted within this report.

5. The Select Committee finds that the use of a blanket external cost adjustment (i.e., one inflation index factor applied and compounded annually model-wide) to adjust the school funding model for the effects of inflation has historically created unintended results for certain model components between the established cost-based level of funding and the actual funding provided by the model.

6. The Select Committee further recommends that any funding added to the school funding model by the Legislature through an external cost adjustment be provided in a manner that enhances alignment between the established cost-based levels and the component funding within the model. The Select Committee included a process by statute (within legislation) to ensure model components remain cost-based, while at the same time allowing for a more precise model funding adjustment.

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BLOCK GRANT MODEL MONITORING PROCESS**

As noted in the 2010 cost of education study and in the 2010 labor market studies, funding provided by the Wyoming legislature for education exceeds the cost-basis of providing the basket of goods and services to Wyoming school children. Using average salaries currently embedded in the education resource block grant funding model, the cost of education study estimates that current funding exceeds cost by approximately $100 million. The labor market studies conclude that the average salaries embedded in the model are funded in excess of what is required to recruit and retain a highly qualified labor force. Thus, funding currently exceeds the cost-basis of providing the education basket by a figure in excess of $100 million per year.

The select committee on school finance recalibration has adopted the approach of holding funding constant, allowing inflationary pressures on the cost-basis to cause a convergence with the funding level over time. In order to monitor when the cost-basis is converging on the funding level, a series of benchmarks or indicators should be established. These benchmarks may include total funding levels, monitoring the labor market and economy, establishing a teacher salary comparator, and teacher quality and effectiveness measures. A process needs to be established to interpret the results and information generated by the benchmarks for the legislature to make policy decisions.

Under proposed legislation to be recommended to the 2011 legislature, the legislative service office, by November, 2011, is required to prepare an initial report for the joint education committee and the joint appropriations committee which provides options for adoption of benchmarks, a mechanism for tracking each of the benchmarks, a process for determining where and when convergence appears to be occurring, and a process for making recommendations for legislative action if needed. Recommended legislative action can range from a very broad system-wide external cost adjustment to targeted funding to address a specific issue. Preparation of the annual reports and any further development of those reports will require an ongoing data collection effort by the Wyoming department of education, the professional teaching standards board and other state, federal and private entities.

**The model monitoring process is referenced in proposed legislation of the Select Committee which forwards recalibration recommendations to the 2011 legislature.

2010 COST OF EDUCATION STUDY

Submitted To
Select Committee on School Finance Recalibration
Wyoming State Legislature

Final Report

Prepared By
Lawrence O. Picus
Allan Odden
Lawrence O. Picus and Associates

December 17, 2010

2010 COST OF EDUCATION STUDY

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2010 COST OF EDUCATION STUDY

1. INTRODUCTION

The purpose of this document is to describe and report the findings and conclusions of the 2010 recalibration of the Wyoming Funding Model (the "model"). This recalibration was conducted by Lawrence O. Picus and Associates under contract to the Wyoming Legislative Service Office (LSO), and was completed in support of the work of the Wyoming Legislature's Select School Finance Recalibration Committee. This document summarizes our work with the Select Committee including a series of meetings beginning in May 2010 and continuing on a monthly basis through December 2010. The first step in this process was to conduct a desk audit of the current funding system to ascertain whether or not the model continues to provide adequate resources to fund the cost of providing the Wyoming basket of educational goods and services (the "basket").

The desk audit identified those elements of the funding model which remain cost-based and do not require further examination. The desk audit also identified those elements of the funding model which required further analysis and offered our initial opinions regarding the new estimated cost-basis of each element. Based upon the initial analysis we performed in the desk audit, we concluded:[1]

Our primary finding is that the structure and framework of the funding model is sound. It continues to be more than sufficient to provide adequate financial resources to enable Wyoming's schools and school districts to deliver the State's basket of educational goods and services. The model appears to exceed the Court's requirement that the funding system be cost-based. (p. 1)

Our final conclusion remains the same. The cost-basis for providing the constitutionally required basket in school year 2011-12 is estimated to be $1,239,332,171. Estimated 2011-12 funding provided by the legislature is expected to be approximately $1,340,701,661. The legislative choice to provide funding in excess of the cost-basis of the basket ensures that Wyoming's funding system remains sound and constitutional.

If the legislature implements the recommendation of its Select Committee to preserve current levels of funding and relies on a benchmarking process to monitor the cost-basis of the basket over time, the State of Wyoming will be prepared to consider funding changes when the estimated cost basis exceeds appropriations for the funding model.

Under the current evidence-based model, resource costs are estimated at the school and school district level. Once a district receives its funding, the money is generally treated as a block grant. Districts are not required to expend that funding in a manner which reflects the research-based educational service strategies used to estimate the costs of the basket.

[1] The entire desk audit is included as Appendix A to this document.

We have concluded the overall funding is sound, equitable and adequate. In a number of areas, we have concluded current funding exceeds the Court's requirements. In several areas, we identified components that required further analysis of their cost-basis. Of those identified components, the Select Committee directed us to provide more information and data regarding the costs of certain components. The Select Committee chose not to further examine several components where a new and lower cost-basis appeared to exist (e.g., special education).

Lawrence O. Picus and Associates worked with other consultants, the Wyoming Department of Education (WDE) and the LSO to provide the Select Committee with information and data that identified the cost-basis of those specific components of the basket for which they requested further analysis. Our findings were presented through a number of technical memos and testimony to the Select Committee. Each memo contained a discussion of the evidence used to estimate the costs of providing that component of the basket, a description of how the model might be modified and the resultant change in the overall funding level required to fund the entire model's costs.[2] In addition, staff from Lawrence O. Picus and Associates met on a regular basis with representatives of the Wyoming Association of School Business Officers (WASBO) to enhance mutual understanding of the proposed changes in the cost-basis of the model. WASBO concurred that overall funding was adequate.

The technical memos were presented to the Select Committee during its meetings in August, September, October and November 2010. At its meeting on November 18 and 19, 2010, the Select Committee recommended maintaining current legislatively established funding levels for the components of the model. We estimate that the current level of funding for the model is approximately $101.4 million *more* than the cost-based amount identified through the recalibration process.

Therefore, it is our view that the model's current funding level exceeds the Supreme Court's requirement that the State estimate the cost of providing that basket for all children, and that the State then provide school districts with adequate levels of funding to meet that need.

[2] These memoranda are included as appendices B-K in a separate volume.

2. STUDY FINDINGS

The current model was developed as part of the 2005 recalibration and relied on a rigorous series of analyses and activities. Our desk audit of the current model and our conclusions regarding recalibrating the model in 2010 were presented to the Select Committee in May 2010. The purpose of that audit report was to ascertain if the level of resources provided for each component of the model are adequate to provide the basket, and if so, whether current methods for estimating resource levels remain cost-based. Where a new cost-basis was required for a particular component, we provided the supporting evidence and associated cost-basis to the Select Committee. We identify each of these components below.

In addition to reviewing the model components, the Select Committee was presented with six technical corrections to the existing model. These dealt with assessment, principals and assistant principals in elementary schools, pupil support funding, retirement, school configurations in grades 5-8 and instructional facilitators. These technical corrections are described following discussion of the components.

Following identification of the model components in their respective categories, Table 1 summarizes the difference between our conclusions regarding the cost-basis for each component and current funding level. *Details on each of these topics are included in the desk audit on the pages noted in parentheses beside in each section and as appropriate in identified appendices to this document*.

A. Model Components That Remain Cost-Based.

Our review of the model identified 14 model components that, in our judgment, remain cost-based and did not require further review or analysis. They include the following:

1. ADM count by school and district (p. 15)
2. Prototypical school size (p. 15)
3. Tutors (p. 18)
4. ELL teachers (p.18)
5. Pupil support (p.19)
6. Professional development (p. 20)
7. Assessments (p. 22 – note we did conclude that elimination of future ECA adjustments for this component is appropriate)
8. Gifted and talented (p. 23, see also appendix F for confirming analysis conducted at request of the Select Committee)
9. School site leadership (p. 26, see section 3 regarding a technical change at the elementary level)
10. School secretarial and clerical staff (p. 26)
11. Supervisory aides (p. 26)
12. Substitute teachers (p. 27)
13. Transportation (p. 29)

14. Food services (p. 30, recommended studying this topic but retaining the self-supporting assumption in the current model)

B. Model Components For Which A New Cost-Basis Was Established.

1. Librarians, Library clerks and computer technicians (p. 20; Appendix C)
2. Instructional Materials (p. 21; Appendix D)
3. Technology (p. 22; Appendix D)
4. Student Activities (p.23; Appendix E)
5. Alternative Learning Environment Schools (p. 24; Appendix G)
6. Career/Vocational Education (p. 27; Appendix H)
7. Central Office Staff (p. 27; Appendix I)
8. Operations and Maintenance (p. 28; Appendix J)
9. Utilities (p. 28; Appendix K)

C. Model Components Where Funding Level Diverges From Cost-Basis

1. Teachers (p. 15)
2. Specialist Teachers (p. 17)
3. Minimum number of Teaching Positions in Small Schools/Districts (p. 16)
4. Instructional Facilitators (p. 18)
5. Extended Day (p. 19)
6. Summer School (p. 19)

D. Additional Key Areas Of Analysis

There are three other issues that must be examined as part of recalibration. They are:

1. Salary Levels in the Model

Determination of appropriate salary levels is essential to estimating an accurate cost-basis. The calculations of the difference between our estimated cost basis and the anticipated Legislative appropriation for 2011-12 located in Table 1 of this report are based on the average salary figures embedded in the model for school year 2010-11. A listing of these average salaries may be found in Section D of Table 1. These salary figures reflect the average salaries used in the 2005 recalibration as adjusted by legislatively adopted external cost adjustments since that time. Labor market analyses have concluded these funded salaries exceed market level salaries for each of the identified positions. Because these salary levels appear to exceed our estimate of the cost basis for the model, future monitoring through the benchmarking process is recommended. This topic is the subject of the labor market studies distributed with this document. .

2. *Regional Cost Adjustments (RCA)*

   Wyoming is a large diverse state with considerable differences in the cost of purchasing identical baskets of goods and services. Estimation of an RCA to adjust for these differences is an important component of the overall model. At the present time, the Select Committee has decided to rely on the existing model's adjustment which is the greater of a Hedonic Wage Index, the Wyoming Cost of Living Index (WCLI) or an index value of 100. We continue to recommend use of a Hedonic Wage Index, updated upon availability of 2010 census data.

3. *External Cost Adjustment (ECA)*

   Over time the level of prices for goods and services changes. An ECA is needed to make these adjustments to ensure the model continues to be cost-based. At the present time, we are working with economists to develop a four component ECA that adjusts the cost-basis of the model through: professional labor, non-professional labor, supplies and materials, and utilities. We believe this approach will enable the state to apply an ECA in a more precise manner that takes into account these four components.

4. *Benchmarking Process*

   As stated in this report, the model is sound and funded in excess of its cost-basis. Over time, however, it is expected the cost-basis will increase and begin to converge with the level of funding appropriated by the Legislature. In order to monitor that convergence, and monitor the elements driving that convergence (including salaries), a detailed benchmarking process will be needed.

E. Technical Corrections

During the course of our study, the need for several technical corrections to the model was identified. These changes have been implemented in the estimates of the model for the 2011-12 school year and are included in the cost-basis of the model. These have very little to no impact on the overall cost of the model. The six areas are:

- Assessment – elimination of the ECA adjustment for assessment costs in the future.
- Elementary School Principals – the model prorated principal positions above ADM of 288 in elementary schools, this was changed to prorate assistant principal positions beyond the one principal at 288 ADM and now matches the principal and assistant principal allocation approach for middle and high schools.
- Pupil Support Funding – this correction separates guidance counselor positions from other pupil support positions in middle and high schools (for transparency reasons only) but does not add additional personnel positions to the model.
- School configuration in grades 5-8 – treats a school configured of grades 5-8 as a middle school and not as a fifth grade elementary school and a 6-8 middle school.

- Instructional Facilitators – adjusts the categorical grant program so that it funds positions at 60 percent of the cost-basis rather than a fixed dollar amount, thus ensuring the number of facilitators does not shrink as salaries increase.
- Retirement – adjusts the retirement contribution to accommodate the 1.44 percent increase in employer retirement contributions implemented by the Legislature effective September 2010.

3. ESTIMATED COST-BASIS

Below, Table 1 provides an estimate of the difference between our cost-based estimate of the basket and the current legislative funding choice. The table lists each of the components identified above, describes our estimate of the cost-basis, and displays the net difference between our estimate and the estimated funding model for the 2011-12 school year.

Table 1. Comparison of Recalibrated Cost-Basis with Current Funding Model Estimated School Year 2011-12.

Component	Cost-Based Component	Net Difference between Cost and Current Model Funding
A. Model Components that Remain Cost-Based		
ADM count by school and District	Use the greater of the school three-year average or prior year ADM.	0
Prototypical school size	288 elementary; 315 middle; 630 high school.	0
Tutors	1.0 FTE teacher position for every 100 at risk students with a minimum of 1.0 per prototypical school resourced at the highest-grade level prototype.	0
ELL Teachers	1.0 FTE teacher position for every 100 ELL students.	0
Pupil Support	1.0 FTE teacher position for every 100 at-risk students with a minimum of 1 FTE teacher position for prototypical elementary, middle and secondary schools, resourced at the highest-grade prototype using total school ADM; 1.0 FTE guidance counselor position for every 250 secondary ADM.	0
Professional Development	In addition to instructional facilitators and 10 pupil free days $116.76 per ADM.	0
Assessment	$37.70/ADM, which amount is not subject to any external cost adjustment.	0
Gifted and Talented	$29.19 per ADM	0
School Site Leadership	Principal: 1.0 for all schools down to 96 ADM elementary and 105 ADM middle and high, prorated by ADM below these ADM levels. Assistant principal: Begin phasing in 1.0 assistant	0

Component	Cost-Based Component	Net Difference between Cost and Current Model Funding
	principal position for every 288 elementary school ADM beginning at 289 ADM; Begin phasing in 1.0 assistant principal position for every 315 middle and high school ADM beginning at 316 ADM; Resource at the highest-grade prototype using total school ADM.	
School Secretarial and Clerical Staff	Secretary: 1.0 for all schools down to 96 ADM elementary and 105 ADM middle and high, prorated by ADM below these ADM levels; 1.0 for 105 to 315 ADM prototypical middle school, prorated down below 105 ADM and prorated up for 316 ADM and above; 1.0 for 105 to 630 prototypical high school ADM, prorated down below 105 ADM and prorated up for 631 ADM and above; Resource at the highest-grade prototype using total school ADM. Clerical: 1.0 for 288 ADM prototypical elementary school; 1.0 for 315 ADM prototypical middle school; 2.0 for 315 ADM prototypical high school; All FTE positions prorated up and down from prototypical level, resourced at the highest-grade prototype using total school ADM.	0
Supervisory Aides	2.0 for 288 ADM prototypical elementary school; 2.0 for 315 ADM prototypical middle school; 5.0 for 630 ADM prototypical high school; Resourced at the highest-grade prototype using total school ADM.	0
Substitute Teachers	Additional 5 percent of ADM generated core, specialist, tutor, instructional facilitator, summer school and extended day teacher positions at $99.75/day plus 7.65% for benefits.	0
Transportation	100% state reimbursement of prior year actual expenditures computed in accordance with W.S. 21-13-320.	0
Food Services	Assumed to be self-supporting.	0
Special Education	100% state reimbursement 100% of prior year actual expenditures computed in accordance with W.S. 21-13-321, less amounts received by the district under federal Title VI(b) for the same prior year.	0
B. Model Components For Which A New Cost-Basis Was Established		

Component	Cost-Based Component	Net Difference between Cost and Current Model Funding
Librarians, Library Clerks and Computer technicians	Librarian: District ADM 300 and below: 1.0 FTE librarian position. District ADM from 300 to 630: 1.0 FTE librarian position plus proration of additional 1.0 FTE up to 630 district ADM. District ADM above 630: 1.0 FTE librarian position for every 288 district elementary ADM; 1.0 FTE librarian position for every 630 district middle and high school ADM; Minimum of 2.0 FTE librarian positions. Library Clerk: District ADM 630 and below: 1.0 FTE library clerk position. District ADM above 630: 2.0 FTE library clerk positions for every 630 district middle and high school ADM; Minimum of 1.0 FTE library clerk position. Computer technician: 1.0 FTE position for every 1,000 total district ADM, kindergarten through grade 12, prorated up and down; Minimum of 0.5 FTE computer technician position.	($2,542)
Instructional Materials	$140.00/elementary and middle school ADM; $175.00/high school ADM.	$17,930,647
Technology	Computers, equipment: $250.00/ADM.	$3,676,909
Student Activities	$291.90 per ADM.	$7,419,065
Alternative Learning Environment	No longer treated as alternative schools.	$308,551
Vocational Education	$9027.27/FTE career-vocational education teacher for equipment and supplies.	$2,304,553
Central Office Staff	District ADM 500 and below: 3 administrative and 3 secretarial; District ADM from 500 to 1000: Proration of an additional administrative and secretarial position; District ADM at 1000: 4 administrative and 4 secretarial; adjusted upwards to 3500 ADM. District ADM from 1000 to 3500 ADM: Proration of additional administrative and secretarial positions; District ADM at 3500: 7 administrative and 9 secretarial, prorated up for districts with ADM greater than 3500.	$3,682,023
Maintenance and Operations	Based on ADM, gross square footage, number of buildings and classrooms, age of buildings and site	0

Component	Cost-Based Component	Net Difference between Cost and Current Model Funding
	acreage for custodians, maintenance workers and groundskeepers, computed in accordance with the 2010 cost of education study. Groundskeeper FTE computations shall be based upon the lesser of the actual site acreage on which the facility is situated as defined by department rule and regulation, or the school facility guidelines and site acreages established by the school facilities commission under W.S. 21-15-114. Acreages acquired on or prior to July 1, 1997, and acreages acquired after July 1, 1997 through an exchange with another governmental entity if the acreages involved in the exchange were originally acquired by the district and the governmental entity on or prior to July 1, 1997, shall not be subject to groundskeeper FTE computation limitations.	
Maintenance and Operations Supplies	$0.64 per 110% of gross square feet of authorized education space.	0
Utilities	Actual 2009-2010 expenditures by district. For additional school buildings added to district building inventories after 2009-2010, 100% of 2009-2010 district average utility expenditures per gross square feet for district school buildings multiplied by the additional authorized educational square footage.	($356,987)
C. Model Components Where Funding Level Diverges From Cost-Basis		
Core Teachers	Full-day kindergarten: Funded for all elementary schools. Class size: 15 for Kindergarten through grade 3; 25 for grades 4 through 12. Core teachers: Kindergarten through grade 3 ADM divided by 15; Grades 4 through 12 ADM divided by 25.	$53,620,776
Specialist Teachers	Elementary and middle schools: 20% of core teachers; high schools: 33% of core teachers.	$6,530,050
Minimum Teachers	3.65 for elementary schools with greater than 49 ADM; 7.0 for middle schools with greater than 49 ADM; 7.0 for high schools with greater than 49	$14,641,490

Component	Cost-Based Component	Net Difference between Cost and Current Model Funding
	ADM; 7.0 for secondary schools, grades 6 to 12, with greater than 49 ADM.	
Very Small Schools	For all schools with 49 or fewer ADM, resource with 1.0 assistant principal position plus 1.0 FTE teacher position for every 7 students for all staff; For a K-6 school, resource as elementary school; For a 5-8 or 6/7-9 school, resource as middle school; For a K-7, K-8 or K-9 school, resource K-5 teachers as elementary school and remaining teachers as middle school, and resource all other staff resources at the highest-grade prototype; For K-12 school, resource K-5 teachers as elementary, 6-8 teachers as middle and 9-12 teachers as high school, and resource all other staff resources at the highest-grade prototype; For 6/7-12 school, resource 6-8 teachers middle school and 9-12 teachers as high school, and resource all other staff resources at the highest-grade prototype.	$1,563,550
Instructional Facilitators	1.5 in 288 ADM prototypical elementary school; 1.5 in 315 ADM prototypical middle and high school.	($13,357,666)
Extended Day and Summer School	0.25 FTE teacher position for every 30 at-risk students.	($8,642,185)
D. Additional Key Areas Of Analysis		
Regional Cost Adjustment (RCA)	Hedonic Wage Index used for all staff to adjust for geographic differences.	$12,051,275
Model Salaries by Position****	• Teachers* (includes 10 pupil free days): $50,662.03 • Principals: $83,072.43 • Assistant principals: $69,702.30 • Superintendents: $106,892.58 • Assistant superintendents: $85,514.06 • Business managers: $72,079.04 • Aides: $18,445.82 • Computer technicians: $43,500.93 • Central office secretaries: $34,885.39 • School secretaries: $32,409.86 • School clerical staff/library clerks: $24,930.49	0

Component	Cost-Based Component	Net Difference between Cost and Current Model Funding
	• Maintenance workers/groundskeepers: $35,775.69 • Custodians: $29,843.38 *"Teachers" include core and specialist teachers, instructional facilitators, tutors, ELL teachers, extended day teachers, summer school teachers, pupil support staff, secondary school guidance counselors and librarians. ****Salary levels represent 2006 levels adjusted by subsequent legislatively adopted External Cost Adjustments. As these levels exceed labor market study estimates of cost, future monitoring is required through the benchmarking process.	
External Cost Adjustment	Analysis of appropriate cost indices for professional and non-professional labor, energy and materials.	N/A

2010 COST OF EDUCATION STUDY
Appendix

Submitted To
Select Committee on School Finance Recalibration
Wyoming State Legislature

Prepared By
Lawrence O. Picus
Allan Odden
Lawrence O. Picus and Associates

December 17, 2010

APPENDIX A

RECALIBRATION OF THE WYOMING SCHOOL FUNDING MODEL: INITIAL DESK AUDIT

RECALIBRATION OF THE WYOMING SCHOOL FUNDING MODEL

INITIAL DESK AUDIT

Submitted To
Select School Finance Recalibration Committee
Wyoming State Legislature

May 2010

By
Lawrence O. Picus
Allan Odden
Lawrence O. Picus and Associates

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RECALIBRATION OF THE WYOMING SCHOOL FUNDING MODEL INITIAL DESK AUDIT

INTRODUCTION

School finance in Wyoming has a long and rich history that includes a number of important court rulings and substantial efforts on the part of the State Legislature to ensure that funds are allocated to school districts on an adequate and equitable basis. In *Campbell I*,[1] the Wyoming Supreme Court ordered the State to identify the basket of educational goods and services every child should receive. The state was further ordered to estimate the cost of providing that basket for all children and to then provide school districts with adequate levels of funding to meet that need. In one of the following court rulings on the topic, known as *Campbell II*,[2] the Court also said that the model developed to estimate adequate levels of funding should be recalibrated at least once every five years. In *Campbell IV*[3], the Court held that the funding system initially developed in the 2000 recalibration and modified several times by the Legislature through 2004, but prior to the 2005 recalibration, met the requirements of the Wyoming Constitution. To date the current model has not been challenged in court.

The last recalibration of the Wyoming School Funding model took place in 2005 and was conducted by Lawrence O. Picus and Associates.[4] At that time, we used our Evidence-Based model to estimate the components of the basket of educational good and services needed to ensure most, if not all, of the school children in Wyoming would have access to an adequate level of resources to meet the state's learning proficiency standards. The Joint Education Committee as well as the Legislature enhanced many of our initial recommendations. We then developed a comprehensive funding model in order to implement all the final recommendations. That model has been used since the 2006-07 school year. The model is maintained by the Wyoming Department of Education and the Legislative Service Office to allocate revenues to each school district in the state, and has been modified over time to reflect estimated changes in the cost basis of some of its components.

Based on our initial review of the current model, our primary finding is that the structure and framework of the funding model is sound. It continues to be more than sufficient to provide adequate financial resources to enable Wyoming's schools and school districts to deliver the State's basket of educational goods and services. The model appears to exceed the Court's requirement that the funding system be cost-based.

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[1] *Campbell County School District v. State*, 907 P2d 1238 (Wyo. 1995), known as *Campbell I*
[2] *State v. Campbell County School District*, 19 P.3d 518 (Wyo. 2001), known as *Campbell II*.
[3] Need reference for Campbell IV.
[4] Odden, A.O., Picus, L.O. and others (2005). *An Evidence-Based Approach to Recalibrating the Wyoming Block Grant School Funding Formula*. State of Wyoming, Legislative Service Office. http://legisweb.state.wy.us/2009/interim/schoolfinance/WYRecalibration.pdf

The current Wyoming Funding Model was developed through a rigorous series of analyses and activities. These include:

1. Our Evidence-Based model's extensive review of research on the impact of all elements of the model, for which research findings exist on student achievement. The research cited is included in the reference section of the 2005 report and is transparent to anyone interested in understanding the research basis for the recommendations. That research review formed the basis for our initial cost recommendations for each element of the model in 2005.

2. The initial research recommendations were considered in detail by the Wyoming Legislative Select Committee on Recalibration, leading to the initial modifications that were part of the process we used to create a funding model that matched the needs and expectations of Wyoming.

3. The recommendations that emerged from this legislative process were subjected to review by several Wyoming Professional Judgment Panels in June 2005. The panels offered a number of suggested modifications to the proposals from the Legislature.

4. During subsequent meetings, those recommendations were debated by the Select Committee which produced further changes to the initial cost recommendations.

5. In August, 2005 we held an additional Professional Judgment Panel which addressed specific issues for small districts and small schools in Wyoming. This meeting produced a more tailored refinement of the model's small district and small school adjustments, which were forwarded to the Select Committee for consideration.

6. The Select Committee held open public hearings on the draft model in early Fall 2005. From these hearings additional modifications to the Wyoming Funding Model were proposed and accepted, and the Select Committee sent its report and proposed legislation to the full Legislature for consideration during the 2006 Legislative Session.

7. The Joint Education Committee held public hearings in January 2006 prior to the start of the Legislative session later that year. The JEC recommended a number of enhancements and changes to the model, including increases in the minimum number of teachers at secondary schools, as well as placing instructional facilitators, extended day and summer school programs in categorical programs that were funded outside of the block grant. In addition, the JEC recommended that the Regional Cost Adjustment use the higher of the two indices under consideration or a minimum of 100 (see page 31 for details).

8. The Select Committee's report was debated by the 2006 Legislature, a process which produced additional model refinements, most of which further enhanced the level of resources provided to Wyoming's schools and districts both through the model and in some instances (i.e. instructional facilitators, extended day and summer school) through categorical program funding outside of the model.

9. Since its implementation beginning with the 2006-07 school year, the model has undergone technical, and sometimes substantive, changes. These changes were designed to resolve issues that were not anticipated at the time the initial Evidence-Based model was adopted.

This document is the first step in the recalibration process which will take place in 2010 in preparation for the 2011 Legislative session. It describes our initial desk audit of the current model and our recommendations regarding how the model might best be recalibrated. The purpose of this report is to ascertain if the level of resources provided for each component of the model are adequate to provide the basket of educational goods and services, and if so, whether current methods for estimating resource levels remain cost-based. If components are no longer cost-based we outline potential approaches for changing the formula parameters for that resource.

We are confident that the theoretical and research base for the model is still sound and aligns with our current work on school finance adequacy in other states[5] and with our continued review of best practices for improving student achievement. For example, to make our analyses more transparent to both the academic and policy communities, we have included the research reviews of the evidence on what improves student learning, and how to include that in school funding formulas, in the most recent edition of our frequently cited and used school finance text – *School Finance: A Policy Perspective*.[6] As always, each edition of the book is reviewed by both researchers and practitioners before it is published.

In addition, the School Finance Redesign Project's final report, funded by the Bill and Melinda Gates Foundation, stated that while more evidence is needed on how to improve schools and thus refine school funding models, the Evidence-Based method is a good approximation of what is now known and represents a best-evidence approach for moving forward on this agenda at this time.[7] To add further academic credibility to the ideas in the model, the leading school finance journal in the United States, the American Education Finance Association's *Journal of Education Finance and Policy* – published an overview of the Evidence-Based approach to school finance adequacy in 2008.[8]

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[5] See Appendix A for a complete list of our other state studies conducted since completion of the 2005 Recalibration report.
[6] Odden, A.R. and Picus, L.O.. (2008). *School Finance: A Policy Perspective 4th Edition*. New York: McGraw Hill.
[7] National Working Group on Student Learning. (2008). Funding Student Learning: How to align Education Resources with Student Learning Goals . Seattle, WA: School Finance Redesign Project, Center on Reinventing Public Education. (October).
[8] Odden, A.R., Goetz, M.E., and Picus, L.O. (2008). Using Available Evidence to Estimate the Cost of Educational Adequacy. *Education Finance and Policy*, 3 (3), Summer 2008. 374-397.

Since our 2005 work in Wyoming, we have published two books on how districts and schools can dramatically improve student performance, drawing on additional research both by us and by others.[9] The findings in these books identify strategies and resources that are highly aligned with and further reinforce the framework of the Wyoming Funding Model.

Since 2005 we have conducted two studies in Wyoming assessing how schools and districts in the state use education resources and organize schools to improve student learning. As part of that work, in October 2008 we convened a group of leading Wyoming educators – superintendents, principals, instructional facilitators, lead teachers and teachers – to give advice to us on their views of the key features of schools that boost student achievement. The result of that meeting was what we termed the Wyoming Improving School, which although tailored to the Wyoming context, was tightly aligned with the elements in the Wyoming Funding Model.[10] All of our subsequent analyses and research provide additional support to the framework and structure of the Wyoming Funding Model. As a result we are able to conclude with confidence that there is no reason to change it at this time.

We have also reviewed the current version of the funding model (version 1f).[11] That review suggests that the underlying components and Excel programming continue to operate as intended and that changes to the overall structure and operation of the model are not needed at this time.

As described above, during our initial recalibration, and subsequent to that work, many of the parameters of the formula have been modified from our initial recommendations. In many instances, the Wyoming Funding Model now in use represents Legislative enhancements to our 2005 recommendations. In addition, the state funded an External Cost Adjustment (ECA) for most components of the model in 2007-08, 2008-09 and 2009-10. The index used for this adjustment (the Employment Cost Index – Education Services[12]) exceeded the CPI-U. These enhancements have led to a situation where the Model funding exceeds our estimate of the resources needed to provide an adequate, cost-based, education program in Wyoming schools.

Therefore it is our conclusion that the structure of the Wyoming Funding Model does not need a formal, overall change and that because of current "over" funding, the model could remain adequate and cost-based in the near future without additional external cost

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[9] Odden, A. and Archibald, S. (2009). *Doubling Student Performance… And Finding the Resources To Do It.* Thousand Oaks, CA: Corwin Press; and Odden, A. (2009). *Ten Strategies for Doubling Student Performance*. Thousand Oaks, CA: Corwin Press

[10] Odden, A., Picus, L.O., Archibald, S. and Smith, J. (2009) *Wyoming School Use of Resources 2: Making More Progress in Identifying How Schools Use Resources in Ways That Boost Student Performance on State Tests*. Prepared for the Wyoming Legislative Service Office. Available at, http://legisweb.state.wy.us/2009/interim/schoolfinance/SUR2.htm

[11] Available at http://legisweb.state.wy.us/2009/interim/schoolfinance/modelversions.htm

[12] ECI – Education Services – All civilian – total compensation – Unadjusted (Series CIU1016100000000I)

adjustments. Our initial "desk audit" of the model explains this conclusion in detail and provides support for our conclusion. In the discussion below, we note areas where the state could make modifications in formula parameters to ensure the model will remain cost-based.

This conclusion is, in our view, sound today. However, over time it is likely that without further consideration, the funding levels contained in the model may no longer provide a cost basis for the basket of educational goods and services. Therefore, we also recommend that as part of its work, the Select School Finance Recalibration Committee develop a set of benchmarks to estimate when the cost basis of the model no longer meets funding requirements of the model.

We would also point out that much of the analysis contained in this document would not be possible without the Legislature's investment in comprehensive education data systems both as part of the last recalibration and continuing through today. The LSO and WDE staff have been able to provide policy makers with sophisticated analyses about resource allocation and use patterns thanks to this support and to the efforts of staff in each of the school districts. The data available in Wyoming exceed the kinds of data available in other states. Moreover, the WDE and Legislature appear to be using these data to make empirically based decisions about education programs for the future. We strongly recommend the Legislature continue to fund these data collection efforts and in fact, consider expanding those efforts to enable tighter linkages between resources and student performance in the future.

Below we review the individual components of the model, discuss whether or not they continue to deliver the basket of educational goods and services, and consider the extent to which the funding provided through the model remains cost-based. Our review suggests that the model's components can be placed into one of three categories as follows:

1. Components that remain cost-based and for which no change is necessary at the present time. This includes some components that currently appear to be "overfunded."

2. Components for which the formula parameters should be modified as part of this overall recalibration process

3. Components where the Legislature may want to consider policy changes that reflect current research based educational practice.

Each component, along with our initial analysis of its status is described in detail below.

INDIVIDUAL COMPONENT ANALYSIS

The remainder of this report describes our desk audit of each component of the model. In each section we provide background information on the particular component, including the rationale for its inclusion in the model, and discuss whether or not modifications are necessary to maintain the cost basis of the entire funding model. We also provide a discussion of policy issues the Legislature may want to consider in the future as it reviews the model.

1. ADM Count by School and District

Background

The Wyoming funding model enacted in 2006 and operational for the 2006-07 school year and beyond counts students as ADM (Average Daily Membership) at the school level rather than the district level as was past practice and as is done in all other states. Conceptually this provides a more accurate assessment of the resource needs at each school, and should lead to a more accurate cost-based estimate of the resources needed to meet the basket of educational services.

Model ADM is the higher of a three year rolling average ADM in a school or the previous year ADM, whichever is greater. The rationale for this approach was to provide a "soft landing" for districts experiencing enrollment declines (which included most schools in the state at the time of the 2005 recalibration) but not to penalize those schools/districts where enrollment was growing.

There have been some unintended consequences of this approach. The most serious was the existence of large numbers of "phantom" students in cases where a new school was built and attendance boundaries were adjusted for all schools, resulting in children moving from one school to another school in the same district. The Wyoming Department of Education (WDE) implemented a correction for this problem in 2008 through rule and regulation.

However, by using the "higher of" approach outlined in the 2005 recalibration report, the model generates more ADM than would be counted if the state relied on either the 3 year rolling average, or the previous year ADM. The table below shows the LSO estimates of the additional ADM generated and the estimated additional funding generated compared to using a three year rolling average (which is currently the option that would generate the fewest ADM), or the prior year actual ADM for the 2009-10 school year.

Estimated Funding Differences Based on ADM Count Method, School Year 2009-10

ADM Count Method	ADM	Difference	Funding	Difference
3 Year Avg.	84,707		1,194,906,807	
Prior Year Actual	85,958	1,251	1,205,950,845	11,044,038
Higher of (Model)	87,116	2,409	1,215,994,722	21,087,915

Source: LSO, 4-19-2010

Over a four year period, the model's approach to counting ADM resulted in additional funding of $45.4 million compared to using prior year ADM only, and additional funding of $75.2 million compared to the three year average approach.

2010 Recommendation

We see this as a policy issue for the legislature. It is our view that the current policy could be retained. The marginal cost of adding one student to a school is generally lower than the additional revenue generated, whereas the savings that can be found from the loss of one student is similarly lower than the revenue lost. A growing school will benefit more from funding actual prior year ADM, while a school with declining enrollment will have a cushion for planning if the three year average is used. In the long run accommodating both conditions is probably important given the variation in enrollment trends across the state in recent years.

2. Prototypical School Size

Background

Prototypical school sizes in Wyoming's funding model are used as the basis for estimating resource needs and pro-rating resource generation based on the actual enrollment in a school. The current prototypes used in the model are:

- Elementary Schools: 288 students
- Middle Schools: 315 students
- High Schools: 630 students

These prototypes were developed after the decision was made by the Legislature to continue previous law and use core class sizes of 16 at the elementary level and 21 at the secondary level. With average class sizes of 16, the 288 prototypical elementary schools is a 3 section school – with 3 sections at each grade level. The prototype choices for middle and high schools revolved around even computations of core teachers (at a ratio of 21:1, a school of 315 students generates 15 core teachers).

However, because of the many small schools in Wyoming, this prototypical school size also makes it straight forward to recognize smaller prototype schools. These are generally proportions of the prototypes themselves. For example, at the elementary level, while 288 students represent a three section school, a 192 student elementary school would be a two section school and a 96 student elementary school would be a one section school.

2010 Recommendation

In other states we have recommended prototypes of 432 for elementary schools, 450 for middle schools and 600 for high schools. This generally derives from larger class size recommendations (see item 3 below), and from larger average school sizes generally found in other states as well. Our general recommendation in Wyoming is to reconsider this issue after the class size discussion is resolved (see the next item below).

However, there are a few areas where because the initial high school prototype was double the middle school prototype, some unusual proration issues occur. These include such things as the distribution of librarian staff, principals and assistant principals, and potentially others. Our recommendation is to identify these anomalies and correct them in the model, but to not change the prototypes unless major changes are made to the class sizes. This is an area where the formula parameters may require a small modification.

3. Elementary and Secondary Class Sizes

Background

The funding model resources core class size at 16 for grades K-5, and 21 for grades 6-12 (there are some exceptions for certain school organization schemes, but this is the general intent of the model). This approach devolved from the class sizes used in the Wyoming formula before the 2005 recalibration, even though a close reading of the history of the 16 and 21 figures suggests that they were intended to include both core and elective classes, which would translate approximately into core class sizes of 19 at the elementary and 25-28 at the secondary level, depending on conversion factors.

In our other work we have recommended core class sizes of 15 in grades K-3 and 25 in grades 4 and above. We defined core classes as the regular classroom teacher in elementary school and teachers of mathematics, science, reading/English/writing, history, and world language in secondary schools. With these ratios, class sizes average about 18 in elementary schools (grades K-5) and 25 in middle and high schools (grades 6-12).

Research on class size shows that small classes of 15 (not a class of 30 with an instructional aide or two teachers) in kindergarten through grade 3 have significant, positive impacts on student achievement in mathematics and reading.[13] It is also commonly concluded that the impact of small class size is even larger for students from low-income and minority backgrounds.[14] Thus, current research supports a policy of

[13] (Achilles, 1999; Gerber, Finn, Achilles & Boyd-Zaharias, 2001; Grissmer, 1999; Mishel & Rothstein, 2002; Molnar, 1999; Nye, Hedges & Konstantopoulous, 2002)
[14] (Finn & Achilles, 1999; Krueger & Whitmore, 2001)

funding core class sizes of approximately 18 in grades K-5. This figure is derived from the average of K-3 class sizes of 15 and grade 4-5 class sizes of 25.

The primary evidence on the impact of small classes today is the Tennessee STAR study, which was a large scale, randomized experiment of class sizes of 15 for kindergarten through grade 3.[15] The results showed that students in the small classes achieved at a significantly higher level (effect size of about 0.25 standard deviations) than those in regular class sizes, and that the impacts were even larger (effect size of about 0.50 standard deviations)[16] for low income and minority students.[17] The same research showed that a regular class of 24-25 with a teacher and an instructional aide did not produce a discernible positive impact on student achievement, a finding that undercuts proposals and wide spread practices that place instructional aides in elementary classrooms.[18]

Evidence on the most effective class sizes in grades 4-12 is harder to find. Most of the research on class size reduction has been conducted at the elementary level. Thus, we look for evidence on the most appropriate secondary class size from typical and best practices to make a recommendation for class sizes for these grades.

- First, the national average class size in middle and high schools is about 25.

- Second, nearly all comprehensive school reform models are developed on the basis of a class size of 25, a conclusion on class size reached by the dozens of experts who created these whole-school design models.[19] Although many professional judgment panels in other states have recommended secondary class sizes of 20, none cited research or best practices to support such a proposal. When the recommendations for specialists (described below) are included in the overall teacher count, there are adequate resources for schools to have classes of 25 or fewer in all core subjects, even under the typical circumstance where a teacher is responsible for five classes a day and students enroll in six classes a day.

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[15] (Finn and Achilles, 1999; Word, et al., 1990)

[16] Effect size is a term used to measure the magnitude of the treatment. In this case, how well students in small classes performed on standardized tests compared to students in large classes. Effect sizes are measured in terms of standard deviations so that tests using different scales or measures can be compared with each other. What this means is that at the median an effect size of 1.0 standard deviation would raise the student from the 50th to the 83rd percentile; 0.50 effect size would raise the student from the 50th to the 66 percentile, and a 0.25 effect size would raise the student from the 50th to the 58th percentile.
An effect size of less than 0.20 is considered a small effect. An effect size between 0.2 and 0.50 is considered a medium effect and an effect size larger than 0.50 is considered a large effect.

[17] (Achilles, 1999; Finn, 2002; Grissmer, 1999; Krueger, 2002)

[18] (Gerber, Achilles, & Boyd-Zaharias, 2001)

[19] Whole school reform or design addresses the entire school—from the organization of the school to the structure of the school day to the development of leaders and staff—through the implementation of a new school design that research suggests will lead to improved student learning. See for example, (Odden, 1997; Odden & Picus, 2000; Stringfield, Ross & Smith, 1996)

2010 Recommendation

We suggest that parameters of this element be modified. We have recommended larger core class sizes in all other adequacy studies. The figures of 16 for grades K-5 and 21 for grades 6-12 were based on the historical approach used in Wyoming and not only meet but exceed our adequacy standard. We would propose average elementary core class sizes of 18 and secondary (middle and high school) core class sizes of 25. If these parameters had been in place for 2009-10, the model's total funding would have been $54 million lower ($26.66 million less for elementary and $27.34 million less for secondary schools).

This recommendation can also be supported by current practice in Wyoming because WDE data show substantially fewer teachers have been hired for Wyoming schools, particularly at the elementary level, than the model currently fully funds suggesting that the recommendations in our other studies are adequate and cost-based.

The model was designed to fund core and specialist teachers at the class size (plus minimums discussed below) of 16 for grades K-5 and 21 above that. For 2008-09, districts across Wyoming chose to hire 468.2 fewer elementary teachers, 9.7 fewer middle school teachers, and 9.7 more high school teachers than funded.

4. Minimum Numbers of Teacher Positions In Small Schools/Districts

Background

Wyoming has always been concerned with the impact of higher per student costs for small schools and funding formulas have traditionally provided additional funds to compensate for these costs. The current funding formula has two adjustments for small schools/districts.

For schools with 49 or fewer students, the model provides funding for 1 assistant principal position plus funding for 1 certificated teaching position for each 7 ADM. These funds are assumed to be sufficient to meet *all* staff needs at the school (certificated and classified). In the special case where all of the schools in a district have 49 or fewer ADM (currently only one district) the model provides 1.5 certificated positions for every 7 ADM along with the 1.0 FTE assistant principal.

The model provides for a minimum number of teachers in schools with enrollments between 50 and 96 at the elementary level and between 50 and 105 students at middle and high schools. These minimum teacher numbers exceed the minimum teacher numbers we initially recommended in the 2005 recalibration effort. The table below shows our 2005 recommendations for the minimum number of teachers by type of school compared to the final choices made by the Legislature.

Comparison Of Minimum Teacher Recommendations In Schools With 50 or More Students With Current Wyoming Funding Model

School Level	ADM Range for Minimum Allocation	Evidence-Based Recommendation for Number of Teachers	Legislative Policy Choice for Number of Teachers
Elementary	50-96	3.75	6
Middle	50-105	7	8
High School	50-105	9	10

In addition, because of the way the law was drafted, a secondary school serving both middle school students (grades 6-8) and high school students (grades 9-12) generates the minimum for both school levels. This means that a small 6-12 school with 100 students is funded a minimum of 18 teachers. In 2009-10 if the minimum number of teachers recommended in the 2005 report were used, the model would generate $4.6 million less in funding, and if the grade band minimum requirement were lifted (the statute that results in the minimum of 18 teachers in a 6-12 secondary school) the model would generate $8.7 million less.

2010 Recommendation

The legislature chose to fund a higher number of minimum teachers for small elementary and secondary schools than we recommended. It remains our view the that the minimums we recommended represent an adequate cost basis for staffing schools with more than 49 and fewer than either 96 (elementary) and 105 (secondary) ADM. The formula parameters could be modified to reflect this.

5. Specialist Teachers

Background

Specialist teachers offer instruction in art, music, physical education, career technical education, and other electives. At the elementary level, specialists provide this instruction at times that enable the core or regular classroom teachers time for planning. In secondary schools they are provided in numbers adequate to cover a six period day in middle schools with teachers teaching for just five periods, and at the high school level in numbers sufficient to offer instruction in 90 minute block schedules. This resource also provides all teachers with time during the day for collaborative planning and to work on the instructional program. The model provides specialist teachers at the rate of 20 percent of the number of core teachers for elementary schools, and 33 percent of number of core teachers for middle and high schools.

In our 2005 report we initially recommended specialist teachers at 20 percent of the number of core teachers at all school levels. Our review of the evidence since completing the 2005 recalibration suggests the following:

- At the elementary level providing each teacher one period a day for collaborative planning and professional development focused on the school's curriculum requires an additional 20 percent allocation of specialist teachers needed to provide those planning periods while maintaining the core class sizes. These teachers could teach art, music, PE, or other specialist content classes.

- The 20 percent additional staff is also adequate for middle schools with a six period day where teachers provide instruction for five periods.

- At the high school, additional specialists might be needed. If the goal is to have more high school students take a core set of rigorous academic courses and learn that material at a high level of thinking and problem solving, a block schedule that allows for longer class periods may be a better way to organize the instructional time of the school. And typical block scheduling for high schools requires an allocation of specialist teachers equal to 33 percent of the number of core teachers. This enables the school to create a block schedule with four 90-minute blocks each day. Teachers would provide instruction for three of those 90-minute blocks and have one block – or 90 minutes – for planning and preparation each day.[20] We have made a recommendation for 33% specialists at the high school level in all our adequacy studies since 2005.

2010 Recommendation

Wyoming's funding model exceeds our current recommendations at the middle school level. We would recommend modifying the parameters in the funding model to provide specialists at the middle school level in numbers equal to 20 percent of the number of core teachers. This is sufficient for both individual plan time as well as time for teacher collaborative work on curriculum and instructional issues. This would most likely result in a lower number of specialist teachers at the middle school level. If the number of specialist teachers at middle schools were reduced to 20 percent, it would have reduced the funding commitment to schools in 2009-10 by approximately $7.6 million.

6. Instructional Facilitators/Coaches

Background

Instructional facilitators or coaches provide the critical ongoing instructional coaching and mentoring that the professional development literature shows is necessary for teachers to improve their instructional practice.[21] They also help to coordinate the instructional program in each school and in coordination with district wide curriculum and instruction goals. This means that they spend the bulk of their time working with teachers, either in collaborative work teams analyzing formative assessment data and

[20] There are a variety of block schedule options, but each of them require a specialist allocation of 33 percent of the number of core teachers to provide adequate individual planning time and time for teachers to collaborate in the design of instruction.
[21] (Garet, Porter, Desimone, Birman, &Yoon, 2001; Joyce & Showers, 2002)

revising instructional strategies, or in classrooms, helping individual teachers by modeling lessons, giving them feedback, and helping improve the instructional program.

The 2005 recalibration report recommended funding instructional facilitators at a rate of one facilitator per 200 ADM. The Legislature chose to fund these positions outside of the model as a categorical program, but did not fully fund the number of positions necessary to meet this ratio although the actual funding level is approximately two-thirds of the initial recommendation. In the two resource allocation and use studies we have conducted in Wyoming since the current model was put in place, we found districts employed facilitators in about the numbers funded, but their use and effectiveness varied across schools and districts.[22] Moreover, while Wyoming appears to be making the best progress in the nation on recruiting and training a cadre of effective instructional facilitators, it has found this to be a complex and difficult task that is quite time consuming. The WDE believes the state has a solid and growing cadre of effective Instructional Facilitators at the elementary level, and is making progress, but at a slower rate, in developing a cadre of effective Instructional Facilitators for secondary schools. As the state's experience with instructional facilitators deepens, and there is more evidence of their effectiveness and positive impact in helping teachers improve student achievement, there could come a time when the state might want to increase funding for this program resource.

2010 Recommendation

It is our view that facilitators/coaches are a critical component of the school improvement process and that current research has confirmed that importance.[23] Our recommendation is that this component be left as is while recognizing that the state might move toward more fully funding these positions at some point in the future.

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[22] Picus, L.O., Odden, A., Aportela, A. Mangan, M.T., and Goetz, M. (2008). *Implementing School Finance Adequacy: School Level Resource Use in Wyoming Following Adequacy-Oriented Finance Reform.* North Hollywood, CA: Lawrence O. Picus and Associates. Prepared for the Wyoming Legislative Service Office. Available at, http://legisweb.state.wy.us/2008/interim/schoolfinance/Resources.pdf; and Odden, A., Picus, L.O., Archibald, S. and Smith, J. (2009) *Wyoming School Use of Resources 2: Making More Progress in Identifying How Schools Use Resources in Ways That Boost Student Performance on State Tests.* Prepared for the Wyoming Legislative Service Office. Available at, http://legisweb.state.wy.us/2008/interim/schoolfinance/Resources.pdf

[23] See for example Mangin and Stoelinga (2008).. New Research: Impact of Focused Collaboration on Learning. Elmore, Richard. "Building A New Structure for School Leadership." In School Reform from the Inside Out: Policy, Practice, and Performance, ed. R. Elmore. Cambridge, Mass.: Harvard Education Press, 2004. Gallimore, Ronald, Bradley A. Ermeling, William M. Saunders, and Claude Goldenberg. "Moving the Learning of Teaching Closer to Practice: Teacher Education Implications of School-Based Inquiry Teams." The Elementary School Journal 109, 5 (2009): 537-553. Saunders, William M., Claude N. Goldenberg, and Ronald Gallimore. "Increasing Achievement by Focusing Grade-Level Teams on Improving Classroom Learning: A Prospective, Quasi-Experimental Study of Title 1 Schools." American Educational Research Journal 46 (2009): 1006-1033. Supovitz, Jonathan. "Developing Communities of Instructional Practice." Teachers College Record 104, no. 8 (2002): 1591-1622. Vescio, V., Ross, D., & Adams, A. "A Review of Research on the Impact of Professional Learning Communities on Teaching Practice and Student Learning." Teaching and Teacher Education 24 (2008): 80–91.

7. Strategies for Struggling Students

Because not all students learn at the same rate, the model includes a series of tiered strategies to help struggling students. The intent is to keep performance expectations high and vary instructional time enabling students to meet those performance levels. This assumes schools begin with effective classroom instruction linked to a rigorous curriculum program and delivered by high quality teachers. The set of tiered interventions, if needed for struggling students, begins with accommodations in the regular classroom provided by the regular teacher, followed by tutoring in very small groups – sometimes one-to-one tutoring – at each school level, followed by academic help in extended day programs as well as summer school, leading to special education programs for students who still need additional help.

Services should be available to all students who are struggling in the regular curriculum. The model relies on a proxy to estimate the number of students likely to need such services, specifically using the unduplicated count of students eligible for Free and Reduced Price Lunch and who are English Language Learners, plus in grades 6-12 adding the number of mobile students – those who change schools during the school year. While this serves as a proxy for need, it does not preclude any student from receiving assistance as described below if needed. At the present time, we are not aware of a better research based way to estimate the need for these services. Additionally, use of a proxy avoids creating an incentive for schools and districts to over-identify students as struggling in order to generate additional revenue.

Our recommendations for each of these strategies are summarized below.

a. Tutors

Background

The most powerful and effective strategy to help struggling students meet academic standards is individual one-to-one tutoring, or tutoring in very small groups (maximum of five students) provided by licensed teachers.[24] If provided appropriately as part of an effective reading program in grades K-2, this extra help strategy can reduce reading failure to less than 2 percent of students.[25]

The impact of tutoring programs depends on how they are structured. The alignment between what tutors do and the regular instructional program is important.[26] Who conducts the tutoring matters, as does the intensity of the tutoring.[27] Poorly organized

[24] (Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993)
[25] For example, see Anthony Rebora, Responding to RTI, An Interview with Richard Allington, *Education Week*, April 12, 2010.
[26] (Mantzicopoulos, Morrison, Stone, & Setrakian,1992; Wheldall et al., 1995)
[27] (Shanahan, 1998)

programs in which students lose instructional time moving between classrooms can limit tutoring effects.[28]

Researchers have found greater effects when the tutoring includes the following mechanisms:[29]

- Professional teachers as tutors
- Tutoring initially provided to students on a one-to-one basis
- Tutors trained in specific tutoring strategies
- Tutoring tightly aligned to the regular curriculum and to the specific learning challenges, with appropriate content specific scaffolding and modeling
- Sufficient time provided for the tutoring
- Highly structured programming, both substantively and organizationally.

An important issue is how many tutors to provide for schools with differing numbers of at-risk students. The standard of many comprehensive school designs is a ratio of one fully licensed teacher-tutor for every 100 students in poverty, with a minimum of one for every prototypical school.

2010 Recommendation

Funding levels in the current model reflect the recommendations we made in our 2005 report and align with current research on the use of tutors. Consequently, we do not recommend any modifications to the model for tutors at the present time.

However, our resource allocation and use studies as well as the WDE's Continuing Review report found that many districts do not employ the full number of teacher tutors funded through the model. Consequently, the Legislature might want to consider funding this staffing position at the same level but outside of the block grant and through a separate categorical program, similar to the way instructional coaches are funded.

b. ELL Staff

Background

Research, best practices and experience show that when students are from both a low-income background and English language learners, some additional assistance is needed. This assistance includes a combination of small classes, English as a second language classes, professional development for teachers to help them teach "sheltered English" classes, and "welcome" centers in districts with large numbers of ELL students who arrive at different times during the school year.

[28] (Cunningham & Allington, 1994)
[29] (Cohen, Kulik, & Kulik, 1982; Farkas, 1998; Mathes & Fuchs, 1994; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993)

In studying specific strategies to provide ESL instruction during the regular school day where the ELL students take language courses in place of an elective course, we have found that additional staff are needed.

Based on feedback from professional judgment panels in Wyoming in 2005, we recommended that ELL services be funded by providing one additional certificated teacher position for each 100 ELL students. We believe this figure continues to provide adequate resources to meet the needs of English Language Learners and continue to recommend this level of funding in other states and school districts.

2010 Recommendation

We recommend this model component be retained at current levels.

c. Extended Day Programs

Background

In the 2005 recalibration study, we recommended extended-day resources to provide academic help for two hours of before or after school programming at the ratio of one FTE position for every 30 at-risk students, assuming about 50 percent of at-risk students would participate. The Legislature elected to fund extended day and summer school programs outside of the model through a categorical grant program with appropriations for both programs of $9 million in 2006-07 and 2007-08 and $10 million in 2008-09 and 2009-10. This program provides funds to districts that offer extended day programs on a reimbursement basis

In a review of research, Vandell, Pierce and Dadisman (2005) found that well designed and administered after-school programs yield numerous improvements in academic and behavioral outcomes.[30] Studies of the effects of specific extended day programs have found:

- Improved sixth grade SAT-9 math and reading scores for participants in the high-program attendance group versus those in the low-program-attendance group
- Significantly higher PSAT scores for program versus control groups of students
- Increased reading ability
- Program members were much more likely than control group members to have graduated from high school and to be in a post-secondary school. The rate of four-year college attendance among members was more than three times higher than the control group rate and their rate of two-year college attendance was more than twice as high.

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[30] (see also, Baker & Witt, 1996; Dishion, McCord, & Poulin, 1999; Mahoney, Stattin, & Magnusson, 2001; Posner & Vandell, 1994; Schinke, Cole, & Poulin, 2000; Tierney, Grossman, & Resch, 1995; White, Reisner, Welsh, & Russell, 2001)

These studies documented positive causal effects on the academic performance of students in select after-school programs, but the evidence is mixed both because of research methods (few randomized trials) and poor program quality and implementation.

Researchers have identified several structural and institutional supports necessary to make after-school programs effective:[31]

- *Staff qualifications and support* (staff training in child or adolescent development, after-school programming, elementary or secondary education, and content areas offered in the program, staff expertise; staff stability/turnover; compensation; institutional supports)
- *Program/group size and configuration* (enrollment size, ages served, group size, age groupings and child staff ratio)
- *Financial resources and budget* (dedicated space and facilities that support skill development and mastery, equipment and materials to promote skill development and mastery; curricular resources in relevant content areas; location that is accessible to youth and families)
- *Program partnerships and connections* (with schools to connect administrators, teachers and programs; with larger networks of programs, with parents and community)
- *Program sustainability strategies* (institutional partners, networks, linkages; community linkages that support enhanced services; long term alliances to ensure long term funding).

2010 Recommendation

Our recommendations in 2005 require somewhat more resources than currently allocated to extended day programs. However, current extended day programs in Wyoming appear to be much more limited in design than envisioned in that document. Moreover, districts do not yet use the full level of funding for these programs. The WDE continues to study these programs, and we recommend review of the effectiveness of the programs and district demand for more funds than are currently available before consideration of whether or not the model components need to be modified. If student attendance in extended day programs were not to change, additional funding would not be needed.

d. Summer School

Background

In the 2005 recalibration study, we recommended summer school resources to provide academic help for programs that were six to eight weeks long with six hour school days, at least four of which were focused on core academic programs. We recommended funding at a rate of one FTE position for every 30 at-risk students, assuming about 50

[31] (e.g., Fashola, 1998; Vandell, Pierce & Dadisman, 2005)

percent of at-risk students would participate. The Legislature elected to fund extended day and summer school programs outside of the model through a categorical grant program with appropriations for both programs of $9 million in 2006-07 and 2007-08 and $10 million in 2008-09 and 2009-10. This program provides funds to districts that offer summer school programs on a reimbursement basis.

Research dating back to 1906 shows that students, on average, lose a little more than a month's worth of skill or knowledge over the summer break.[32] Summer breaks have a larger deleterious impact on poor children's reading and mathematics achievement, than it does on the performance of middle-class students. This loss can reach as much as one-third of the learning during a regular nine-month school year.[33] A longitudinal study, moreover, showed that these family income-based summer learning differences accumulate over the elementary school years, such that poor children's achievement scores – without summer school – fall further and further behind the scores of middle class students as they progress through school grade by grade.[34]

Evidence on the effectiveness of summer programs in attaining either of these goals, however, typically has been of poor quality. Although past research linking student achievement to summer programs shows some promise, several studies suffer from methodological shortcomings and the low quality of the summer school programs themselves.

Recommendations from a recent book on summer school and how to enhance its impacts include (Borman & Boulay, 2004):

- Early intervention during elementary school
- A full 6-8 week summer program
- A clear focus on mathematics and reading achievement, or failed courses for high school students
- Small-group or individualized instruction
- Parent involvement and participation
- Careful scrutiny for treatment fidelity, including monitoring to ensure good instruction in reading and mathematics is being delivered
- Monitoring student attendance.

Summer programs that include these elements hold promise for improving the achievement of at-risk students and closing the achievement gap.

[32] (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996)
[33] (Cooper et al., 1996)
[34] (Alexander & Entwisle, 1996)

2010 Recommendation

Our recommendations in 2005 require somewhat more resources than currently allocated to summer school programs. However, current summer school programs in Wyoming appear to be much more limited in design than envisioned in that document. Moreover, districts do not yet use the full level of funding for these programs. The WDE continues to study these programs, and we recommend review of the effectiveness of the programs and district demand for more funds than are currently available before consideration of whether or not recalibration is needed. If student attendance in summer school programs remains constant, additional funding is not needed.

e. RTI And Special Education

Background

Wyoming currently funds special education on a 100 percent reimbursement basis. In our current adequacy work, we recommend full state funding of the costs for high cost (children with the most severe disabilities) special need students, and generally assume two percent of those with disabilities are in this "high cost" category).

For other children requiring special education services, the Evidence-Based model provides resources at each prototypical school to provide special education services for students with mild and moderate disabilities via the census approach to funding these students' needs (Odden & Picus, 2008). The census approach, which funds a set number of additional teacher resources for every school, assumes the incidence of these categories of disabilities is approximately equal across districts and includes resources for providing needed services at an equal rate for all schools and districts. Once allocated to the district, however, districts could differentiate resource allocations for these students with disabilities across schools recognizing varying incidence of need and placement of programs within the district across its various schools.

The census approach has emerged across the country for several reasons:

- The continued rise in the number and percentage of students as "learning disabled" and continued questioning by some of the validity of these numbers
- Under-funding of the costs of students with severe disabilities
- Over-labeling of poor, minority, and ELL students into special education categories, which often leads to lower curriculum expectations, and inappropriate instructional services, as well as delayed classification and under-identification of students in other categories
- Reduction of paper work.

Wyoming, like many other states, has also adopted a "Response to Intervention (RTI)" approach to providing services for students with disabilities. Without addressing the various technical debates about what RTI specifically means, this strategy is generally designed to have school systems provide “prevention” extra help services to students before labeling them as disabled and developing an accompanying Individual Education Plan (IEP). There are clear benefits to the student as well as cost savings if assignment to special education services can be avoided through preventative services. The Wyoming Funding model was initially designed to accommodate an RTI approach for providing such preventative services.

The model provides extensive professional development resources for teachers (see discussion below) which should give them the training needed to provide some “accommodation” for student needs during regular classroom instruction. This is the first stage of the RTI process. The second stage is to provide intensive and highly effective extra help service for a student struggling to learn to standards. This is the rationale for the tutoring resources in the funding model. If a student needs help beyond tutoring, the model then provides resources for extended day academic help, as well as summer school academic help. The extended day programming is designed to provide more instructional time for a struggling student “within the regular school year” but “outside the regular student day.” The summer school programming is designed to provide more instructional time for a struggling student “outside the regular school year.”

The notion of the RTI approach is that a student is labeled as having a disability only AFTER being provided within classroom accommodations, tutoring, and some combination of extended day and summer school academic help.

This approach is critical in the first two years of schooling, and the 2005 recalibration report argues that if effectively implemented, an extra help strategy like this can virtually eliminate reading problems, which are often the basis of students under performing in later grades. The RTI approach, if used in the early years, can also substantially reduce the incidence of students being labeled as having a disability. In a recent interview in Educ*ation Week*, Richard Allington, a former President of the International Reading Association and a national expert on RTI, argued that if Kindergarten and Grade 1 and 2 teachers are skilled in teaching reading (which unfortunately is not always the case) and are supported with expert tutoring in small groups (one-to-one groups to at maximum of one-to-five groups) for students with a reading problems, those problems can be reduced to an infinitesimal percentage and the incidence of students with disabilities (usually learning disabilities) can be halved.[35]

Since Wyoming’s funding model provides the kind of extra help resources reading and RTI experts like Allington recommend, as well as 100 percent funding of special education services for children with disabilities, we would anticipate that in the near future the number of students not reading at level should be reduced. This increase in reading skills will hopefully also lead to a reduction in the percentage of students identified as having a formal disability.

[35] Anthony Rebora, *Responding to RTI, An Interview with Richard Allington*, Education Week, April 12, 2010.

2010 Recommendation

We recommend that Wyoming revisit its approach to funding services for students with disabilities. Funding local services at 100 percent of local expenditures does not provide incentives for efficient service provision and may create incentives to over identify children as needing special education services. Further, having each of Wyoming's school districts, many of which are very small, provide for the full range of special education services for children with disabilities is more expensive than having some of the services provided by regional entities. We also note that Wyoming does not deduct federal Title VIb funds from local reimbursement, as done in most other states.

When looking at the resources provided by the state's funding model, schools should be able to provide a robust RTI program to serve all students struggling to meet Wyoming's proficiency standards. The model also provides ample funding for professional development, enough in fact, to enable training in RTI processes for all teachers. Consequently, it seems likely that districts receiving Federal Title VIb funds would still have adequate special education funding if those Federal dollars were used to offset the state's costs for providing 100 percent reimbursement of special education expenditures. Currently, Wyoming's approach to funding special education appears to be the most expensive way to fund services for students with disabilities.

We recommend modification of the parameters of the model in for special education with an eye toward identifying service delivery efficiencies (both through RTI and the regional provision of special education services), along with a census approach to staff allocations for special education services to children with mild and moderate disabilities at the district level. This model would exclude resources for students with severe and profound disabilities for whom educational services would continue to be fully funded by the state.

8. Pupil Support

Background

This category provides licensed staff to implement a school's student support and family outreach strategy. It includes guidance counselors, nurses, family outreach staff, and psychologists (non-special education).

The model provides a minimum of 1 pupil support FTE for each prototypical elementary, middle and high school. In addition, the model provides funding for guidance counselors at the secondary level at a rate of 1 FTE for every 250 students. Additional pupil support staff are provided to schools on the basis of at-risk counts. These are currently supported at the rate of one FTE for every 100 at-risk students.

We also recommend that in future versions of the model, positions for guidance counselors at the secondary schools be broken out from computation of pupil support staff generated on the basis of at-risk student counts. We used this approach in our work in Washington, and it helps clarify the resources allocated to each school. With this technical modification to the model, it will be possible to better track how schools and school districts use these two critical resources in the future.

2010 Recommendation

We would not recommend modification of the model's parameters for this function.

9. Librarians and Library Media Tech

Background

The funding model provides librarians at a rate of 1 FTE librarian for each prototype elementary school – prorated up to the actual size of an elementary school and down to an enrollment of 49 ADM (when the small school adjustment becomes operative). At the secondary level, funding for librarians is provided at the rate of 1 FTE for schools with enrollments between 105 and 630 ADM. Below 105 it is prorated down to 49, and above 630 it is prorated up.

Library media technicians are funded at the secondary level at a rate of 1 per 315 ADM, and prorated between 49 and the actual size of the school.

Evidence suggests that librarian staffing resources in Wyoming's funding model are higher than in any other state formula, and exceed standards for librarian staff in other states. Our resource allocation and use studies as well as the Continued Review developed by WDE show that Wyoming districts actually hired fewer librarian staff than is funded in the model. The WDE's Continuing Review of Educational Resources in schools shows that in 2008-09 there were 92.3 fewer librarians in elementary schools than funded through the model, 20.2 fewer middle school librarians, and 22.9 fewer high school librarians. Additionally, the WDE found 127.7 more media tech personnel than the model funds at elementary schools, 2.2 more at middle schools and 17.6 fewer at the high schools. This suggests districts and schools use library/media staff in very different ways than funded through the model.

2010 Recommendation

We recommend a review of the model parameters in this area, with consideration of the relative allocation of technicians compared to librarians, and consideration of eliminating the difference in how librarian staff are prorated between middle and high schools. These revisions should be more reflective of current best practices in Wyoming and elsewhere.

10. Professional Development

Background

This category includes the instructional facilitators/coaches described in item 6 above. In addition, the Wyoming funding model provides 5 additional days of time for teachers to participate in intensive summer workshops along with dollar per ADM resources for trainers and materials. In 2008-09 districts spent 56.7 percent of funds allocated for this use on professional development training and materials. This amounted to $4.3 million less than the model allocated for this purpose.

2010 Recommendation

We recommend that this program element remain as is. As indicated above, we recommend retaining the instructional facilitators/coaches as a separate categorical program. We also recommend that the state require districts to exert more "control" over the ten days provided in the teacher work year for curriculum-linked professional development, five of which resulted in additional funding for teacher salaries during the development and implementation of the current model. We also recommend that the state urge all districts to fully use their professional development resources to help all teachers acquire the instructional strategies and skills needed to improve instructional practice in ways that boost student learning more than has been the case over the past five years.

11. Instructional Materials

Background

The model provided $296.99 per ADM for instructional materials for elementary and middle schools and $363.65 per ADM for high schools. These figures were adjusted by the external cost adjustment and are $333.43 for elementary and middle schools and $408.26 for high schools in 2009-10. The initial figure was based on current practice in Wyoming at the time of recalibration.

2010 Recommendation

Since the last recalibration, we have engaged in a more detailed analysis of these costs, developing a figure for instructional materials based on a six year textbook adoption cycle and the actual costs of textbooks and other instructional materials. Our current estimates for the costs of instructional materials are lower than the $250 we used initially in Wyoming, and substantially lower than current funding levels. We recommend modifying the parameters of this element assuming a six year textbook adoption cycle. If the Wyoming Funding Model includes the figures we most recently recommended – $145 per pupil for both elementary and middle schools and $180 per pupil for high schools – the model's cost would be reduced by $17.4 million.

12. Assessments (Formative, Benchmark)

Background

The current model provides an external cost adjusted figure of $37.70 per ADM for assessments. In 2008-09, districts only spent 32.2 percent of the funds provided for assessment through the model on assessment activities. Because the state funds the full costs of the PAWS test outside of the model, these resources are needed only for formative and benchmark assessments.

2010 Recommendation

We recommend retaining this element of the Wyoming funding formula as is. Under current practice, these resources need only fund formative and benchmark assessments. Formative assessments are diagnostic – often teacher developed – tools to understand what students know and need to know and are used to assess student understanding before teaching each curriculum unit. Benchmark assessments are periodic tests to check understanding to ensure students have mastered the material they have been taught.

The state may want to eliminate the external cost adjustment for this factor in the future as the costs for these assessments seems unlikely to rise, the state pays for the costs of the summative PAWS assessment outside of the model, and the current funding level appears to exceed most current estimates of assessment costs. Picus, et. al. (2010) estimate assessment costs in the range of $25 per pupil, while Topol, Olson and Roeber (2010)[36] provide per pupil assessment costs (including formative, benchmark and summative assessments) that range from $19.93 to $55.67 depending on the complexity and comprehensiveness of the assessment.

Additionally, it is currently unclear how the $350 million in Race to the Top funds set aside for assessment will be distributed and used, but it is possible that a variety of assessments may be available at no cost. We note also, that Wyoming has signed on to the national standards efforts, which will also impact assessment costs. Once all of this has become more settled, the state may want to reconsider the level of per pupil funding for assessment, but the overall strategy embedded in the model seems sound at the present time.

[36] Lawrence Picus, Frank Adamson, Will Montague, and Maggie Owens, (2010). *A New Conceptual Framework for Analyzing the Costs of Performance Assessment*. Barry Topol, John Olson, and Edward Roeber, *The Cost of New Higher Quality Assessments: A Comprehensive Analysis of the Potential Costs for Future State Assessments*. Both available at http://edpolicy.stanford.edu/pages/pubs/perf_assessment.html#papers.

13. Technology

Background

The 2005 recalibration report recommended funding at $250 per ADM. This figure is currently $291.90 based on the external cost adjustment.

2010 Recommendation

We recommend that the parameters used to estimate this figure be modified based on additional cost studies. In the 2005 recalibration study, we used findings about costs for computer technologies from other more conceptual, research as well as other Professional Judgment studies. However, in subsequent work, we have developed a detailed approach that identifies more precise cost figures, starting from a goal of specifying how many computers to provide to each group of students, the refresh cycle, equipment for internal networks as well as teachers, software, spyware.[37] Our work also includes funding for central data processing and technology functions as well.   We have consistently found that a figure of $250 per pupil is adequate to fund these technology resources and are confident that this figure would be sufficient in Wyoming as well.

14. Student Activities

Background

The 2005 recalibration report recommended a base funding level of $250 per ADM. The Legislature elected to adopt a complex formula developed by Campbell County School District #1 that provided resources for activities based on the grade band and enrollment. School allocations for student activities were dependent on grade band (K-5 received less per pupil than 6-8 schools which received less per pupil than grades 9-12), and on grade size (the amount per pupil varied inversely with a school's enrollment).

2010 Recommendation

It is our sense that funding for activities in most other states is considerably below both the current Wyoming funding level and below our initial recommendations in 2005. We recommend modification of the parameters in the model with an effort to more accurately capture the costs of providing strong student activity programs. If the $250 per student were inflated by the ECA it would be $290.91 for the 2009-10 school year. Using this figure in place of the system approved by the Legislature would reduce payments for student activities through the model by $6.6 million.

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[37] See for example, *Picus, L.O., Odden, A., Goetz, M.E., Aportela, A., Archibald, S. (2008).* Funding Schools Adequately in North Dakota: Resources to Double Student Performance. *North Hollywood, CA: Lawrence O. Picus and Associates. Prepared for the North Dakota Commission on Education Excellence.*

15. Gifted and Talented

Background

The current model provides funding of $25 per ADM adjusted through the external cost adjustment to $29.19 per ADM to provide extra resources for gifted and talented students.

Research shows that developing the potential of gifted and talented students requires:

- Effort to discover the hidden talent of low income and/or culturally diverse students
- Curriculum materials designed specifically to meet the needs of talented learners
- Acceleration of the curriculum
- Special training in how teachers can work effectively with talented learners.

Our review of the research on best practices in serving gifted and talented students is, at the elementary and middle school level, to place gifted students in special classes comprised of all gifted students and accelerate their instruction because such students can learn much more in a given time period than other students. When the pull out and acceleration approach is not possible, an alternative is to have these students skip grades in order to be exposed to accelerated instruction. Research shows that neither of these practices produces social adjustment problems; indeed, many gifted students get bored and sometimes restless in classrooms that do not have accelerated instruction. Both of these strategies have little or no cost, except for scheduling and training of teachers.

The primary approach to serve gifted students in high schools is to enroll them in advanced courses – advanced placement (AP), International Baccalaureate (IB) – to participate in dual enrollment in postsecondary institutions, or to have them take courses through distance learning mechanisms.

The University of Connecticut developed a very powerful Internet-based platform, Renzulli Learning, which provides a wide range of programs and services for gifted and talented students. This system takes students through about a 25-30 minute detailed assessment of their interests and abilities, which produces an individual profile for the student. The student is then directed, via a search engine, to 14 different Internet data systems, including interactive web-sites and simulations that provide a wide range of opportunities to engage the student's interests. Renzulli stated that such an approach was undoubtedly the future for the very bright student.

The initial cost estimates for the Wyoming model are based on the Renzulli estimated cost of $25 per student.

2010 Recommendation

We do not think this program needs to be modified at this time.

16. Alternative Learning Environment Schools

Background

The recalibration report recommended funding alternative schools with funding to support one assistant principal and certificated teachers at a ratio of one FTE per seven students – intended to meet all staffing needs. The report assumed that alternative schools would be small high schools providing services to no more than 50 or 60 students with severe emotional and/or behavioral problems.

The Legislature funded this model, but there were three fairly large "alternative" schools in the state that were then funded through this approach, providing them with what appeared to be far more funds than would have been the case had they been treated as regular schools. Because of this assumption, there is currently a moratorium on the creation of new alternative schools.

However, an analysis of activity funding shows that if the large alternative schools are treated as regular high schools and the smaller ones treated like small schools in the model, the fiscal impact in 2009-10 would have been to allocate an additional $355,000 to school districts. This unexpected finding appears to be the result of student activity funding. Under the current model, alternative high schools receive $290.91 per ADM ($250 plus the ECA) for student activities. Further analysis to ascertain which schools/districts gain and which lose is still needed, but even at an enrollment of 268 ADM which is roughly the size of the largest alternative high school, student activity funds are substantially higher than $290.91 per ADM, amounting to $1,140.87 per ADM.

2010 Recommendation

We recommend that funding for alternative schools be carefully studied this interim. It may be that the best approach for funding these schools is to grandfather in the current large schools and then cap the size of future schools at an enrollment in the range of 50 to 60 students, and treat all alternative school as other small schools are treated in the funding model. However further study appears warranted despite the fact that few states have been successful to date in defining alternative schools. In the 2005 recalibration report, our intent was that the ALE adjustment would apply to schools with no more than 50 or 60 students.

17. School Site Leadership (Principals and Assistant Principals)

Background

The current model provides one elementary principal for a prototypical school of 288 ADM. This level of funding is provided from an enrollment of 96 to 288 and then prorated up for schools with more than 288 ADM. Between 49 and 96, the principal position is prorated as well. For 49 and fewer, the small school funding formula is in place.

For high schools and middle schools, one principal is provided for schools with 105 or more students. Assistant principals are phased in on a prorated basis starting at 316 ADM.

2010 Recommendation

We recommend modifying the formula parameters for principals at the elementary school so that above 288 ADM, elementary schools generate prorated assistant principals at the rate of one per 288 ADM. This does not need a recalibration, but instead simply an adjustment to the formula (and likely the concurrent statute).

Additionally, if the prototypical schools sizes are adjusted in response to changes in core class sizes, further changes in the allocation of principal resources could occur.

18. Secretarial and Clerical Staff

Background

The model provides 1 FTE secretary (12 month positions) in elementary schools between 96 and 288 ADM, and prorates this resource between 49 and 96 and above 288. It also provides 1 FTE clerical position (9 months) prorated above and below 288 ADM.

For middle schools, the model provides 1 FTE secretary (12 month positions) in between 105 and 315 ADM, and prorates this resource between 49 and 105 and above 315. It also provides 1 FTE clerical position (9 months) prorated above and below 315 ADM.

For high schools, the model provides 1 FTE secretary (12 month positions) in between 105 and 630 ADM, and prorates this resource between 49 and 105 and above 630. It also provides 2 FTE clerical position (9 months) prorated above and below 315 ADM.

Review of the WDE's Continuing Review document shows that across the state in 2008-09 elementary schools employed 66.8 fewer clerical staff (secretaries and clerks) than funded through the model, middle schools employed 2.2 more, and high schools 21.5 fewer clerical staff than funded through the model.

2010 Recommendation

The formulas in the model appear to generate more clerical staff than districts employ. The reason for this is not clear, but at the present time we do not recommend modification of the formulas as future demands on school personnel in the areas of assessment and data collection and analysis may place a heavier burden on school level clerical staff necessitating increased hiring in some schools.

19. Supervisory Aides

Background

Supervisory aides provide student supervision before and after school, during lunch and recess and help with bus drop-off and pick-up. These are non-instructional positions.

Elementary schools are funded for 2 FTE position for every 288 ADM, prorated above and below to 49 ADM.

Middle schools are funded for 2 FTE for every 315 ADM, prorated above and below to 49 ADM.

High schools are funded for 5 FTE for every 630 ADM prorated above and below to 49 ADM.

2010 Recommendation

We do not recommend modification of the formulas for this element of the model, although a small study of the impact of 100 percent transportation reimbursement on employment of such aides – whose responsibility includes bus drop-off and pick-up – might be considered.

20. Substitute Teachers

Background

Substitute teacher funding is based on 5 percent of core and specialist teachers and tutors at each school.

2010 Recommendation

We do not recommend modification of the formulas in this part of the model at this time.

21. Vocational Education

Background

Additional resources are provided for vocational education, by weighting ADM in approved vocational education programs by an additional 29 percent. This generates additional teaching positions at a school to provide for smaller vocational education classes. In addition, the model includes $9,027.27 per vocational education teacher for equipment, supplies and replacement

2010 Recommendation

We recommend that Wyoming modify the parameters of the model for vocational education, including a careful review of actual program services. Given small class sizes in Wyoming, there might be no strong rationale for even smaller classes for vocational education, particularly if the vocational education programs transform into more career/technical education which often requires no additional resources. Further, school districts actually spent considerably less on vocational education supplies and equipment than is provided in the extra funding formula, spending 59.8 percent of the resources allocated to vocational education supplies and equipment.

22. Central Office Staff

Background

The funding model provides resources for district administrators as follows:
a minimum of 3 FTEs, with 1 additional FTE prorated from 500 to 1,000 ADM (for a total of 4 at 1,000 ADM), and 1 additional FTE prorated for every 625 ADM beyond 1,000.

For Clerical support at the central office, the model provides a minimum of 3 FTEs, with 1 additional FTE prorated from 500 to 1,000 ADM, and 1 additional FTE prorated for every 417 ADM above 1,000.

The model also provides $312 per ADM (increased by the external cost adjustment to $350.28 per ADM) for central office non-personnel expenditures.

2010 Recommendation

We recommend that the parameters of the model for central office staff be modified. We have conducted additional research on central office staff size, and the findings show that this program element provides significantly more staff than current research suggests are needed, even after adjustments for small district size. Surprisingly, a review of the WDE's Continuing Review shows that across the state, districts employed 145.7 more professional, and 261 more secretarial/clerical positions than were funded through the model.

Further, the central office non-personnel dollar figure is much larger than districts actually spend, and could potentially be reduced to an actual expenditure amount per pupil for some year in the future.

23. Operations And Maintenance

Background

Operations and maintenance funding is provided through a set of formulas that generate custodial and maintenance personnel, and dollar resources for materials and supplies.

Custodians are provided on the basis of a formula that considers the number of teachers, classrooms, ADM and gross square footage in a school building, all of which is adjusted by size and type of school. In addition, district based custodians are provided on the basis of district square footage of buildings.

Maintenance workers are provided on the basis of a formula at the school level that includes a minimum allocation, gross square footage of the school, ADM and the district's operating expenditures. This figure is then adjusted on the basis of type of school, age of the school and the district ADM.

Groundskeepers are also funded through a formula that provides resources based on the acreage and ADM of each school in a district, adjusted by a factor for middle and high schools and assuming 93 hours of work per acre.

Finally, operation and maintenance supplies are funded at a rate of 57 cents per ADM adjusted to 64 cents per ADM by the external cost adjustment.

2010 Recommendation

Operations and maintenance is an area that has been reduced considerably in other states as school funding becomes tighter. Moreover, the WDE Continuing Review shows that Wyoming districts employed 237.3 fewer FTE staff in operations and maintenance jobs than were funded through the model. Further, there now is a growing body of evidence on the best practices for operations and maintenance from ASBO, state ASBO organizations and other sources. We recommend a more detailed review of the model parameters of how Wyoming's cost-model compares with other states and these emerging standards before making a determination about changing the formula parameters for this model element.

24. Utilities

Background

Utilities were funded based on prior year expenditures by the districts. In addition a 4 percent inflation factor was applied and further external cost adjustments have been made. Current utility funding is $33,152,577. Across the state, districts spent 103 percent of model funding on utilities in 2008-09.

2010 Recommendation

The current funding parameters in the model were put in place due to the tremendous uncertainty regarding future utility costs in Wyoming and elsewhere. As was predicted at the time of our 2005 report, utility costs increased somewhat and then declined substantially. There is little expectation that costs will increase in the next few years, providing time for the state to look more closely at developing a formula to more closely match the fluctuations in utility costs over time.

25. Transportation

Background

Transportation is currently funded through a 100 percent reimbursement.

2010 Recommendation

Because Wyoming reimburses 100 percent of local district expenditures for transportation, the funding system has no efficiency element built into it. The difficulty in developing a cost-based formula is the tremendous distances, weather and terrain challenges faced by school districts in transporting students to school. Therefore, in a state like Wyoming, it may be best to reimburse districts for their expenditures as is currently the case.

26. Regional Cost Adjustment

Background

The current model adjusts for differences in costs across the state based on a hedonic price adjustment we developed in 2005 and the Wyoming Cost of Living Index computed twice a year by the Wyoming Economic Analysis Division. A district's adjustment is the highest of these two indices or a value of 100.

2010 Recommendation

From an economic point of view, the current adjustment overcompensates for cost differences across the state. If a hedonic adjustment is used in the future, it should be recomputed. Regardless, reconsideration of the 100 minimum value is needed. The current approach is also the most expensive in terms of total model funding. The table below identifies the estimated savings to the state that would accrue with alternative regional cost adjustments if they had been used in 2009-10.

Estimated Impact of Alternative Cost Adjustment Approaches on Total State Funding Through the Wyoming School Funding Model: 2009-10

Alternative Regional Cost Adjustment	Difference in Total Model Funding ($)
Hedonic Index (no minimum)	-12.1 million
WCLI (no minimum)	-33.0 million
WCLI (minimum of 100)	-13.3 million
WCLI (computed without Teton County)	-7.5 million
Greater of Hedonic or WCLI (no minimum)	-4.1 million
Greater of Hedonic or WCLI (min. of 100 – current model)	0

27. External Cost Adjustment

Background

We recommended that the Legislature use a consistent index for all years between recalibrations. The state has used the Employment Cost Index – Education Services[38] for 2007-08 (3.8%), 2008-09 (4.3%), and 2009-10 (3.7%). For 2010-11 there will not be an external cost adjustment.

2010 Recommendation

Because the index is based on an education specific adjustment, it may reflect inefficient education management practices (such as automatic step and column salary increases as well as using labor over potential uses of technologies) which artificially inflate the true costs of providing educational services in Wyoming. We recommend consideration of an alternative adjustment for future years.

We also believe that many of the other recommendations included in this document will result in a lower cost basis for educational services. Thus the state will also want to

[38] ECI - Education Services- All Civilian - Total Compensation - Unadjusted (Series CIU1016100000000I)

establish a set of benchmarks to help recognize the point in time when the current funding level no longer meets the cost basis standard and need to be adjusted.

28. Food Services

Background

We recommended in 2005 that food services be a self sustaining fund with no net cost to the state. A study conducted in 2007 resulted in an annual allocation of approximately $5 million a year.[39]

2010 Recommendation

We recommend the state revisit food services in an effort to help districts find efficient approaches to providing meals for students that will result in a zero net cost of food services programs to schools, districts and the state.

29. Salaries and Benefits

We will withhold recommendations on this issue pending the completion of the labor market study currently being conducted.

[39] Perkins, J. (2007). Food Service Programs in Wyoming Public Schools: A Review and Analysis of Financial Deficits. Prepared for the Wyoming Department of Education by the Perkins Consulting Group. (November 13, 2007). Available at: http://legisweb.state.wy.us/2009/interim/schoolfinance/John%20Perkins%20report.pdf

Appendix A
State Adequacy Studies Completed by Lawrence O. Picus and Associates Since 2005

Fermanich, M., Mangan, M.T., Odden, A., Picus, L.O., Gross, B. and Rudo, Z. (2006). *Washington Learns: Successful District Study*. Final Report Prepared for Washington Learns. North Hollywood, CA: Lawrence O. Picus and Associates. http://www.washingtonlearns.wa.gov/materials/SuccessfulDistReport9-11-06Final_000.pdf

Odden, A.R. (2009). *Ten Strategies for Doubling Student Performance*. Thousand Oaks, CA: Corwin Press.

Odden, A.R. & Archibald, S.A. (2009). *Doubling Student Performance…and finding the resources to do it*. Thousand Oaks, CA: Corwin Press.

Odden, A. R., Goetz, M. E., & Picus, L. O. (2007, March 2). *Paying for school finance adequacy with the national average expenditure per pupil* (Working Paper 2). Seattle: University of Washington, Center on Reinventing Public Education, School Finance Redesign Project.

Odden, A. Picus, L.O., Archibald, S., Goetz, M., Mangan, M.T., and Aportela, A. (2007). *Moving from Good to Great in Wisconsin: Funding Schools Adequately and Doubling Student Performance*. Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education. Available at http://www.wcer.wisc.edu/cpre/finance/WI%20March%201%202007%20Adequacy%20Report1.pdf

Odden, A.O., Picus, L.O., and Goetz, M. (2006). *Recalibrating the Arkansas School Funding Structure: Final Report submitted to the Adequacy Study Oversight Sub-Committee of the House and Senate Interim Committees on Education of the Arkansas General Assembly*. North Hollywood, CA: Lawrence O. Picus and Associates.

Odden, A., Picus, L.O., Goetz, M., Mangan, M.T., and Fermanich, M. (2006). *An Evidence-Based Approach to School Finance Adequacy in Washington*. Prepared for Washington Learns. North Hollywood, CA: Lawrence O. Picus and Associates. http://www.washingtonlearns.wa.gov/materials/EvidenceBasedReportFinal9-11-06_000.pdf

Picus, L.O. (2007). *Review of Report on the Cost of Education*. Prepared for the New Jersey Department of Education, January 2007

Picus, L.O., Odden, A., and Goetz, M. (2009). *An Evidence-Based Approach to Estimating the National and State-by-State Costs of an Integrated PreK-3rd*

Education Program. Prepared for the Foundation for Child Development, New York, NY.

Picus, L.O. and Odden, A.O. (2009). *Review and Analysis of Ohio's Evidence-Based Model*. Prepared for the KnowledgeWorks Foundation, April 2009.

Picus, L.O., Odden, A., Goetz, M.E., Aportela, A., Archibald, S. (2008). *Funding Schools Adequately in North Dakota: Resources to Double Student Performance.* North Hollywood, CA: Lawrence O. Picus and Associates. Prepared for the North Dakota Commission on Education Excellence.

APPENDIX B

MEMO ON SMALL SCHOOL ISSUES

To: Wyoming Select Committee on Recalibration

From: Larry Picus and Allan Odden[40]

RE: Small School Issues

Date: October 6, 2010

This memo considers issues pertaining to the configuration of and the funding for small schools and school districts under the Wyoming Funding Model. Specifically it considers two issues:

1. The school configuration guidelines prepared by the WDE

2. The so called "cliff effects" when district enrollment changes such that all schools in the district no longer have enrolment below 49 ADM

Each is discussed below.

WDE SCHOOL CONFIGURATION GUIDELINES

One issue that has vexed Wyoming School Finance for many years has been the definition of a school. The definition of a school is problematic, not because it is hard to determine whether or not a structure is a school, but rather because the funding system is structured such that small changes in enrollments can impact how a school is treated in the funding system and change district funding levels depending on both a school's total ADM, and whether a school building is treated as three separate schools (elementary, middle and high school), as one K-12 school, or some other alternative combination.

The WDE memo of September 30, 2010 describes the history of this issue succinctly. The WDE has also prepared a set of school configuration guidelines. The purpose of this memo is to discuss our thoughts and concerns regarding the memo and guidelines. Both are attached as appendices to this memo.

[40] Matt Willmarth of the LSO assisted in the preparation of this memo.

In reviewing the Guidelines, the first four of them identify a set of rules for future schools and grandfather in existing configurations pending district requests to change their configuration. We assume that for the most part the changes will result in efficiencies and eliminate the unusual situation of a very small K-8 school or a very small 7-12 school being treated as both an elementary and middle school or a middle and high school, and resolve some of the issues related to staffing that continue to arise.

Guideline 5 says that all co-located schools must meet the above configurations in 2011-12 which in our view will bring consistency to the identification of schools. This has the potential to affect 17 school districts. Currently there are 47 schools co-located in 20 different buildings. If Guideline 5 were to become law, these 47 schools would become 20 schools, which will affect funding slightly for these districts.

Guidelines 6-8 deal with very small schools, and require that if they are in existence (either grandfathered in or approved by the State Superintendent) they must be administered as satellite schools. Several questions seem unresolved in our mind:

1. If all schools with 49 or fewer students are to be satellite schools, how will they be funded? Will they remain individual schools, or will they be funded as part of the school to which they are a satellite? That is if the main school has 200 students and the satellite school has 20, should the model fund a school of 200 and a school of 20, or would funding be for just one school of 220? We would argue this needs to be explicit as part of the configuration guidelines or it will be a point of confusion for all parties.

   Our recommendation is that these small satellite schools continue to be funded as very small schools (i.e. less 49 or fewer students). They would then receive funding for one assistant principal and one teacher for every seven ADM. Under the funding model, these resources are to be used to pay for all staff at the school. Although an assistant principal is included in the funding for a school that is now a satellite and managed by the principal of the larger school, this additional funding would enable the district to identify one individual to be in charge of the facility on a daily basis and provide them with a slightly larger salary to compensate for the additional responsibility.

2. In the case of a district where all schools have fewer than 49 ADM (there is only one school in that situation today) there is no larger school to which the satellite school could be attached. In that case our recommendation is to continue to fund the schools as is done under the current model (but see our recommendations on small school cliff effects below).

3. The guidelines are not clear if waivers are granted by the State Superintendent refer only to the configuration, or if the satellite requirement can also be waived? Our recommendation is that the satellite requirement not be waived, this will establish a clear line of responsibility for the performance of the very small schools.

SMALLSCHOOL "CLIFF EFFECTS"

The second issue this memo addresses is the so called "cliff effects" that are caused by small changes in enrollment in very small schools and districts. This problem stems from the 2006 decision by the Legislature to fund schools with fewer than 49 students that are in districts where all schools have fewer than 49 students differently than schools with fewer than 49 children in other districts. Specifically, a school with 49 or fewer students is generally provided funding sufficient to support an assistant principal and one teacher for every seven students. From this allocation the school must support all personnel.[41] For schools in districts where all schools have fewer than 49 students, the ratio is 1.5 teachers per seven students. This adjustment for districts where all schools are very small was created by the Legislature to avoid declines in revenue for those very small districts. Our recommendation then, and now, is that for schools with 49 or fewer students, funding at the level of one assistant principal and one teacher position for every 7 ADM represents an adequate cost basis for operation of the school.

The problem arises when a school's enrollment increases beyond 49 students and a district no longer consists of all schools with 49 or fewer students. In these circumstances there is a small reduction in funding for the district despite the increase in enrollment. When passed into law in 2006, this particular feature only applied to two school districts, Sheridan #3 and Washakie #2. Since that time, Washakie #2 has reconfigured[42] into a single K-12 school.

While the potential loss of revenue for a school district is problematic, an analysis of the state's three smallest districts over 11 years (1999-00 to 2009-10) that is attached to this memo suggests the problem may not be as serious as it appears. This analysis shows the following:

- In Park #16, enrollment has steadily declined by 37.0% from 168.5 to 106.2. During that time the funding guarantee has increased by 79.8% and the per pupil funding guarantee has increased by 185.4% to a total of $28,733 per ADM.

[41]Small schools also receive funding for substitute teachers and non-personnel resources (i.e., instructional materials and supplies, student activities, assessment, professional development, gifted and talented, vocational education equipment and supplies (if applicable), and technology. However these per ADM amounts would also be available to a larger school and thus do not need to be considered in this analysis.

[42]Washakie #2's elementary school increased above 49 ADM in school year 2006-07 and thus no longer generated the 1.5 teachers per seven students. By reconfiguring to a K-12 school the district generated more staff resources than the preceding year when two of the three schools were small schools.

Moreover, the Meeteetse School is now a K-12 school and consequently district funding won't be impacted by fluctuations above and below 49 in a single school.

- In Washakie #2, enrollment has fluctuated considerably more starting at 130.7 ADM in 1999-00, dropping as low 73.8 ADM in 2005-06 and increasing since then to 106.1. Overall enrollment is down 18.8%, while the funding guarantee is up 75.6% and the per ADM guarantee is up 116.2%. Ten Sleep K-12 is now the district's only school, so again this district will not face the risks associated with enrollment fluctuations above and below 49 students.

- Sheridan #3 is the only one of the three smallest districts in the state that has not shifted to a K-12 school configuration. Currently this is not possible because they have two separate elementary buildings and their junior high school and high school are co-located in a single building[43]. The district's enrollment has been the most volatile of the three districts starting at 101.2 in 1999-00, growing to a high of 114.0 the next year and then dropping and climbing each year with a low of 95.5 ADM in 2004-05 and a current enrollment of 96.9 ADM. Funding for Sheridan #3 has increased overall every year except 2001-02, and per ADM funding has increased every year since 1999-00 and in 2009-10 stood at $36,313 per ADM. Percentage wise, the total funding guarantee increased by 140.5%, and funding per ADM by 151.19% over the 11 years.

The data described above is summarized in the table at the end of this memo.

Thus today, the "cliff effect" that results from fluctuations in school enrollment around 49 ADM only impacts one school district with fewer than 100 students. It is our strong view that state policy should not be made on the basis of a single district that has such a low enrollment, but rather situations like this are best dealt with on a case-by-case basis. In the case of Sheridan #3, the district appears to have ample resources, and it has not seen a decline in its total funding guarantee for nearly a decade nor in its per ADM funding since 2003-04. Moreover, the considerable minimum teacher provisions of the current model for schools with more than 49 students and less than 96 (elementary) or 105 (middle and high school) ensure adequate staffing levels for each school in the district should one of them grow beyond 49 ADM.

We stated in the desk audit that the model's funding is adequate. Certainly $36,313 per ADM meets that criterion. Rather than create a new distribution formula for very small schools – one where the final distributional impact on other schools and districts may not be known for some time, if the district faces a decline in resources from one year to the next due to changes in enrollment, it would be better to help this district resolve the financial constraints and changes it may face. This could come in the form of help from

[43] If Guideline 5 were to take effect, Sheridan #3's co-located junior high school and high school would become a single school. Based on current enrollment trends, the total enrollment of the single school then would exceed 49 ADM and Sheridan #3 would no longer qualify for the small school district adjustment of 1.5 teachers for every 7 ADM.

the WDE, from WASBO, or even from the Rural and Community Trust – a national organization that focuses its efforts on rural schools and who could likely find similar districts that have faced the financial problems similar to those in Sheridan #3 (albeit with fewer dollars per pupil to start with) and could provide a substantive technical assistance.

In summary, we suggest no changes to the model and instead recommend the state ensure that districts facing this issue receive technical assistance to deal with changes in the funding guarantee resulting from fluctuating enrollments.

Appendix
WDE Documents

Memorandum

To: Members, Select Committee on School Finance Recalibration

From: Fred Hansen, Director of Finance

Date: September 30, 2010

Re: Report on configuration guidelines

During the 2006 recalibration of the funding model, the Legislature “grandfathered” the existing grade configurations of each school in the state. In order to change their configurations for the funding model, the districts are required by the same statute to first obtain approval from the Superintendent of Public Instruction. (See page 2 attached.)

At the same time, the Legislature required the Superintendent to recommend configuration guidelines (see page 3). These guidelines were presented to Joint Interim Education in September 2007. A revised version was reviewed by the Committee in November 2009.

Two of the guidelines were written with recalibration in mind. Guidelines #5 and #8 (see page 4) have financial impacts to the districts and are, frankly, beyond the Department of Education’s legal authority. They were designed to start a review of the funding necessary to operate these schools and a review of the various “grandfathered” configurations. Most importantly, these two guidelines were written in an effort to perhaps recalibrate the funding model to accurately reflect the districts’ operations.

In the case of co-located schools, four districts have already voluntarily consolidated their co-located schools (see page 5). In general, they reported that these schools have been operated as a single school; and the community and staff regard them as one school. Other districts have considered consolidation but have not applied for it because of possible decreased funding. One of the four above (who consolidated) later applied to create three separate schools because their student population had changed and their foundation guarantee had dropped.

The less than 49 student elementary schools usually have principals and specialist teachers from larger elementary schools. Again, the guideline to report these schools as “satellites” has a financial impact to the districts. The model provides funding for one assistant principal. The districts typically do not hire assistant principals for these small schools but use the funding for items that the model does not provide (school secretary, increased maintenance and custodial costs, etc.).

If the Select Committee is in favor of continuing guidelines #5 and #8, the Committee’s consultants should review the funding for these schools. In addition, these guidelines would need some statutory authority.

Wyoming Department of Education
SCHOOL CONFIGURATION GUIDELINES
Amended and Adopted as of
November 5, 2009

Based on "An Evidence-Based Approach to Recalibrating Wyoming's Block Grant School Funding Formula" by Lawrence O. Picus and Associates and the adoption of similar guidelines by Natrona County School District #1, the Department has adopted the following school configuration guidelines:

1. For new schools, elementary schools shall be configured K-5, middle schools 6-8, and high schools 9-12.

2. For new schools whose total student population is below 315 in grades K-8, the configuration of K-8 shall be used.

3. For new schools whose total student population is below 315 in grades K-12, the configuration of K-12 shall be used.

4. For existing schools, the current configuration will be "grandfathered".

5. Beginning in school year 2011-12, all co-located schools will meet the above configurations.

6. Effective in the 2008-09 school year, the State Superintendent shall not approve the configuration of any new school whose projected enrollment is less than 49 students.

7. Districts who choose to provide on-site educational services in remote areas to a student population of less than 49 may, upon approval by the State Superintendent, may create a satellite school administered and served by the principal and support staff from another approved school within the district.

8. Beginning in school year 2011-12, all schools with less than 49 students shall become satellite schools administered and served by the principal and support staff from another approved school within the district.

9. The State Superintendent may grant waivers to the above configurations based upon the appropriate delivery of the required educational program, the cost effectiveness of the modified grade configuration, and any extraordinary circumstances related to the safe and efficient delivery of the education program to students.

Historical ADM and Guarantee Analysis
1999-2000 through 2009-2010

School Year	Average Daily Membership			Wyoming Funding Model Guarantee			Guarantee Per ADM		
	Park #16	*Sheridan #3*	*Washakie #2*	*Park #16*	*Sheridan #3*	*Washakie #2*	*Park #16*	*Sheridan #3*	*Washakie #2*
1999-00	168.510	101.195	130.679	$ 1,696,375	$ 1,462,915	$ 1,535,892	$ 10,067	$ 14,456	$ 11,753
2000-01	155.703	113.971	125.132	$ 1,672,044	$ 1,516,170	$ 1,499,708	$ 10,739	$ 13,303	$ 11,985
2001-02	146.909	107.803	109.898	$ 1,813,244	$ 1,504,745	$ 1,564,698	$ 12,343	$ 13,958	$ 14,238
2002-03	137.566	95.697	104.048	$ 1,828,903	$ 2,002,516	$ 1,678,469	$ 13,295	$ 20,926	$ 16,132
2003-04	126.328	105.608	95.126	$ 1,982,935	$ 2,158,452	$ 1,650,087	$ 15,697	$ 20,438	$ 17,346
2004-05	118.612	94.520	92.539	$ 2,092,806	$ 2,377,367	$ 1,911,109	$ 17,644	$ 25,152	$ 20,652
2005-06	135.343	95.777	73.846	$ 2,189,983	$ 2,438,333	$ 1,886,257	$ 16,181	$ 25,458	$ 25,543
2006-07	126.388	104.006	90.753	$ 2,716,089	$ 2,955,795	$ 2,535,696	$ 21,490	$ 28,419	$ 27,941
2007-08	119.029	99.778	94.959	$ 2,842,863	$ 3,263,255	$ 2,284,033	$ 23,884	$ 32,705	$ 24,053
2008-09	121.390	100.495	93.530	$ 2,994,472	$ 3,495,097	$ 2,403,654	$ 24,668	$ 34,779	$ 25,699
2009-10	106.160	96.891	106.114	$ 3,050,290	$ 3,518,362	$ 2,696,895	$ 28,733	$ 36,313	$ 25,415

School Year	Prior Year ADM Change			Prior Year Guarantee Change			Prior Year Per ADM Change		
	Park #16	*Sheridan #3*	*Washakie #2*	*Park #16*	*Sheridan #3*	*Washakie #2*	*Park #16*	*Sheridan #3*	*Washakie #2*
1999-00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000-01	-12.807	12.776	-5.547	$ (24,331)	$ 53,254	$ (36,184)	$ 672	$ (1,153)	$ 232
2001-02	-8.794	-6.168	-15.234	$ 141,200	$ (11,425)	$ 64,990	$ 1,604	$ 655	$ 2,253
2002-03	-9.343	-12.106	-5.850	$ 15,659	$ 497,771	$ 113,771	$ 952	$ 6,967	$ 1,894
2003-04	-11.238	9.911	-8.922	$ 154,032	$ 155,936	$ (28,382)	$ 2,402	$ (487)	$ 1,215
2004-05	-7.716	-11.088	-2.587	$ 109,871	$ 218,915	$ 261,023	$ 1,947	$ 4,714	$ 3,306
2005-06	16.731	1.257	-18.693	$ 97,177	$ 60,966	$ (24,853)	$ (1,463)	$ 306	$ 4,891
2006-07	-8.955	8.229	16.907	$ 526,106	$ 517,462	$ 649,440	$ 5,309	$ 2,961	$ 2,398
2007-08	-7.359	-4.228	4.206	$ 126,775	$ 307,460	$ (251,663)	$ 2,394	$ 4,286	$ (3,888)
2008-09	2.361	0.717	-1.429	$ 151,609	$ 231,842	$ 119,621	$ 784	$ 2,074	$ 1,646
2009-10	-15.230	-3.604	12.584	$ 55,818	$ 23,266	$ 293,241	$ 4,065	$ 1,534	$ (284)
Total	**-62.350**	**-4.304**	**-24.565**	**$ 1,353,914**	**$ 2,055,447**	**$ 1,161,003**	**$ 18,666**	**$ 21,856**	**$ 13,662**

School Year	Prior Year Percent Change			Prior Year Percent Change			Prior Year Percent Change		
	Park #16	*Sheridan #3*	*Washakie #2*	*Park #16*	*Sheridan #3*	*Washakie #2*	*Park #16*	*Sheridan #3*	*Washakie #2*
1999-00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000-01	-7.60%	12.63%	-4.24%	-1.43%	3.64%	-2.36%	6.67%	-7.98%	1.97%
2001-02	-5.65%	-5.41%	-12.17%	8.44%	-0.75%	4.33%	14.94%	4.92%	18.80%
2002-03	-6.36%	-11.23%	-5.32%	0.86%	33.08%	7.27%	7.71%	49.92%	13.30%
2003-04	-8.17%	10.36%	-8.57%	8.42%	7.79%	-1.69%	18.07%	-2.33%	7.53%
2004-05	-6.11%	-10.50%	-2.72%	5.54%	10.14%	15.82%	12.41%	23.06%	19.06%
2005-06	14.11%	1.33%	-20.20%	4.64%	2.56%	-1.30%	-8.29%	1.22%	23.68%
2006-07	-6.62%	8.59%	22.89%	24.02%	21.22%	34.43%	32.81%	11.63%	9.39%
2007-08	-5.82%	-4.07%	4.63%	4.67%	10.40%	-9.92%	11.14%	15.08%	-13.91%
2008-09	1.98%	0.72%	-1.50%	5.33%	7.10%	5.24%	3.28%	6.34%	6.85%
2009-10	-12.55%	-3.59%	13.45%	1.86%	0.67%	12.20%	16.48%	4.41%	-1.11%
Total	**-37.00%**	**-4.25%**	**-18.80%**	**79.81%**	**140.50%**	**75.59%**	**185.42%**	**151.19%**	**116.24%**

Each school district has their salaries adjusted by the Regional Cost Adjustment for cost-of-living areas and each district has their salaries further adjusted for their staff members' experience, education and responsibility, where appropriate.

APPENDIX C

MEMO ON LIBRARY, LIBRARY CLERK AND COMPUTER TECHNICIAN STAFFING

To: Wyoming Select Committee on Recalibration

From: Allan Odden, Scott Price and Larry Picus

Re: Library, Library Clerk and Computer Technician Staffing

Date: October 29, 2010

This memo describes our recommendations for a cost based approach to staffing for libraries – librarians and library clerks – as well as for computer technicians for the Wyoming School Funding Model.

Background

In the five years since the last recalibration, the tremendous growth in digital technologies and dramatically increased reliance on the Internet for information has substantially changed the way students find and use information. Because of these changes and the use of Model Resources, we are addressing staffing for libraries and staffing for technology support in this one memo. It is important to note that under technology materials we recommended funding of $250 per ADM for technology and related materials, which we found was adequate to purchase computers at a rate of one computer to three students as well as rely on maintenance agreements for the maintenance and repair of those computers. The $250 per ADM for computer technologies did not include resources for district staff to support the computers.

The model for librarians and library media technicians developed in 2005 no longer appears to provide a cost based approach to funding these important services. The WDE's Continuing Review of school resource use found that there were substantially fewer librarians in districts than the model funds, and that districts were employing large numbers of library clerks and aides (rather than library media technicians) as well as computer technicians to repair and improve computer services. This memo documents our revised recommendations for staffing for these services. The net result of these cost based recommendations is to reduce the number of librarians, increase the number of library clerks (who would be funded at a lower rate than the library media technicians currently in the model) and provide resources for computer technicians to help install and maintain instructional computers. The net result is a relatively small change in net costs, although there is a decrease in the number of librarians, a substantial increase in the number of library clerks (essentially a new position) as well as resources for computer technicians.

THE CHANGING LIBRARY

The nature of information has changed drastically over the last century (Breck, 2006; Tenopir, 2003; Brown, 2001). In libraries, over the last decade, the acquisition of books, print materials, and print journal and magazine subscriptions has declined while subscriptions to digital databases have increased (Tully, 2009). As this transformation from printed to digital materials occurs, the need for students to enter the library doors to access information has decreased significantly (Troll, 2001).

These changes however do not lessen the importance of libraries or librarians; instead, libraries and librarians can now demonstrate their value by providing access to digital materials instead of by owning content, by helping users discover new ways to find information, and by creating spaces for students to research and communicate together (Tully, 2009).

Current Wyoming Situation

The current Wyoming Funding Model provides schools with librarians at a rate of 1.0 FTE librarian for each prototype elementary school (288 ADM) – prorated up to the actual size of an elementary school and down to an enrollment of 49 ADM (when the small school adjustment becomes operative). At the secondary level, funding for librarians is provided at the rate of 1.0 FTE librarian for schools with enrollments between 105 and 630 ADM. Below 105 it is prorated down to 49, and above 630 it is prorated up.

Library media technicians are funded at the secondary level at a rate of 1.0 FTE per 315 ADM, and prorated between 49 and the actual size of the school.

In our desk audit, we found that librarian staffing resources in Wyoming's funding model are higher than in any other state formula, and exceed standards for librarian staff in other states. Our resource allocation and use studies as well as the Continuing Review developed by WDE show that Wyoming districts actually hired fewer librarian staff than are funded in the model. The WDE's Continuing Review of Educational Resources in schools shows that in 2008-09 there were 92.3 fewer librarians in elementary schools than funded through the model, 20.2 fewer middle school librarians, and 22.9 fewer high school librarians. Additionally, the WDE found 127.7 more library clerk personnel than the model funds at elementary schools, 2.2 more at middle schools and 17.6 fewer at the high schools.

General Library K-12 Staffing Standards

There is no common "national staffing standard" adopted by all states to calculate the number of K-12 staff members required to adequately staff school libraries. In a position statement, the American Library Association (ALA) states that, “all students, teachers, and administrators in each school building at all grade levels must have access to a library media program provided by one or more certificated library media specialists working full-time in the school library media center” (American Library Association, 2006). ALA additionally recommends that the number of professional library staff, and paraprofessionals to support them, should be based on school size, number of students and teachers, facilities, and the specific library program, but does not directly address library staffing for small schools and small districts. The Association also recommends that each school district should have a library media director to advocate for the library media program within the district.

Various states have adopted portions of the ALA recommendations and/or created their own staffing standards. However, these standards are not mandated and in most cases are not met (Smith, 2001; Smith, 2006). The majority of states have not adopted any specific library staffing standard.

Most of the state standards that do exist are based on a school site model, utilizing school size (enrollment) and grade level as metrics. One comprehensive example of this type of standard is in the State of Wisconsin. Wisconsin state law outlines that library media services should be provided to all students “by or under the direction of licensed library and audiovisual personnel”. The Wisconsin Department of Public Instruction, although not mandated by statute, recommends the following staffing ratios at school sites to fulfill the statute (note that the proposed staffing includes just librarians and library clerks, but not library media technicians):

Wisconsin State Library Staffing Formula for K-12 Schools

Number of Students	Number of Librarians	Number of Clerical Staff
0-299	0.5 – 1.0 FTE	1.0 – 1.5 FTE
300 -799	1.0 – 2.0 FTE	2.0 – 3.0 FTE
800-1,399	2.0 – 2.5 FTE	3.0 – 3.5 FTE
1,400-2,100	2.5 – 3.0 FTE	4.0 – 4.5 FTE

In an extensive report commissioned by the Wisconsin Department of Public Instruction, these staffing standards, which seem to be more staff intensive than most states but still less than those in Wyoming, were emphasized and supported. While a rationale for these staffing levels was provided in the report, the study found that 40% to 100% of Wisconsin schools, depending on grade level and school size, did not staff their libraries at these ratios. Staffing standards were more likely to be followed at the elementary school level, but as school size (enrollment) increased, standards were followed less frequently (Smith, 2006).

Despite the noncompliance with the staffing recommendation, a final summary report published by the Wisconsin Department of Public Instruction (Smith, 2007) noted that libraries with greater library staffing had students that achieved better on Wisconsin state tests. What the summary report failed to mention from the original report was that these high scoring schools also had higher school budgets, fewer minority students, and smaller free-and-reduced lunch counts (Smith, 2006). The same researcher that completed the Wisconsin study also studied Texas school libraries in 2001 and acknowledged that 96% of the correlation between test scores and library staffing in Texas was attributable to factors other than better-staffed school libraries (Smith, 2001).

The Wisconsin (Smith, 2006) and Texas (Smith, 2001) reports also suggest that the larger the staff in the library, the more these staff members can assist the students, in a school or school district to reach their particular learning goals. What is unknown, however, is whether these other functions might be better performed by instructional or administrative staff outside of the library program, something that is also provided through the Wyoming Funding Model through the strategies to help struggling students. Wisconsin's recommended library staffing formula is one of the most staff intensive among the 50 states, although the state school funding formula does not have specific provisions to pay for staff at these ratios.

The majority of state library staffing formulas call for a full-time librarian at all schools independent of size and level. Formulas then differ at what intervals in school size additional professional and paraprofessional staff members should be retained.

Wisconsin and Utah present one example of different staffing ratio intervals in their formula for clerical staffing. Wisconsin calls for 1.0 to 1.5 FTE clerical support in a school from 0-299 students, and more clerical support as enrollment increases as shown in the table above. Utah on the other hand suggests 0.0 FTE clerical support staff in a school with fewer than 300 students. The Utah model recommends 0.5 FTE support staff from 300 -600 students and 1.0 FTE support from 600 to 1,000. After enrollment reaches 1,000 students, Utah supports an additional 0.5 FTE per additional 500 students (Utah State Office of Education, 2003).

Another staffing formula with distinct staffing intervals is California, a state in the process of adopting its library staffing standard. The California standard calls for a 1.0 FTE librarian and a 0.85 FTE clerical staff when school enrollment reaches 785 students (California Department of Education, 2010). The Wisconsin standards recommend twice the staffing level as the proposed standards for California in a school of 785 students. If Wyoming had 785 students in seven schools of just over 100 students, its library funding standard would call for 7.0 FTE librarians and 2.0 FTE clerical, however if this same number of students were enrolled in one school, the Wyoming formula would call for 1.1 FTE librarian and a little over 2.0 FTE clerical staff.

New York State in association with the New York State Library has created another variation on the staffing formula that helps individual schools prorate a 1.0 FTE allocation of staff by using class periods of a certificated teacher's time to provide library services. New York has library staffing formulas only for secondary schools. From 100 to 300 students, the standard suggests there should be a member on staff to devote at least two periods to providing library services. When a secondary school reaches 700 students, the standards call for a full-time staff librarian (New York State Libraries, 2004).

South Dakota presents a library staffing formula that takes the enrollment of districts and schools and places them within an achievement matrix. Within the model there are three staffing achievement levels; "at risk", "basic", or "exemplary". The categories are self-explanatory and help districts to understand the library environment that they are creating by staffing at the levels listed in each achievement category.

South Dakota Library Staffing Standards			
School Districts Up to 1,500 Students			
	At-Risk	Basic	Exemplary
Up to 300 Students	Less than 1.0 FTE librarian	1.0 FTE librarian	1.0 FTE librarian, 0.5 FTE clerical
300-799 Students	1.0 FTE librarian	1.0 FTE librarian, 1.0 FTE clerical	1.0 FTE librarian, 1.5 FTE clerical
800-1,500 Students	1.0 FTE librarian, 0.5 FTE clerical	2.0 FTE librarian, 1.0 FTE clerical	2.0 FTE librarian, 2.0 FTE clerical

South Dakota Library Staffing Standards			
School Districts with More Than 1,500 Students			
	At-Risk	Basic	Exemplary
1,501 - 4,000 Students (K-12)	1.0 FTE librarian, 2 FTE clerical district wide	2 FTE librarian, 2 FTE clerical district wide	3 FTE librarian district wide, 1.0 FTE clerical at each library
Over 4,000 Students (K-5)	Total 1.0 FTE librarian/clerical (any combination)	Building enrollment < 600; 0.2 FTE librarian, 1.0 FTE clerical	Building enrollment < 300; 0.5 FTE librarian, 0.5 FTE clerical
		Building enrollment > 600; 0.5 FTE librarian, 1.0 FTE clerical	Building enrollment 300 - 600; 1.0 FTE librarian, 0.75 FTE clerical

			Building enrollment > 600; 1.0 FTE librarian, 1.0 FTE clerical
Over 4,000 Students (6-12)	Building enrollment < 1,000; 0.5 FTE librarian	Building enrollment < 1,000; 0.5 FTE librarian, 1.0 FTE clerical	Building enrollment < 1,000; 1.0 FTE librarian, 1.0 FTE clerical
	Building enrollment > 1,000; 1.0 FTE librarian	Building enrollment > 1,000; 1.0 FTE librarian, 1.0 FTE clerical	Building enrollment > 1,000; 1.0 FTE librarian, 1.0 FTE clerical per 1,000 students

For example, a school district with up to 300 students would be considered “at risk” if it had less than one certificated librarian. The same school district would achieve the “basic” level by having at least 1.0 FTE librarian and could become “exemplary” by supplementing library services by adding a 0.5 FTE of clerical support (please see the South Dakota Library Staffing Standards included in this section).

South Dakota, which has many small schools and districts like Wyoming, uses a student enrollment formula approach but removes the calculation for the formula from the school level until districts reach a threshold student enrollment of 1,500 and 4,000. Once a district passes these enrollment figures a new set of staffing formulas apply based on individual buildings within a district and the grade level of students that these building serve.

The rationale behind South Dakota focusing on library staffing at the district level for districts with less than 1,500 students stems from simple practicality and the confidence that local leaders will be able to distribute and share resources so that all students have “access to at least one full-time certificated librarian” albeit that access may be limited to certain days and/or hours for individual sites.

In the South Dakota model, once a district has a student enrollment from between 1,500 and 4,000 students, the standards matrix changes, still focusing on the district in the “at risk” and “basic” categories, but then shifting to the individual school library level in the “exemplary” category regarding the suggestion of 1.0 FTE clerical at each physical library location. Moving the formula to the school level ensures that no libraries in these larger districts receive less than a threshold level of services.

Focusing on the individual library level also makes sense in states that might have multiple “schools” on a single campus that share one physical space called the “library”. In such instances, it would not be rational to provide funding for multiple librarians, despite the presence of multiple schools, when one librarian could manage the single physical space and still address the needs of all students utilizing the library.

The next enrollment level of the South Dakota staffing formula occurs when a district reaches or exceeds an enrollment of 4,000 students. On this enrollment level, the staffing formula shifts from a district perspective to a "single library" or "single building" formula in each of the three achievement categories . Also, within these achievement categories, primary (K-5) and secondary (6-12) grades utilize different enrollment threshold levels (600 and 1,000 respectively) to determine the level of staffing resources to be received. By stipulating a lower threshold level for the K-5 grade level library, South Dakota provides more library staffing resources to the younger grade levels to nurture younger students by providing them extra support.

Recommendations

In the absence of a "national staffing standard", we have examined the practices in a number of states across the country in light of the evidence of the evolving nature of a school library. It is our best professional judgment based upon the available evidence in the literature and practice across the country that South Dakota offers the most comprehensive library staffing model for a state with school enrollment patterns that match Wyoming's educational environment. We therefore recommend a new approach for staffing resources for libraries in Wyoming school districts, one that is generally developed from the South Dakota framework.

We recommend that library staffing be provided as per the table below on a district ADM basis for districts with ADM up to 630 ADM, and on the basis of elementary ADM and secondary ADM above that level.

District ADM	Library Staffing
0 – 300	1 Librarian and 1 library clerk
301-630	Prorate from the 300 ADM level up to 2 librarians but retain the one library clerk for the 630 ADM district
Above 630	1 Librarian for every 288 elementary ADM and 1 Librarian and 2 library clerks for every 630 secondary ADM, with a minimum of 2 librarians and 1 library clerk.

Here is how the recommendation would work:

- Districts with ADM from 1-300 would receive 1 librarian position and 1 library clerk position, regardless of the number of schools.

- This generally is above the level of library staff now provided for a prototypical elementary school, while equal to what a secondary school of this size would receive – a 1.0 library position and a 1.0 library clerk position. Librarian staff in districts with ADM from 301 to 630 would get one librarian plus a prorated librarian position up to 630 ADM at which point the district would have 2 librarians for 630 ADM. There would still be only one library clerk position in a district with up to 630 ADM. Thus a district with 630 ADM would generate resources for 2 librarians and 1 library clerk.

At 630 students, a district could have one three section elementary school with 288 students and an additional 336 secondary students. The library staffing provided by the above formula would then equal current model funding for a prototypical elementary school (1 librarian) and substantially equal current model funding for a 324 student secondary school (1 librarian and 1 library clerk).

- Above 630 ADM, library staff would be provided on the basis of 1 librarian for every 288 elementary ADM and 1 librarian and 2 library clerks for every 630 secondary students, with a minimum of 2 librarian and 1library clerk positions for the district.

We also recommend that the salary for the library clerk, which in the past has not been a specific model staff component, be the same salary as that of a school clerical position. As further evidence is developed in the literature and across the country to support staffing models for libraries in the 21st century, these recommendations could likewise evolve. It is our judgment, however, that this approach provides Wyoming with a cost-based approach until the time of the next recalibration, approximately five years hence.

TECHNOLOGY AND SCHOOLS: COMPUTER TECHNICIANS

Over the last five years, technology has further become an integral part of the lives of K-12 students (Pew, 2010). Students use more devices than ever before; they multi-task and communicate through new media mechanisms. Data-capable phones and other small form-factor computers all connected to the Internet allow students more access to resources and information.

Technology motivates students to become self-directed learners increasing time on task, quality of work, and improving attendance. New software techniques that promote student interaction and use elements of computer gaming, coupled with teacher assignments that leverage the strengths of technology, promote active learning and encourage students to become more independent learners. (Prensky, 2010).

Legislators and educators are responsible for providing access to technology in schools and in funding a support network to keep computers and other technological tools running. Currently within Wyoming, district technology administrators, but no specific formula has been recommended for funding support technicians.

General Technology Support Staffing Standard

There is no national K-12 staffing formula for technology support staff that is accepted by all states. Within the 100 plus pages of the recently completed national technology plan, *Transforming American Education: Learning Powered by Technology*, the issue of technology support staff was only mentioned in two short paragraphs. The plan references that while industry has a "support technician-to-computer ratio" of one technician to every 150 computers, K-12 education averages one technician to every 612 computers. The plan, authored by the U. S. Department of Education, however, makes no recommendation as to what the proper technician –to-computer ratio should be in schools.

Outside of the Department of Education, The International Society for Technology in Education (ISTE), one of the most prestigious national K-12 technology organizations, promotes a technician-to-computer ratio in a range from 1-to-250 to 1-to-75 representing a rating scale from "low efficiency" to "high efficiency" respectively (International Society for Technology in Education, 2010). ISTE states that there are many factors that affect what the "proper ratio" is.

The Consortium for School Networking and the Gartner Group, in analyzing the "total cost of ownership" for computers in schools, shows a wide variation in the technician-to-computer ratio. In four "total cost of ownership" studies completed in different-sized districts in four different states, they found a variation from 1-to-86 ratio in a Utah district of 48,000 students, to a 1-to-342 ratio in a Minnesota district of 2,500 students (Gartner Group, 2003).

With such a variation in technician -to-computer ratios, an *adequate* level of technical support can be challenging to determine. The need for technical support varies with individual district and school characteristics including the age of the computers, the number of operating systems and programs used, the amount of freedom given to users to modify or install programs, and the length of time for the typical refresh cycle. The ratio of laptops to desktop computers can also play a role.

It is important to note here that the computer-to-technician ratio should not be confused with a student-to-technician ratio. For example, a 300 pupil school with a 3-to-1 student-to-computer ratio that has 1.0 FTE technician would have a 1-to-100 technician-to-computer ratio, not a 300-to-1 ratio. This is why lowering the student-to-computer ratio in a school district increases the number of technicians needed to sustain the same support level or technician-to-computer ratio

Recommendation for Technology Support Staffing Formula

The recommendation for Wyoming is that it provides funding for computer technicians at a ratio of one technician for every 350 computers. While this ratio represents less support than the ISTE recommended standard, it is far superior to the national average of "one technician to 642 computers" cited by the US Department of Education in the National Technology Plan.

Because inventorying working computers can be problematic and may lead to over reporting, the 350 technician-to-computer ratio must be converted to ADM numbers.

Three hundred and fifty computers (350), at a 3-to-1 student-to-computer ratio equates to a district with 1,050 ADM.

While it is informative to calculate the FTE of technology support staff at the school level, the number of technicians funded by the model should be determined by district ADM. These technicians should be supervised and directed by district personnel instead of by site level administrators. This allows for the flexibility of district staff to direct all or any resources to specific school needs that might require multiple technicians. It should also allow districts to hire more full-time, better qualified personnel.

Thus, to fit the recommendation for computer technician staffing to the central office staffing, we recommend that districts with ADM up to 500 students receive 0.5 FTE positions for computer tech staffing, and that such staff be prorated up above that at a rate of 1.0 FTE position for every 1,000 additional students. So a district with 1,500 ADM would receive funding for 1.5 FTE computer tech positions.

Cost Comparisons

The table below shows the costs of the proposed combined recommendations for library and technology staffing to those in the current model. The proposed costs are about $500,000 greater than current funding for an estimated 62.2 more FTEs.

Staffing Category	Proposed		Current	
	Staff FTEs	Cost (millions)	Staff FTEs	Cost (millions)
Librarians	234.0	$ 17.16	274.0	$ 20.10
Library Clerks	142.0	5.56	---	
Library Media Technicians	---		130.5	7.37
Computer Technicians	90.7	5.12	---	
Total	466.7	$ 27.94	404.5	$ 27.47

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APPENDIX D

MEMO ON RECALIBRATION OF INSTRUCTIONAL MATERIALS AND TECHNOLOGY COSTS

MEMORANDUM

To: Wyoming Select Committee on Recalibration

From: Scott Price[44], Allan Odden and Larry Picus

RE: Recalibration of Instructional Materials and Technology Costs

Date: September 8, 2010

This memo describes our recommendations for recalibrating the costs of technology and equipment as well as the costs of instructional materials (beginning on p. 15 of this memo) in the Wyoming School Funding Model. Our findings suggest that based on current evidence, a cost based estimate of adequate funding for technology and equipment is $250 per ADM, the same figure we recommended in 2005, but lower than the current ECA adjusted figure of $294 per ADM. For instructional supplies, our evidence based estimate of costs amounts to $140 per ADM for elementary and middle schools, and $175 per ADM for high schools. This figure is also lower than current Model funding of $297 per ADM for Elementary and Middle schools and $364 for high schools.

TECHNOLOGY AND EQUIPMENT

Over the last five years, technology has further become an integral part of the lives of K-12 students (Pew, 2010). Students use more devices than ever before; they multi-task and communicate through new media mechanisms. Data-capable phones and other small form-factor computers all connected to the Internet allow students more access to resources and information.

The benefits of technology in schools are many but research has generalized these benefits into four areas: 1) student preparation to enter the workforce or higher education, 2) student motivation, 3) student learning or increased academic achievement, and 4) teacher/student access to resources (Roblyer, 2005; Earle, 2002).

From the Secretary's (of Labor) Commission on Achieving Necessary Skills (SCANS) in the early 1990's to the more rigorous standards adopted in the 21st Century Workforce

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Commission (U.S. Department of Labor, 2000; Schrum, 2009; Partnership for 21st Century Skills, 2009), technology proficiency is a necessity for students to compete locally and globally in higher education, business, and the general workforce (U.S. Department of Education, 2010a).

Technology motivates students to become self-directed learners increasing time on task, quality of work, and improving attendance. New software techniques that promote student interaction and use elements of computer gaming, coupled with teacher assignments that leverage the strengths of technology, promote active learning and encourage students to become more independent learners. (Prensky, 2010).

Technology has the potential to increase student achievement when teachers use instructionally-sound techniques that take advantage of effective pedagogy and is linked to a rigorous core curriculum program. In cases in which old pedagogy is transferred to a new electronic medium, results are mixed (Archer, 2000; Earle, 2002; Kulik, 1994, 2003). The implication is that although there is great potential for technology to enhance learning, the ability to do so rests on the soundness of the core curriculum and instructional program (Clarke and Estes, 1999).

The Costs

Infusing technology into the school curriculum has associated costs for the computer hardware, networking equipment, software, training and the personnel associated with maintaining and repairing these machines. If legislators and school districts fail to provide funds for all of these elements, fewer of the potential benefits that technology offers will be realized. School systems must be prepared to fund technology at adequate levels to allow students to take full advantage of technology benefits.

In terms of identifying the ***costs*** *of purchasing and embedding technology* into the operation and curriculum of schools, a term now commonly used in the industry is the *Total Cost of Ownership* (TCO). *Total Cost of Ownership* is a calculation designed to help leaders identify both the direct and indirect costs of technology and its successful implementation. TCO was originally developed in the business world to help companies estimate the “real costs” of purchasing, maintaining, and replacing technology in their organizations. TCO calculates both the direct and indirect costs of technology. The *direct costs* of technology include hardware, software, and labor costs for repairing and maintaining the machines. *Indirect costs* include the costs of users supporting each other, time spent in training classes, casual learning, self-support, user application development and downtime costs (Gartner Group, 2004)

In the mid-2000’s, TCO studies were conducted at schools to help policy makers and school administrators understand what resources are required to provide ongoing technology implementations that make a difference to schools and students. Incomplete implementations could result in machines that sit unused for lack of training, insufficient software, or not enough personnel to repair or maintain the devices.

When the Consortium for School Networking (COSN) and the Gartner Group decided to study TCO in schools in 2003 and 2004, eight case studies were conducted in urban, suburban and rural school districts in various states. The initial studies found that total **annual costs** for technology per pupil varied from a low of $385 in a rural district to a high of $1,242 per pupil in a suburban district, with a median of approximately $750. These figures included both direct and indirect costs, as well as professional development and training costs, which are funded elsewhere in the Wyoming Funding Model. Since the mid-2000's when these studies were conducted, the price of computer hardware and networking equipment has decreased; however the costs for software, direct labor costs for the maintenance of equipment and some indirect costs have not changed significantly or in some cases have increased.

That task is to define a total cost of ownership per pupil for the Wyoming funding Model. In this TCO model, direct labor costs and direct technology costs will be separated so that each element of the model can be reviewed by policy makers and other interested parties. Other elements such as training costs, an indirect cost, will not be included in this section of the report as these costs are already accounted for in the Professional Development portion of the Wyoming Funding Model. The main goal of the following analysis is to identify the direct costs of purchasing, upgrading, and maintaining computer technology hardware, the software that helps these computers to function, and the networks on which they run.

With the TCO model in education, no school is beginning at a baseline of zero. All schools have a variety of computers of varying ages, the large majority of which are connected to school networks and the Internet (U.S. Department of Education, 2010b); Wyoming is no exception. The commitment shown by policymakers in Wyoming has helped provide a strong financial and technology resource base from which schools can maintain and build their programs. Unlike the 1990's that focused on expensive projects to retrofit schools with data networks, the funding goal today is to provide sufficient resources to maintain the programs that are in place and to offer funding for innovative efforts by individual teachers and schools that will increase student achievement and learning.

In studies that have been conducted by several states and reviewed by professional judgment panels, the annual cost per pupil for the purchase, update, and maintenance of hardware and software in states with a mature technology program has been $250. This figure corresponds to the average direct costs in the COSN/Gartner model, (Gartner, 2004) adjusted to provide a one-to-three student-to-computer ratio. This was the figure that was found in our original Wyoming finance adequacy study. However, because of the shifting of costs, the elements of the $250 model have changed while the total per pupil expenditure identified in the original model has remained relatively constant.

In the original Wyoming study, the $250 per pupil figure was taken from previous professional judgment panels. Subsequent to that, Lawrence O. Picus and Associates conducted a more detailed analysis of technology costs (Odden, et. al. 2006) and found that a $250 per pupil figure was adequate to purchase, upgrade and maintain computers, servers, operating systems and productivity software, network equipment, and student administrative system and financial systems software, as well as provide sufficient funds for other equipment such as LCD projectors, document cameras and even copiers. To help policy makers and educators understand the costs of technology and related equipment and software, we have identified four categories to provide suggested guidance for expenditures based on the costs of each category.

Before discussing the allocation of these categories it is worth noting that each district and school situation is unique, requiring that an individual technology plan be created at both the district and school levels. Most districts and schools have technology plans because of the federal funding requirements in the E-Rate and EETT programs. These documents should be meaningful mechanisms used to distribute resources to the areas of most need within the school or district environment.

Our analysis also assumes that campuses have been connected through Ethernet and/or fiber cabling and that Main and Intermediate Distribution Facilities (MDFs and IDFs) have been populated with the necessary active electronics (switches) (U.S. Department of Education, 2010b). It also assumes that schools own various computers between one and five years old, each with a mixture of hardware, operating systems, and iterations of instructional and non-instructional software programs.

For each of the four categories we have identified a specific annual dollar per pupil amount as a guideline. Guideline amounts should be considered flexible to encourage districts to meet their highest priority needs outlined in state and district technology plans. The subcategories and their estimated costs are as follows:

Computer Hardware	$71
Operating system, productivity and other non-instructional software	$72
Network equipment, printers, and copiers	$55
Instructional software & additional classroom hardware	$52

Computer Hardware

The annual expenditure guideline per pupil for the category of *Computer Hardware* is $71. This figure was calculated using a base average cost of $850 per computer. At first glance this average cost may seem high for the purchase of a computer workstation, but it is based on the average price of a computer within a group of machines that could include desktop workstations, laptops, servers, high-end video editing stations, and/or wireless mobile carts (20 laptops and cart $25,000) depending on school site need. This figure assumes a three-year onsite warranty for each computer that reduces personnel costs and leaves highly technical problems to expert private companies. It also provides an adequate LCD monitor, at least 17", to reduce eyestrain. Each computer should be purchased with the most up-to-date operating system and the latest office productivity suite ($50) pre-installed so that computers need only be reconfigured, not re-imaged, at installation.

The $71 per pupil annual figure is based upon a 3-to-1 student-to-computer ratio and a four-year average replacement cycle. To arrive at the average annual cost per student of $71, the average cost of the computer, $850, was divided by an average computer life span of four years ($213), and then divided by three, representing the cost of one computer divided among each three students ($71).

Although a four-year replacement cycle for most applications in educational technology is adequate, many computers are used well beyond this timeframe. For example, for computers that are used for simple word processing and other such tasks, a five-year replacement cycle (especially with the software replacement outlined below) is appropriate. But, there are various cases in which a four-year replacement cycle is not sufficient. Some classrooms, most notably at the secondary level, demand the latest technology available and should be on a three-year cycle. Examples of courses that require ever-increasing computer power include higher mathematics, art, some career-tech programs, and other courses that heavily use multimedia or multimedia editing, including biology and social studies. Further, because the student-to-computer ratios include computers for administrators and office staff, "power users" in the school office, such as the individual who processes student data, may require a three-year replacement.

There is call among many educators to lower the 3-to-1 student-to-computer ratio to 2-to-1 or even 1-to-1. Currently, the Wyoming School Boards Association is calling on policymakers to move schools to a 1-to-1 student-to-computer laptop program (Wyoming School Boards Association, 2009). One-to-one programs however are much more expensive, requiring costs for additional computers, personnel, networking, electrical and other associated costs. In the Wyoming School Board Association's plan for example, a cost of $530,000 per 100-student district is cited ($5,300 per student). Although many of the costs in the one-to-one plan would not be needed because there is infrastructure, networking, and other equipment in place, it is unclear how much of the $5,300 per student would be part of a one-time startup cost and how much would be on-going.

Start up and maintenance costs of laptop programs are major barriers to moving to 1-to-1. Start-up costs are high because the existing computer base of desk top units cannot be used to offset the initial expenditures, thus, each student requires a new laptop when the program starts. Assuming the cost of a new laptop (extended replacement warranty, initial software, etc.) is $1,000, and assuming a four year replacement cycle, the cost alone of the computer per pupil, per year, is $250. This does not include any of the additional ongoing costs for personnel, training, etc.

One of the postulated benefits of laptop programs is an assumed cost savings in textbooks. The rationale presented is that electronic textbooks are cheaper than printed editions. While this is a compelling argument, there are still numerous reasons why it is too early for such savings to be realized. First, not all textbook companies provide electronic versions of their texts; if not all texts are available in electronic format, savings are reduced. Additionally there is an assumption that the cost of an electronic textbook is considerably lower than a printed textbook; however most textbook companies provide only minimal discounts in the electronic versus the printed version of the book.

Laptop programs are popular with students and parents, and although gains in student learning have been cited in various cases in other states and districts, it is difficult to attribute the gains claimed solely to the technology or to replicate the positive results in new deployments in other programs. If Wyoming policy makers are interested in creating a 1-to-1 student laptop program, it is recommended that the state identify a technology-leading district within the state, provide specific funding outside of the technology funding suggested in this adequacy study, and initiate a research-based analysis of the program based on costs and impact on student achievement.

With the 3-to-1 ratio proposed in this analysis, a school has enough computers to create one or more computer laboratories (depending on the size of the school) and provide four to five workstations in each classroom for reference or small group projects.

The 3-to-1 student-to-computer ratio can also be lowered by stretching the life span of each computer past a four year cycle, using older machines for simpler tasks such as word processing or basic Internet access, while using faster machines in classrooms where curriculum and software demands are higher. Within the 3-to-1 student-to-computer ratio, there exists latitude to experiment with small form factor computers such as net books. Net books are usually less expensive than traditional laptops and can be used in almost any setting.

Also on the horizon is the opportunity to use devices like iPods for foreign language classes and class projects across the curriculum in which short videos and other sound clips can be used to produce multimedia productions. Currently, Apple is offering a “class set” of 25 iPods to schools for about $8,500, an average of about $340 a machine. However, it should be noted that iPods still lack the ability to use common productivity software such as word processors and that the ability for a teacher to actively manage these computers is limited to non-existent. Therefore, although these devices may serve specific instructional uses, they are still not a replacement for a desktop or laptop computer, and they are substantially more expensive than standard net books which may provide more functionality for students.

Operating system, Productivity, and Non-Instructional Software

This category consists of diverse software packages that allow computers to run, protect networks, and provide students with productivity tools to help them formulate and communicate their ideas. When productivity and system software packages were being developed (Windows, Microsoft Word, etc.) major revisions to these products were released every few years. However, as the software has matured over the last 20 years, programs have been fine-tuned, and major revisions are less frequent. Many times, software will outlast the useful life of a computer. And, with the Internet used as a delivery mechanism, minor revisions for many of these products can be installed at no charge as soon as the companies make them available.

To assign a cost to this category on an annual, per-pupil basis, the category can be organized into three groups of software differing on whether the products are charged for on an annual subscription basis, and/or if the software companies bill districts for the products on a per-pupil or per-workstation charge.

<u>Group A</u>

Under this category, Group A consists of software packages that are billed for using a one-time product charge and, the charge is based on a per-workstation basis. Since the cost of the product is a one-time product charge, the amount should be divided by the number of years that the product is useful. Most of these software products, now that they have matured, have at least a five year useful life cycle before a major revision for which the company charges, is released. Considering a four-year computer replacement cycle, this means that many computers might use the same operating system or productivity software, without ever requiring a major software revision that needs to be purchased during their useful lifespan. Other computers however are in the middle of their useful life when a new major software revision comes forth. To update the software on these computers, a district or school would need to pay for the new revision. Therefore, with software product cycles in Group A being what they are, and the computer replacement cycle being what it is, it is probable that at least 50% of the computers will experience the need to receive a software upgrade during their useful life.

Considering the factors above, the annual, per-pupil calculation for the software in Group A was based on the approximate cost of the software package, divided by 2, because half of the computers would receive a purchased major upgrade during their useful lifespan. This halved cost was then placed in Figure 1 below next to the software type listed in Group A. Next, the halved prices were added together to produce a subtotal for Group A. This subtotal was then divided by five to give an average annual cost of the major revision per workstation spread over the five-year useful life of the revision. Finally, the annualized cost was divided by three to accurately represent that the cost of one workstation shared by three pupils (3-to-1 student-to computer ratio).

For example, with educational discounts, the cost to upgrade an operating system or a productivity suite is approximately $50. Because only half of the computers would require such an upgrade, this cost is halved to $25. Because the product is useful for approximately five years, its cost is annualized to $5 a year. The annual per-pupil cost for this product would then be divided by three assuming that there are three students to each computer. The annualized expenditure per pupil for this particular product would then tally to about $1.67 per year. Lowering the student-to-computer ratio would make these costs increase by lowering the divisor of the "average annual cost per workstation per software package" over the "number of students per computer".

Server operating software, part of Group A, is much more expensive but the same factors apply to these products that apply to the rest of Group A. These servers, such as file and data base servers, require client access licenses in addition to the regular licenses. Larger campuses have at least two servers with various services running. After averaging in the number of servers provided at the district level, the formula for this category assumes three servers per school site.

Using this costing methodology outlined in the paragraphs above, the total annual per pupil expenditure for Group A is $57.

Group B

Group B represents software that can be purchased on a subscription basis and is charged per workstation. Antivirus, Internet content filtering, backup executive, remote access software, recovery software, and laboratory management software, are all elements of Group B. It is interesting to note that this group of software is transparent to the users but is vital for technicians. Without these tools personnel costs to maintain the computers and networks would rise dramatically. Internet security protecting district students, computers, and servers from email viruses, electronic threats, spam, and undesirable Internet content are vital to schools. Many of these services can be purchased separately or in suites.

The annual per-pupil expenditure calculation for Group B requires that the group subtotal be divided by three to spread the per-pupil expenditures to the three students per workstation represented in a 3-to-1 student to computer ratio.

Figure 1

Calculation of Annual Per-Pupil Expenditure for *Operating, Productivity, & Non-Instruction Software*	
Group A	
Five Year Refresh Cycle	
Operating Systems	$20
Productivity Suite	$30
Servers (plus CALs)	$800
subtotal Group A	$850
Group A Divided by 5 Year Refresh Cycle	$170
Group A 5 Years Divided by 3 Students	$57
Group A Per-Pupil Annual Expenditure	$57
Group B	
Annual Subscription Basis -- Per Workstation	
Antivirus	$8
Other Network (Content Filter, etc)	$5
subtotal Group B	$13
Group B Divided by 3 Students	$4
Group B Per-Pupil Annual Expenditure	$4
Group C	
Annual Subscription Basis -- Per Pupil	
Calling System	$3
Student Administation	$5
Financial System	$3
subtotal Group C	$11
Group C Per-Pupil Annual Expenditure	$11
Groups A, B, C Annual Per Pupil Exp	**$72**

Group C

The items in Group C are software products that are usually based on an annual per-pupil subscription model although there are exceptions. One example within the group is the student administration system which is vital to the school system. The need for student administration systems is clear. The cost per year varies depending on the modules that a school wants to purchase. Possible modules include grading programs, teacher web-sites for posting homework, online registration for classes for secondary schools, and/or web-based attendance that allow parents to have instant access to their student's attendance history.

Mass dialing systems have become more commonplace over the last five years. Earlier systems were school or district based, requiring on-site technical support and additional phone lines to allow for high volume calling. These site-based systems have been replaced by Internet based systems that can make thousands of calls in just a few minutes. As schools become accustomed to the mass communication services, their importance in an emergency situation or in simple weekly communications from the principal become invaluable.

For school sites to fully utilize their budgets, districts and their sites must have a financial budget software package which permits them to track encumbered and spent amounts and to project and properly spend remaining totals. Some budget software packages include a large one-time purchase price but almost all have an ongoing maintenance/upgrade cost associated them. It is also worthy to note that the ongoing costs for smaller districts may be larger on a per pupil basis.

Overall, the Operating, Productivity, and Non-Instructional Software Category has some caveats. Depending on how often upgrades/refreshes become available and/or what functionality a new release of software holds, the annual allocation of $72 per student for software could be high or low. In years when the demand is not as heavy in this category, the funds could be used in any of the other categories where there is a local need or carried over for future upgrades. School budget officials must remain aware that the price for refreshes in one subcategory will cut into another subcategory when upgrades for these software products become available. Changing or upgrading any of these products usually entails temporarily hiring consultant help and providing extra and overtime hours for district and site technology related staff.

Finally, as mentioned earlier, new computers should come with the latest operating system and productivity software used by the district, paid for from the above “computer” category. This initially saves expenditures in this “software” category. To also save money, districts and staff may simply postpone software upgrading cycles until the end of the useful life of a computer, using the oldest computers in the more basic functions. By using these techniques schools can spend less in this category, and spend more in the ”computer” category, thus lowering this student-to-computer ratio below 3-to-1.

Not all districts and schools use all of the software listed above, but they might have other software packages that they use to secure and regulate normal computing functions in the district. This formula assumes that these costs will average out.

Network Equipment, Printers, and Copiers

Using a school campus size of 400 students per site as an example, the $55 per pupil expenditure figure for this equipment category provides $22,000 per year, or $66,000 and $88,000 over three and four years respectively. Because this category has such diverse components, it is important that districts and schools set aside the funds necessary to meet the needs of each of the components in the category: network equipment ($26), printers ($18), and copiers ($11).

<u>Network Equipment</u>

To most district and school employees, the network equipment that provides connectivity to the district office, the Internet, and other specialized networks is invisible or transparent. Most networking equipment will have been purchased through facility funds or bond measures. Network equipment does not need to be refreshed as often as computers, but the larger more complex pieces of equipment should be on a maintenance contract with the manufacturer and/or a service contract with a third party vendor. In schools, most of this type of equipment will be used until it breaks or becomes obsolete. Taking this into consideration, the motivating factor for replacement of network equipment usually is the speed of the product. The speed of networking equipment is measured in megabits or gigabits per second. Common speeds of networking switches include 10 megabit, 100 megabit, and 1,000 megabit (commonly called gigabit). The current “standard” (or what most schools have) is 100 megabit to the desktop and 1,000 megabit on the backbone (main lines of the network). For almost any application, this is sufficient speed within a campus. Most 10 megabit equipment is very old and should be replaced.

Over the last five years, the cost of networking equipment has been reduced. A typical school of 400 students would have four to five 24-port switches ($1,300 x 5), and a main router and core switch ($5,500), for a total of $12,000. This analysis assumes that schools have already purchased this equipment because almost all schools and most classrooms are connected (U.S. Department of Education, 2010). The cost of $1,200 has been assigned to replacing 10% of the school’s network equipment annually. In this same school, if each piece of equipment was under a service contract, the service contract would have an approximate annual cost of $2,400 (20% of the original cost of the equipment). Most schools find it more cost effective to contract only for the most vital network pieces and not to maintain service contracts on the smaller switches in the network. Instead, districts purchase additional smaller switches as replacements if one of these pieces of equipment fails. This puts the site networking costs at $3,600, or $9 per pupil.

Core Internet traffic usually passes through district offices which provide filtering and other main server services. Sites need to contribute to districts to help them offset the costs of higher end switches and routers. An annual charge of at least $4 per pupil ($1,600 in a school of 400) should be contributed to the district to support network switches.

As districts move to provide more access to learning materials to students, campuses should consider installing wireless access on their campus. Consumer wireless equipment is not robust enough to give secure wireless access to students. Consumer wireless is difficult for technicians to monitor, can pose a security threat to networks, and can actually bring down an entire network if not configured correct. If enterprise level equipment is purchased and the network is designed and installed correctly, wireless access can be managed at the district office or off site by a private company to provide safe access to all. Enterprise level access points cost around $300-$400, they must be installed correctly, and provided a “hard wired” connection to tap into the network. A campus of 400 may have four or five access points. The main cost of the wireless solution is the managing server and application which can cost, depending on the size of the district, up to $20,000. A $4 annual per pupil expenditure is allocated to wireless costs for districts and schools to properly create secure wireless access on campuses. Once the server is purchased more access points can be added annually to complete a network.

Creating secure wireless networks will allow schools the ultimate flexibility in providing access to their students. The Consortium for School Networking suggests using wireless to “leverage student-owned computing devices” such as laptops, iPods, and other devices to effectively lower the student-to-computer ratio on a campus. Allowing students to use their own devices on campus can lower the student-to-computer ratio but will necessitate changes to school policies that could have a large effect on school learning culture.

The wide area network (WAN) that provides the gateway to the Internet is one of the main administrative and instructional resources for educators. The data lines that make up this network must remain uncongested for teachers and administrators to maximize their efficiency. Most elementary campuses have at least one T-1 line to their site; middle and high schools commonly have two or more T-1 lines to their site. The T-1 line has a capacity of only 1.5

megabits. Many times T-1 lines reach capacity at peak times on campuses frustrating users. It is imperative that administrators, teachers, and students understand that there is a limited amount of bandwidth and that it should be used for educational purposes. There are other types of data lines which provide higher connection speeds, however many of these are not available in all areas and are typically higher priced.

Districts usually use E-Rate funds to offset the monthly cost of their T-1 or other data line which, before discounts, can cost approximately $250 a month, or $3,000 a year, or more. Districts then have to pay an access charge to an Internet provider to provide Internet service. This cost varies by service provider, but can be estimated at around $500 per school per year. So the total school cost of linking a 400-pupil school to the Internet is $ 3,500 per year, or $ 9 per pupil.

Totaling the costs of T-1 or other data lines, an annual 10% replacement of network equipment, maintaining service contracts, and beginning to provide wireless access tabulates to a $26 annual per pupil expenditure for network related expenses.

Printers and Copiers

Computer prices listed in the *Computer Purchase* category do not include the initial costs for workstation printers, but each computer must have some method available to print. To print, schools now purchase higher-end, networked laser printers for each classroom instead of attaching ink-jet printers to each individual work station (laser printers are more cost effective). In addition to classroom printers, each school should have at least two mid-range color laser printers for the office used for communications to community members and parents. Since most small districts do not have the in-house expertise to repair printers, contracting with an outside vendor is common practice.

The cost of an inkjet printer is a nominal $80, however, inkjet printers are more expensive to maintain and are not recommended considering the cost of the ink, their slower speed, and their less robust nature. Prices for high-quality laser printers have dropped considerably over the last five years making laser printers the preferred choice even at the classroom level. A networked, black-and-white, quality laser printer suitable for steady classroom use is $300. Color laser printers are also available for classroom use for just over $400. Considering the price difference, a color laser is preferred although ongoing costs for four colors of toner and other supplies must be managed by staff at the school.

Assuming that a 400-student school contains 20 classrooms each with one laser printer, and at least two higher-end laser printers in the office ($600 each), the initial cost per student for the printing equipment would approximate $9,200 or approximately $23 a student ($9,200/400 students). Assuming a printer life cycle of four years, the annual cost for this element is $6 per pupil. The real costs of printing depend on the frequency of use and the volume of printing done (cost of paper, ink, and toner). With the number of resources on the Internet growing, teachers, students and administrators will print as much the budget can support. Assigning a cost of $12 per student annually to a 400-student campus provides the campus with an annual budget of $4,800 for supplies such as paper, laser toner, drum kits, etc. Thus, printers and printing per pupil annually would be $18. This includes all toner and paper for the office including its administrative functions.

Depending on size, each elementary school should have a high-speed copier that can meet the demands of its teachers and other staff. Depending on size, secondary schools will need additional copiers. Most districts maintain contracts with vendors that repair and maintain these machines. Many sign lease agreements and pay for service on a “per click” basis (“per click" meaning printing per page). Whether a machine is bought or leased can play a factor in the final costs. Life cycle of specific machines and the volume of copying required by leasing companies determine whether one or the other method is more cost effective for any particular school or district. When paper, toner, service contracts, leases and other costs are factored in, the average cost per copy approximates $.025 per copy. Assigning an $11 per pupil per year cost for photo copies allows each student 440 copies a year or approximately 50 copies a month (9 month school year). This number may seem high but as staff implements more Response to Intervention (RTI) and tries to differentiate instruction, supplemental materials outside of traditional textbooks must be utilized.

Instructional Software and Hardware

The $52 per pupil figure for this technology category provides $20,800 per year for the 400-pupil school. Funds in this category should be split evenly among components until sufficient hardware has been purchased (hardware $26, software $26), then as hardware needs diminish a larger portion of the funds can be spent on instructional software that can assist in boosting achievement.

These funds are very important to Wyoming educators at the district and school levels because in other states and contexts, most districts and schools run out of funds before they can purchase the instructional tools that work on technology instead of just simply purchasing the technology.

Twenty six ($26) of the $52 may be spent on instructional hardware such as LCD projectors ($500 - $700), smart boards ($3,500 depending on features), document cameras ($300), digital cameras ($200), digital video cameras ($250), etc. This additional hardware allows teachers to bring multimedia resources alive. It also gives students the opportunity to bring their own experience into the classroom through digital pictures and images. However, these funds have been available to Wyoming schools through the Wyoming Funding Model over the last five years so many of the classrooms may have been retrofitted already. Additionally, when Wyoming builds schools, classrooms are now equipped with these items through capital construction monies and there may also be funds to retrofit classrooms using these facility funds, as well as major facilities maintenance funds. If this is the case in particular schools, a large portion of the funds within this category, intended for LCD and smart board installation, can be used to purchase additional instructional software.

When projectors, interactive whiteboards, and document cameras are installed, there will be more opportunity to use multimedia instructional software typified in student courseware and assessment packages. Reading packages such as Accelerated Reader, writing assessments like My Access, mathematics courseware, and multimedia resources such as Discovery.Com, each present digital curricular solutions. Each of these products is based on an annual subscription costing from $5 - $17 per student for each individual package.

Administrative solutions that help administrators analyze test scores include products like Edusoft. Costs of a student administration system might also be considered a part of this component. Costs of these systems vary greatly ($5-$15 annually).

There are also products such as Renaissance Learning and Wireless Generation that assist teachers to formatively assess their students and provide immediate multimedia, instructive content, to help reinforce instructional concepts in which students have shown weakness.

If the costs of all these instructional packages were totaled, the amount would exceed the $26 per student annually assigned to this component, but not every school will use all packages. Schools and districts must analyze their needs and then rank order those packages that target the needs of their population. They must then share their successes with neighboring schools and districts. Additionally, as mentioned above, after all classrooms have been better equipped, funds from the hardware component of this category can be shifted to instructional software component.

Staff

No portion of the $250 per pupil is intended for staff. Staff to help train teachers in use of technology and to do minor computer fixing and software installation appears to be available through other funding in the model. The underutilization of librarian staff as funded through the Model, and the inclusion of computer/network technicians in the spending category for library/media technicians currently funded through the model at rates that are sufficient to employ computer technicians, suggest that most Wyoming districts have been able to use current resources to hire staff to fix and maintain computer technologies. The hiring of substantial numbers of computer/network technicians has been made possible, in part, because nearly all schools and districts do not fully use library staff resources and have hired many computer/network technicians rather than and sometimes in addition to library/media technicians. Library staffing funding amounts to one librarian per prototypical elementary, middle and high school and one library/media technician for each 315 secondary school ADM. Further analysis of the library staffing components of the funding model is needed to determine whether the amounts now included in the formula are sufficient for districts to hire adequate numbers of librarians, library/media technicians as well as computer/network technicians, the latter being the individuals who perform maintenance and fixing of computer technologies. We also note that a technology manager is included in the central staff design. Thus, we do not recommend any additional staffing resources for computer maintenance at this time.

Sources of Additional Funding

There are two federal sources of funding for educational technology that augment the above proposals for state support. The first is Title II D of the No Child Left Behind Act (NCLB), also known as the Enhancing Education Through Technology grant (EETT). These funds are distributed to state departments of education based on a formula which includes the number of disadvantaged students. Though the level of funding for this federal program fluctuates over time, it should be viewed as a strategic additional resource that states can deploy for whatever specific new technology need that might arise.

The second federal support for educational technology is the E-Rate program that helps schools connect to the Internet and build internal networks within their buildings. This program is administered by the Schools and Library Division (SLD) of the Federal Communications Commission (FCC). Districts apply directly to the federal government to participate. The assistance this program provides can be significant to a district. Since funding is substantially based on the percentage of disadvantaged students within a district, this program mainly helps districts with concentrations of students from lower income backgrounds, and offers limited participation to other more economically advantaged districts. Nevertheless, this source of funding should be viewed as a second strategic resource to augment the above core recommendations for funding for computer and related technologies.

Recommendation

We recommend that each school be allocated $250 per pupil to purchase and update computers, servers and software, including security, instructional and management software, to have an overall ratio of one computer to every three students. The $250 level of funding would also allow for the technology needed for schools to access distance learning programs, and for students to access the new and evolving web-based testing and assessment programs. Fortunately, Wyoming has developed a substantial technology infrastructure over the years, so most if not all schools are linked to the Internet and to district offices and/or a state network.

Further, we also would recommend districts either incorporate maintenance costs in lease agreements or, if purchasing the equipment, buy 24-hour maintenance plans. For example, for a very modest amount, one can purchase a maintenance agreement from a number of computer manufacturers that guarantees computer repair on a next business day basis. In terms of educator concerns that it would be difficult for a manufacturer's contractors to serve remote communities, the maintenance agreement makes that the manufacturer's or contractor's problem and not the districts'. Indeed, these private sector companies often take a new computer with them, leave it, and take the broken computer to fix, which often turns out to be more cost effective than to send technicians all around to fix broken computers. We also recommend that further analysis be done of current library staffing resources to determine if in fact they are sufficient for districts to also hire adequate numbers of computer/network technicians for computer maintenance.

INSTRUCTIONAL MATERIALS

The need for current, up-to-date instructional materials is paramount. Newer materials contain more accurate information and incorporate the most contemporary pedagogical approaches. To ensure that materials are current, twenty states have instituted adoption cycles in which they specify or recommend texts that are aligned to state learning standards (Ravitch, 2004). Many states that adopt textbooks encourage districts to purchase recommended texts by requiring that funds specified for instructional materials be used only to purchase approved texts.

Up-to-date instructional materials are expensive, but vital to the learning process. Researchers estimate that up to 90 percent of classroom activities are driven by textbooks and textbook content (Ravitch, 2004). Adoption cycles with state funding attached, force districts to upgrade their texts instead of allowing these expenditures to be postponed indefinitely. Wyoming does not require a state adoption cycle but leaves these decisions to local school districts. This places more responsibility on local districts to assess their own needs but gives them added flexibility to address immediate concerns.

The type and cost of textbooks and other instructional materials differ across elementary, middle school, and high school levels. Textbooks are more complex and thus more expensive at the upper grades and less expensive at the elementary level. Elementary grades, on the other hand, use more workbooks, worksheets and other consumables than the upper grades. Both elementary and upper grades require extensive pedagogical aides such as math manipulatives and science supplies that help teachers to demonstrate or present concepts using different pedagogical approaches. As school budgets for instructional supplies have tightened in the past, consumables and pedagogical aides have typically been the first items to be cut as teachers have been forced to make due or to purchase materials out of their own pockets.

The price of textbooks ranges widely. In reviewing the price of adopted materials from the states of California, Texas, and Florida patterns emerge creating price bands (Figure 2 below). Although there are texts with prices that lie outside of these bands, most publishers seem to keep within or close to these constraints. The top end of the high school price band is notable at $120 per textbook. In the 1990's such prices for textbooks at the high school level were uncommon, but as more students move to take advanced placement courses, districts have been forced to purchase more college-level texts at college-level prices.

Figure 2

Costs of Textbooks and Instructional Supplies (Consumables & Aides) by School Level (in annual dollars per pupil)			
	Elementary	**Middle School**	**High School**
Textbooks	$45 - $70 ($60)	$50 - $80 ($70)	$75 - $120 ($100)
Consumables and Pedagogical Aides	$60	$50	$50
Subtotal Textbooks and Comsumables	$120	$120	$150

The subtotal figure for textbooks and consumables would not need to be adjusted for the size of school or school district because it is assumed that costs for adopted textbooks would be negotiated and verified with other districts buying the same materials. Additionally, the total figure would also provide sufficient funds for adequate instructional materials and texts for most non-severe special education students. Modifications for severe special education cases would need to be funded from Special Education funds.

Adoption Cycle

While Wyoming does not utilize a statewide adoption cycle, it is important that district and school textbook adoption committees pace themselves by spreading adoptions out by subject over a set number of years. We recommend a six year adoption cycle that will account for both secondary and elementary needs. At the secondary level, a six year adoption cycle allows textbooks for all major subject areas to be purchased. At the elementary level, the sixth year provides for a refresh of important more-durable consumables and pedagogical aides.

Secondary Adoption Cycle						
Year	1	2	3	4	5	6
Content Area	Science, Health, P.E.	Social Studies	Foreign Language	Fine Arts	English	Mathematics
Elementary Adoption Cycle						
Year	1	2	3	4	5	6
Content Area	Reading Language	Mathematics	Social Studies	Science	P.E., Visual & Performing Arts	Supplements, Consumables, Manipulatives

Library Funds

The average national per pupil expenditure for library materials in the 1999-2000 school year was $15 (excluding library salaries). Library materials include books, subscriptions, video materials, and CD-ROMs. This average varied by region with the West spending $14 per pupil annually and the Eastern states spending $19. Wyoming, on the other hand spent more than the national average, in fact, $22 per pupil (excluding salaries). Over half ($13) of the $22 that Wyoming schools spent on libraries were used to purchase books and the remainder was spent on other instructional materials such as subscriptions and video materials (Michie & Holton, 2005).

As the world shifts to more digital resources, libraries are purchasing or using electronic databases such as online catalogs, the Internet, reference and bibliography databases, general article and news databases, college and career databases, academic subject databases, and electronic full-text books. In 2002, 25 percent of school libraries across the nation had no subscriptions, 44 percent had 1-3 subscriptions to electronic databases, 14 percent had 4-7 subscriptions, and 17 percent had subscriptions to 7 or more. Usually larger high schools subscribed to the most services (Tenopir, 2003; Scott, 2004).

Electronic database services vary in price and scope and are usually charged to school districts on an annual per pupil basis. Depending on content of these databases, costs can range from $1-5 per database per year per pupil.

Thus, to adequately meet the needs of the school libraries, it is recommended that the funding system provide elementary, middle, and high schools $20, $20, and $25 respectively on a per pupil annual basis for library texts and electronic services. These figures outstrip the national average allowing Wyoming librarians to strengthen collections. As print collections begin to wane in importance, librarians can assess local needs to determine which portion of these funds should go to print collections and which to electronic resources.

Total per Pupil Apportionment for Instructional Materials

Taking the recommended apportionment for "library texts and electronic services" and adding it to the "textbook and consumables" figures, results in the totals listed in Figure 3 below.

Figure 3

Total Annual Costs Per Pupil for Instructional Materials and Library Resources			
	Elementary School	**Middle School**	**High School**
Textbooks & Consumables	$120	$120	$150
Library Texts and Electronic Services	$20	$20	$25
Total Instructional Materials	$140	$140	$175

Professional Development for Adoptions

It should be noted that these cost figures do not include the cost of the professional development necessary for teachers during the adoption process. On a six-year cycle, professional development for teachers at the secondary level only comes once every six years when their particular content area is reviewed. At the elementary level, professional development would be necessary every year since each teacher teaches each subject area. Professional development in an adoption cycle usually requires one day of initial training and then one follow-up day later in the semester after the teachers have familiarized themselves more with the use of the new materials. The professional development resources that are included in the recommended Wyoming Funding Model would be adequate to meet these needs.

Recommendation

We recommend that the Wyoming Funding Model include $140, $140 and $175 per pupil for instructional materials, books, supplies, including library resources, for elementary, middle and high schools, respectively. Currently, the Wyoming Funding Model provides $297, $297, and $364 per pupil for instructional materials, for elementary, middle and high schools, respectively.

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APPENDIX E

MEMO ON STUDENT ACTIVITIES

MEMORANDUM

To: Wyoming Select Committee on School Finance Recalibration

From: Larry Picus and Allan Odden[45]

Subject: Student Activities Technical Issue Brief and Recommendation

Date: October 10, 2010

Prior to the July 21-22, 2010 Select Committee on School Finance Recalibration (the "Select Committee") meeting, a technical issue related to the student activities funding component of the Wyoming Funding Model was identified. The student activities technical issue was not presented to the Select Committee with the other technical issues in July because it was anticipated that student activities would be included on the list of issues requiring further study as part of recalibration. This memorandum provides an option for the Select Committee to consider in determining whether to correct this issue.

Background

During the 2005 recalibration effort, the Select Committee for recalibration initially adopted the consultant recommendation to fund student activities at $250 per ADM. After the Select Committee concluded its work, Campbell #1 proposed an alternative funding method for student activities to the Joint Education Committee (JEC). Campbell #1's proposal was intended to address variations in spending on student activities in middle and high schools based on school size – with the assumption that as school enrollment increased, spending for student activities per student would decline.

Campbell #1's recommendation was that a table of declining amounts per ADM be used to fund student activities for each school. A concern that arose during discussions was

[45] Matthew Willmarth of the LSO also provided substantial data analysis for this memo.

how to treat students in grades traditionally associated with activities at one level, but enrolled (due to district policy) in a different school (e.g. 6th graders in an elementary school or 9th graders in a Jr. High school). The JEC's final recommendation modified Campbell #1's proposal and student activities funding was modified to "grade band" (K-5, 6-8, and 9-12) rather than funding by school enrollment. An unanticipated outcome of this "grade band" approach was that when sixth graders at an elementary school were included as middle school students, they were treated as a separate school to determine activities funding per ADM, thus generating substantially more revenue for the district than they would have generated had they been counted in a middle school along with 7th and 8th graders. The same issue arose with 9th graders enrolled in Jr.High schools. This was the JEC recommendation that was eventually adopted into law.

The model currently funds student activities at the school level by grade band, not by school grade configuration. Specifically, student activities funding is calculated in the following manner:

- Grades K-5 – $24.29 per ADM
- Grades 6-8 – $799.01 for 1 ADM to $206.44 per ADM for 1,260 ADM (a table that funds using a gradually declining scale to determine funding)
- Grades 9-12 – $2,059.69 for 1 ADM to $607.15 per ADM for 1,600 ADM (a table that funds using a gradually declining scale to determine funding)
- Alternative Schools – $291.90 per ADM (this figure is the original proposal of $250 per ADM adjusted by the ECA)

Table 1 compares the consultant's recommendation of $250 per ADM (adjusted to the current $291.29 per ADM by the ECA) to both Campbell #1's original proposal (which was simply a declining per pupil cost based on district size), and the cost used in the model (Campbell #1 revised proposal) for the past four school years.

Table 1 – Comparison of Consultant Recommendation, Campbell #1 Original Proposal and Actual Funding for School Years 2006-07 through 2009-10

School Year	Consultant Recommendation	Campbell #1 Original Proposal	Campbell #1 Revised Proposal (Actual Funding)	Campbell #1 Original/ Revised Difference
2006-07	$ 22,093,617	$ 24,868,955	$ 28,987,467	$ 4,118,512
2007-08	$ 23,027,626	$ 25,744,881	$ 29,890,778	$ 4,145,897
2008-09	$ 24,222,050	$ 26,712,105	$ 30,973,403	$ 4,261,299
2009-10	$ 25,429,038	$ 27,747,410	$ 32,035,068	$ 4,287,658

Source: LSO analysis of WDE Final Statewide Payment Model Data for Fiscal Years 2006-07 through 2009-10.

The large disparity in the Campbell #1 original proposal and the revised Campbell #1 proposal (actual funding) is caused by the change to fund student activities by grade band and not by school grade configuration. This technical issue is described below.

Technical Issue

The technical issue with student activities includes schools that have grade configurations that span across grade bands: elementary schools that serve grade 6 (i.e., schools with grade configurations of K-6, 3-6, 4-6, or 5-6), middle/junior high schools that serve grade 9 (i.e., schools with grade configurations of 6-9 or 7-9), and other schools that cover multiple grade band configurations (i.e., K-9 and, 8-12). By using the grade band approach, grade 6 (in a K-6 elementary school) and grade 9 (in a 6-9 or 7-9 middle/junior high school) are resourced for student activity funds at a much higher level per ADM than the rest of the students in the school because they are essentially treated as being in their own school when the ADM in those grades are matched to the appropriate middle and high school funding tables that are part of the model. *Put another way, the grade 6 ADM (in the elementary school) and grade 9 ADM (in the middle/junior high school) are funded for student activities as if they were very small, independent schools with low ADM rather than based on the total number of students served in that school.*

The funding differences for student activities between similarly sized schools (K-5 versus K-6 elementary schools; grades 6-8 middle schools versus grades 6-9 or 7-9 junior high schools) are problematic.

For example, an elementary school with a grade configuration of K-6 will have the total K-5 ADM funded at a rate of $24.29 per ADM. Grade 6 will be funded through the middle school student activity funding table. The result is significantly more funding per ADM for a K-6 school as compared to a similarly sized K-5 school.

The total student activities funding for K-6 schools in school year 2009-10 was $2,576,369, with 84 percent of the funding generated by 13 percent of the ADM enrolled in grade 6. In school year 2009-10, there were 81 schools from 18 school districts with K-6 grade configurations that received student activity funding using this method. See Table 2 for an illustration.

Table 2 – 2009-10 Student Activities Funding for K-6 Elementary Schools

Grade K-5			Grade 6		
Total ADM	Total Funding	Avg. Per ADM Funding	Total ADM	Total Funding	Avg. Per ADM Funding
17,196.823	$417,643	$24.29	2,537.337	$2,158,725	$850.78

Source: LSO summary of WDE Fiscal Year 2009-10 Final Statewide Payment Model data.

This issue also exists in middle/junior high schools with grade configurations of 6-9 or 7-9. Grades 6-8 are funded using the 6-8 middle school funding table and grade 9 is funded using the high school funding table. The total student activities funding for 6-9 and 7-9 middle/junior high schools in school year 2009-10 was $4,120,105, with 64 percent of the funding being generated by 29 percent of the ADM in grade 9. In school year 2009-10, there were ten schools with 6-9 or 7-9 grade configurations that received student activity funding using this method. See Table 3 for an illustration.

Table 3 – 2009-10 Student Activities Funding for 6-9 and 7-9 Middle/Junior High Schools

Grades 6-8			Grade 9		
Total ADM	**Total Funding**	**Avg. Per ADM Funding**	**Total ADM**	**Total Funding**	**Avg. Per ADM Funding**
5,364.290	$1,484,458	$276.73	2,234.511	$2,635,647	$1,179.52

Source: LSO summary of WDE Fiscal Year 2009-10 Final Statewide Payment Model data.

This middle/junior high school issue is further magnified when comparing the funding model's current allocation to these ten schools, with the initial funding proposal submitted to the Legislature by Campbell #1 in December 2005. Table 4 compares the *proposed* middle school activity funding per ADM computed in the Campbell #1 original proposal, adjusted by the ECA, to the *actual* funding model student activity funding per ADM for the ten middle/junior high schools with grade configurations of 6-9 or 7-9.

Table 4 – Comparison of *Actual* (2009-10) and ECA Adjusted *Proposed* Middle School Activity Funding

District	School	Grades	2008-09 ADM	*Proposed* Per ADM (Campbell #1)	*Actual* Per ADM	Difference
Natrona #1	Casper Classical Academy	6-9	143.000	$485	$741	$256
Natrona #1	C Y Junior High School	6-9	399.330	$294	$624	$330
Natrona #1	Dean Morgan Junior High School	6-9	700.177	$260	$493	$232
Natrona #1	Centennial Junior High School	6-9	603.417	$270	$486	$216
Albany #1	Laramie Junior High School	7-9	473.341	$285	$594	$309
Campbell #1	Twin Spruce Junior High School	7-9	517.799	$280	$572	$292
Campbell #1	Sage Valley Junior High School	7-9	547.526	$277	$560	$284
Laramie #1	Carey Junior High School	7-9	742.824	$256	$490	$234
Laramie #1	Johnson Junior High School	7-9	531.284	$279	$567	$289
Laramie #1	McCormick Junior High School	7-9	705.592	$260	$507	$247

Source: LSO analysis of Campbell #1 December 2005 proposal and WDE Fiscal Year 2009-10 Final Statewide Payment Model Data.

Under this computation, two schools with the same enrollment could receive very different student activity funding per ADM depending on the existence of 6th and/or 9th graders at the school.

Recommendation

The recommendation to address this technical issue is to fund student activities as recommended in the original Campbell #1 proposal.

In a K-6 elementary school, all ADM would be funded as elementary school students for student activity purposes. Similarly at the middle/junior high level, all ADM in a 6-9 or 7-9 school would be funded as middle/junior high students for student activity purposes. This recommendation aligns funding to the methodology used to create the middle and high school funding tables by Campbell #1. This would not require any modification to the current formulas in the Wyoming Funding Model other than to direct the model to fund student activities based upon configuration.

Please see Attachment A to see a district-by-district impact, had this been in effect for school year 2009-10.

APPENDIX F

MEMO ON GIFTED AND TALENTED

To: Wyoming Select Committee on Recalibration

From: Larry Picus and Allan Odden

Re: Gifted and Talented Education

Date: October 6, 2010

In our Desk Audit prepared for the Select Committee on Recalibration, we concluded that the current approach to funding Gifted and Talented (GT) education programs was adequate and further recalibration analysis was not needed. However, at its July meeting, the Select Committee voted to ask us to review the funding for GT education. At the recommendation of the WDE and the LSO, we employed Ruth Sommers to conduct an analysis of GT programs in Wyoming and to review current research on the provision of education services to GT students. Based on Sommers' analysis of GT programs, we continue to conclude that the current funding of $29.19 provides adequate funding for GT programs in Wyoming. Sommers' report is included as an appendix to this memo.

BACKGROUND

The Wyoming Funding Model currently provides funding of $25 per ADM adjusted through the external cost adjustment to $29.19 per ADM to provide extra resources for gifted and talented students.

Research shows that developing the potential of gifted and talented students requires:

- Effort to discover the hidden talent of all children, with particular attention given to low income and/or culturally diverse students;
- Curriculum materials designed specifically to meet the needs of talented learners;
- Acceleration of the curriculum; and
- Special training in how teachers can work effectively with talented learners.

Our review of the research on best practices in serving gifted and talented students is, at the elementary and middle school level, to place gifted students in special classes comprised of all gifted students and accelerate their instruction because such students can learn much more in a given time period than other students. When the self-contained classroom approach is not possible, an alternative is to have these students placed in higher-grade level classes (dependent on student ability), or to skip whole grades in order to be exposed to accelerated instruction.

Research shows that neither of these practices produces social adjustment problems; indeed, many gifted students get bored and sometimes restless in classrooms that do not have accelerated instruction. Both of these strategies have little or no cost, except for scheduling and training of teachers. There are other examples of low-cost GT models contained in Sommers' report.

The primary approach to serve gifted students in high schools is to enroll them in advanced courses – e.g., advanced placement (AP), International Baccalaureate (IB) – and to have them participate in dual enrollment in postsecondary institutions, or to have them take courses through distance learning mechanisms.

The University of Connecticut developed a very powerful Internet-based platform, Renzulli Learning, that provides a wide range of programs and services for gifted and talented students. This system takes students through about a 25-30 minute detailed assessment of their interests and abilities, which produces an individual profile for the student. The student is then directed, via a search engine, to 14 different Internet data systems, including interactive web-sites and simulations that provide a wide range of opportunities to engage the student's interests. Renzulli stated that such an approach was undoubtedly the future for the very bright student.

The initial cost estimates for the Wyoming model were based on the Renzulli estimated cost of $25 per student when the last recalibration was completed.

SOMMERS' FINDINGS

Ruth Sommers conducted a two part analysis of GT programs in Wyoming. The first focused on current research for providing GT services, while the second part was a survey of GT programs in Wyoming school districts. Her report is attached to this memo, and the major findings are summarized here. It is important to note that only 21 of the state's 48 districts reported providing GT programs to their students. One of the other districts reports a GT program that serves 100% of the students, but assigns no expenses to a specific GT program. While other districts may also have programs for GT students, they are not reported on official WDE forms, nor were they discussed as part of the survey.

Current Wyoming Support for GT Programs[46]

Sommers identified a number of national surveys of state GT programs, conducted by the Council of State Directors of Programs for the Gifted (CSDPG) and the National Association for Gifted Children (NAGC), the most recent of which was conducted for 2008-09. Table 1 of the

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[46] In addition to the GT programs described in this section, Wyoming has also supported the Student Enrichment Program (SEP) for the past three years. Funded by the Legislature at the level of $450,000 per year for 2008-09, 2009-10 and 2010-11, SEP is a supplemental program which expands student exposure to enriched learning opportunities. It does not appear to be a true GT program as the target audiences differ (all students versus a narrowly-identified GT population), the rigor of the programs supported differs from that of the expectations for GT programs, and SEP grants are generally supplemental to the school year/day. Further, it is our understanding that to date, no district has applied for a SEP grant to do a true GT program during the school year or day. It is not included in our analysis or recommendations as it is not specifically a GT program.

appendix summarizes the findings of the most recent national survey of GT programs and shows the wide variation in both state policy and level of expenditure for GT students.

The NAGC and CSDPG found that 45 states have a standing state advisory committee to help develop policy and direct gifted and talented education services. Alaska, Delaware, Nevada, North Dakota, and Wyoming are the only states that do not have such an advisory committee. The survey further found that while eight states have a stand-alone office of gifted and talented education, most state education agencies combine the function within other administrative areas such as curriculum and instruction, and special or general education. Twenty-three states reported having at least one full-time person working in GT education at the state office, and four have more than one full-time person. Part-time staff allocation is most common, reported in eighteen states. Only two states reported having no personnel at the state level. The most common area managed by state agencies is the administration of Advanced Placement (AP) or International Baccalaureate (IB) courses/exams. State agency personnel generally provide technical assistance to local education agencies, coordinate professional development, respond to parental requests, and monitor program compliance and quality.

Sommers points out that there is currently no appropriation specific to the operation of a state office or staff to coordinate delivery of services or supports to students identified as gifted and talented within the State of Wyoming. Neither does the state have a standing committee to direct policy and provide guidance concerning GT education. Within the Wyoming Department of Education (Department), a part-time position has been dedicated to providing support for GT education funded through the Department's general administration budget. Time devoted to GT education occupies about five percent of a full-time position; that person usually spends the majority of time responding to parent questions, followed by involvement in professional development activities and technical assistance to districts. Moreover, despite a requirement that the WDE provide an annual report on the status of GT education, such a report has not been produced since 2006.

Wyoming has developed a set of GT guidelines that are available to districts. The guidelines primarily provide a comprehensive description of the process of student identification (Wyoming Department of Education, 2005). However, the Department is not sure how widely distributed these guidelines are, or to what degree they are used by districts to help direct their programs or their identification of students. Data on GT programs are collected through the WDE613, the WDE684 and the WDE601forms.

Overall, Sommers reached the following conclusions about GT education in Wyoming (p. 13-14):

- There exists a statewide definition of gifted and talented students. There are statutory mandates to both identify and serve these students;

- There is inconsistent adherence across school districts to the mandates of identifying and serving gifted and talented students, particularly in elementary and middle school/junior high grades;

- A number of districts have thoroughly researched, planned, and implemented robust programs for identified gifted and talented students;

- Though most districts use multiple processes to identify students for GT programs, there is considerable variance in how districts apply eligibility criteria;

- Nearly all gifted and talented education programs within the state focus on academics. There is little identification of students considered talented, creative, or excelling in leadership;

- There are few state-level resources dedicated to administering gifted and talented programs and no state-level advisory body;

- There is no formal review or monitoring of GT programs in place to assure program accountability or quality;

- Professional development is a key component to GT program success. Some districts have done outstanding jobs in making GT professional development available to teachers and others have had none. There is no statewide coordination of GT professional development;

- There is underutilization in high school of distance learning opportunities in which credits can be earned;

- Use of computer-based learning opportunities in elementary and middle/junior high grades is limited;

- All districts within the state make available some level of advanced instructional opportunities to high school students. These opportunities vary considerably from district to district;

- Lack of clear statutory direction concerning district and college reimbursement and restrictive district and community college policies regarding concurrent and dual enrollment can result in lack of opportunity for students;

- Despite inconsistency among district and college policies, there is widespread use of concurrent and dual enrollment, particularly with Wyoming community colleges. There is a process currently underway to identify and seek resolution of policy inconsistency.

In terms of program funding, Sommers concluded (p. 19):

- The resources contained within the cost-based funding model, plus the adjustment made for gifted and talented education programs, are generally adequate to fund *most delivery models* of gifted and talented education;

- At this point in time, pull-out, enrichment programs are the most common delivery method used by districts to provide gifted and talented educational supports for students in elementary and middle grades;

- Model resources including the GT adjustment will generally not fund pull-out programs for gifted and talented education when those programs require additional personnel resources.

Table 6 of Sommers' report shows that across the state, districts reported spending $822,942 more on GT programs than they received through the Funding Model. This figure requires more explanation however as many of the districts report no spending at all on GT programs. The table shows that total model resources for GT programs amount to $2,542,904 and districts spend a total of $3,365,846 (which includes $75,701 in grants and federal funds focused on GT programs) for an overall deficit of $822,942. However, the 22 districts reporting no GT expenditures received $632,404 in GT funding, and the 26 districts reporting GT expenditures thus spend $1,455,347 more than they receive in GT funding. The deficits across the districts range from as little as $10,000 in Laramie #1 to over three quarters of a million dollars in Campbell County #1.

Unfortunately, it is hard to assess whether the spending variation compared to revenue across the districts is the result of inadequate funding, or a function of district choices. Laramie #1 for example is one of three districts that has a self-contained GT program, but does not include the spending for those programs in its GT program report as they have found that funding for core programs and teachers is the appropriate way to account for these self-contained classes. Campbell County on the other hand, has an expensive program because there is a GT coordinator in almost every school, a resource allocation strategy that we did not identify as being essential to adequate funding for GT programs.

RECOMMENDATION

As indicated above, based on Ruth Sommers' analysis of GT programs in Wyoming, we remain confident that the current approach and level of funding for GT programs in the Funding Model is adequate to provide services to GT children under the Wyoming Educational Basket of Goods and Services.

The current model funds districts through a block grant which allows each district to determine how best to offer GT funding. The variation in approaches identified in Sommers' report suggests districts have taken advantage of this block grant approach to meet the needs of their individual student characteristics, and no need for changing the funding formula is warranted.

Most GT programs, such as accelerated learning and when districts are large enough, self-contained classes, do not require additional funding given the high levels of resources available through the Funding Model generally. The $29.19 per ADM in a school/district allows districts to identify gifted children and offer them a range of specialized services that should meet their needs as well as offers districts sufficient resources to manage AP courses and exams and International Baccalaureate programs as they choose.

That said, there are several districts that spend substantially more than the model funds. While we view this as a local decision, if the Committee is concerned that additional funding is needed, rather than increase funding for all districts, we would recommend a state grant program that would enable districts to develop and initiate GT programs that have been identified as successful elsewhere. But before establishing such a program, the state needs to create a GT advisory committee that could develop a statewide GT education strategy, provide enough resources to WDE to support a grant program and provide other technical assistance to districts as needed.

Appendix

Ruth Sommers Gifted and Talented Report

History of Gifted Education

Within the United States, attention to educating students considered gifted and/or talented (GT) has waxed and waned over time, dependent on budget constraints, contemporary research, or in response to global competition. In recent history, the first major attempt to create a national education policy came in 1958, in response to the Soviet Union's launch of Sputnik in 1957. The National Defense Education Act appropriated $1 billion to identify academically gifted students and provide them with accelerated and focused learning in math, science, and foreign language. Title V of the act specifically authorized and provided financial assistance to states to establish testing programs to identify students with outstanding aptitude and abilities (Fleming, 1960). This was generally accomplished through the use of standard measures of a student's intelligence quotient (IQ).

The first national report targeted specifically on gifted education was presented to Congress in 1972 by the Secretary of Education, Sidney Marland. The Marland Report proposed a definition of giftedness that went beyond standard IQ, which included creativity, leadership, visual and performing arts, and specific academic ability (versus general). Marland estimated that use of this broader definition would identify three to five percent of the student population as gifted or talented (Marland, 1972).

In 1974, the Special Projects Act created a federal Office of Gifted and Talented within the U. S. Department of Education and offered grants to state and local education authorities to provide training, research, and to establish model GT programs. This office was later eliminated by President Ronald Reagan in 1981 largely due to budget constraints (Dobron, 2010).

The publication in 1983 of *A Nation at Risk* (National Commission on Excellence in Education, 1983) sounded a loud alarm that the United States' secondary students were not competing well with secondary students in other developed countries and warned the nation's education system was "being eroded by a rising tide of mediocrity." The report brought a rather abrupt end to further cuts in education spending, and is widely regarded as being a major impetus, two decades later, behind the passage of No Child Left Behind legislation in 2002.

In response to findings published in *A Nation at Risk*, the Office of Gifted and Talented was again opened in 1988 via the Jacob K. Javits Gifted and Talented Students Education Act. The act made available grants to local education agencies to serve gifted and talented students who are economically disadvantaged, have disabilities, or speak limited English. The act additionally established national research centers at four separate universities. Today the National Research Center on the Gifted and Talented still has four participating universities – Yale University and the Universities of Connecticut, Georgia, and Virginia. The Directorate is the administrative unit, and is housed at the University of Connecticut and headed by Joseph S. Renzulli, Ph. D. The research center's broader consortium includes 360 school districts, 20 senior scholars at collaborating universities, and 52 state and territorial Departments of Education. Their purpose is to "conduct research on the methods and techniques for identifying and teaching gifted and talented students and for using gifted and talented programs and methods to serve all students" (Curry School of Education, University of Virginia).

To date, the last piece of major legislation directing national education policy has been the No Child Left Behind Act (NCLB), passed in 2002. The goal of NCLB is to ensure all students are able to demonstrate proficiency in their grade level in (particularly) math and language arts by 2014. It does not address standards for high functioning students but instead places emphasis on bringing low-performing students to established levels of proficiency. According to the latest survey of states completed by the National Association of Gifted Children, the vast majority of respondents expressed frustration that NCLB's focus on low-performing students has negatively influenced gifted education, as resources are shifted to this purpose.

Gifted Education Today – A National Perspective

A cohesive federal policy to educate gifted and talented learners does not exist. Other than Javits grants to local education agencies and support for the national research centers, there is no federal funding for programs. Gifted and talented children are not a protected class, as are some students under laws such as the Individuals with Disabilities Education Act (IDEA).

According to Passow and Rudnitski (1993), the challenge of consistent treatment of gifted and talented students across the nation is further fractured by states via a delivery system which delegates the task of implementing GT policies to local education agencies. The piecemeal delivery system in place across the nation today lacks cohesiveness, is unevenly funded, and inequitable. At the same time, all states have recognized, at least to some degree, the importance of providing gifted and talented education to high-ability learners. In the 1970s, few programs existed for gifted and talented students; by 1990, 2 million children across 38 states were receiving services. By 2006, 3.2 million students were recipients of some level of gifted and talented educational supports in every state (U.S Department of Education, 2008). As Passow and Rudnitski (1993) observe in their analysis of state policies regarding education of the gifted and talented, "The fact that all fifty states have formulated policies in the form of legislation, regulations, rules, or guidelines that support education of the gifted and talented represents a very significant achievement, a consequence of vigorous and persistent efforts on the part of many advocates" (p. vii).

Every two years, the Council of State Directors of Programs for the Gifted (CSDPG) and the National Association for Gifted Children (NAGC) collaborate to collect and publish information and data on the policies, practices, and degree of support for gifted and talented students across the nation. The statistics and details presented in this section of this report are gathered almost exclusively from the *2008-09 State of the States in Gifted Education,* and are reiterated to give the reader a broader, national perspective of how gifted and talented programs are operated throughout the states. See Table 1, an attachment to this report, for a state-by-state response to some of the common data elements collected in the *2008-09 State of the States in Gifted Education*.

State-level Commitment: On page 4 of *2008-09 State of the States in Gifted Education,* the NAGC and CSDPG make the statement that, "the allocation of funding and personnel is a major indicator of state-level commitment to gifted and talented education." This includes not only funding for direct services to students, but also funding at the state level to help coordinate and oversee statewide delivery of services. The existence of a standing state advisory committee for GT education is also considered evidence of a state's commitment to this effort. Only five states do not have a standing state advisory committee to help develop policy and direct gifted and talented education services – Alaska, Delaware, Nevada, North Dakota, and Wyoming.

Eight states have a stand-alone office of gifted and talented education; most state education agencies combine the function within other administrative areas such as curriculum and instruction, and special or general education. Twenty-three states reported having at least one full-time person working in GT education at the state office, and four have more than one full-time person. Part-time staff allocation is most common, reported in eighteen states. Only two states reported having no personnel at the state level. The most common area managed by state agencies is the administration of Advanced Placement (AP) or International Baccalaureate (IB) courses/exams. State agency personnel generally provide technical assistance to local education agencies, coordinate professional development, respond to parental requests, and monitor program compliance and quality.

Definition: While the No Child Left Behind Act does not direct services to or establish educational goals for gifted and talented students, it does include a definition of this population (No Child Left Behind, 2004). These students are those

> "…who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities."

As of school year 2008-09, the majority of states have developed statewide definitions of gifted and talented students in order to identify them for supports. Many of those definitions do not necessarily mirror the one provided in NCLB, which is based on the broader Marland definition, described above. *2008-09 State of the States in Gifted Education* reports that virtually all states include in their definition some form of intellectual or academic giftedness, while only 26 states include creativity, 25 mention performing or visual arts, and seventeen cite leadership as qualities included in their definition of a gifted or talented student.

Of the 41 states which indicated the existence of a statewide definition of gifted and talented students, only 31 require local districts to adopt the same definition.

Identification Mandate/Service Mandate: Most states do mandate identification of gifted and talented students, and most with mandates also require the provision of services to those students. However, most states only partially fund this mandate. Six reported fully funding GT services to students (Arizona, Georgia, Iowa, New Mexico, North Carolina and Oklahoma); three of these six states include GT services as part of their special education program. And while five reported no official funding for the provision of GT services, sixteen states indicated zero state funds were allocated for these services when queried about per student expenditures.

Student Identification: Most local schools and districts continue to identify gifted students largely based on exceptional intellectual ability as measured through IQ tests, or other achievement data indicated by some kind of assessment; test scores are concrete, easier to determine, and less subjective (U.S. Department of Education, 1993). And, even though some sort of assessments may be used as a final determinant in the identification of a student as gifted or talented, it is nearly always the culminating event of a multi-criteria process that can include teacher or parent referral, review of student work, classroom observation, and perhaps interviews with school counselors. It is now generally accepted that no single measure should be used to identify gifted students. Twenty-eight states require districts to use specific criteria and methods to identify gifted and talented students.

Levels of Identification: As with many issues surrounding education for gifted and talented students, the number and percent of students identified for services varies from state to state. Only 21 states responded to the *2008-09 State of the States in Gifted Education* inquiry about their total number of identified students. In those that responded, the percent of identified students ranged from less than two percent in Utah and West Virginia to over 25 percent in Kentucky. Data collected by the National Center for Education Statistics (NCES) on the number and percent of students identified by states as gifted and talented for 2006 show a national average of 6.7 percent, with ranges from 0.7 percent in Massachusetts to 16.1 percent in Maryland (U.S. Department of Education, 2008). See Table 2 at the end of this report for NCES summary identification data on all states for both 2004 and 2006.

Accountability: State officials cannot make well-informed decisions on gifted and talented education policy, practice, or funding without accurate data on students served and the quality of services provided. Yet, only about half of the states encourage accountability through the audit or monitoring of local GT programs to ensure compliance, and eighteen states collect little if any information about students identified as gifted or talented.

In about half of the states, local education agencies are required to submit plans of delivery of GT services to the state for approval or review. Components required to be included in the plans most commonly include defining how the local agency will identify students, a description of what services will be made available to students, how they will provide professional development of staff, and how they will evaluate student progress, as well as overall program quality and success.

Professional Development: Thirty-six states do not require general education teachers to have any kind of specialized professional development on how to effectively deal with gifted or talented students, even though gifted and/or talented students spend the majority of their time in general education classrooms. Only five states require teachers in specialized GT programs to have annual training, and only five incorporate pre-service training in GT education.

Gifted and Talented Education Programming: Services and supports for gifted and talented students can be delivered through a wide variety of environments, from different grouping configurations such as self-contained classrooms or pull-out programs, to grade or subject acceleration and compacted or differentiated curriculum. The *2008-09 State of the States in Gifted Education* reports the most common method of delivering gifted services to students to upper elementary students is to provide services in pull-out groups. In both early elementary and middle school grades, the most common setting still remains the regular classroom, lending support to the need for teacher training in gifted and talented education pedagogy.

In high school, the focus of delivery methodology changes and moves away from the regular classroom to Advanced Placement classes (most common) followed by dual or concurrent enrollment in college or other virtual learning opportunities.

Funding: Other than making available very limited funding through Javits grants for underserved populations and aiding research, the federal government does not support gifted and talented education in the states. The allocation of resources from state or local entities is quite uneven. Half of the states dedicate state funds specifically for GT services, and most of those do so through some sort of formula. Ten states use weighting formulas based on number of enrolled or identified students; four use a flat grant formula, and another four require districts to apply for state funds. Nationally, gifted and talented program funding is frequently supplemented with local district funds.

Levels of funding for gifted and talented education across the nation range from zero (sixteen states) to $91 million in Texas; five states reported spending less than $1 million; eleven states spend more than $10 million in state funds. In 2008-09, funding per pupil (not per identified student) varied from $0 in sixteen states to $87 in Oklahoma (Table 1). In order of frequency, specific programs most often funded with state dollars were reported to be summer governor's schools (seventeen), AP or IB testing (seventeen), virtual high schools (sixteen), then special schools for math and science (fourteen). Eight states reported funding the cost of ACT/SAT or Discover/Explore tests.

Gifted Education in Wyoming

State-Level Commitment: There is currently no appropriation specific to the operation of a state office or staff to coordinate delivery of services or supports to students identified as gifted and talented within the State of Wyoming. Neither does the state have a standing committee to direct policy and provide guidance concerning GT education. Within the Wyoming Department of Education (Department), a part-time position has been dedicated to providing support for GT education funded through the Department's general administration budget. Time devoted to GT education occupies about five percent of a full-time position; that person usually spends the majority of time responding to parent questions, followed by involvement in professional development activities and technical assistance to districts.

Definition/Identification Mandate/Service Mandate: Wyoming statutes do provide a definition of gifted and talented students, and the law additionally mandates identification and provision of services to identified students. The statute does not direct districts to adopt the statewide definition, but does imply that rules and regulations should help direct both identification and provision of programs. W. S. § 21-9-101(c) states:

> "In addition to subsection (b) of this section, each school district within this state shall provide programs designed for the specific needs of those student populations specified within this subsection. Programs under this subsection shall be provided and shall identify special student populations in accordance with rules and regulations of the state board of education. The state board shall monitor the proportion of students in each special needs category, compared to available regional averages. Special needs student populations include:
>
> > (ii) Gifted and talented students identified by professionals and other qualified individuals as having outstanding abilities, who are capable of high performance and whose abilities, talents and potential require qualitatively differentiated educational programs and services beyond those normally provided by the regular school program in order to realize their contribution to self and society."

Further statutory direction was given to the Department and the Joint Education Interim Committee (JEIC) under 1997 Wyoming Special Session Laws, Chapter 3, Part II. B. Section 202(d):

> "The state superintendent shall develop recommendations for procedures under which districts shall submit annually, not later than October 15, a summary regarding the district's programs for gifted and talented students during the preceding school year and changes that will be implemented during the current school year. The procedures shall specify that the summaries shall include, at a minimum, a description of the procedures under which the district identifies gifted and talented students, the number of students so identified at each grade level,

> and a description of the contents of the programs the district provides to these students. The procedures shall specify that the state superintendent shall compile these summaries and submit them to the joint education interim committee of the legislature not later than December 1 of each year. The committee shall review the summaries and may make recommendations to the legislature for modifications to applicable law, including sponsoring legislation."

The Department still adheres to this mandate of collecting information on district programs for the gifted and talented through the information gathered via the WDE613, the WDE684 and the WDE601. And, until 2006, the Department prepared annual reports for the Joint Education Interim Committee.

And although rules and regulations have not been promulgated, the Department, in a broad-based effort in 2005 which included multiple district representatives and GT education specialists, did indeed develop guidelines that are available to districts. The guidelines primarily provide a comprehensive description of the process of student identification (Wyoming Department of Education, 2005). However, it is not sure how widely distributed these guidelines are, or to what degree they are used by districts to help direct their programs or their identification of students.

When discussing gifted and talented education services with educators throughout the state, there were sometimes unclear expectations of which services should be made available to students specifically identified as gifted, and services provided to all interested students which could be considered enrichment. A few districts have adopted a philosophy that all their students are potentially gifted, and try to ensure GT opportunities are made available and differentiated instruction in place that spans a broad range of needed interventions, from remediation, through intervention, to the specific intellectual challenges needed by GT students. This philosophy should not necessarily be taken lightly, because if implemented assiduously, it could approach the school-wide enrichment model (SEM) proposed by Renzulli and Reis, (1985, 1997). It is not known how effectively this approach is being implemented locally within the state.

Wyoming Gifted Education in Elementary and Junior High/Middle Schools

Data collected for this report was gathered from multiple sources. Districts report statistics and program information on their gifted and talented offerings through three different data collections submitted to the Department: GT expenditure data is reported through the WDE601; the WDE684 collects counts of students in gifted and talented programs within districts; and in the WDE613, districts describe an overview of their GT program offerings. In addition to these, a survey specific to information needed for this report was distributed to districts for completion. Telephone interviews were conducted with personnel in eleven school districts as well as legislators, program administrators, national organizations, and researchers in the field of gifted and talented education.

Tables 3 and 4 focus on gifted and talented education data for elementary and junior high/middle school schools. (Tables can be found at the end of this report.) Districts included in Table 3 are *only* the 21 districts which make available gifted and talented supports *during the school day* to students in elementary and middle grades. Table 4 provides a broader overview of K-8 offerings made by *all* districts across the state and show specific type of GT programming districts make available to students. In this table, it can be seen that 21 districts offer school-day supports for GT education in elementary and middle grades, six utilize only after-school opportunities, and the remaining 21 districts neither identify nor deliver specific services for gifted and talented students.

<u>Student Identification (Table 3):</u> It appears from the information provided by districts that the majority does not publish a formal written definition of gifted and talented students, but twenty described a structured student identification process which involved some level of student assessment. Nearly all districts included in this table reported that the initial student screening process begins with a teacher or principal referral as a result of one or multiple local assessments or classroom observations, and most considered parent referrals as well. Fourteen of the 21 districts utilize some recognized formal cognitive or aptitude assessment as part of their screening process. The majority of the districts which do not use a cognitive abilities test rely on other student performance indicators using local or state assessments such as MAP, PAWS, STAR Math or STAR Reading, etc. Only two or three districts reported placing students in GT programs informally as a result of parent or teacher referral/collaboration without further screening or other indicators.

Not surprisingly, districts vary considerably in how they define at what point in a continuum a student will be identified for GT program eligibility. Some districts establish cognitive eligibility to be an IQ score of 100, while others set the cut-off at IQ130. Some districts reported using 95 percent or higher (of a student's grade level) on the Measurement of Academic Progress (MAP), while others use 70 percent or higher. Some recognize advanced scores in all three testing areas on PAWS. Others require students to place academically two years ahead of their age-grade. Guidelines developed by the Department do not suggest specific cut-off scores or other concrete determinants for GT eligibility.

It does appear districts largely identify only students who could be considered academically gifted or talented. Two districts specifically mentioned providing music opportunities for talented students, but generally, there are very few programs in the state for students who could be identified as especially talented, creative, or having strong leadership potential.

<u>Levels of Identification (Table 4):</u> Excluding districts that identify all students as gifted or talented, percentage of student identification ranges from 2.09 percent in Natrona to 17.63 percent in Sheridan #1; seven identify more than 10 percent of their student population while seven identify fewer than 5 percent. Six districts make available only after-school programs; others use after-school time to pursue advanced project work, facilitate mentoring, etc. After-school programs frequently provide students with the opportunity to participate in national academic challenges recognized to promote and reward critical thinking and problem-solving such as Destination Imagination, Future

Problem Solving, Science Olympiad, History Day, etc., (U.S. Department of Education, 1993).

Accountability/Program Evaluation (Table 3): When districts were asked how they evaluate their programs, most responded that they track the progress of their identified students; only one or two specifically addressed segregating performance of the GT populations from the general student body. One district did discuss the difficulty of assessing the effectiveness of specific interventions since the population of GT students was so small. A few districts evaluated their program only through the use of surveys or interviews. One district described a rigorous evaluation not only of student outcomes but also of the workings of the program as a whole, which used standards of program excellence developed by the National Association of Gifted Children as the basis to evaluate their progress (Park #6).

Research Base (Table 3): Although there were some districts that did not provide or provided little information on the research base they used to help design their current or hoped-for future programs, the majority providing information cited well-known experts in the field. Unfortunately, there were some that cited methodologies only for differentiating curriculum as their research base rather than recognized sources that can help build dynamic and vigorous GT programs.

Professional Development (Table 3): The Professional Teaching Standards Board of Wyoming requires teachers obtain a certificate endorsement to deliver gifted and talented education when their primary job is to provide GT instruction. Some districts reimburse teachers the expense of taking required university courses needed to add the endorsement to their teaching certificate. These courses must all be obtained from universities out of state; there is currently no program available in state. Other districts reported sending teachers to conferences specifically targeted to GT education. In some districts, their GT specialists provide instruction and mentoring to classroom teachers. More than half of the districts surveyed either provided no specific GT professsional development for their teachers or reported as their GT training exposure to methodologies primarily used for differentiating curriculum and increasing student engagement.

Miscellaneous Survey Responses: Most districts completing the GT survey expressed the opinion that existing model **funds were not adequate** to support the programs they either had or wished to develop. Two districts which operate only after-school opportunities thought funds were sufficient, and another expressed the advantage of having a block funding model, which enabled districts to set their own funding priorities, thus allowing them to develop GT programs as desired locally. Most who commented on funding inadequacy either had or wanted to develop pull-out programs for gifted and talented students.

When asked what approaches or **support districts need** to help them develop quality gifted and talented education programs, many expressed the need for more profess-sional development opportunities targeted to GT pedagogy. Creation of local opportuniies through the University of Wyoming or online for teachers to receive the instruction needed for a GT endorsement was seen as highly desirable. When asked how they would like to **grow programs**, some mentioned wanting to include talent and leadership in their student identification, to make available more after-school academic offerings, and to add personnel which would be responsible for GT education. At the middle and high school levels, districts would like to have more technology equipment available, to add AP and pre-AP classes, and to broaden opportunities for distance education, internships, and project-based enrichment.

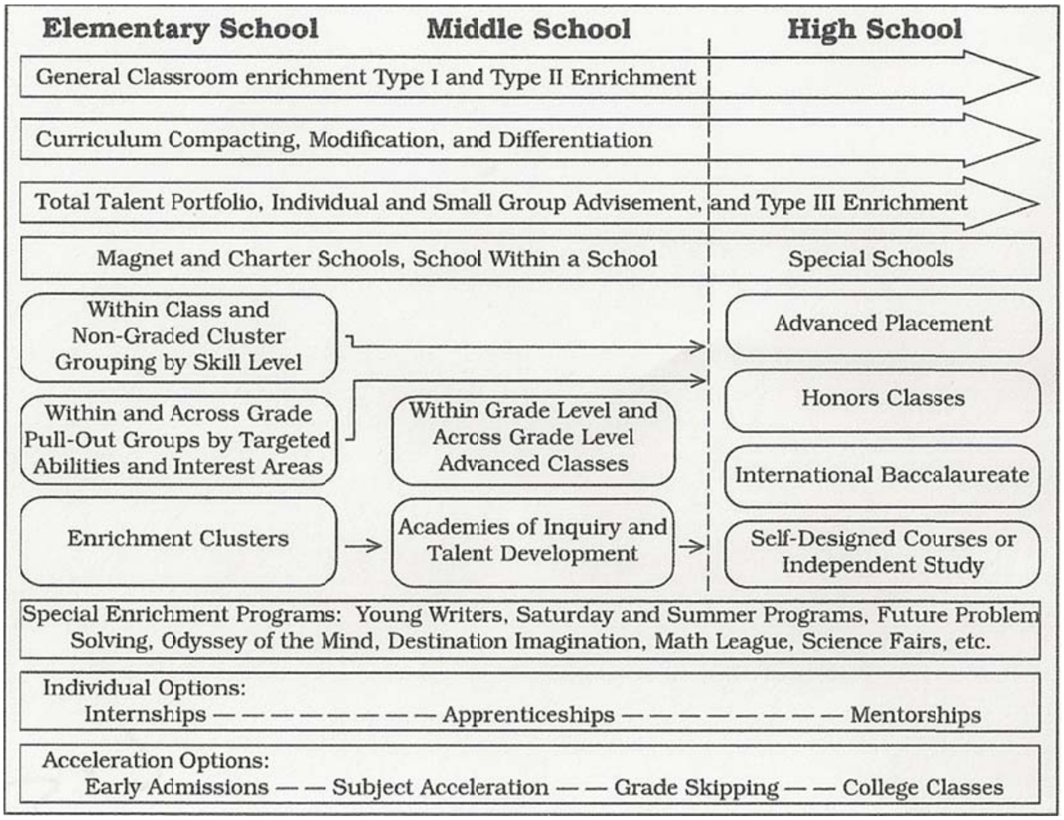
When asked about how they utilize on-line resources, districts mentioned use of distance education opportunities for college course enrollment. Other **computer-based resources** mentioned were OdysseyWare, Apex, Rosetta Stone, Accelerated Reader, Accelerated Math, Cognitive Tutor, and resources such as museums, Ask the Expert, Future Problem-Solving, Wiki sites, etc.

When asked to provide additional comments concerning gifted and talented education, the two most common **comments**, in order of frequency, included needing additional resources, and being able to receive more technical assistance from the state. A number of districts proposed moving GT programs and funding to special (education) services. A couple of districts expressed the desire to move away from the current focus on minimum competencies, and another pointed out that there was currently no incentive to accelerate students or graduate them early because of the negative effect on ADM and funding.

<u>Gifted and Talented Education Programming (Table 4):</u> Appropriately, most districts which provide GT services during the school day to K-8 students approach delivery of gifted and talented education with multiple strategies, not limiting their support to only one delivery schema. Self-contained classrooms for gifted and talented students are located in three districts – Albany #1, Natrona #1 and Laramie #1. Nine districts indicated they utilize grade or subject acceleration as part of their program; ten utilize cluster grouping; and five specifically identified modifying or compacting curriculum for the gifted learner. The most common strategy used by districts within the state to provide gifted and talented educational supports is a pull-out session, where identified students are removed from their regular classrooms generally for two to four hours per week to receive specific gifted and talented education. This is also the most costly way to deliver GT education.   Description and discussion of the effectiveness of different programmatic strategies and models that can be used to deliver GT education will be discussed further in this report.

Gifted Education in Wyoming High Schools

Frequently districts do not report to the Department numbers of identified gifted and talented students in high school because there is sometimes confusion on what gifted education in the upper grades is or should be. Some argue that options generally available to high school students such as earning college credit, Advanced Placement (AP) classes, or International Baccalaureate (IB) programs should not be classified as gifted options since these options are open to all interested students. Nevertheless, these are exactly the offerings that are described for high school students when examining a continuum of services K-12. Below is illustrated the Integrated Continuum of Special Services developed by Renzulli and Reiss (1997):



Generally speaking, all districts within the state make available to students some level of advanced instructional opportunity in high school. International Baccalaureate is an option for students in only the two largest districts in the state – Natrona #1 and Laramie #1. Many more districts offer Advanced Placement classes, although some may have only one or two AP classes available, while others offer a very broad array of AP opportunities. Additionally, some districts offer college credits through distance learning, either through Wyoming community colleges, or through other universities such as the University of Wyoming, Brigham Young University, or Wyoming e-Academy of Virtual Education (WEAVE).

There is generally widespread use in high school of concurrent and dual enrollment in Wyoming community colleges. Dual enrollment courses are taught by a college instructor, either on campus or at an outreach site, while concurrent enrollment classes are taught by a high school teacher approved by a community college. There is much more utilization of concurrent enrollment classes (taught in high school) than dual enrollment classes (taught in a college setting), even though there are many more dual enrollment courses offered through colleges than concurrent courses offered through high schools. There is much higher enrollment in career/technical courses than in academic courses. A report prepared for the Joint Education Interim Committee by Job and Riske in January 2010 indicate the following (as reported from the state's seven community colleges):

Courses Offered by Community Colleges		
Semester	**Dual Enrollment**	**Concurrent Enrollment**
Summer '07	64 courses	0 courses*
Fall '07	336 courses	214 courses
Spring '08	363 courses	176 courses

Students Enrolled		
Semester	**Dual Enrollment**	**Concurrent Enrollment**
Summer '07	101 students	0 students*
Fall '07	666 students	3080 students
Spring '08	646 students	2385 students

*Concurrent not available in summer as public schools closed

The report prepared by Job and Riske (2010) did raise the question of whether all students throughout the state have equitable and affordable access to concurrent and dual enrollment opportunities. They discovered extreme variance in the availability of (particularly) concurrent enrollment classes across districts, underutilization of distance education in the provision of college classes, little if any collection of longitudinal data on student outcomes and wide variance in data collected on student numbers, unpredictability of types and quality of courses offered, and lack of uniformity in articulation agreements between colleges and school districts. Additionally, there is considerable inconsistency in how and when districts allow students to take college classes, and some district policies are quite restrictive. For example, some districts restrict dual enrollment to career/technical courses only, and some will allow credits earned from only one dual enrollment class to count toward high school graduation.

Furthermore, there is confusion on how to reimburse colleges and high schools for courses. Current state statute implies there should be no cost to students (W.S. § 21-20-201); both school districts and colleges include enrollees in their student counts for funding. The exchange of funds between community colleges, districts, and Boards of Cooperative Education (BOCES) is inconsistent, complicated, and confusing. Absence of a clear policy applied uniformly across the state has, in some places, resulted in lack of opportunity for students.

A process has been put into place to discuss and resolve some of these issues. The Wyoming Community College Commission is undertaking a broad consensus-building course of action to develop and implement policies and strategies to further seamless education throughout the state. Additionally, the Department has recently included in its school accreditation process the requirement that districts must enter into an agreement with a community college or the University of Wyoming to provide eligible students the opportunity to enroll in post-secondary education programs.

Observations on Gifted and Talented Education Offerings in Wyoming: From the findings presented above, the following observations of gifted and talented education programs within the state can be made:

- There exists a statewide definition of gifted and talented students. There are statutory mandates to both identify and serve these students;
- There is inconsistent adherence across school districts to the mandates of identifying and serving gifted and talented students, particularly in elementary and middle school/junior high grades;
- A number of districts have thoroughly researched, planned, and implemented robust programs for identified gifted and talented students;
- While most districts use multiple processes to identify students for GT programs, there is considerable variance in how districts apply eligibility criteria;
- Nearly all gifted and talented education programs within the state focus on academics. There is little identification of students considered talented, creative, or excelling in leadership;
- There are few state-level resources dedicated to administering gifted and talented programs and no state-level advisory body;
- There is no formal review or monitoring of GT programs in place to assure program accountability or quality;
- Professional development is a key component to GT program success. Some districts have done outstanding jobs in making GT professional development available to teachers and others have had none. There is no statewide coordination of GT professional development;
- There is underutilization in high school of distance learning opportunities in which credits can be earned;
- Use of computer-based learning opportunities in elementary and middle/junior high grades is limited;

- All districts within the state make available some level of advanced instructional opportunities to high school students. These opportunities vary considerably from district to district;

- Lack of clear statutory direction concerning district and college reimbursement and restrictive district and community college policies regarding concurrent and dual enrollment can result in lack of opportunity for students;

- Despite inconsistency among district and college policies, there is widespread use of concurrent and dual enrollment, particularly with Wyoming community colleges. There is a process currently underway to identify and seek resolution of policy inconsistency.

Note: No research was completed on the levels of behavioral and emotional supports available to Wyoming students. This is an important component of successful gifted and talented education.

Program Options/Models for Delivery of Gifted and Talented Education

Although a very wide array of program and service options can be made available to help support gifted and talented students, they can be arranged into a few broad categories.

Grouping model alternatives can range from self-contained classes wherein a homogenous group of students receive differentiated, compacted curriculum instruction full-time, to within-class flexible grouping for special subject instruction in a regular classroom setting. In cluster grouping, students of similar abilities are assigned to a single teacher in a general education classroom, and that teacher modifies instruction and curriculum to meet their needs. The most common form of grouping is removing students from the regular education classroom a few hours per week to receive extra learning opportunities and to cover material that extends and enriches the core curriculum (pull-out programs).

Acceleration encompasses many forms as well, and can be classified into content-based and grade-based categories (Colangelo, Assouline, and Gross, 2004). Single-subject acceleration is a **content-based strategy** wherein a student or group of students is exposed to an upper grade subject either by moving the student to the class or moving a teacher to the students, usually for a single subject (IRPA, CSDPG, and NAGC, 2009). Curriculum compacting involves pre-assessment of a student's abilities in a specific academic area; advanced content is made available to the student, usually in the general education classroom. At the high school level, content-based strategies of acceleration include dual or concurrent enrollment, AP and IB classes, or award of credit with demonstration of proficiency (credit by examination).

Grade-based acceleration strategies can consist of early entrance to school, advancing a student a whole grade either at the beginning or the middle of the school year, early entrance to college, and grade telescoping whereby a student or a group of students completes more than a single year's curriculum in a compacted timeframe.

A third component included in the list of approaches used to deliver effective gifted and talented education is **highly qualified teachers** supported with continuous ongoing **professional development** (VanTassel-Baska,1986). Except for self-contained classrooms, gifted students, particularly in elementary and middle grades, still spend the majority of their time in a regular general education setting. It is quite important that teacher-directed differentiation is meaningful, and in many ways it is an art as much as a skill. Among other things, it requires knowing when to change pace or go into more depth, when and how to focus on higher-level thinking skills, how to encourage independent learning, and how to create flexible instructional groups. It requires not only extensive knowledge of specific subject content areas but also advanced training and comprehensive exposure to the concepts needed to effectively instruct gifted and talented students. Successful gifted and talented (elementary) programs are almost always associated with (among other things) advanced training and knowledge of teachers, teacher willingness and readiness to embrace change, teacher beliefs and strategies for differentiating curriculum, collaboration, and administrative leadership (Westberg and Archimbault, 1995).

Alternatively, use of coaches specifically trained to support high-ability students can aid the general education teacher through demonstration and introduction of alternative materials and strategies (Hearne and Maurer 2006). In the Wyoming cost-based funding model, these coaches could be instructional facilitators. Discussion should contemplate whether the current funding level for instructional facilitators could absorb the additional duties of facilitating gifted and talented education, and whether it would be desirable to direct the use and have an accounting of resources made available for this purpose.

The **Schoolwide Enrichment Model** (SEM) studied and developed by Renzulli and Reis is a broad-based approach to gifted and talented education which provides higher learning standards and enriched learning methodologies for all children within a school or district. Its three primary goals are to develop talents in all children, provide advanced-level enrichment experiences for all students, and make available follow-up learning based on specific student interest and learning style (Renzulli and Reis, 1985). Renzulli Learning, an on-line version of the SEM is now available.

A **virtual learning environment** occurs when instruction is differentiated using information technology, usually delivering learning materials through the Internet. Combining some of the best practices in gifted and talented education, such as curriculum compacting and differentiation, with resources specifically designed to deepen student understanding of curriculum, can result in making available higher-order learning opportunities for students. Information technology is becoming a common instructional tool, and its potential for delivering GT education is limited only by the imagination of those using it. Particularly in a state with many rural districts, virtual learning environments could be the primary resource for GT services (Mulrine, C.F., 2007).

A specific on-line system designed to provide a continuum of learning and to extend the concept of personalization for every student, from remedial to advanced, is the Renzulli Learning System (RLS). It was developed over a period of 35 years, with support of the University of Connecticut Research and Development Corporation. It involves four steps that assure effective differentiation of curriculum for students: development of student profiles, defining academic strengths, learning styles, and interests; match of student profile with activities, materials, and resources; project-maker using original student research linking projects with class-related work; creation of a cumulative student record to track student progress and provide guidance for future activities. The system focuses on engaging students in learning by allowing student interest to direct their work and projects, with the philosophy that more student interest leads to success.

While the use of virtual learning environments or specifically the Renzulli Learning System has not been yet included in studies involving specific strategies used to deliver (only) GT education, research has been undertaken to analyze the effect of RLS on student achievement (Field, 2008). The conclusion of Field's research of students in grades three through eight was that use of RLS two to three hours per week for sixteen weeks (the length of the study period) increased student achievement in reading fluency (a sixteen-week effect size of 0.16), and social studies (a sixteen-week effect size of 0.13). Math was not included in Field's analysis.

Which Strategies Work?

Not surprisingly, since 1988 and the establishment of the National Research Center on the Gifted and Talented, huge research data bases have accumulated over time. In 1991, Karen Rogers, Ph.D. tackled the task of analyzing thirteen separate research syntheses to acquire a more thorough understanding of what research indicates about ability grouping and other GT strategies (Rogers, 1991). Among Rogers' findings are the following:

- Accelerating student learning through curriculum compacting, grade telescoping, non-graded classrooms, subject or grade acceleration, and credit by examination, produces substantial academic gains;

- Full-time ability grouping produces substantial academic gains for gifted students enrolled full-time in programs for the gifted and talented; full-time ability grouping for regular instruction for average and low ability students yields no discernible difference in academic achievement;

- Ability grouping for enrichment, either as a pull-out program or within-class, produces substantial academic gains;

- Cooperative learning in mixed-ability groups for regular instruction cannot be shown to be academically beneficial for gifted and talented learners.

In 1994, researchers at the University of Virginia conducted a learning outcomes study in which one of their three primary goals was to "examine the impact of specific methods of grouping gifted and talented students within classrooms and schools," (Delcourt, Loyd, Cornell, Dewey, and Goldberg 1994, p ix). Their findings were that "children in special schools, separate class programs, and pull-out programs for the gifted showed substantially higher levels of achievement than both their gifted peers not in programs and those attending with-in class programs," (p vii).

Both these research papers emphasize that decisions about what kind of programs to establish in schools or districts require careful cost-benefit analyses and consideration of many other factors beyond the single focus on outcomes. Steps can be taken to improve success with other kinds of delivery methodologies. For example, careful mentorship and high-level professional development can greatly strengthen the outcome of within-in class interventions.

More and more attention is lately being focused on acceleration as one of the most effective yet most underutilized interventions for the academic growth of gifted and talented students. Colangelo, in *A National Deceived: How Schools Hold Back America's Brightest Students*, states, "America's schools routinely avoid academic acceleration, the easiest and most effective way to help highly capable students. While the popular perception is that a child who skips a grade will be socially stunted, fifty years of research shows that moving bright students ahead often makes them happy."

Acceleration can take multiple forms, as explained above. It is a very low-cost high-yield strategy that should be pursued by local education agencies as a very important component of their gifted and talented educational programs. And, as budgets get tighter, some education specialists are asking why this isn't done with more frequency. "Nurturing gifted students and saving money don't have to be at odds…It costs nothing to send a first grader to third grade for reading…If a student moves through grades K-12 in eleven or twelve years rather than thirteen, taxpayers save money" (Vanderkam and Whitmire, 2010).

State Levels of Funding and District Expenditures

One of the primary objectives of this report was to determine whether resources provided within the school funding model cover district costs of delivering gifted and talented programs. And the answer is – yes and no. And, not surprisingly, this generally depends on whether or not districts have employed additional people (and how many) to deliver gifted and talented education. Please refer to Table 6 for detailed district information.

Before discussing the issue of funding adequacy, the issue of program equity should be considered. Despite statutory mandate to define and provide services to gifted and talented students, 22 districts did not report any expenditures associated with gifted and talented education. These 22 districts nevertheless still received $632,404 through the adjustment to provide gifted and talented education. This amount could cover a large portion of the entire reported “shortfall” of $822,942. Perhaps consideration could be given to directing funds to programs rather than districts.

While looking at the information provided in this table, please keep in mind that the only revenue shown here is from the GT *adjustment* of $29.19/ADM; revenue provided within the larger funding model is not included in the table.

Consider that the full cost of providing gifted and talented educational supports to all students in Laramie County School District #1 (LCSD #1) in school year 2009-10 was reported by the district to be $3.4 million, yet expenditures of only $387,742 are shown on Table 6 because the difference is covered through the cost-based funding model. Gifted and talented education for elementary students within the district is provided through its Trail Blazer program, a self-contained classroom GT model. Classroom size in the Trail Blazer program mimics the size of district general education classrooms. A teacher would be required to teach these students regardless of how or where the classroom was structured; no additional positions are needed and classroom expenses are covered by the funding model. There were no “extra” costs incurred for the GT program for elementary students – model revenue adequately funded the district’s self-contained classrooms.

The major component of the expenses shown for Laramie #1 in this table is administration of the district’s International Baccalaureate program - three full-time persons, license fees, training, curricular materials, and test fees associated with IB. Additional cost of IB can also be contributed to the shortfall of “seat time” instructional hours required by IB. Their international standard for hours of instruction is 150 hours per subject; the state calendar accommodates only 120 to 125 instructional hours – approximately *thirty percent short* of the international standard. The GT adjustment to the model for LCSD #1 for school year 2009-10 was $376,972; expenses for additional personal services and other costs not covered within the model was estimated by the district to be $387,742 for the same school year, a shortfall of $10,770. Thus, in the instance of this district and the approach it has followed to deliver GT instruction, additional costs above and beyond what was provided within the cost-based funding model were largely covered by the GT adjustment to the model.

There was a substantial difference between resources generated by the funding model and the GT adjustment and the additional expenses associated with extra personnel delivering gifted and talented education in Campbell County School District #1. As its method of delivering gifted and talented education to its students, the district has chosen to provide additional personnel in most buildings (almost twelve positions) to develop GT pull-out programs for identified students within the building to attend two to three hours each week. The cost-based funding model (including the GT adjustment) does not cover a GT delivery methodology which requires adding a number of positions in excess of what the funding model provides. Total district expenditures for GT education were reported to be $1,001,964 for the school year; the cost-based funding model will not support any of these expenses as all personnel were extraneous to the model.

The GT adjustment was $234,576, leaving the district to expend $767,388 more than funds made available through the adjustment or the cost-based funding model.

There are no expenses shown in Table 6 for Lincoln County School District #2, as the current school year is the first year they are operating their GT program. The district has undertaken a year of planning with multiple stakeholders to develop their GT program, and have adopted a GT delivery methodology that will largely be paid for by the GT adjustment to the funding model. The district is using a cluster grouping approach whereby identified GT students in a grade are all assigned to a single classroom together so differentiation and curriculum compacting can be under the direction of fewer classroom teachers. Teachers (24) have undergone extensive professional development over the prior year and summer to be able to effectively deliver GT services. The GT adjustment to the model provided the district with $77,618 in school year 2009-10. The district anticipates hiring one GT coordinator with these funds next year to help mentor teachers, coordinate professional development, and aid in developing individual service/learning plans for identified students. The funding model, with the GT adjustment, will support this approach of delivering gifted and talented education services.

Yet another approach currently utilized by Fremont County School District #25 provides gifted and talented education to almost eleven percent of their students in grades two through nine well within the funds made available by the GT adjustment. For this district, classes delivered through a block schedule provide an excellent opportunity for differentiation. The first two-thirds of the class period is spent delivering general education curriculum to students; the last third is used for differentiation, from remedial through advanced. Classroom teachers deliver modified curriculum to individual students as their instructional needs dictate.

Observations on State Funding Levels:

- The resources contained within the cost-based funding model, plus the adjustment made for gifted and talented education programs is generally adequate to fund *most delivery models* of gifted and talented education;

- At this point in time, pull-out programs are the most common delivery method used by districts to provide gifted and talented educational supports for students in elementary and middle grades;

- Model resources including the GT adjustment will generally not fund pull-out programs for gifted and talented education when those programs require additional personnel resources.

Below please find a list of recognized strategies used to deliver gifted and talented education services. Each strategy listed is associated with an effect size, a generalized cost of implementation, and an indication of whether professional development is needed for successful delivery of the strategy. Generally speaking, the cost-based funding model, including the adjustment of $29.19/ADM, will fund strategies considered to cost none to little and little to moderate.

Gifted and Talented Program Strategies

Effect Size, Cost, Professional Development

Strategy	Strategy Category*	Effect Size**	Cost to Implement	Professional Development Required
Grade Skipping	A	0.78	$	
Credit by Exam	A	0.75	$	
Grade Telescoping	A	0.56	$	Y
Single Subject Acceleration	A	0.49	$	
Curriculum Compacting	A	0.45	$$	Y
Early Entrance to School	A	0.36	$	
Concurrent Enrollment	A	0.36	$	Y
Advanced Placement	A	0.29	$	Y
Cross-Grade Grouping	A & G	0.45	$$	Y
In-class Group/Special Subject	G	0.34	$$	Y
Cluster Grouping	G	0.62	$$	Y
Self-contained Classes	G	0.33	$$	Y
Pullout	G	0.65	$$$	Y

* A=Acceleration; G=Grouping

** (Rogers, 1991)

$=No to Little Cost; $$=Little to Moderate; $$$=Moderate to High Cost, dependent on personnel added

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Table 1: State of the States in Gifted Education, 2008-09: Selected National Policy & Practice Data
Published by Council on State Directors of Programs for the Gifted and the National Association of Gifted Children

State	2008-09 $ per ADM	Part of Special Education	Grant or Application Process	State Definition	Districts/LEAs Required to Use Definition	Identification Mandated	Services Mandated	State Provision of Guidelines or Guidance	Program Monitored
Alabama	$0.00			Y	Y	Y	Y	Y	Y
Alaska	$0.00			N	N	Y	Y	N	N
Arizona	$3.00		Y*	Y	Y	Y	Y	Y	Y
Arkansas	$53.33			Y	Y	Y	Y	Y	Y*
California	No Data		Y	Y	Y	N	N	Y	Y
Colorado	$10.26	Y		Y	No Data	Y	Y	Y	Y
Connecticut	No Data			Y	Y	Y	Y	Y	No Data
Delaware	$0.00			N	N	N	N	N	N
Florida	No Data	Y		Y	Y	Y	Y	Y	Y
Georgia	No Data	Y		Y	No Data	Y	Y	Y	Y
Hawaii	$0.00			Y	Y	Y	Y	Y	Y
Idaho	$3.64			Y	Y	Y	Y	Y	N
Illinois	$0.00			Y	N	N	N	No Data	N
Indiana	$13.08			Y	Y	Y	Y	Y	N
Iowa	$70.56			Y	Y	Y	Y	Y	Y
Kansas	No Data	Y		Y	Y	Y	Y	Y	N
Kentucky	$10.18	Y		Y	Y	Y	Y	Y	Y
Louisiana	$46.15	Y		Y	Y	Y	Y	Y	Y
Maine	$0.00		Y	Y	Y	Y	Y	Y	N
Maryland	$0.00			N	N	Y	Y	Y	N
Massachusettes	$0.53			N	N	N	N	N	N
Michigan	$0.00			N	N	N	N	N	N
Minnesota	$13.86			Y	N	Y	Y	Y	N
Mississippi	No Data			Y	Y	Y	Y	No Data	No Data
Missouri	$0.00			Y	Y	N	N	Y	Y
Montana	$1.82		Y	Y	Y	Y	Y	Y	Y
Nebraska	$8.55		Y	Y	N	Y	N	Y	Y
New Jersey	$0.00			Y	Y	Y	Y	Y	Y
New Mexico	No Data	Y		Y	Y	Y	Y	Y	Y
New York	$0.00			Y	N	N	N	Y	N
North Carolina	$47.62	Y		Y	Y	Y	Y	Y	N
North Dakota	No Data			Y	N	N	N	Y	N
Ohio	No Data		Y	Y	Y	Y	N	Y	Y
Oklahoma	$87.85			Y	Y	Y	Y	Y	Y
Oregon	No Data		Y	Y	Y	Y	Y	Y	Y
Pennsylvania	$0.00	Y		Y	No Data	Y	Y	Y	Y
South Carolina	$35.05			Y	Y	Y	Y	Y	Y
South Dakota	$0.00			No Data	N	N	N	N	No Data
Tennessee	$0.00			Y	Y	N	N	Y	N
Texas	$20.08		Y (part)	Y	Y	Y	Y	Y	N
Utah	$4.26		Y	Y	Y	N	N	Y	Y
Vermont	$0.00			Y	N	N	N	N	N
Virginia	No Data	Y		Y	Y	Y	Y	Y	Y
Washington	$9.13		Y	Y	Y	N	N	Y	Y
West Virginia	$0.00			Y	Y	Y	Y	Y	Y
Wisconsin	$0.31			Y	Y	Y	Y	Y	N
Wyoming*	$28.50			Y	N	Y	Y	Y	N
(47)		10(Y)	10(Y)	41(Y)	31(Y)	34(Y)	32(Y)	39(Y)	25(Y)

*NAGC data updated as result of phone interview
States with No Data not included in chart: Nevada, New Hampshire, Rhode Island

Table 2: Percent of Gifted and Talented Students in Public Elementary and Secondary Schools, 2004 and 2006

Summary Data from National Center of Education Statistics, U. S. Department of Education, Table 54 (2008)

State	2004	2006
United States	**6.7**	**6.7**
Alabama	4.8	5.5
Alaska	4.1	4.1
Arizona	5.9	6.3
Arkansas	9.9	9.5
California	8.4	8.3
Colorado	6.7	6.8
Connecticut	3.0	3.8
Delaware\1\	4.6	5.6
Florida	4.5	4.7
Georgia	8.9	9.3
Hawaii\2\	5.7	6.2
Idaho	3.9	4.2
Illinois	5.4	5.8
Indiana	7.1	7.9
Iowa	8.5	8.2
Kansas	3.3	3.0
Kentucky	13.0	14.6
Louisiana	3.9	3.4
Maine	3.0	3.2
Maryland\1\	13.8	16.1
Massachusetts	0.8	0.7
Michigan	3.9	3.4
Minnesota	8.1	8.8
Mississippi	6.0	6.1

State	2004	2006
United States	**6.7**	**6.7**
Missouri	3.8	3.6
Montana	5.6	5.2
Nebraska	11.4	11.4
Nevada\2\	1.9	1.9
New Hampshire	2.3	2.6
New Jersey	6.9	7.0
New Mexico	10.7	4.0
New York	2.2	2.9
North Carolina	10.9	10.8
North Dakota	3.1	2.8
Ohio	7.4	7.3
Oklahoma	14.0	13.7
Oregon	7.1	6.9
Pennsylvania	4.8	4.5
Rhode Island	1.8	1.4
South Carolina	12.7	11.0
South Dakota	2.2	2.7
Tennessee	3.3	1.7
Texas	8.0	7.6
Utah	4.6	5.0
Vermont	0.8	0.8
Virginia	12.1	12.6
Washington	3.8	3.9
West Virginia	2.2	2.2
Wisconsin	6.8	6.4
Wyoming	3.2	2.2

!Interpret data with caution.
\1\Data are based on universe counts of schools and school districts; therefore, these figures do not have standard errors.
\2\Data for 2006 are based on universe counts of schools and school districts; therefore, these figures do not have standard
SOURCE: U.S. Department of Education, Office for Civil Rights, Civil Rights Data Collection: 2004 and 2006. (This table was prepared June 2008.). Table modified by report author to include only summary data.

Table 3: Summary of Gifted and Talented Education Programs in Wyoming Districts Offering School-Day Options in Elementary/Middle/Junior High

District	District Definition in Place	Formal Aptitude Assessment Part of Identification Process	Use of MAP, PAWS, STAR, etc. as Primary Screening Tool	Research Base Used to Design Offerings	Program Evaluation	Professional Development;
Albany #1		Y	~			
Campbell #1	Y	Y	~	Renzulli;NAGC	Student progress;surveys	GT Endorsmt - U of Iowa
Converse #1		Y	~			
Converse #2		Y	~	Brain-based research	Student progress	
Fremont # 6		~	Y	Renzulli, Montessori	Student progress	
Fremont #24		~	Y	21st century PBL	Developing measures	Conferences;workshops
Fremont #25		~	~	Renzulli		
Fremont #38		Y	~	Javits grant awardee		
Hot Springs #1	All Students	~	~	PLC		
Laramie #1		Y	~			
Laramie #2		Y	~	Betts	Student progress	Nothing specific
Lincoln #2	Y	~	Y	Entire body of lit on G/T	Student progress	GATE conference
Natrona #1	Y	Y	~	Renzulli, Reis, et al	Student progress	Conferences;consultants
Park # 6	Y	Y	~	NAGC Standards	Stu progress;NAGC Stds	GT instr trains teachers
Platte #2		~	Y			
Sheridan #1		~	Y	Renzulli	Student progress	Quantum;Brain-based
Sheridan #2	Y	Y	~	Renzulli	Student progress	GT instr trains;AGATE
Sublette #1	Y	Y	~	Teton #1 pgms;Marzano	Student progress	Brain-based
Sweetwater #1		Y	~			
Sweetwater #2		Y	~		Student progress	GATE consultants
Teton #1	Y (State def)	Y	~	NAGC;ColumbusGp, et al	Student progress	GT instr trains teachers
(21)						

District participated in GT recalibration survey

District definition of GT students from GT survey

Use of formal assessment in identifiation process obtained from data collected on WDE613 or GT Survey

Research base used derived from GT survey

*Competitions - academic, such as Destination Imagination, Future Problem-Solving, etc.

Table 4: Summary of District Offerings for Gifted and Talented Education in Wyoming Elementary and Middle/Junior High, Grades K-8

District	Grades Targeted (other than high school)	Number of Students Served	Percent of Students Served	Program Model/Grouping Used - Options Available: Self-Contained Classroom	Pull-out	Grade or Subject Accel	Cluster Group	After School	Description/Other
Albany #1	3 through 8	44	2.72%	Y		Y	Y		
Big Horn #1	None	0	0.00%						
Big Horn #2	None	0	0.00%						
Big Horn #3	1 through 6*	Not ID'd	0.00%					Y(only)	Above & Beyond
Big Horn #4	3 through 8 (DI only)	37	15.23%					Y(only)	Destination Imagination
Campbell #1	3 through 9**	308	6.98%		Y	Y	Y		Pull-out 2 to 3 hrs/week/grade
Carbon #1	None	0	0.00%						
Carbon #2	None	0	0.00%						
Converse #1	2 through 8	74	8.37%		Y		Y	Y	
Converse #2	grade 4	8	12.70%		Y		Y	Y	
Crook #1	3 through 8 (DI only)	Unk	Unk					Y(only)	Destination Imagination
Fremont # 1	None	0	0.00%						
Fremont # 2	None	0	0.00%						
Fremont # 6	K through 8	8	2.95%						Diff instr in Classroom
Fremont #14	None	0	0.00%						
Fremont #21	None***	0	0.00%						
Fremont #24	3 through 8	20	13.99%		Y			Y	
Fremont #25	2 through 9	172	10.89%		Y			Y	Diff instr;1 day/wk after school
Fremont #38	2 through 7**	7	4.19%		Y			Y	
Goshen #1	None	0	0.00%						
Hot Springs #1	K-8, districtwide	449	100.00%						Diff instr in Classroom
Johnson #1	None	0	0.00%						
Laramie #1	K through 6	218	2.99%	Y		Y			
Laramie #2	1 through 8	65	9.68%		Y				Pull-out 2 to 3 hrs/week/grade
Lincoln #1	None	0	0.00%						
Lincoln #2	New this year	Unk	Unk				Y		
Natrona #1	1 through 8	150	2.09%	Y	Y	Y	Y		Diff instr in Classroom
Niobrara #1	3 through 8 (DI only)	20	7.33%					Y(only)	Destination Imagination
Park # 1	None	0	0.00%						
Park # 6	1 through 8	69	5.29%		Y	Y			1 day/wk elem;1 class/day mddle
Park #16	None	0	0.00%						
Platte #1	None	0	0.00%						
Platte #2	3 through 8	13	17.11%		Y	Y		Y	Dest Imag;Future Prob Solving
Sheridan #1	3 through 8	76	17.63%		Y	Y	Y		Diff instr in Classroom
Sheridan #2	3 through 8	103	7.34%		Y		Y		Pull-out half day/week/grade
Sheridan #3	None	0	0.00%						
Sublette #1	K through 4	10	2.59%		Y				
Sublette #9	None	0	0.00%						
Sweetwater #1	3 through 6	65	3.92%		Y				Pull-out one day/week/grade
Sweetwater #2	2 through 8	102	7.15%		Y	Y			3 hrs/week/grade + diff in class
Teton #1	3 through 8	178	16.54%		Y	Y	Y	Y	
Uinta #1	None	0	0.00%						
Uinta #4	5 through 8*	15	6.79%					Y(only)	Acadmic/talent bowls;KEY camp
Uinta #6	3 through 5*	19	13.10%					Y(only)	
Washakie #1	None	0	0.00%						
Washakie #2	None	0	0.00%						
Weston #1	None	0	0.00%						
Weston #7	None	0	0.00%						

District participated in GT recalibration survey
* Enrichment offered in ater-school clubs/projects
** Enrichment offered in summer to broader group of students
***Interested in developing program or program being developed

Program/Model Options collected from WDE613, GT survey, or phone interviews
Grades Targeted derived from data reported by districts on WDE684 or GT survey
Number Students Served from data reported by distrits on WDE684 or phone interview
% Students Served calculated as percent of all students in targeted grades

Table 5: Summary of District Offerings for Gifted and Talented Education in Wyoming Grades 9 through 12

District	Number of Students Served	IB	AP	Concurrent/Dual Enrollment in Wyoming Comm College	College Credits through Distance Learning	Honors or Challenge Classes	Career Academies	After School	Description/Other
		Opportunities Available for High School Students							
Albany #1			Y	Y	Y-BYU;Alex				
Big Horn #1				Y					
Big Horn #2			Y	Y	Y-Comm Coll			Y	KnowldgBowl;Lego/Robotics
Big Horn #3				Y	Y			Y	
Big Horn #4	12		Y	Y	Y-CommColl				
Campbell #1			Y	Y	Y-CommColl/Univ Iowa		Transp;Toursm;Enrgy		
Carbon #1	68			Y					
Carbon #2				Y	Y-Comm Coll				
Converse #1	11		Y	Y					
Converse #2				Y					
Crook #1				Y					
Fremont # 1				Y					
Fremont # 2				Y					
Fremont # 6	26			Y	Y-Comm Coll				
Fremont #14				Y					
Fremont #21				Y					
Fremont #24	8			Y	Y				
Fremont #25				Y					
Fremont #38				Y					
Goshen #1				Y					
Hot Springs #1	203			Y	Y-Comm Coll				
Johnson #1				Y					
Laramie #1		Y	Y	Y					
Laramie #2	42		Y	Y					
Lincoln #1				Y					
Lincoln #2			Y	Y	Y-BYU and other				Indv Academic Plans
Natrona #1	36	Y	Y	Y		Y			
Niobrara #1				Y					
Park # 1				Y	Y-Comm Coll/BYU				
Park # 6	12		Y		Y-Apex	Y			
Park #16				Y					
Platte #1				Y					
Platte #2	19			Y	Y			Y	WyoAcadChall;FutProb-Solv
Sheridan #1	51			Y	Y-CommColl/WEAVE				
Sheridan #2	66		Y	Y	Y-UnivNoDak;OklaState	Y			
Sheridan #3				Y					
Sublette #1				Y					
Sublette #9				Y					
Sweetwater #1			Y	Y	Y-CommColl/UW		Health; Energy		
Sweetwater #2			Y	Y	Y-Comm Coll				
Teton #1	141		Y	Y					
Uinta #1	24			Y		Y			
Uinta #4	25			Y	Y	Y			
Uinta #6				Y	Y-Comm Coll				
Washakie #1				Y					
Washakie #2									
Weston #1				Y					
Weston #7				Y					

District participated in GT recalibration survey

District participation in IB and AP obtained from WDE613 and/or G/T survey

Dual/concurrent enrollment in WY community colleges collected from either WDE613 or (Job & Riske, 2010) as of fall semester 2009

Distance learning data collected from WDE613, GT survey, (Job & Riske 2010)

Information on Honors/Challenge classes from GT survey

Data on Career Academies from phone interviews

Table 6: District Expenditures and Model GT Adjustment School Year 2009-10

District	SY09-10 School GF Expenditures	Grants or Federal Funds	SY09-10 Total Expenditures Reported by Districts	SY09-10 Model GT Adjustment	Difference
Albany #1	$ 144,226	$ -	$ 144,226	$ 103,904	$ (40,322)
Big Horn #1	$ 9,859	$ -	$ 9,859	$ 18,264	$ 8,405
Big Horn #2	$ 8,859	$ -	$ 8,859	$ 18,895	$ 10,036
Big Horn #3	$ -	$ -	$ -	$ 14,846	$ 14,846
Big Horn #4	$ -	$ -	$ -	$ 9,903	$ 9,903
Campbell #1*	$ 1,001,964	$ -	$ 1,001,964	$ 234,576	$ (767,388)
Carbon #1	$ -	$ -	$ -	$ 53,264	$ 53,264
Carbon #2	$ -	$ -	$ -	$ 19,689	$ 19,689
Converse #1	$ 65,492	$ -	$ 65,492	$ 50,068	$ (15,424)
Converse #2	$ 10,943	$ -	$ 10,943	$ 20,503	$ 9,560
Crook #1	$ 5,186	$ -	$ 5,186	$ 32,244	$ 27,058
Fremont # 1	$ -	$ -	$ -	$ 49,813	$ 49,813
Fremont # 2	$ -	$ -	$ -	$ 6,234	$ 6,234
Fremont # 6	$ -	$ -	$ -	$ 11,328	$ 11,328
Fremont #14	$ -	$ -	$ -	$ 16,717	$ 16,717
Fremont #21	$ -	$ -	$ -	$ 12,643	$ 12,643
Fremont #24	$ 36,741	$ -	$ 36,741	$ 9,007	$ (27,734)
Fremont #25	$ 5,994	$ -	$ 5,994	$ 72,011	$ 66,017
Fremont #38	$ -	$ 43,478	$ 43,478	$ 9,582	$ (33,896)
Goshen #1	$ -	$ -	$ -	$ 54,162	$ 54,162
Hot Springs #1	$ -	$ -	$ -	$ 18,969	$ 18,969
Johnson #1	$ -	$ -	$ -	$ 36,270	$ 36,270
Laramie #1**	$ 387,742	$ -	$ 387,742	$ 376,972	$ (10,770)
Laramie #2	$ 53,579	$ 15,495	$ 69,074	$ 25,762	$ (43,312)
Lincoln #1	$ -	$ -	$ -	$ 18,454	$ 18,454
Lincoln #2	$ -	$ -	$ -	$ 77,618	$ 77,618
Natrona #1**	$ 393,485	$ 16,728	$ 410,213	$ 342,709	$ (67,504)
Niobrara #1	$ 3,562	$ -	$ 3,562	$ 11,010	$ 7,448
Park # 1	$ -	$ -	$ -	$ 48,766	$ 48,766
Park # 6	$ 189,594	$ -	$ 189,594	$ 63,646	$ (125,948)
Park #16	$ 1,921	$ -	$ 1,921	$ 3,693	$ 1,772
Platte #1	$ -	$ -	$ -	$ 32,639	$ 32,639
Platte #2	$ 22,425	$ -	$ 22,425	$ 6,669	$ (15,756)
Sheridan #1	$ 173,972	$ -	$ 173,972	$ 27,100	$ (146,872)
Sheridan #2***	$ 293,381	$ -	$ 293,381	$ 90,673	$ (202,708)
Sheridan #3	$ -	$ -	$ -	$ 3,143	$ 3,143
Sublette #1	$ -	$ -	$ -	$ 29,080	$ 29,080
Sublette #9	$ -	$ -	$ -	$ 20,541	$ 20,541
Sweetwater #1	$ 113,336	$ -	$ 113,336	$ 144,238	$ 30,902
Sweetwater #2	$ 174,376	$ -	$ 174,376	$ 78,257	$ (96,119)
Teton #1	$ 173,547	$ -	$ 173,547	$ 67,063	$ (106,484)
Uinta #1	$ -	$ -	$ -	$ 86,911	$ 86,911
Uinta #4	$ 2,985	$ -	$ 2,985	$ 21,139	$ 18,154
Uinta #6	$ 5,690	$ -	$ 5,690	$ 19,745	$ 14,055
Washakie #1	$ 8,218	$ -	$ 8,218	$ 39,029	$ 30,811
Washakie #2	$ -	$ -	$ -	$ 2,825	$ 2,825
Weston #1	$ 3,068	$ -	$ 3,068	$ 23,740	$ 20,672
Weston #7	$ -	$ -	$ -	$ 8,589	$ 8,589
	$ 3,290,145	**$ 75,701**	**$ 3,365,846**	**$ 2,542,904**	**$ (822,942)**

Expenditure Data from WDE601or G/T survey

* Exp amt does not reflect summer enrichment GATE program (per district)

** Exp amt does not reflect self-contained classroom costs funded by model (per district)

***Exp increased to correct WDE601 submission error

APPENDIX G

MEMO ON ALTERNATIVE LEARNING ENVIRONMENT SCHOOLS

To: Wyoming Select Committee on Recalibration

From: Larry Picus and Allan Odden

Re: Alternative Learning Environment Schools

Date: October 10, 2010

Our desk audit of the Wyoming School Funding Model concluded that funding for Alternative Learning Environment Schools (ALE) be reviewed as part of the current recalibration. This memo summarizes our recommendation for ALE schools as part of the Wyoming Funding Model.

Background

Our 2005 Recalibration report recommended funding alternative schools with funding to support one assistant principal and certificated teachers at a ratio of one FTE per seven students – intended to meet all staffing needs. These schools also receive resources for substitute teachers, supplies, technology, gifted programs, professional development, assessment and student activities (funded at $250 per student which differs substantially from the funding of student activities in non-ALE schools). The 2005 report assumed that alternative schools would be small high schools providing services to no more than 50 or 60 students with severe emotional and/or behavioral problems.

The Legislature funded this model, but there were three fairly large "alternative" schools in the state that were also funded using these pupil/teacher ratios. They appeared to receive far more money than they would have received had they been funded as regular high schools. As a result, there is currently a moratorium on the creation of new alternative schools.

Today there are 16 ALE schools in Wyoming. Table 1 in the appendix to this report shows that the three ALE schools in the three largest districts have enrollments exceeding 100 students, while the enrollment at the remaining ALE schools ranges from 11.6 to 63.5. That table also shows that if all of the ALE schools in the state were funded as regular schools, the 13 smaller ALE schools would receive more funds and the three large schools would lose between $325,000 and $502,000.

It appears that the main reason for the gain in funding for the smaller ALE schools is the increase they would receive in student activity funds as a result of being treated as a regular schools. For schools with 49 or fewer ADM, that would be the only difference because if they were funded under the Model as a very small school, the staffing would be identical to that of any school with 49 or fewer students.

The three ALE schools with between 50 and 63 ADM gain funding both for student activities and for increased levels of staff. This is because all of them would receive the 10 teacher minimum in the Model for high schools with less than 105 ADM.[47]

The reason for the moratorium on creating of new ALE schools is the additional revenue any high school with more than 100 students is likely to gain by identifying itself as an alternative program. Thus, the state faces two issues, defining an what an ALE program is, and determining how to fund ALE schools.

Defining Alternative Education Programs

A review of literature and state practice on alternative education provides little guidance for developing a clear definition of alternative education. Perhaps the best we were able to identify was from the Urban Institute which defined alternative education as:[48]

> Alternative education refers to schools or programs that are set up by states, school districts, or other entities to serve young people who are not succeeding in a traditional public school environment. Alternative education programs offer students who are failing academically or may have learning disabilities, behavioral problems, or poor attendance an opportunity to achieve in a different setting and use different and innovative learning methods. While there are many different kinds of alternative schools and programs, they are often characterized by their flexible schedules, smaller teacher-student ratios, and modified curricula.

We also reviewed state standards – where such existed – for alternative schools. Most states use definitions similar to that of the urban institute, but we only identified on state, Indiana that actually established standards for what an alternative education program might look like. The Indiana Department of Education's web site states that:[49]

> While each of Indiana's alternative education programs is unique, they share characteristics identified in the research as common to successful alternative schools.

[47] An ALE high school with 63 ADM would receive funding for one AP and 9 teachers, whereas if it were funded as a regular school it would receive a portion of a principal salary plus funding for ten teachers. Obviously an ALE school with between 71 and 105 ADM would fare differently and would generate more staff as an ALE school. The exact number of ADM where being treated as an ALE school instead of a regular high school cannot be computed exactly because the teacher salary provided varies by district depending on the average education and experience of the entire teaching staff of that district, and the per ADM allocation for student activities declines as enrollment grows.

[48] Aron, L. Y. (2006). *An Overview of Alternative Education*. Washington, DC: The Urban Institute. http://www.urban.org/UploadedPDF/411283_alternative_education.pdf

[49] Indiana Department of Education. *Alternative Education Programs*. http://www.doe.in.gov/alted/altedlinkpg.html

- Maximum teacher/student ratio of 1:15[50]
- Small student base
- Clearly stated mission and discipline code
- Caring faculty with continual staff development
- School staff having high expectations for student achievement
- Learning program specific to the student's expectations and learning style
- Flexible school schedule with community involvement and support
- Total commitment to have each student be a success

The Institute for Education Sciences at the U.S. Department of Education published some statistics on Alternative Schools and Programs for the 2007-08 school year.[51] That study identified 558,300 students in 10,300 district administered alternative education schools and programs across the United States. Although the report did not provide data on the size of these schools or on staffing ratios, the data above suggest an average alternative school size of 54 students. Most of the programs served students in grades 9-12. The main reasons students were enrolled in alternative programs – all of which meet our initial definition of severe emotional and/or behavioral problems – included:

- Possession or use of firearms or other weapons
- Possession, distribution, or use of alcohol or drugs
- Arrest or involvement with the criminal justice system
- Physical attacks or fights
- Disruptive verbal behavior
- Chronic truancy
- Continual academic failure
- Pregnancy/teen parenthood
- Mental health needs

Recommendation

Our findings suggest that most ALE schools in Wyoming appear to fit the general parameters of alternative education programs across the United States. Moreover, the current funding formula for non-ALE schools appears to provide more staffing than is generally used or called for in other alternative programs. Our recommendation is that the state define ALE programs as being at the high school level for the purpose of serving children with severe emotional and/or behavioral needs as identified by their resident school district.

We also recommend that funding for ALE schools be identical to the funding of any high school in the state. By funding ALE schools as regular high schools, there will be no fiscal incentive to establish large alternative schools to gain a funding advantage. The Wyoming

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[50] Even at 105 students, with a minimum of 10 teachers, Wyoming staffing standards for regular schools are below this maximum ratio for an alternative school in Indiana.
[51] Carver, P.R., and Lewis, L. (2010). *Alternative Schools and programs for Public School Students At Risk of Educational Failure: 2007-08* (NCES 2010-026). U.S. Department of Education, National Center for Education Statistics. Washington, DE: Government printing Office.

funding Model provides more staffing resources to schools with fewer than 100 students than all other states, and that level of staffing appears to be more than other states or districts provide for alternative schools, thus there does not appear to be any reason to treat ALE schools differently than other high schools.

The result of this recommendation is that districts will elect to establish ALE schools on the basis of identified student needs, not on the basis of a real or perceived fiscal advantage, something that we think will lead to better decisions about how to best serve high school students with substantial needs.

Estimated FY 2011 Wyoming Funding Model School-Level Resources Differences for Alternative Schools Funded as Regular Schools

SCHOOL_ID	SCHOOL_NAME	FY11 Model ADM	Total Difference
0101057	Whiting High School	42.782	$ 66,053.05
0301057	Westwood High School	159.970	$ (325,489.12)
0401057	Cooperative High	27.362	$ 44,377.34
0601058	Bear Lodge High School	21.119	$ 33,271.30
0701056	Pathfinder High School	40.218	$ 63,431.60
1101057	Triumph High School	255.740	$ (429,133.39)
1201056	Kemmerer Alternative School	15.638	$ 24,228.01
1202057	Swift Creek High School	28.309	$ 45,910.80
1301058	Roosevelt High School	210.192	$ (502,117.23)
1501056	Shoshone Learning Center	11.580	$ 18,774.14
1702052	The Wright Place	16.760	$ 7,309.08
1702056	Ft. Mackenzie	47.062	$ 73,066.67
1901057	Independence High School	52.029	$ 380,163.68
1902056	Expedition Academy	59.983	$ 356,377.97
2001056	Summit High School	46.179	$ 71,690.41
2101056	Horizon Alternative School	63.517	$ 398,267.72
	Total	1,098.439	$ 326,182.05

APPENDIX H

MEMO ON VOCATIONAL EDUCATION

To: Wyoming Select Committee on Recalibration

From: Allan Odden and Larry Picus[52]

Re: Career and Technical Education

Date: October 29, 2010

This memo describes our recommendations for a cost based approach to Career and Technical Education Costs for the Wyoming School Funding Model. In our desk audit, we recommended that Wyoming modify the parameters of the model for vocational education. Given small class sizes in Wyoming, we stated that there might be no strong rationale for even smaller classes for vocational education, particularly if the vocational education programs transform into more career/technical education which often requires no or few additional resources. Further, school districts actually spent considerably less on vocational education supplies and equipment than is provided in the extra funding formula, spending just 59.8 percent of the resources allocated for vocational education supplies and equipment.

CURRENT STATUS

Additional resources are provided for career, technical and vocational education, by weighting ADM in approved vocational education programs by an additional 29 percent. This generates additional teaching positions at a school to provide for vocational education classes that have fewer than 21 students. In addition, the model includes an ECA adjusted $9,027.27 per vocational education teacher for equipment, supplies and replacement.

In addition, the Wyoming Legislature also provided additional grants for new and demonstration career/technical education programs. A school district may apply to the Wyoming Department of Education (WDE) for state assistance to fund expenses associated with the planning, developing and implementing a career-technical education demonstration project as a new or an expansion to any existing high school career-vocational education program in the district. Amounts awarded are to be used for curricular development and project design costs and

[52] L. Allen Phelps, Professor of Educational Leadership and Policy Analysis, School of Education, and Director, Center on Education and Work, University of Wisconsin-Madison and Miles Tokheim, Career and Technical Education Resource Teacher, Career and Technical Education, Madison Metropolitan School Districts helped in providing background and costing information for this document.

certified teachers to provide course instruction during the two (2) years of project implementation and to fund initial purchases of equipment and supplies. Three projects were funded for the 2008-2011 cycle and three additional projects were funded for the 2010-2013 cycle.

THE CASE FOR HIGH QUALITY CAREER AND TECHNICAL EDUCATION IN AMERICA'S HIGH SCHOOLS

Improving the college and career readiness of U.S. high school graduates is a recurrent, major theme in recent state and federal education initiatives, including Wyoming's Strategic Plan for *New Directions for High School Career and Technical Education*. As part of this process, states are reorganizing and restructuring what used to be "vocational" education courses into programs that help students become college and career ready. This is occurring particularly in high wage/high skills job areas, and especially in science, technology, engineering and mathematics (STEM). By 2020, the current U.S. President expects the proportion of Americans ages 25 to 34 with college degrees and credentials representing 21st century workforce skills to increase from 40% to 60%. This is deemed essential for sustaining U.S. competitiveness in the global economy. In support of these ambitious goals, ACHIEVE.org – a national organization of business and state leaders – is working actively to make college and career readiness a priority of K-12 education systems across the country. ACHIEVE's American Diploma Project Network now includes 35 states educating nearly 85 percent of all U.S. public school students. Though the Network does not currently include Wyoming, the issue of enhancing the rigor of Wyoming high school graduation requirements, including joining ACHIEVE, has emerged during the course of the recalibration meetings. The goal is to make all high school graduates career and college ready, i.e., prepared to do high quality work whether taking a job directly out of high school or entering college or a post-secondary education program.

What constitutes career and college readiness for high school graduates? The following three paragraphs, excerpted from America Diploma Project Network's recent Policy Brief, offer a description of the key constructs for policy makers and education leaders.[53]

> **What is COLLEGE ready?**
> College today means much more than just pursuing a four- year degree at a university. Being "college ready" means being prepared for any postsecondary education or training experience, including study at two- and four-year institutions leading to a postsecondary credential (i.e. a certificate, license, Associates or Bachelor's degree). Being *ready* for college means that a high school graduate has the English and mathematics knowledge and analytic skills necessary to qualify for and succeed in entry-level, credit-bearing college courses without the need for remedial coursework.
>
> **What is "*CAREER*" ready?**
> In today's economy, a "career" is not just a job. A career provides a family-sustaining wage and pathways to advancement and requires postsecondary[54] training or education.

[53] http://www.postsecconnect.org/files/CollegeandCareerReadyFINAL31809.pdf
[54] Postsecondary means some training beyond high school that could include specific job training, or training in a technical college, community college or four-year college or university.

A job may be obtained with only a high school diploma, but offers no guarantee of advancement or mobility. Being *ready* for a career means that a high school graduate has the English, and mathematics knowledge and skills needed to qualify for and succeed in the postsecondary job training and/or education necessary for their chosen career (i.e. technical/vocational program, community college, apprenticeship or significant on-the-job training).

Is ready for *COLLEGE* and ready for *CAREER* the same thing?
With respect to the knowledge and skills in English and mathematics expected by employers and postsecondary faculty, the answer is yes. In the last decade, research conducted by ACHIEVE, ACT, the Southern Regional Education Board, as well as others shows a convergence in the expectations of employers and colleges in terms of the knowledge and skills high school grads need to be successful after high school.

Economic reality reflects these converging expectations as does Wyoming's strategic plan for career and technical education. Education today is more valued and more necessary than ever before. The bottom line is that today ALL high school graduates need to be prepared for some postsecondary education – job specific training, technical college, community college or four year college – if they are to have options and opportunities for high wage jobs in the knowledge-based, global economy.

- Thirty five years ago, only 12% of U.S. jobs required some postsecondary training or an associate's degree and only 16% required a bachelor's degree or higher.

- Nearly eight in ten future job openings in the next decade in the U.S. will require postsecondary education or training. Forty-five percent will be in "middle skill" occupations, which require at least some postsecondary education and training, while 33% will be in high skilled occupations for which a Bachelors degree or more is required. By contrast, only 22% of future job openings will be "low skill" and accessible to those with a high school diploma or less.

- Though the U.S. still ranks 3rd in the adult population (25-64 year olds) with an associate's degree or higher among 30 countries, the country now ranks 10th among 25-34 year olds with a two-year degree and above. Competing countries are catching up to – and even outpacing – the U.S. in the educational attainment of their new generation of adults.

- Wyoming's data, included in the career and technical education strategic report, reflect these trends. Though the natural resources and mineral extraction industries account for a solid portion of Wyoming's jobs, with many jobs in those industries not requiring education beyond high school, other industries – education, health care, professional and business services, financial activities, information and government – actually employ larger numbers of individuals with most of these jobs requiring some postsecondary training. However, enrollments in Wyoming CTE school district programs in these areas are substantially under the numbers needed.

- Further, if all Wyoming students are to have access to high wage/high skill jobs in the broader economy even if they move out of the state, larger percentages will need not only a solid high school education but also preparation for additional training that would be required for jobs in other states but not plentiful now in Wyoming.

Higher levels of education lead to elevated wages, a more equitable distribution of income and substantial gains in productivity. For every additional average year of schooling, individual life time earnings rise by 10 percent. Moreover, for every additional year of schooling U.S. citizens complete, the GDP would increase by about 0.37 percentage points – or by 10% – over time.

While many traditional vocational and technical education programs did not produce high skills in math, science and English in their graduates, there is a new "breed" of career technical education programs developing across the country and these programs seek to prepare students for the emerging and most rapidly rising jobs in the broader economy, particularly those in health sciences, biotechnology, engineering, and information technologies. Moreover, it was these career and technical clusters that were emphasized in Wyoming's recent strategic plan for career and technical education. And all of these have rigorous nationally designed programs that states and districts can implement.

Wyoming has already adopted the 16 career clusters identified by the U.S. Department of Education as the basis for organizing CTE programs, and uses the clusters as a platform for reporting purposes. To be approved, districts and schools must offer a program that includes 3 semester courses comprising a CTE concentration. The goal of all these programs is to take courses, including the CTE courses, sufficient to allow the student to enroll in the University of Wyoming, a community or technical college, or a high wage job. It should be noted that 15 of the 16 CTE career clusters require mathematics up to Algebra 2, so the knowledge, skill and concept requirements for successfully engaging in CTE programs are quite similar to, if not the same as, those required to be college ready. Further, although Wyoming students now take CTE courses in five major areas – architecture and construction; agriculture, food and natural resources; business, management and administration; manufacturing; information technology – one goal of the CTE strategic plan is to expand on these offerings so as to cover more career areas requiring higher skills not only in Wyoming but also across the country.

In our effort to identify a cost-basis for these new career and technical programs, we have used Project Lead the Way, as an exemplar. It is one of the most recognized, "high end" career and technical education program in the country and has a growing research base showing that it produces graduates who achieve more than similar students who have not had the program. By high end, we mean it also is one of the most rigorous as well as expensive career and technical programs so can serve as one basis for determining additional resources needed – if any – for career and technical education beyond those in the regular Wyoming Funding Model.

PROJECT LEAD THE WAY: AN EMERGING NATIONAL MODEL

Project Lead the Way (PLTW) is a nationally prominent exemplar for secondary CTE education. Often implemented jointly with local postsecondary education institutions and employer advisory groups, these programs usually feature project or problem-based learning experiences, career planning and guidance services, and technical and/or academic skills assessments. The program is designed to develop the science, technology, engineering and mathematics skills essential for achievement in the classroom and success in college or jobs not requiring a four-year college education through hands-on experience preparing students for the real world. Developed in upstate New York schools in the early 1990s, PLTW is offered in more than 3,000 high schools in all 50 states and now enrolls over 350,000 total students.

According to the PLTW web site:[55]

> The PLTW Engineering and Biomedical Sciences programs offer students an array of advantages, from career readiness and hands-on experience to college preparatory–level classes, labs, and creative exercises. Its programs are designed to appeal to all students, from those already interested in Science, Technology, Engineering, and Math (STEM)-related fields, to those whose experience in the sciences and math has been less comprehensive or who find themselves uninterested in traditional STEM curricula. PLTW classes are hands-on, based in real-world experience, and fun for students and teachers. The program sets high standards for rigorous, focused, and engaging study, developing students' innovative, collaborative, cooperative, and problem-solving skills.
>
> PLTW is a comprehensive, turnkey program with a quick turnaround time and support for smooth and efficient implementation, whether the school is starting up for the first time or introducing new courses. PLTW.org gives educators 24-hour access to information, sourcing, and purchasing.
>
> PLTW is a true curriculum based on a tried-and-true pedagogy. It can be offered as full year and multi-year primarily for high schools, and both the Engineering and Biomedical Sciences tracks dovetail with current class offerings. Curricula include standards, learning outcomes, sequence and schedule, problems, projects, integrated activities, assessments, and support.
>
> PLTW provides professional development and support. Teachers receive comprehensive training from a PLTW partner university. Training gives teachers full proficiency regardless of previous experience. PLTW's Virtual Academy for Professional Development updates teachers through an online repository of information and references. PLTW also offers counselor conferences to provide high school guidance counselors with a clear understanding of the program and how it fits within a student's scholastic/academic career path.

Appendix A includes more detailed descriptions of both PLTW's Pathway to Engineering and Biomedical Sciences programs, including the course sequences for each.

The curriculum features rigorous, in-depth learning experiences delivered by certified teachers and end-of-course assessments. High-scoring students earn college credit recognized in more

[55] www.pltw.org

than 100 affiliated postsecondary institutions. Courses focused on engineering foundations (design, principles, and digital electronics) and specializations (e.g., architectural and civil engineering, bio-technical engineering) provide students with career and college readiness competencies in engineering and science.

In 2009-10, approximately 130,000 students completed end-of-course assessments. To date, more than 12,000 high school teachers and 8,000 guidance counselors have completed professional development and certification through the national network of higher education institutions.

Evidence of Effectiveness

Currently, longitudinal studies and experimental evaluations of PLTW programs are in process in several states, but several local implementation studies have produced promising results on several outcome measures (Project Lead the Way, 2010, April):

1. *Improving student achievement and college/career readiness**:*** Phelps, L. A., Camburn, E., & Durham, J. (2008)

   This study of TESLA Engineering Charter School students at Appleton East High School in Wisconsin uses the Project Lead the Way Pathway to Engineering curriculum. In comparing the TESLA Engineering senior students and the Appleton East seniors, the analyses revealed that:
   - TESLA/PLTW students scored significantly higher on the ACT composite measure than the non-PLTW students
   - TESLA/PLTW students scored significantly higher ACT-Mathematics and Science sub-scores than non-PLTW students
   - TESLA/PLTW reported higher levels of college intellectual openness and pursuing career exploration activities that are critical to postsecondary STEM success than their peers.

2. *Significant improvement in Mathematics and Science:* Southern Regional Education Board (SREB) July, 2009.

   This study of PLTW students participating in the 2008 SREB-High Schools That Work (HSTW) assessment determined that:
   - PLTW students were significantly more likely to complete at least four years of mathematics and three years of science courses.
   - Significantly more PLTW students meet readiness goals, aligned with NAEP assessments, in reading, mathematics, and science.
   - PLTW students integrated more academic knowledge and skills in Career Technical Education classes and PLTW students experienced more engaging mathematics instruction.

3. *Significant indicators of college readiness:* Walcerz, Douglas (2008-2009)

This study based on a 12,506 surveys of PLTW students across the nation measured the characteristics and habits of mind students need to succeed in college and plans for postsecondary education and found that:

- 94% - 97% plan to attend either a two or four-year postsecondary institution
- 80% indicated that their PLTW course taught them a lot about engineering and technology careers
- 70% indicated their PLTW experience increased their likelihood of studying engineering and technology after graduating
- Most students said PLTW experiences significantly increased their ability to succeed in postsecondary education

4. Closing the achievement gap for Latino middle school students: Heywood, J., White, S., December 31, 2009.

This study evaluated the impact of PLTW in three poverty impacted, largely Latino-populated middle schools. Students from three urban middle schools followed a three-year PLTW Gateway to Technology curriculum plan that focused on science learning. All of the PLTW students began middle school (6^{th} grade) at lower proficiency in math, reading and science and with lower attendance rates than the control group of non-PLTW students.

- By 8^{th} grade, achievement and attendance gaps had been eliminated
- By the end of the third year, PLTW students outperformed the control group

This study suggests that a long-term exposure to the PLTW program has the potential for removing an achievement gap for students in urban settings. It is well-known that if students are not math, science, and reading ready when they finish the eighth grade, the likelihood of their entering and completing career- and college-ready math and science courses is significantly reduced.

In sum, Project Lead the Way is one of the most comprehensive examples of what career and technical education can be, it should be clear that the program is quite different from what has been traditionally called vocational education, the program superbly implements the ideas and strategies of Wyoming's strategic plan on career and technical education and there is emerging research across the country that student's in the program perform at higher levels in multiple areas compared to similar students who have not had the PLTW course experiences.

THE COSTS OF IMPLEMENTING PROJECT LEAD THE WAY IN THE CONTEXT OF WYOMING'S FUNDING MODEL

PLTW's web site has detailed manuals for districts and schools to determine the costs of implementing the program. There are three primary costs:

- Class sizes
- Professional Development
- Equipment.

Class Size

For many districts, PLTW's suggestions for class size usually require a reduction in the number of students. The program recommends that class sizes be around 25 students. This is larger than currently provided in the Wyoming Funding Model for all high school classes, and therefore would not require additional resources. Moreover, assuming PLTW can serve as the cost-basis for a high quality career and technical education program, its class size requirements would not need the additional weighting of 0.29 that Wyoming now provides for such courses either.

Despite the apparent ability of Wyoming school districts to support a program as extensive as PLTW without staffing resources beyond what are available in the base funding model, we would advise the state to continue collecting data on the number of students in career, technical and vocational education courses, as well as have the WDE continue to approve career and technical programs. However, at this time it does not appear that class sizes smaller than the 21 ADM per teaching position in the current model are needed for top quality career and technical programs.

Professional Development

PTLW also has considerable professional development requirements, including summer institutes where teachers are trained and certified to be PLTW course instructors. Our analysis of the fiscal requirements for training to meet the needs of PTLW fit well within what Wyoming already provides through the Funding Model for professional development. This includes 10 pupil free days for training, $116.76 per pupil for training costs, time during the day for teacher collaborative work, and instructional coaches and facilitators in schools. It is our conclusion that no additional professional development funding is required for districts and schools to become involved in PLTW but that current professional development resources would need to be tapped to develop the initial and ongoing teacher capacity to deliver such a program.

Equipment

PLTW also requires substantial computer equipment for most of its classes. Because the program prefers that students work in teams as they collaboratively solve problems, the program recommends at least 1 computer for every 3 students, including a computer for the teacher, and for a few of the classes, a more powerful computer for the teacher. Computer technology as called for by PLTW can be purchased with the $250[56] per pupil that we recommend be included in the Wyoming Funding Model for all schools and programs. The computer technology needs of PLTW for both students and teachers can largely be supported by the resources that are included in the regular funding model.

PLTW does require some special equipment purchases for some programs. For example, the Computer Integrated Manufacturing course requires specialized equipment costing about $40,000 with annual maintenance costs of $4,000 a year. Assuming the equipment lasts five years, the upfront costs can be amortized over 5 years at an annual cost of $8,000 plus the

[56] The Wyoming Funding Model currently provides $290.91 per pupil for computer equipment and technology costs.

ongoing cost of $4,000 for a total equipment cost of $12,000 per teacher/course. Special equipment costs for other courses are much smaller, ranging from $1,500 to $15,000 with annual maintenance costs running from $1,000 to $2,000 a year. Again assuming a five year life of the major equipment purchase, these costs range from approximately $300 to $3,000 a year, plus the maintenance averaging $1,500 a year, or a total of from $1,800 to $4,500 a year. All of these costs can be covered by the $9,027.27 per voc/career/ed teacher allocation in the current funding model. If this allocation is more than is needed in any one year for specialized equipment, the "extra" funds could be devoted to more powerful computers for some PLTW courses.

Appendix B includes a summary of PLTW program costs, delineated by Project Lead the Way, but note that the summary includes costs assuming districts and schools start with an empty classroom, which would not be the case in Wyoming, and also includes professional development costs, which are covered in other portions of the Wyoming Funding Model.

2010 Recommendation

We recommend that Wyoming modify the parameters of the funding model for career, technical and vocational education. Specifically, the state over staffs career and technical education programs by the additional 0.29 weight given to every student in an approved career, technical and vocational education program. The weight is no longer needed because one of the highest end and most effective career technical education programs used by school districts today can be run effectively with class sizes of 21 as funded through the base funding model. We recommend that the state retain the $9,027.27 per vocational/career tech teacher to cover equipment costs beyond those of desktop computers and related software. This funding level would be more than adequate to provide for the equipment needs of a career and technical education program as advanced as Project Lead the Way. It would also provide additional flexibility to enable districts to purchase more than one computer for every three students, and perhaps even more powerful computers for students in advanced career and technical education programs.

APPENDIX A

PROJECT LEAD THE WAY'S
PATHWAY TO ENGINEERING AND BIOMEDICAL SCIENCE PROGRAMS

PLTW's **Pathway To Engineering (PTE)** curriculum is designed as a four-year high school sequence. Three foundation courses – Introduction to Engineering Design, Principles of Engineering, and Digital Electronics – are supplemented by a number of electives to create up to eight rigorous, relevant, reality-based courses:

Foundation Courses

- **Introduction to Engineering Design (IED).** Designed for 9th or 10th grade students, the major focus of the IED course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards and technical documentation. Students use 3D solid modeling design software to help them design solutions to solve proposed problems and learn how to document their work and communicate solutions to peers and members of the professional community.
- **Principles of Engineering (POE).** This survey course of engineering exposes students to major concepts they'll encounter in a postsecondary engineering course of study. Students employ engineering and scientific concepts in the solution of engineering design problems. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, documenting their work and communicating solutions to peers and members of the professional community.
- **Digital Electronics (DE).** Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras and high-definition televisions. The major focus of the DE course is to expose students to the process of combinational and sequential logic design, teamwork, communication methods, engineering standards and technical documentation. This course is designed for 10th or 11th grade students.

Specialization Courses – usually for students in grades 11 and 12.

- **Aerospace Engineering (AE).** Aerospace Engineering engages students in engineering design problems related to aerospace information systems, astronautics, rocketry, propulsion, the physics of space science, space life sciences, the biology of space science, principles of aeronautics, structures and materials, and systems engineering. Using 3-D design software, students work in teams utilizing hands-on activities, projects and problems and are exposed to various situations encountered by aerospace engineers.
- **Biotechnical Engineering (BE).** Biomedical Engineering exposes students to the diverse fields of biotechnology including biomedical engineering, molecular genetics, bioprocess engineering, and agricultural and environmental engineering. Lessons

engage students in engineering design problems related to biomechanics, cardiovascular engineering, genetic engineering, agricultural biotechnology, tissue engineering, biomedical devices, forensics and bioethics. Students apply biological and engineering concepts to design materials and processes that directly measure, repair, improve and extend living systems.

- **Civil Engineering and Architecture (CEA)**. In this course, students apply what they learn about various aspects of civil engineering and architecture to the design and development of a property. Working in teams, students explore hands-on activities and projects to learn the characteristics of civil engineering and architecture. In addition, students use 3D design software to help them design solutions to solve major course projects. Students learn about documenting their project, solving problems and communicating their solutions to their peers and members of the professional community of civil engineering and architecture.
- **Computer Integrated Manufacturing (CIM).** In this course, students answer the questions: How are things made? What processes go into creating products? Is the process for making a water bottle the same as it is for a musical instrument? How do assembly lines work? How has automation changed the face of manufacturing? As students find the answers to these questions, they learn about the history of manufacturing, a sampling of manufacturing processes, robotics and automation. The course is built around several key concepts: computer modeling, Computer Numeric Control (CNC) equipment, Computer Aided Manufacturing (CAM) software, robotics and flexible manufacturing systems.

Capstone Course

- **Engineering Design and Development (EDD)**. This course, usually just for 12^{th} graders, is focused on engineering research in which students work in teams to research, design, test and construct a solution to an open-ended engineering problem. The product development life cycle and a design process are used to guide and help the team to reach a solution to the problem. The team presents and defends their solution to a panel of outside reviewers at the conclusion of the course. The EDD course allows students to apply all the skills and knowledge learned in previous Project Lead the Way courses. The use of 3D design software helps students design solutions to the problem their team has chosen. This course also engages students in time management and teamwork skills, a valuable set for students in the future. This course is designed for 12th grade students.

PLTW's **Biomedical Sciences** program parallels the proven PLTW Engineering program. The initial program includes four courses, all aligned with appropriate national learning standards:

- **Principles of the Biomedical Sciences (PBS).** Students investigate the human body systems and various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. They determine the factors that led to the death of a fictional person, and investigate lifestyle choices and medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, medicine, research processes and bioinformatics. This course is designed to provide an overview of all the courses in the Biomedical Sciences program and lay the scientific foundation for subsequent courses.
- **Human Body Systems (HBS).** Students examine the interactions of body systems as they explore identity, communication, power, movement, protection, and homeostasis. Students design experiments, investigate the structures and functions of the human body, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration. Exploring science in action, students build organs and tissues on a skeletal manikin, work through interesting real world cases and often play the role of biomedical professionals to solve medical mysteries.
- **Medical Interventions (MI).** Students investigate the variety of interventions involved in the prevention, diagnosis and treatment of disease as they follow the lives of a fictitious family. The course is a "How-To" manual for maintaining overall health and homeostasis in the body as students explore: how to prevent and fight infection; how to screen and evaluate the code in human DNA; how to prevent, diagnose and treat cancer; and how to prevail when the organs of the body begin to fail. Through these scenarios, students are exposed to the wide range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. Lifestyle choices and preventive measures are emphasized throughout the course as well as the important roles scientific thinking and engineering design play in the development of interventions of the future.
- **Biomedical Innovation (BI).** In this capstone course, students apply their knowledge and skills to answer questions or solve problems related to the biomedical sciences. Students design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems, addressing topics such as clinical medicine, physiology, biomedical engineering, and public health. They have the opportunity to work on an independent project and may work with a mentor or advisor from a university, hospital, physician's office, or industry. Throughout the course, students are expected to present their work to an adult audience that may include representatives from the local business and healthcare community.

APPENDIX I

MEMO ON CENTRAL OFFICE STAFF

MEMORANDUM

To: Wyoming Select Committee on Recalibration

From: Larry Picus and Allan Odden

RE: Recalibration of Central Office Costs

Date: September 8, 2010

This memo describes our recommendations for a cost based approach to Central Office Costs for the Wyoming School Funding Model. In our desk audit, we suggested that the parameters of the model for central office staff may require modification. This was based on additional research we have done for other states along with an analysis of central office staffing patterns compared to model funding for the state's 48 school districts.

The current funding model provides both professional and secretarial/clerical staff resources for school district central offices. For professional staff, the model allocates a minimum of 3 FTEs, 1 additional FTE prorated from 500 to 1,000 ADM (for a total of 4 at 1,000 ADM), and 1 additional FTE prorated for every 625 ADM between 1,000 and 3,500 ADM. Beyond 3,500 ADM, the model provides 8 FTE per 3,500 ADM.

For Clerical support at the central office, the model provides a minimum of 3 FTEs, with 1 additional FTE prorated from 500 to 1,000 ADM (for a total of 4 at 1,000 ADM), and 1 additional FTE prorated for every 417 ADM between 1,000 and 3,500. Beyond 3,500, the model provides 10 FTE per 3,500 ADM.

The model also provides $312 per ADM (increased by the external cost adjustment to $350.28 per ADM) for central office non-personnel expenditures.

For school year 2008-09, the WDE's Continuing Review of school district spending patterns in comparison to model resources showed that across the state, districts employed 145.7 more professional, and 225.4 more secretarial/clerical positions than were funded through the model[57].

[57] Updated amounts from the January 13, 2010, version of the WDE's Continuing Review report. These amounts were provided by WDE during the May select committee meeting.

Unfortunately, as documented below, our further review suggests that these numbers may not provide an accurate portrait of central office staffing funded through the model, thus complicating the analysis.

Below we lay out the evidence available for staffing central office operations and recommend staffing configurations for the funding model. In addition, we discuss ways districts can staff technology repair staff through current model funding, and provide some insights into why, despite the apparently higher numbers of central staff than funded by the model, further central office staff allocations do not appear necessary at this time. Finally we consider the adequacy of the $350 per ADM for non-personnel services.

Research Base for Allocation of Central Office Staff

Since the 2005 recalibration, we have developed central office staffing standards in three other states, Washington, Wisconsin and North Dakota. In all three states, we used the analysis of Elizabeth Swift as part of her Ed.D. Dissertation research at the USC Rossier School of Education. That research addressed the issue of the appropriate staffing for a district of 3,500 students. Swift's work formed the basis of each states' analysis, where we also conducted professional judgment panels to review the basic recommendations that emerged from Swift's research to estimate central office staffing requirements. Through all that work we were able to estimate the central office resources required for a district of 3,500 students. Table 1 displays the central office staffing estimates we developed for each of the above three states. We also consulted with the staff at Educational Research Services (ERS)[58] and reviewed their analysis of central office staffing patterns.[59] Nothing in our review of ERS research or conversations with ERS staff has uncovered new or helpful research, nor suggested that our recommendations for central office staff should be modified.

The data in Table 1 are helpful as a place to start, but two differences should be noted.

First, both the Wisconsin and North Dakota models include a special education director for a district of 3,500 students, and the North Dakota model also includes a district funded psychologist. Both of these positions (as well as any other central office staff intended to support special education services) would be funded in Wyoming through the State's special education reimbursement. Consequently, the model does not need to fund central office special education staff. With the special education directors and the North Dakota School Psychologist removed from our research based central office staffing allocations, the North Dakota and Wisconsin recommendations are identical with each identifying a total of 7 professional staff members at the central office. Both state models also include 9 clerical positions at the central office. If we assume one of those clerical positions supports the special education program, the remaining number of central office clerical positions to be funded through the model is 8 for a 3,500 student district.

[58] Personal Interview with Nancy Protheroe of ERS, September 2, 2010 and September 7, 2010.
[59] Educational Research Service (2009). *Staffing Patterns in Public School Systems: Current Status and Trends, Update 2009*. Alexandria, VA: Educational Research Service, www.ers.org. Downloaded September 3, 2010.

Table 1
Central Office Staffing Recommendations for a District of 3,500 Students in Other States

Position	WI Base Model	ND Base Model	WA Base Model
Admin/Prof.			
Superintendent	1.00	1.00	1.00
Asst. Supt. (curriculum)	1.00	1.00	1.00
Business Manager	1.00	1.00	1.00
Dir. HR	1.00	1.00	1.00
Dir. Pupil Services	1.00	1.00	1.00
Dir. Special Education	1.00*	1.00*	-
Dir. Tech	1.00	1.00	1.00
Dir. Maint. and Op.	1.00	1.00	-
Psychologist	-	1.00*	-
Clerical			
Sr. Secretary	5.00	7.00	5.00
Secretary	2.00	-	-
Accounting Clerk	1.00	1.00	1.00
Accounts Payable	1.00	1.00	1.00
Other State Totals			
Total Admin/Prof	8.00*	9.00*	6.00
Total Clerical	9.00*	9.00*	7.00

*These figures include a special education director and clerical support for special education in both North Dakota and Wisconsin as well a psychologist in North Dakota, positions that are funded in Wyoming through the special education reimbursement.

Second, we note that the Washington estimate of 6 professional and 7 clerical staff at the central office is lower than current model funding in Wyoming. Moreover, it probably is inadequate as a cost based staffing model for Wyoming school district central offices if they are to manage the staffing levels provided at the school level through the funding model – staffing levels that are substantially higher than are available to school districts in Washington. We also consider the Washington central office estimates to be generally low because they are based on a set of staff ratios that were developed some 20 or more years ago. Districts in Washington have been limited in the staff they can employ (at schools as well as at the district level), and even though the professional judgment panels we worked with supported increases in staffing from current levels in 2006, their recommendations – as shown in Table 1 – remained lower than the research-based estimates we developed in North Dakota and Wisconsin.

Although the research basis for staffing school district central offices is relatively limited, analysis of the ERS Staffing Ratio report shows that nationally school districts with between 2,500 and 9,999 students employ an average of one central office professional/administrative staff member for every 440.0 students.[60] This works out to almost exactly 8 central office professionals (7.95) in a district of 3,500 students. Our research based staffing formula of 7 FTE plus a special education director matches the ERS estimate of 8 FTE central office staff for a school district of 3,500 students nationally.

The same research efforts that identified a cost based estimate of professional staff in central offices were used to estimate the appropriate level of clerical staffing at 9 FTE for a district of 3,500 students. If a secretary/administrative assistant for the special education director is funded through the special education budget, then the remaining 8 FTE clerical staff could include 6 secretaries, an accounting clerk and an accounts payable clerk or some other combination of staff as deemed appropriate by the district. ERS does not publish data on clerical staff ratios[61] so it is not possible to compare this figure with national practice, but the evidence-based data collection strategies identified above suggest this should be an adequate figure for clerical staff.

There are only five districts in Wyoming with 3,500 or more students, so staffing levels need to be determined for smaller districts as well. In the 2005 recalibration, we initially suggested that a school district needed a minimum of a superintendent and a business manager as well as two clerical staff to support them. The professional judgment panels we met with in 2005 indicated that even the smallest districts (up to 500 students) needed a technology director. We concurred with that recommendation and suggested that the funding model staff a minimum of 3 FTE professional and 3 FTE clerical positions for central offices. We also recognized that as the number of students increase, by the time a district enrollment reached 1,000 students, it would need four central office staff (superintendent, business manager, assessment director and a technology manager), as well as 4 FTE clerical staff to support central office operations. We have not identified any research that would lead us to change the recommendation of 4 professional and 4 clerical staff for a district of 1,000 students, although we expect that compared to other districts of 1,000 students around the country this is a generous central office staffing configuration.[62]

While there is still no research base to suggest adequate staffing levels for such small districts, we continue to expect 3 FTE professional staff would be adequate for districts with enrollments

[60] ERS Staffing Ratio Study, p. 7

[61] ERS indicated that they do not collect data on clerical positions because in their experience, it is the administrative positions that are of policy interest to school districts and the public.

[62] The ERS Staffing Ratio Study (2009, p. 7) found an average of 353.8 students per central office professional for school districts with 300 to 2,499 students. This works out to 2.8 professional staff in a district of 1,000 students.

up to 500, and our assumption is that in addition to the superintendent and business manager, the third position could be responsible for technology and assessment.

Thus, our recommendation for central office staffing is that for professional staff, the model fund 3 FTE professional and 3 FTE clerical positions for districts with 500 or fewer students, and that between 500 and 1,000 students this figure be prorated such that for a district with 1,000 students there are 4 FTE professional and 4 FTE clerical staff in the central office. This is identical to the current funding model.

Above 1,000 students, we recommend allocating additional professional staff on a per student basis until a total of 7 FTE professional and 8 FTE clerical positions are funded for a district of 3,500 students. Beyond 3,500 students central office staff will be allocated on a pro-rata basis of 7 professional and 8 clerical staff per 3,500 students. Table 2 at the end of this memo summarizes the differences between this recommendation and current central office staffing patterns.

Current Central Office Staffing

There has been considerable concern about the number of central office staff members in Wyoming districts compared to the staffing level in the funding model. To better understand and to decompose how staff are counted at the central office level, we talked with a number of district business managers. What we discovered is that there are problems with the way central office staff are counted and that there is a "quirk" in the funding formula that could provide more funding than is needed for some central office positions.

First, it became clear that the WDE count of central office staff may have included individuals who were funded through special education reimbursement funds, transportation reimbursement funds, or Federal funds. In addition, we found situations where individuals were coded to the central office staff when in fact the model provides school level resources to fund that position. For example some districts listed head custodians or instructional facilitators who worked at multiple school sites as central office staff, despite funding for such positions in the model's school level resource allocations. Thus many of the positions counted by WDE as central office personnel may in fact have been funded through other resources.

The "quirk" in the funding formula arises from the fact that the fourth professional FTE and beyond, is resourced at the average salary level of two assistant superintendents and one business manager. The first three FTEs are resourced one superintendent salary, one assistant superintendent salary, and one business manager salary. This makes sense in small districts where any additional central staff are likely to be at the assistant superintendent level. But in larger districts there are a number of positions such as coordinators and directors who are paid at rates lower than that of an assistant superintendent. Consequently, it may well be possible under the block grant funding model for a district to employ more FTEs than the model identifies, but still spend at or below the total dollar revenue generated for central office salaries.

When we talked with district officials about these counts we fund corroborating information suggesting that the initial WDE counts may have included more staff positions than are funded through the model and/or who receive lower salaries than the model provides. In both cases, the number of central office staff would appear to be higher than the model resources, but for different and acceptable reasons. In one larger district that reported over 40 central office staff, when custodians, instructional facilitators and athletic directors were allocated to school sites as part of the school revenue streams through the model, the total central office professional staff count declined to about 25 – and the model generated about 29 positions for that district.

This has led us to conclude that the districts may not necessarily be over staffed at the central office – at least in terms of funding through the model. What is needed is a consistent definition of central office staff and accurate coding of positions in school district financial reports. We fear neither has quite been achieved at this point in time.

Staff for Technology Maintenance and Repairs

When the Select Committee met in August, representatives of the Wyoming School Administrators Association expressed concern that the model does not include adequate staffing to repair and maintain technology. In our 2005 recalibration report, we recommended that districts include maintenance agreements when they purchase computer and related technologies to make the maintenance and upkeep of computers the responsibility of firms that specialize in these issues and not district staff.

Moreover, our expert on costing and operating computer technologies in school districts suggests that even with maintenance agreements, it is wise for districts to have a small number of staff who can fix and maintain computer technologies. At the same time, we note that often individuals in library media technician positions play this role in many school districts; their job is technical and, though focused on library services, includes all or nearly all of the skills to engage in modest maintenance of school-based computer technologies.

Analysis of the librarian and library/media tech staffing compared to the model suggests that adequate resources for this type of computer maintenance might be available. Data provided by the WDE show that districts currently employ 143.8 fewer librarians than the model resources and 265.66 more library technicians than the model resources. Librarians are funded at the salary level of teachers, while all library/media tech staff are funded at the level of computer technicians. Thirty-six of the 48 districts specifically identify some portion of their library/media techs as computer technicians, and a total of 167.30 of the 396.52 library/media techs employed by the districts are identified as computer technicians. We are unable at this time to compare total expenditures in these two categories with the dollar level of resources generated in the categories, but our sense is that the total resources generated for the 143.8 fewer librarians employed have in part allowed districts to fund the 229.22 non-computer technician library/media aides across the districts.

We noted in our Desk Audit that the Wyoming model's staffing for libraries far exceeded that in any other state, not even considering the fact that many schools across the country are switching from full time librarians in elementary schools (which are funded by the Wyoming model) to library technicians simultaneously with automating the library.

Rather than engage in a full recalibration of library staff, we suggest that the model maintain the current staffing levels – which are 1 librarian for every prototypical 288 ADM elementary school, and 1 librarian for every prototypical middle and high school with a student count between 105 and 630 plus 1 library media technician for every 315 middle and high school students (or two in a 630 student middle and high school) – and for now recognize that the library staffing resources generated by the model help to provide both library services and computer maintenance and support services. We also note that the model resources the media/technicians in the schools at salary rates comparable to computer technicians so districts have resources necessary to hire individuals with these qualifications. This approach keeps model staffing constant, recognizes the underutilization of librarian staffing resources and finds resources to both support library operations and to maintain district investments in technology. A needed role for the use of library media technician staffing can be accomplished as well as.

Table 2
Comparison of Recommended Central Office Staffing with Current Model

	Professional Staff		Clerical Staff	
Enrollment	Current Model	Proposed Model	Current Model	Proposed Model
100	3.00	3.00	3.00	3.00
500	3.00	3.00	3.00	3.00
750	3.50	3.50	3.50	3.50
1,000	4.00	4.00	4.00	4.00
1,500	4.80	4.60	5.20	4.80
2,000	5.60	5.20	6.40	5.60
2,500	6.40	5.80	7.60	6.40
3,000	7.20	6.40	8.80	7.20
3,500	8.00	7.00	10.00	8.00
5,000	11.43	10.00	14.29	11.43
8,000	18.29	16.00	22.86	18.29
12,000	27.43	24.00	34.29	27.43

Non-Personnel Costs

As indicated above, the 2005 recalibration included $312 per ADM for non-personnel services in the central office budget of school districts. This figure has increased by the ECA to a total of $350 per ADM, of which districts currently spend $318. Spending in this category includes a range of non-personnel items including property insurance, supplies and materials, travel, and purchased services. As we discuss in the memo on maintenance and operations, many of the purchased services in this category are for maintenance and operations – approximately $85 per pupil. While average district spending in this category is lower than the model's resources, we have not identified any new information or research to suggest that the ECA adjusted figure of $350 is not representative of the costs districts are likely to incur in this category. Moreover, to some extent, purchased services are likely to be utilized for unexpected or unforeseen circumstances – such as an unanticipated repair to a school facility – and consequently districts may use some of this money as a contingency, spending it in years when special needs arise and using it as a carryover when such issues are not a problem. In those circumstances, combine with the lack of a research base to indicate differently, we would not recommend changing this funding level at the present time.

APPENDIX J

MEMO ON OPERATIONS AND MAINTENANCE COSTS

MEMORANDUM

To: Wyoming Select Committee on Recalibration

From: Larry Picus and Richard C. Seder[63]

RE: Recalibration of Maintenance and Operation Costs

Date: September 12, 2010

EXECUTIVE SUMMARY

Our Desk Audit of the Wyoming Funding Model recommended the recalibration process review Maintenance and Operations (M&O) costs as part of the State's continuing efforts to monitor the cost basis of the components within the Wyoming Funding Model. This component was considered for review, in part, because the WDE *Continued Review of Educational Resources in Wyoming, 2005-06 through 2008-09* report found substantially fewer M&O staff in school districts than the model generated, and because we felt it important to review recent research on the provision of these services.

In addition to the staffing ratios for M&O in the Wyoming Funding Model, the 2005 recalibrated model included funding for Central Office Miscellaneous Expenditures, a portion of which is identified for M&O "purchased services," which include expenses for property insurance and contracted services. Therefore, total M&O resource funding embedded in the Wyoming Funding Model includes a staffing component (via formula), a purchased-services component (via per-ADM funding in the central office component of the model), and a supplies and materials component (via per-square footage funding).

To explore the continued research-based cost basis of M&O, we utilized staffing standards available from APPA, a professional association dedicated to educational facilities management. APPA has staffing standards for maintenance workers, custodians, and groundskeepers; the same staff categories for which districts receive funding through the Wyoming Funding Model. These staff resources are allocated according to different service care and stewardship levels. After

[63] Richard C. Seder, Ph.D. is a consultant to the State. Matthew Wilmarth of the LSO also provided substantial background research and data analysis for this memo.

careful review of APPA's web site[64] and publications,[65]which are considered industry standards for educational facilities, we found the APPA staffing ratios offered the best research basis for establishing an appropriate benchmark for estimating the cost basis for O&M for the Wyoming Funding Model.

APPA standards offer a range of services levels. We assumed a high level of care and stewardship for the maintenance and operations of Wyoming school facilities (see the appendix for details) and estimated the resources necessary to meet those service levels using the staffing standards recommended by APPA. Our baseline estimates suggest that using the APPA standards would generate resources comparable to those M&O resources currently provided for in the Wyoming Funding Model through a combination of the staffing ratios, funding for supplies and materials, and the resources for purchased services (funded through the central office per ADM allocation for non-personnel resources). **Through this process, we are confident that the current approach to funding M&O services in Wyoming school districts relies on an adequate, evidence-based, cost basis.**

Looking forward, we suggest additional and more detailed data be collected about the buildings and grounds in Wyoming's school districts to allow for continued monitoring of the cost basis of routine maintenance and operations. Given the care and stewardship standards articulated by APPA, we also encourage the Legislature to explore a set of monitoring mechanisms associated with routine maintenance and operations. Buildings and grounds that are not properly maintained (through deferred maintenance), lead to faster depreciation, resulting in increased medium- and long-term cost pressures on the general fund, major maintenance and capital construction expenditures, the latter also currently funded entirely by the state.

M&O IN THE CURRENT MODEL

Model funding for M&O consists of funding through three sources:

- *Personnel*: staffing formulas for custodians, maintenance workers and groundskeepers.
- *Supplies & Materials:* 64 cents per gross square foot[66] (GSF) of building space for supplies and materials (adjusted from 57 cents per ADM in 2006-07 by the ECA).
- *Non-Personnel:* the model provides M&O funding through central office non-personnel expenditures—part of the current $350 per ADM—for activities such as contracted/purchased services and property and equipment insurance.

*Wyoming's smal*l districts are unlikely to need full-time employees for many specialized maintenance and operations functions. Moreover the labor markets in the state's smaller

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[64] http://www.appa.org/index.cfm

[65]*Custodial Staffing Guidelines for Educational Facilities*, Published by: APPA, 2nd Edition, 1998; *Maintenance Staffing Guidelines for Educational Facilities*, Published by: APPA, 2002; *Operational Guidelines for Grounds Management*, Published by: APPA, National Recreation and Park Association, Professional Grounds Management Society, 2001.

[66] The GSF used is the lesser of the actual or 115% of the School Facilities Commission's allowable.

communities are unlikely to have enough demand (public and private) for individuals with some of these skills to remain fully employed. Consequently, contracting for specialized services on an as-needed basis is an efficient and cost-effective approach for school districts. The result is that districts can choose to hire M&O staff or utilize the available funding to contract for these M&O services. These choices are likely best made at the local level and represent one of the strengths of the block grant approach used by the funding model.

In total for 2009-10, the Wyoming Funding Model generated $86.44 million dollars in resources for Wyoming's 48 school districts. This consisted of $74.66 million for maintenance and operations staff and $11.78 million for supplies and material. Finally, non-personnel M&O expenditures equaled approximately $10.7 million of the $30.5 million of funding from central office non-personnel per-ADM funding.

This section summarizes the approach used to generate staff positions. Complete details on how the formulas were derived and how they operate can be found in the 2005 recalibration report. (See pages 118 through 133) Minor changes were made to the allocation of groundskeepers in 2008, and they are described in this memo.

Custodians – Current Model Formula

Custodians generally work in one school and are primarily responsible for daily cleaning tasks, routine furniture movement to accommodate different events, and minor repairs that can be completed easily and as part of their routine duties. Most school districts allocate custodian positions on the basis of square footage, and sometimes consider school enrollment as well to measure the intensity of the workload.

The current funding model considers four work level measures, averages them and then makes minor adjustments to compensate for the generally small size of Wyoming schools to estimate the number of custodians. The four measures are:

- 1 Custodian for every 13 teachers, plus
- 1 Custodian for every 325 students, plus
- 1 Custodian for every 13 classrooms, plus
- 1 Custodian for every 18,000 Gross Square Feet (GSF)

The total is divided by four to generate the number of custodians at a school building. For secondary schools, the model also allocates an additional 0.5 FTE position.

In addition, the model generates custodians to maintain other district facilities at the rate of 1 per 18,000 GSF for 10 percent of the district's model GSF.

The use of four separate measures that are then averaged was recommended by the school districts during our Professional Judgment Panel meetings that were part of the recalibration process in 2005. Districts argued that the variation in district facilities and settings (location) required them to make a variety of different choices about how to allocate custodial staff depending on how school buildings were used by the district and the use made of the facility by other community organizations. As a result of these differences across districts in Wyoming, the recalibration report recommended averaging the four approaches for computing custodial staffing needs.

Maintenance Workers – Current Model Formula

Maintenance workers are assumed to work across the district and provide routine maintenance as well as repairs to larger more complex equipment such as heating and cooling systems. The computation is based on a number of school level factors for schools with more than 49 students and is based on the average of the following four components:

- 1.1 FTE maintenance worker
- 1.2 FTEs for every 60,000 GSF
- 1.3 FTEs for every 1,000 ADM
- 1.2 FTEs for every $5,000,000 of operating expenditures.

After averaging these four components further adjustments are made for the schools grade level, the age of the building (slight reduction if less than 10 years old and an increase if the school is more than 30 years old), and districts with fewer than 1,000 students.

Groundskeepers – Current Model Formula

The initial funding model generated groundkeeper positions at the rate of one FTE position for every 93 acres of land at a site. For school sites this was multiplied by 1.5 for middle schools and 2.5 for high schools. Because all district sites (even vacant ones) were included, this formula led to substantial variation in the number of FTE groundskeepers generated by the model among districts with similar numbers of schools, and appeared to create an unintended incentive for districts to acquire land or to site schools on particularly large plots of land that would generate additional groundskeeper FTEs. In 2008, the formula was modified so that schools and district facilities would only generate groundskeeper positions on the lesser of actual acreage or the acreage allowed by the School Facilities Commission. In addition, sites with no facilities would not generate any groundskeeper FTEs. This modification was only applied to property acquired after July 1, 1997.

Finally, analysis of groundskeeper positions shows that districts report only 40 FTE groundskeepers across the entire state suggesting they are coded elsewhere (likely with custodians or maintenance workers) in their staffing reports submitted to the Wyoming Department of Education.

TESTING THE COST BASIS OF THE M&O COMPONENT

As part of our efforts to test the cost basis for the M&O component of the Wyoming Funding Model, we identified APPA, a national reference on educational facilities management standards for establishment of staffing needs for maintenance and operations. APPA standards are based on five levels of service and stewardship with recommended staffing needs associated with those service levels. These Levels of Service range from 1 to 5, with Service Level 1 often identified with pristine upkeep and maintenance and Service Level 5 often identified with very low levels of upkeep and maintenance and a general state of disrepair. Across custodial and maintenance worker service levels, Service Level 2 is the recommended level of service. For groundskeepers, Service Level 2 is the recommended level of service for well-developed public areas while Service Level 3 is identified as “moderate-level” maintenance and should be associated with those locations that have moderate to low levels of development or visitation. Descriptions of the levels of service for custodians, maintenance workers, and groundskeepers are described below. Based on these service level standards, APPA developed service ratios associated with each level of service and stewardship. Descriptions of the APPA standards and staffing ratios for custodians, maintenance workers, and groundskeepers are described in more detail below.

Custodians – APPA Formula

APPA evaluates custodial staffing needs on three ground rules:

- “Appearance Levels – If cleaning activities are accomplished with decreasing frequency, appearance will suffer. Five appearance levels have been defined.
- Standard Spaces – Not all spaces are created equal. Different types of space require different types and amount of cleaning effort. Thirty-three distinct standard space types have been identified for which cleaning data have been accumulated.
- All data presented in assignable square feet (cleaned square feet, CSF) per worker – This is an industry standard of measure by which comparisons can be made” (APPA, 1998).

Based on these ground rules, APPA established guidelines to describe cleaning requirements to produce five levels of cleanliness: Level 1 – Orderly Spotlessness, Level 2 – Ordinary Tidiness, Level 3 – Casual Inattention, Level 4 – Moderate Dinginess, and Level 5 – Unkempt Neglect.

Facilities are recommended to be maintained at Service Level 2 – Ordinary Tidiness where:

- “Floors and base moldings shine and/or are bright and clean. There is no buildup in corners or along walls, but there can be up to two days’ worth of dust, dirt, stains, or streaks.
- All vertical and horizontal surfaces are clean, but marks, dust, smudges, and fingerprints are noticeable upon close observation. Lights all work and fixtures are clean.
- Washroom and shower fixtures and tile gleam and are odor-free. Supplies are adequate.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free” (APPA, 1998).

Maintenance Workers – APPA Formula

According to APPA, “There are common characteristics that can be used to describe the level of maintenance existing at a campus or facility. Those same characteristics can be used to establish an improvement goal for a higher level of maintenance. These characteristics can also be used as benchmarks to monitor improvements, or provide indicators when making financial decisions” (APPA, 2002). There are 11 characteristics that allow for comparisons between service levels and across characteristics, including: Customer Service and Response Time, Customer Satisfaction, Preventive Maintenance vs. Corrective Maintenance, Maintenance Mix, Interior

Aesthetics, Exterior Aesthetics, Lighting Aesthetics, Service Efficiency, Building Systems' Reliability, Facility Maintenance Operating as Percent of Current Replacement Value, and Campus Average Facility Condition Index (FCI).

APPA determined general descriptions of the essential characteristics used to measure the effectiveness of maintenance at five levels. The five service levels are: Level 1 – Showpiece Facility, Level 2 – Comprehensive Stewardship, Level 3 – Managed Care, Level 4 – Reactive Management, and Level 5 – Crisis Response.

According to APPA, Service Level 2 – Comprehensive Stewardship is the recommended level of service for most facilities, where:

- "Maintenance activities appear organized with direction.
- Equipment and building components are usually functional and in operating condition.
- Service and maintenance calls are responded to in a timely manner.
- Buildings and equipment are regularly upgraded, keeping them current with modern standards and usage" (APPA, 2002).

Groundskeepers – APPA Formula

APPA developed grounds staffing guidelines using two essential factors. The first factor is the type of area maintained and the tasks associated with that maintenance. APPA provided six areas that could be maintained: flower beds, baseball/softball fields, shrub areas, soccer/football fields, open turf areas, and main ground turf areas. The second factor is the level of attention to be paid to the grounds area. APPA developed five levels of attention that could be used to maintain these grounds: Level 1 – State-of-the-Art Maintenance, Level 2 – High Level Maintenance, Level 3 – Moderate Level Maintenance, Level 4 – Moderately Low Level Maintenance, and Level 5 – Minimum Level Maintenance.

APPA stated that the standard Level of Attention that one expects to see on a recurring basis is Level 2. Level 2 grounds are considered to have a high level of maintenance and are associated with well-developed public areas and areas frequently visited. Main school grounds and, perhaps, soccer/football fields satisfy this definition. Level 3 grounds are considered to have a moderate level of maintenance and are associated with locations that have moderate to low levels of development or visitation. Open fields and other areas associated with school campuses along with non-school grounds that do not have a high level of visitation satisfy this definition. School district sites are a mix of highly visited and less visited spaces.

APPA STAFFING LEVEL ESTIMATIONS

We estimated the number of M&O staff that would be generated through the APPA standards utilizing existing building and school site data available from the Wyoming School Facilities Commission (SFC) along with several assumptions about building space and site acreage that is not yet available from the SFC. For the full set of APPA parameters contemplated for the staffing formulas, please see Appendix A to this memo. As part of our recommendations, we suggest that the SFC expand and enhance the information collected and stored about school district buildings and sites.

Staffing estimates developed using the APPA guidelines for the recommended service levels described above are as follows:

> *Custodians:* The estimated number of school-level custodians for school year 2011-12, using APPA Service Level 2 standards, would be 700.75 FTEs. According to the Wyoming Funding Model, an additional 10 percent would then be generated for central administration and other district space for a total of 770.72 FTEs. This would be an estimated increase of 40.95 FTE custodians across the state over the estimated 2011-12 Wyoming Funding Model amount.
>
> *Maintenance Workers:* The estimated number of school-level maintenance workers according to APPA Service Level 2 standards would be 287.59 FTEs. As with school-level custodians, an additional 10 percent would then be generated for central administration and other district space for an estimated total of 316.35 FTE. This would be a decrease of 9.08 FTE maintenance workers across the state compared to the current estimate for school year 2011-12.[67]
>
> *Groundskeepers:* Estimating the number of groundskeepers needed to meet APPA standards was by the far most difficult estimate because SFC does not currently have the kind of precise acreage data on school district grounds required to accurately estimate staffing needs according to APPA standards. To estimate the number of groundskeepers according to APPA standards, we made several assumptions. First, we assumed groundskeeper service level 2 for all elementary school site acreage. Second, for secondary schools we used a mix of service level 2 and service level 3 assuming that some acreage might be considered to have moderate to low levels of development or visitation. Additionally, we utilized the SFC school site acreage standards and estimated the number of non-school groundskeepers based on the median percentage (13.95%) of non-school acreage that exists across districts. Based on these assumptions, the estimated number of additional groundskeepers according to APPA service standards would be 119.99 FTEs.[68]

In total, the APPA standards as estimated herein would generate an estimated 151.86 FTE custodians, maintenance workers, and groundskeepers more than the staffing generated through the Wyoming Funding Model using the aforementioned assumptions. This initially appears to suggest that Wyoming's schools are under-resourced in terms of custodial, maintenance and grounds keeping staff. To test this, we compared the total district funding generated using the

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[67]This may be an over estimation of maintenance workers because gym space is treated as a classroom and thus only counted as 750 classroom GSF, with the remaining GSF of a gym treated as office space. APPA guidelines recommend more maintenance staff resources per SGF for office space than for classroom space.

[68]This is only an estimate and requires substantially more detailed data from SFC before it can be considered reliable for the distribution of resources to school districts.

APPA standards with total funding available to school districts for M&O through the current model formulas.

In making the comparison we assumed that the $0.64 per ADM (supplies and materials) was distributed to districts under both models. Thus, total APPA generated funding included resources allocated for staff (approximately $74.7 million through staffing formulas) and non-personnel (approximately $7.4 million[69]via per-ADM central office allocation) for a total of $82.1 million. We believe that this is the appropriate comparison because school districts can choose to utilize the generated resources in the form of either hired staff or contract/purchased services. Current funding for M&O through the model amounts to $74.66 million for the non-supplies portion of the M&O formula plus the $10.7 million districts spend from the central office per ADM allocation, for a total of $85.4 million, or $3.3 million more than called for with the APPA standards.

The difference between the evidence-based formula developed through the recalibration five years ago and the use of APPA standards to estimate the costs of M&O for Wyoming school districts is quite small, suggesting that there is little need to revise the formulas at the present time.

RECOMMENDATIONS

Two alternative evidence-based approaches to estimating the cost basis for the M&O component of the Wyoming Funding Model reach nearly identical funding levels. This suggests that the formulas currently in use represent an accurate and reasonable approach to estimating the costs of this important service. Moreover, the state's current data capacity supports the method embedded in the existing model. Therefore, we recommend that the Wyoming Legislature maintain the current approaches to funding M&O through the existing staffing formulas, non-personnel allocations, and supplies and materials.

It may be helpful in the future to collect additional and more detailed data about the buildings and grounds in Wyoming's school districts to allow for continued monitoring of the cost basis of routine maintenance and operations. This more detailed school and non-school building and acreage data would provide the state the option of monitoring buildings and grounds according to industry-leading standards of care and stewardship as well as provide the state the option of migrating towards the APPA staffing standards to generate resources within the Wyoming Funding Model at the time of the next recalibration. The question the Legislature should consider is whether the potential enhanced accuracy is worth the expenditures needed to collect the additional data.

Regardless of the direction chosen by the Legislature, the future funding of M&O is really only half of the equation – districts must use the funds they receive to maintain the school facilities they operate. As a result, we would encourage the Legislature to explore a set of monitoring mechanisms associated with routine maintenance and operations. By adopting APPA Level 2

[69]This amount is the preliminary M&O purchased services expenditures for school year 2009-10 less amounts for insurance (objects 381, 382, 383, and 385).

standards of service for routine maintenance, a level for which they are currently providing adequate funding, we believe the State will realize a cost-savings through reduced deferred maintenance.

APPENDIX A
APPA STAFFING STANDARDS FORMULA PARAMETERS AND ASSUMPTIONS

Custodians
APPA utilizes an average workload for custodians according to the types of space requiring custodial services. These workloads are expressed in the form of number of people per square feet for a given type of space (e.g., classrooms, gymnasiums, hallways, washrooms, etc.). To arrive at the number of custodians then involves dividing the square footage of the school space by the workload associated with that space.

Estimating the number of custodians according to APPA Service Level 2 standards required the following assumptions:

- School classroom square footage was calculated by multiplying the number of classrooms in the school, as provided by the Wyoming School Facilities Commission (SFC), by an average classroom size of 750 square feet[70].
- Classroom space was assumed to be 65 percent hard floors with regular use and 35 percent carpeted floors with regular use. Service Level 2 uses 16,700 cleanable square feet (CSF) per custodian for classrooms with hard floors that are regular use and 21,700 CSF per custodian for classrooms with carpeted floors that are regular use. The weighted average of the two classrooms, 18,450 CSF per custodian, is used to estimate custodian FTEs for classrooms.
- Non-classroom space was assumed to be the model gross square footage (GSF), the lesser of the actual GSF or the SFC allowable GSF adjusted by 115 percent, minus the calculated classroom square footage with the workload associated with these spaces being an average of several APPA workload guidelines for non-classroom spaces. The spaces and CSF that are used in the non-classroom average for Service Level 2 are: Entranceway (7,500), Locker/Changing Room (12,100), Office with Carpet (18,200), Public Circulation Space – Hard Floor (20,500), Public Circulation Space – Carpet (40,400), Stairwell (15,100), Storeroom (210,000), Washroom (2,600), Shower Room (5,200), Office – Hard Floor (14, 600), Washroom – High Use (1,300), Cafeteria – Carpet (15,400), Cafeteria – Hard Floor (16,400), Library – Carpet (36,900), Library – Hard Floor (20,200), Auditorium Seating and Foyer (14,000), and Gymnasium – Wood Floor (36,000). The average CSF used to estimate custodian FTEs for non-classroom spaces is 28,641 CSF.

Below is an example showing how this calculation would work for a school with a model GSF of 50,000 and 25 classrooms:

- Classroom GSF = 18,750 (25 classrooms x 750)
- Classroom custodian FTE = 1.43 (18,750 ÷ 13,150)
- Non-classroom GSF = 31,250 (50,000 – 18,750)
- Non-classroom custodian FTE = 1.09 (31,250 ÷ 28,641)
- Total school-level custodian FTE = 2.52

Given the custodian assumptions, the estimated number of school-level custodians for school year 2011-12, using APPA Service Level 2 standards, would be 700.75FTEs. According to the

[70] The 750 amount was provided by SFC staff.

Wyoming Funding Model, an additional 10 percent would then be generated for central administration and other district space for a total of 770.72 FTEs. This would be an estimated increase of 40.95FTE custodians across the state over the estimated 2011-12 Wyoming Funding Model amount.

Maintenance Workers

APPA utilizes an average workload for maintenance workers according to the types of space requiring routine maintenance services. These workloads are expressed in the form of number of people per 1 million square feet for a given type of space (e.g., classrooms, gymnasiums, hallways, washrooms, etc.). To arrive at the number of maintenance workers then involves dividing the square footage of the school space by the workload associated with that space. Estimating the number of maintenance workers according to APPA Service Level 2 standards required the following assumptions:

- Space in a school was assumed to be either classroom space or office space.
    - Classroom space is defined by APPA as classroom, seminar, conference, lecture hall, theatrical seating, demonstration, gymnasium, lounge space.
        - Service Level 2 provides 12 FTE maintenance workers for every 1 million GSF.
    - Office space is defined by APPA as offices, all library (study) spaces, and general support facilities such as maintenance shops and storage.
        - Service Level 2 provides 15 FTE maintenance workers for every 1 million GSF.
- Classroom GSF is calculated by multiplying the number of classrooms in the school by an average of 750 square feet.
- Office GSF is calculated by subtracting the calculated classroom GSF from the school's model GSF.
- APPA adjustment factors are applied for campus size.
    - Schools with a model GSF of 100,000 of less are adjusted by 10.0 percent.
    - Schools with a model GSF between 100,001 and 250,000 are adjusted by 7.0 percent.
    - Schools with a model GSF between 250,001 and 500,000 are adjusted by 4.0 percent.
- APPA adjustment factors were applied for building age.
    - Schools 24 years old or less are not adjusted.
    - Schools 25-29 years old are adjusted by 1.0 percent.
    - Schools 30-39 years old are adjusted by 2.0 percent.
    - Schools 40-49 years old are adjusted by 4.0 percent.
    - Schools 50-74 years old are adjusted by 5.0 percent.
    - Schools 75-100 years old are adjusted by 7.0 percent.
    - Schools older than 100 are adjusted by 10.0 percent.
- APPA adjustment factors are applied for the condition of the school as measured by the Facility Condition Index (FCI).
    - Schools with an FCI of 0.0-1.99 are adjusted by -5.0 percent.
    - Schools with an FCI of 2.0-3.99 are adjusted by -3.0 percent.
    - Schools with an FCI of 4.0-4.99 are adjusted by -1.0 percent.
    - Schools with an FCI of 5.0-9.99 are not adjusted.
    - Schools with an FCI of 10.0-19.99 are adjusted by 3.0 percent.

- Schools with an FCI of 20.0-30.00 are adjusted by 7.0 percent.
- Schools with an FCI greater than 30.00 are adjusted by 10.0 percent.

Below is an example showing how this calculation would work for a school with a model GSF of 50,000, 25 classrooms, 20 years old, and an FCI score of 10:

- Classroom space = 18,750 (25 classrooms x 750)
- Classroom custodian FTE = .225 [(18,750 x 12) ÷ 1,000,000]
- Office space = 31,250 (50,000 – 18,750)
- Office custodian FTE = .50 [(31,250 x 16) ÷ 1,000,000]
- Total school-level maintenance worker FTE *before* adjustments = .725
  - Square footage adjustment = .10 (model GSF is less than 100,000)
  - Building age adjustment = 0.0 (age is less than 25 years old)
  - FCI adjustment = .03 (FCI is between 10.0 and 19.99)
- Total school-level maintenance worker FTE *after* adjustments = .855

Given these assumptions, the estimated number of school-level maintenance workers according to APPA Service Level 2 standards would be 287.59 FTEs. As done with school-level custodians, an additional 10 percent would then be generated for central administration and other district space for an estimated total of 316.35 FTEs. This would be a decrease of 9.08.8 FTE maintenance workers across the state compared to the current estimate for school year 2011-12. However, this is an overestimation of the number of maintenance workers because the classroom space does not accurately capture the square footage associated with the gymnasium in the school. The vast majority of the gymnasium square footage is counted as "office" space that requires a greater number of maintenance workers per 1 million square feet than does classroom space according to the APPA Service Level 2 standards. Therefore, the number of FTE maintenance workers would decrease further resulting in a greater difference between the estimated number and the number calculated using the current formula.

Groundskeepers

APPA utilizes an average workload for groundskeepers according to the types of acreage requiring grounds keeping services. These workloads are expressed in the form of number of people per acre depending on the type of acreage being considered (e.g., soccer/football fields, open turf areas, and main ground turf areas). To arrive at the number of groundskeepers then involves identifying the acreage associated with the school space by the workload associated with that type of acreage. However, detailed information about site acreage is currently unavailable through the Wyoming SFC. Given this lack of detailed information about site acreage, two scenarios were used:

1. Staffing for groundskeepers for secondary school sites using a mix of service levels, with 1/3 of the acreage staffed at Attention Level 3 for open turf areas (33.33 acres for 1 FTE) and 2/3 of the acreage staffed at Attention Level 2 for main ground turf areas (2.30 acres for 1 FTE) and soccer/football fields (4.09 acres for 1 FTE).

2. Staffing for groundskeepers for elementary school sites using only Service Level 2 across all school site acreage, a level that would be the upper bounds of how many groundskeepers needed to maintain the grounds of Wyoming's school districts.

Estimating the number of groundskeepers according to APPA standards also required the following assumptions:

- Utilizing the lesser of the actual site acreage or the Wyoming SFC allowable. The guidelines for calculating the allowable school site acreage are:
    - Elementary schools are allowed 4 acres plus 1 acre for every 100 students.
    - Middle schools are allowed 10 acres plus 1 acre for every 100 students.
    - High schools are allowed 20 acres plus 1 acre for every 100 students.
    - The allowable acreage would be calculated at the highest school level on the site (e.g., a K-12 would be allowed the lesser of the actual acreage or 20 acres plus 1 acre for every 100 students).
- Non-school site acreage to be staffed 1/3 of acreage at Level 2 for main ground turf areas and 2/3 of acreage at Level 3 for open turf areas.
- Activity frequency for school sites was assumed to be weekly, which provides an adjustment factor of 1.0, and activity frequency for non-school sites was assumed to be bi-weekly, which provides and adjustment factor of 0.50.
- The statewide median of 13.95 percent additional acreage for non-school acreage in a district—half of Wyoming's school districts have more than 13.95 percent additional acreage and half of Wyoming's districts have less than 13.95 percent additional acreage.

Below are three examples calculating groundskeepers for elementary, middle, high schools, as well at the district level:

- Elementary school, 288 students, 5 acres
    - SFC allowable acreage = 6.88 acres [4 + (288/100)]
    - Model acreage = 5 (lesser of allowable or actual)
    - Groundskeeper FTE = 2.17 [(5 ÷ 2.30)*1.0 (weekly frequency adjustment 1.0)]
- Middle school, 315 students, 20 acres
    - SFC allowable acreage = 13.15 [10 + (315/100)]
    - Model acreage = 13.15 (lesser of allowable or actual)
    - Groundskeeper FTE = 0.99 [(13.15 ÷ average(2.30, 33.33, 4.09)*1.0 (weekly frequency adjustment1 1.0)]
- High school, 630 students, 40 acres
    - SFC allowable acreage = 26.30 [20 + (630/100)]
    - Model acreage = 26.30 (lesser of allowable or actual)
    - Groundskeeper FTE = 1.99 [(26.30 ÷ average(2.30, 33.33, 4.09)*1.0 (weekly frequency adjustment1 1.0)]
- District-level groundskeeper FTE calculation for elementary school above
    - One-third of acreage at Level 2 for main ground turf areas with a frequency of bi-weekly
        - Groundskeeper FTE = .014 [((5 acres x 1/3 x .1395)/2.30) x .50]
    - Two-thirds of acreage at Level 3 for open turf areas with a frequency of bi-weekly
        - Groundskeeper FTE = .057 [((5 acres x 2/3 x .1395)/33.33) x .50]
    - Total district-level FTE generated by elementary school equals .071.

Based on these assumptions, the estimated number of school-level groundskeepers according to APPA service standards would be 521.61 FTEs. The total district-level groundskeepers would be an estimated 31.82 FTEs. The total estimated groundskeeper FTEs would be 553.44, which is an increase of 119.99 over the current resources. *However, at this time, it is not feasible to use the APPA standards for groundskeepers due to the lack of granularity of school district acreage reported to and by the SFC. The assumptions used would have to be précised by more granular to be implemented into the Wyoming Funding Model.*

APPENDIX K

MEMO ON UTILITIES

MEMORANDUM

To: Wyoming Select Committee on Recalibration

From: Larry Picus and Allan Odden

RE: Recalibration of Utility Costs

Date: October 29, 2010

This memo discusses the issues surrounding funding for school district utility costs for Wyoming School districts. The memo covers the following topics:

- A short summary of the current model allocation methods
- Data on school district spending for utilities through 2009-2010
- Estimates of projected changes in utility costs school districts are likely to face in the next five years
- Recommendations to the Committee

Current Model

The approach for funding school district utility costs was developed in 2005 during the last recalibration. Although that recalibration occurred during a period of high utility costs, five year projections showed that the per unit price of energy would decline within two years, which happened beginning in 2006. A number of alternative cost estimation methodologies were studied and the final recommendation was that the model fund school districts at the level of their 2004-05 utility costs plus four percent to accommodate inflation to 2006-07 (the first year the current model was used to distribute funds to schools). In addition, utility costs were included in the adjustments made for the External Cost Adjustment (ECA) each year.

The rationale for this approach was that utility costs, although unpredictable, represent only about three percent of total district budgets, and thus even an underestimate of costs in the range of ten percent, amounted to approximately one-third of one percent of a district's budget, a figure that appeared manageable to districts in the short term. Moreover consultants suggested that if there were much more dramatic increases in utility costs, the Legislature could pass special appropriations to help districts at that time. As the data below suggest, this approach was quite accurate in estimating the costs faced by school districts for utilities for the past four years.

When utility costs were computed for 2004-05, ten separate categories were included in the analysis to ensure that districts had adequate resources to pay for all forms of utilities. Table 1 at the end of this memo shows the relative proportion each of the ten contributed to the total expenditures for utilities from 2005-06 through 2009-10. As the table shows, natural gas and electricity expenditures represented 76.3% of utility costs in 2005-06 when this approach was implemented, and in 2009-10 were 73.4% of total utility costs. Communications last year represented an additional 9% of utility costs.

Data on School District Spending for Utilities

In 2009-10, the funding model allocated $33.15 million to school districts for utilities. This represented 2.76% of total model revenues of $1.215 billion that year. Moreover, the WDE Continuing Review report (along with an analysis of preliminary 2009-10 data) show district spending for utilities closely matched the model's allocations. Table 2 compares model resources to utility expenditures from 2006-07 through 2009-10.

As the table shows, district spending in all four years slightly exceeded the resources generated by the model. For 2008-09, districts spent $1.2 million more than the model generated. This represents 103.8% of the allocation for resources and the difference amounts to one tenth of one percent of the total model allocation. Preliminary estimates for 2009-10 show districts spent 101.8 percent of the total model allocation, a difference of $356,987.

Estimates of Future Utility Costs

The United States Energy Information Administration's (EIA) Annual Energy Outlook 2010 provides projections of utility costs through 2035. The related data on the EIA's website provides detailed projections of utility costs for the mountain states region. Table 3 displays the projected annual increase in costs for a number of components of utility expenditures through 2015 adjusted for inflation.

Natural gas costs (one of the two largest components of utility expenditures) are expected to increase considerably in 2010 and 2011, and then flatten out over the next four years. On the other hand, electricity costs are anticipated to be essentially flat (even decline slightly) over the period of recalibration. While costs for gasoline appear to increase some over time, they represent less than one percent of utility costs (gasoline for school busses is reimbursed through the 100% transportation reimbursement and not included here). Similarly, coal costs decline initially, and then are flat, but they too represent just over one percent of the total. While LPG (an estimate for propane) increases slightly, it is just 1.5% of the total.

Projections of costs for water, sewage and garbage collections were not available, but seem unlikely to increase at a rate faster than inflation generally. Combined they represent 10.8% of the utility cost component. Although communications also represent just over 9% of the utility cost component of the model, cost projections are difficult to estimate and fluctuate widely depending on assumptions about changes in technology and levels of use. Assuming district communication strategies focus mostly on telephone communications and computer technology, and recognizing that many of the infrastructure costs for computer technology systems (such as access to and use of the world-wide web) are funded directly by the state and that there is separate funding in the model to pay for technology costs including hardware, software and infrastructure, it seems unlikely that communications costs will grow faster than the rate of inflation.

Recommendations

Overall the utility cost portion of the funding model seems to have worked quite well. Moreover, given the very small proportion of total district expenditures for utilities, the consequences of dramatic changes in utility costs are relatively modest. When combined with the predicted stability of electricity costs (48.1% of the total in 2009-10) for the term of the current recalibration, there appears to be little reason to change the approach used five years ago.

Thus we recommend that utility costs be established at the level of school district expenditures for utilities in the 2009-10 school year, and adjusted in the future on the basis of the state established ECA.

This recommendation leads to three issues that the Committee should consider.

First, natural gas costs are projected to increase from 2009 to 2010 and again to 2011 before leveling off. While the proposal to use 2009-10 utility costs will accommodate the first year increase, the increase in the second year may be an issue. One solution would be to add 15% (the 2010 to 2011 anticipated increase in natural gas costs) to the base year computation for natural gas. This would increase overall utility costs for 2011-12 by approximately $1.27 million. We don't believe this adjustment is necessary given the accuracy of this approach for the total costs of utilities over the last five years.

Second, is consideration of the impact of new construction on utility costs. We initially assumed that schools built more recently would be more energy efficient and thus the cost of funding utilities for replacement schools would be lower. However, as Table 4 shows, utility costs per square foot are remarkably stable regardless of when a building was built. The Table summarizes average expenditures per square foot by type of school over three years (2007-08, 2008-09 and 2009-10) by the decade in which buildings were constructed. As the table shows, utility costs averaged $1.50 per square foot over all time periods and types of schools, ranging from a high of $1.61 per square foot for buildings built in the 1990s to a low of $1.41 per square foot for buildings built in the 1980s. Thus we are confident our model will adequately compensate districts for utility costs regardless of the age of construction for the next five years.

The remaining new construction issue is construction for new schools to meet growing enrollments. Given the findings in Table 4, we recommend using the district's average cost per square foot to reimburse them for the costs of utilities for these buildings.

Third, this approach creates a disincentive for energy conservation on the part of districts in the future if they assume that the recalibration in five years will take the same approach. Thus, we recommend that the Legislature signal its intent now, that when the model is recalibrated in five years, districts that have reduced utility costs (or slowed the growth in those costs below the state average) will not be penalized. Potential approaches to do this include sharing the savings with the districts on some proportional basis, establishing an energy conservation fund that enables the districts to use the savings for other purposes, or some other approach that eliminates unintended incentives to use energy inefficiently.

Table 1
Components of the Utility Computation and the Relative Share of Each in 2004-05

	Percent of Total Expenditures for Individual component				
Component	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**
340 - Communications	9.79%	9.56%	9.40%	9.47%	9.05%
451 - Natural Gas	36.62%	31.12%	29.48%	27.98%	25.25%
452 - Electricity	39.71%	43.16%	43.45%	45.70%	48.12%
453 - Fuel Oil	0.48%	0.47%	0.73%	0.35%	0.59%
454 - Gasoline	0.62%	0.98%	0.88%	0.75%	1.28%
455 - Coal	1.21%	1.58%	1.65%	1.98%	1.62%
456 - Propane	1.50%	1.72%	2.72%	1.95%	1.85%
457 - Water	5.71%	6.48%	6.54%	6.40%	6.49%
458 - Sewer	1.72%	1.90%	2.00%	2.05%	2.01%
459 - Garbage Collection	2.64%	3.02%	3.16%	3.37%	3.73%

Source: Wyoming Department of Education

Table 2
Comparison of School District Utility Expenditures with Model Allocations, 2006-07 to 2009-10

School year	Model Funding	Expenditures	Difference	Expenditures as a Percent of Model
2006-07	$ 29,529,553	$ 30,828,597	$ 1,299,044	104.40%
2007-08	$ 30,651,676	$ 32,381,389	$ 1,729,713	105.64%
2008-09	$ 31,969,698	$ 33,173,810	$ 1,204,112	103.77%
2009-10*	$ 33,152,577	$ 33,509,564	$ 356,987	101.08%

*Preliminary figures from WDE

Table 3
Estimated Annual Percentage Increase in Utility Cost Components, 2010 to 2015 for Mountain States (adjusted for inflation using 2008 dollars)

	Percentage Increase Over Previous Year (2008 dollars)					
Component	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Natural Gas	9.1%	15.2%	3.3%	-3.2%	0.4%	2.4%
Electricity	-2.5%	-0.2%	1.0%	-0.8%	-0.8%	-0.3%
Motor Gasoline	-3.9%	-1.2%	5.3%	9.2%	3.8%	1.5%
Coal	-8.6%	-1.2%	0.8%	0.0%	0.0%	0.2%
LPG*	-1.2%	-0.5%	5.6%	4.7%	3.8%	2.4%

*LPG (propane combined with butane) is used here as an estimate for propane costs
Source: United States Energy Information Administration

Table 4

Average Utility Costs Per Square Foot Based on Type and Age of School: 2007-08 through 2009-10

Year of Construction	Type Of School			
	Elementary	**Middle**	**High**	**Overall**
Earlier than 1970's	1.66	1.21	1.15	1.49
1971-1980	1.62	1.46	1.54	1.58
1981-1990	1.56	1.28	1.16	1.41
1991-1999	2.59	0.81	1.36	1.61
After 2000	1.65	1.27	1.44	1.54
Overall	1.67	1.23	1.28	1.50

Source: WDE

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LABOR MARKET STUDY PROCESS SUMMARY and SUMMARY OF STUDY FINDINGS

December 2010

The purpose of this report is to provide the Legislature with a summary of the process that studied the labor market conditions and the price of personnel resources in the Wyoming Funding Model.

The Select Committee on School Finance Recalibration undertook a review of the cost basis of the Wyoming Funding Model. The Select Committee received reports, studies and information from the Wyoming Department of Education, Legislative Service Office and consultants as part of this process. In particular, a team of consultants was tasked with providing the Legislature information regarding the costs of labor and the competitiveness of total compensation to attract and retain a high-quality workforce.

The labor market focus was different than past recalibrations. The focus was not to determine salary levels based upon school district expenditures, but rather look at labor market indicators to determine if the current salaries provided for in the Wyoming Funding Model were at levels so as to recruit and retain a high-quality workforce. These indicators primarily consisted of:

- Comparable wages nationally, regionally and locally;
- Teacher quality indicators; and
- Non-teacher salaries compared to the Wyoming labor market using the State employee classification pay plan.

The labor market study consisted of three primary studies, two related to teacher labor markets and one related to other staff included in the Wyoming Funding Model. The consultants retained are national leaders in the field with expertise in both labor market economics and in labor market conditions in rural states such as Wyoming.

Labor Market Studies

The State of Wyoming retained the services of Dr. Lori Taylor from Texas A&M University and Dr. Christiana Stoddard from Montana State University to investigate teacher compensation trends, competitiveness of funding model salaries and actual-paid salaries, and the effects that teacher salaries have had on teacher labor market indicators and quality. Neville Kenning and Lisa Bailey from Hay Group utilized the State of Wyoming's employee classification system and salaries and those salaries in regional school districts to investigate the competitiveness of salaries for certified (non-teachers) and classified staff. The following is a summary of the issues investigated by the consultants.

Teacher Labor Markets

Dr. Christiana Stoddard, Montana State University (TAB D)

- Attractiveness of the teaching profession in Wyoming by looking at Wyoming teacher salary trends; the competitiveness of those salaries to regional and national averages; and the relative competitiveness of Wyoming teacher salaries to other professional occupations and relative to other comparable workers in Wyoming.

- Effects of teacher salaries on the ability of Wyoming school districts to recruit and retain teachers.

- Effects of teacher salaries on teacher quality.

Dr. Lori Taylor, Texas A&M University (TAB C)

- Competitiveness of teacher salaries compared to teachers in other states and compared with non-teachers in Wyoming.

- Competitiveness of benefits, salary supplements and working conditions for Wyoming teachers compared to teachers in other states.

Other Professional and Classified Staff

Mr. Neville Kenning, Hay Group (TAB E)

- Crosswalk of job knowledge, roles, responsibilities of certified (non-teachers) and classified staff in the Wyoming Funding Model to State of Wyoming employee classifications.

- Competitiveness of Wyoming Funding Model salaries and actual salaries to the state's Market Policy Position (MPP) for comparable categories of employees.

- Competitiveness of Wyoming Funding Model salaries and actual salaries to the average salaries of a representative sample of comparable school districts in the region.

The three final reports are included within this report under separate cover (TABS C THROUGH E) with full descriptions of the questions pursued, the methodologies utilized and findings and conclusions.

The following is a summary of key findings contained in the attached three reports.

Summary of Findings

<u>Comparable Wage Analysis of Wyoming Teacher Salaries</u> (Taylor – TAB C)

- Teacher salaries in Wyoming are among the highest in the nation
  - Wyoming starting Teacher salaries are relatively high
    - #7 in nation - $38,500; cost-adjusted rank #1 - $46,500
    - US Average - $33,600
  - Experienced teacher (10 years with a Master's Degree) salaries are also high
    - Cost-adjusted rank #3 - $60,278
  - Many beginning teachers earn more in 10 months than comparably educated and skilled non-teachers earn in 12
- Teacher benefits are more extensive in Wyoming
- Working conditions are more favorable in Wyoming
  - Class sizes rank #13 in nation – 18.9; US average – 20.3
  - High school average class size rank #4 – 18.7; US average 23.3

- Wyoming average teacher salaries increased by over 60 percent over the last 10 years, faster than any other state; the US average was 32 percent
- Wyoming average teacher salaries increased faster than non-teacher wages even during the rapid acceleration of wages between 2007 and 2009

Teacher Labor Markets in Wyoming (Stoddard – TAB D)

- Particularly large salary changes since 2005
- Salaries are high relative to other states
- Salaries are high relative to other professions
- Based on ratio of teaching wages to non-teaching wages, WY is one of most attractive areas to be a teacher
- Salary increases had modest effects, if any, on recruitment and retention of teachers
    - Exit rates constant from 2000-2009
    - Exit rate of new teachers fell from 17% to 15% (lowest in the nation)
    - Most turnover now from retirement and is less sensitive to salary changes
- Teacher quality, by available measures, has not improved in the state over the past five to ten years
    - Little change in average years of experience
    - Percent with MA degrees rose, mostly before major salary increase
    - Percent with National Board Certification rose rapidly
    - Trends in student outcomes constant or similar to other states throughout period
- Although nearly 75 percent of all new teachers are from out-of-state, these teachers do not represent individuals with quality factors that are significantly different from the current workforce
    - Similar GPA (slight decline since 2003)
    - Similar average ACT scores based on undergrad institution and major (slight decline since 2005)
    - Similar probability of major in disciplinary fields
- Districts vary somewhat in quality of new hires

Competitiveness of Certified (non-teachers) and Classified Staff Compensation (HAY GROUP – TAB E)

Hay Group will further investigate teacher salary market price for Wyoming, however, they concluded for non-teacher staff:

- The very generic descriptions for funding purposes and the variance of the existence of Job Descriptions means that there are challenges in matching like kind job content with the market and with comparable jobs in the State of Wyoming Classified and Executive Pay Plan
- There are some considerable variances between the amount of funding for positions as determined through the current funding formula and the amount of actual salary being paid
- For several employee categories for which a like-kind comparison of job content could be made, the salaries included in the Wyoming Funding Model are higher than the state MPP and State of Wyoming actual pay
- The salaries included in the Wyoming Funding Model are competitive with those salaries paid by comparable school districts in the region
- For most positions for which a like-kind comparison of job content could be made, the levels of salaries paid in School Districts is higher than the State of Wyoming MPP and State of Wyoming actual pay
    - This may be influenced by the fact that the current funding formula is required to provide additional funding in recognition of experience and the different definition of the market
- The requirement for experience based funding, combined with the current workforce demographics, can lead to a potential reaction of “our funding is being cut” when in fact the Wyoming Funding Model properly reflects lower costs associated with employing less-experienced staff

Putting Teachers in Context: A Comparable Wage Analysis of Wyoming Teacher Salaries

Submitted to:

The Select Committee on School Finance Recalibration

Submitted by:

Dr. Lori L. Taylor
Texas A&M University

December 2010

Executive Summary

In order to attract and retain a high quality workforce, Wyoming school districts must pay teacher salaries that are competitive not only with non-teaching jobs in the local community, but also with teaching jobs in other states. This report finds that teacher salaries in Wyoming are highly competitive in both dimensions. .

The first part of the report compares teacher salaries with those of non-teachers, using data on individual teachers from the Wyoming Department of Education, funding model salaries, school district salary scales and an updated version of the National Center for Education Statistic's Comparable Wage Index. The analysis finds that teacher salaries in Wyoming are highly competitive with non-teacher salaries in Wyoming, and have been so for years. The average Wyoming teacher earns 97 percent of the average annual salary for comparable non-teachers, even though teachers typically work fewer weeks per year and are more likely to receive fringe benefits than non-teachers. Funding model starting salaries are higher than the 10-month starting salaries of comparable non-teachers in every school district and higher than the 12-month starting salaries for comparable non-teachers in half of the school districts in Wyoming. Based on the salary scales, most starting teachers in Wyoming earn more in ten months than comparable non-teachers earn in twelve.

The second part of the report compares teacher salaries in Wyoming with teacher salaries in other states using data from the National Center for Education Statistics' Schools and Staffing Survey. Again, the analysis finds that teacher salaries in Wyoming are highly competitive. Even without cost adjustments, salaries in Wyoming are well above average. Once regional variations in amenities and the cost of living are taken into account, Wyoming teacher salaries are among the highest in the nation, and starting salaries in Wyoming are by far the highest in the nation. Furthermore, Wyoming school districts are more likely to offer fringe benefits than are school districts in other states, and more likely to offer teachers relatively attractive working conditions such as small class sizes.

Introduction

Wages vary substantially from place to place and from occupation to occupation. In order to attract and retain a high quality workforce, Wyoming school districts must pay teacher salaries that are competitive not only with non-teaching jobs in the local community, but also with teaching jobs in other states. This report examines the competitiveness of Wyoming teacher salaries in both those dimensions.

When making such comparisons, it is important to recognize that factors outside of school district control can lead to substantial geographic differences in labor cost. All other things being equal, regions with a high cost of living are less attractive to teachers than regions with a low cost of living, so districts in high cost of living areas must pay higher wages if they want to attract highly qualified teachers. Similarly, regions that have a lot of natural beauty or other local amenities are more attractive to teachers than other regions, so districts without such amenities may need to offer a salary premium to attract teachers. Any place-to-place comparison of teacher salaries must take differences in amenities and the cost of living into account. I have done so using an updated version of the National Center for Education Statistic' Comparable Wage Index (CWI). Updating the CWI also provides estimates of the prevailing wage for college graduates in each Wyoming school district for 2009. See Appendix A for details on the update to the CWI.

Competitiveness with Non-teaching Jobs

There are three basic reasons why wages differ from one person to another. First, differences in worker characteristics will drive differences in wages. All other things being equal, workers with advanced degrees or increased work experience can expect to earn higher wages than other workers. Second, differences in job characteristics will drive differences in wages. Workers will demand a wage premium to accept jobs that are relatively unattractive or dangerous, but may be willing to work at a modest discount when the job is particularly fulfilling or the working conditions are unusually pleasant. Finally, locational characteristics will drive differences in wages. Workers in areas with a low cost of living or an abundance of amenities will be willing to accept a lower nominal wage than otherwise equal workers in a less attractive locale. To make fair comparisons across locations, one needs to isolate the effect of the location from the other two sources of wage variation.

A hedonic wage model uses regression analysis to decompose the observed variation in wages into that which is attributable to worker characteristics, that which is attributable to working conditions and that which is attributable to locational characteristics. Chambers (1998) used hedonic wage models to construct the price indices for certified personnel, non-certified personnel and non-personnel inputs that comprise his geographic cost of education index.[1] Goldhaber (1999) used a hedonic wage model to estimate his general wage index. Taylor and Fowler (2006) used a hedonic wage model to estimate the National Center for Education Statistics' Comparable Wage Index. Taylor (2008a,b) used a hedonic wage model to compare teacher and non-teacher salaries.

I use the same technique to estimate the prevailing salary for teachers in Wyoming school districts. The hedonic salary model for Wyoming teachers describes each teacher's salary as a function of her personal characteristics, her job assignments, and the school district in which she works. I use this model to predict the average full-time-equivalent salary in each school district, holding constant the influence of demographic and job characteristics. Those predictions indicate the demographically and occupationally adjusted—or prevailing—salaries in the school district. Variations in the prevailing salaries reflect how much more or less each school district pays to recruit and retain comparable school personnel.

The Prevailing Salary for Teachers in Wyoming

Data for this part of the analysis were provided by the Wyoming Department of Education (WDE). Data on earnings, teacher characteristics and job assignments were drawn from the WDE602 fall data collection files for the ten school years from 2000-2001 through 2009-2010. All individuals who taught at least half time for a Wyoming public school district during the 10-year period are included in the analysis.

The teacher and job characteristics used to adjust teacher salaries are outlined in Table 1. Most are self explanatory, but a few require a bit of additional explanation. The teaching assignments are a series of indicators for whether or not the teacher was assigned to the specific subject matter. Any teacher could have one or more teaching assignments. Similarly, the non-teaching assignments are a series of indicators for whether or not the teacher was assigned to the specific non-teaching activity. Again, any teacher could have one or more non-teaching assignments. Because all of the teachers under analysis were, by definition, assigned to the teaching activity at least half time, there is no need for an indicator for teaching assignment. Instead, the analysis includes a measure of the percent time spent in teaching. The model also includes individual fixed effects to capture any unobserved differences in teacher qualifications across school districts.

[1] The price index for non-personnel inputs that Chambers used in the construction of the GCEI was based on geographic variations in the cost of hiring contractual personnel (which was estimated from the personnel indexes) and "some limited geographic variations in energy prices" (Chambers 1997).

Table 1: Explanatory Factors from the Hedonic Wage Model for Wyoming Teachers

Individual Characteristics	
Years of experience in the school district	Highest degree held (BA, MA, PhD)
Years of experience, total	Percent FTE in teaching
Years of experience unknown	Individual fixed effects
Teaching Assignments	
English	Social Science
Math	Health and P.E.
Foreign Language	Vocational Education
Bilingual/ESL	Fine Art
Science	Special Education
Elementary Education	
Non-Teaching Assignments	
Advisor/Sponsor	Head teacher
Assistant principal	Principal
Assistant coach	Support staff position
Coach	Certified Teacher Tutor Professional
Classified staff position	Other administrator

To estimate the prevailing teacher salary in each school district each year, I applied the hedonic salary model described in Table 1 to all available data on the earnings of Wyoming teachers from fall 2000 through fall 2009. Complete data were available for 13,441 individual teachers from 48 school districts.[2] Appendix Table B.1 presents the coefficient estimates and standard errors from the salary model. The dependent variable is the log of each individual's full-time-equivalent total salary, and the analysis also includes district-by-year fixed effects.

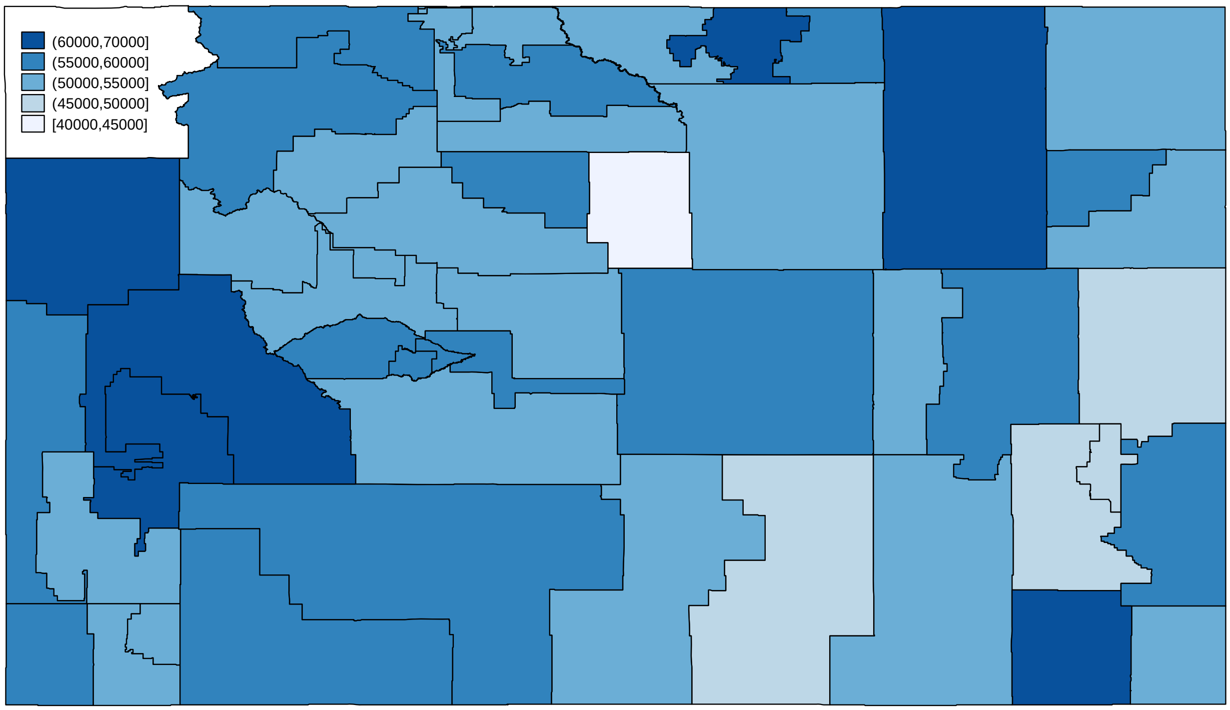
The hedonic model does a good job of capturing variations in teaching salaries. As expected, salaries increase with teaching experience and educational attainment. Teachers with administrative duties earn more than other teachers, all other things being equal. Head teachers earn 4.4 percent more, on average, than other teachers, while coaches on average earn 6.5 percent more. Elementary school teachers and bilingual/ESL teachers also earn significantly more than other teachers, all other things being equal. The model explains 96.3 percent of the variation in full-time-equivalent teaching salaries in the state of Wyoming over the last 10 years.

[2] Due to data quality concerns, teacher records with full-time-equivalent (FTE) total salaries greater than $120,000 or less than $12,000 were excluded from the analysis, as were individuals with a reported FTE greater than 1.1 or a FTE in teaching greater than 110 percent of the individual's total FTE. A teacher's FTE total salary is his or her total salary divided by his or her FTE.

Figure 1 illustrates the prevailing salary in each Wyoming school district in the fall of 2009. The prevailing salary in each district is the predicted salary for a teacher with state average characteristics.[3] Darker colors indicate higher prevailing salaries.

As the figure illustrates, even after adjustments for differences in teacher and job characteristics there are still substantial variations in teacher salaries within the state of Wyoming. Salaries were highest in Teton County School District #1, where the prevailing salary for a teacher with state average characteristics was greater than $64,000 per year. They were lowest in Washakie County School District #2, where the prevailing salary, once differences in teacher demographics were taken into account, was less than $45,000 per year.

Figure 1: The Prevailing Wage for Teachers, Fall 2009



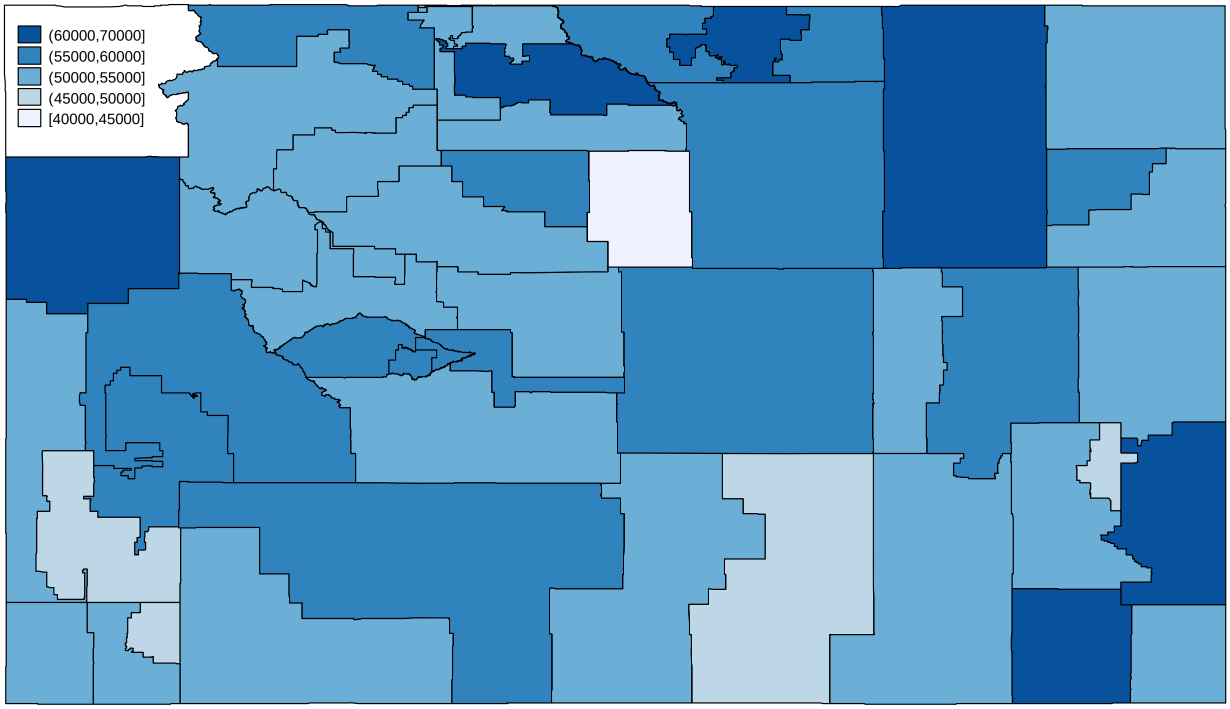
Source: Author's calculations using WDE602 files.

Figure 2 illustrates the prevailing salary for teachers, adjusted for regional variations in labor cost using the updated CWI. Again, darker colors indicate higher salaries.

As the figure shows, adjusting for regional differences in labor cost alters the pattern of teacher compensation somewhat. Cost adjustment lowers salary levels in western Wyoming, raises them in eastern Wyoming and the Cheyenne and Laramie metropolitan areas, and leaves them essentially unchanged in Central Wyoming (Carbon, Natrona and Fremont counties). Even after cost adjustments, salaries are still lowest in Washakie County School District #2. Cost-adjusted salaries are highest in Campbell County School District #1, Laramie County School District #1 and Sheridan County School District #2.

[3] Appendix table B.2 indicates the demographic and job characteristics of this standardized Wyoming teacher.

Figure 2: The Cost-Adjusted Prevailing Wage for Teachers, Fall 2009



Source: Author's calculations using WDE602 files and the updated CWi.

Table 2 presents the prevailing teaching salaries for each Wyoming county and compares them with the average non-educator salary implied by the updated CWI. The baseline national salary used to construct the NCES CWI was $47,836 (Taylor and Fowler 2006).[4] Multiplying the local CWI by $47,836 yields the comparable salary for college graduates in each Wyoming county.

Of course, the average college graduate works more weeks per year than does the average teacher in Wyoming.[5] Given a 10-month school year, a comparable baseline salary would have been $39,863 ($47,836*10/12). Assuming that the appropriate frame of reference is days worked, and that non-educators typically work 250 days a year (5 days a week * 50 weeks) while Wyoming teachers typically work 185 contract days, the comparable baseline salary would have been $35,399 ($47,836*185/250). In order to make salaries outside of education truly comparable to teaching salaries, one must adjust the comparable salaries downward. However, the appropriate adjustment is not obvious. The third column of Table 2 presents the comparable wages, assuming a 10-month school year, but other adjustments are equally plausible.

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[4] This was the average annual salary and wages for all Census respondents with college degrees in 1999. Appendix table B.3 lists the 460 occupations held by those individuals, and each occupation's weight in the construction of the average wage. Alternatively, Allegretto, Corcoran, and Mishel (2004) identified 16 occupations in the Current Population Survey that were particularly comparable to teaching on the basis of an evaluation of the skills required to do the job. If only these industries were used to construct it, the baseline comparable salary would be $45,100 per year.

[5] On average, Census respondents with a college degree reported working 51 weeks per year.

Table 2: Prevailing Teacher Salaries by County, 2009-10

County	Prevailing Teacher Salary	12-Month Comparable Wage	10-Month Comparable Wage
Albany County	$52,187	$57,209	$47,674
Big Horn County	$52,807	$56,568	$47,140
Campbell County	$62,836	$56,568	$47,140
Carbon County	$51,134	$59,222	$49,352
Converse County	$54,203	$56,568	$47,140
Crook County	$51,938	$56,568	$47,140
Fremont County	$55,431	$59,222	$49,352
Goshen County	$59,918	$56,568	$47,140
Hot Springs County	$50,382	$56,568	$47,140
Johnson County	$54,824	$56,568	$47,140
Laramie County	$60,685	$57,209	$47,674
Lincoln County	$57,347	$63,076	$52,564
Natrona County	$57,202	$59,222	$49,352
Niobrara County	$47,836	$56,568	$47,140
Park County	$58,705	$63,076	$52,564
Platte County	$47,880	$56,568	$47,140
Sheridan County	$59,292	$56,568	$47,140
Sublette County	$60,945	$63,076	$52,564
Sweetwater County	$58,165	$63,076	$52,564
Teton County	$64,891	$63,076	$52,564
Uinta County	$54,897	$63,076	$52,564
Washakie County	$54,341	$56,568	$47,140
Weston County	$53,162	$56,568	$47,140
State Average	$57,424	$59,149	$49,291

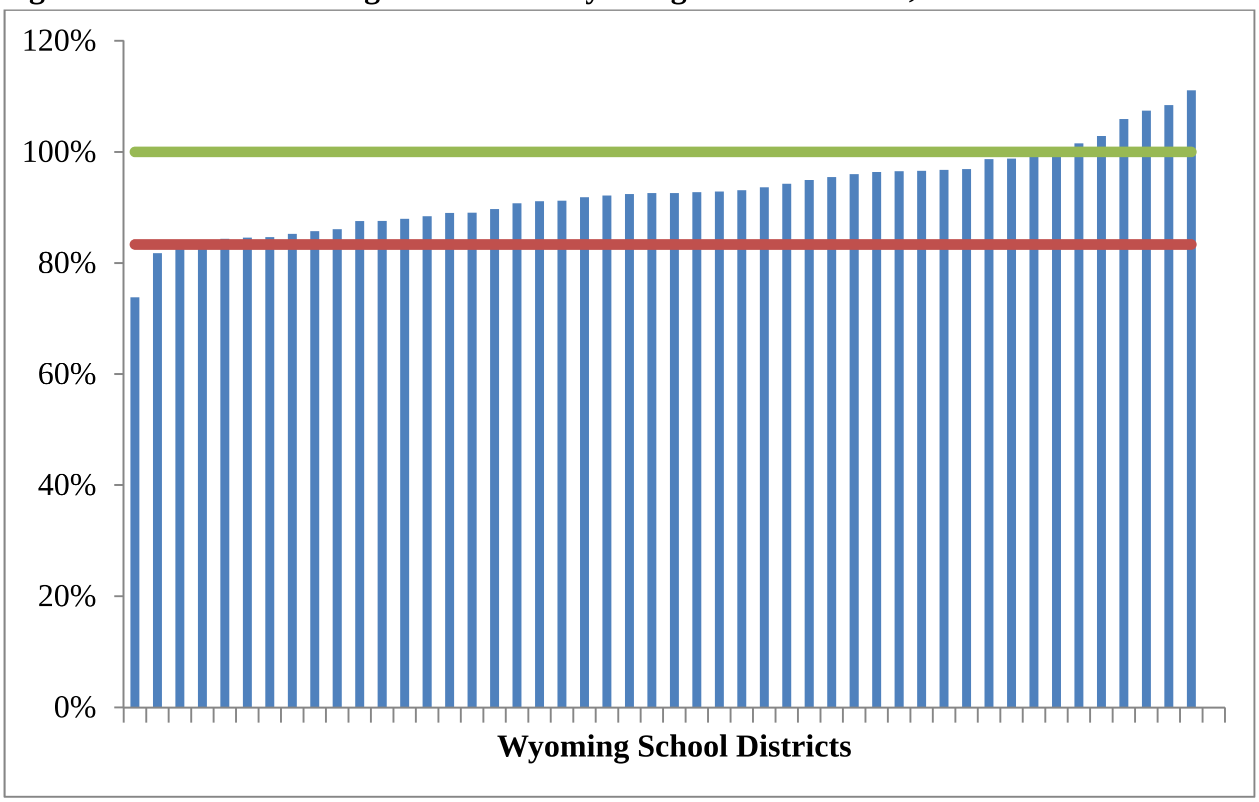
Source: Author's calculations.

As the table illustrates, there is considerable variation in prevailing teacher salaries across Wyoming counties. On average, prevailing salaries in Platte and Niobrara Counties are the lowest in the state, while prevailing salaries in Campbell and Teton counties are the highest in the state. Prevailing teacher salaries are higher than the 10-month comparable salary for non-teachers in all Wyoming counties, and higher than the 12-month comparable salary for non-teachers in Teton, Sheridan, Goshen, Laramie, and Campbell counties. In Campbell county, the models predict that the average Wyoming teacher would earn $62,836 per year while the average college graduate would earn $56,568, even though the average teacher works considerably fewer weeks each year.

The relative teaching salary is one measure of the competitiveness of teacher salaries. It is defined as the ratio of teaching salaries to 12-month salaries for comparable non-teachers. A relative salary greater than 100 percent indicates that teachers are paid more than the annual salary of comparable non-teachers, while a relative salary less than 100 percent indicates that teachers are paid less than the annual salary of comparable non-teachers. A relative salary greater than 83.3 percent (10/12) indicates that teachers are paid more than the 10-month salary of comparable non-teachers.

Figure 3 illustrates the relative teaching salary in each Wyoming school district. Each of the 48 vertical bars represents a single school district. The lower horizontal line indicates the 10-month comparable salary; the higher horizontal line indicates the 12-month comparable salary. As the figure illustrates, all but two Wyoming school districts--Washakie County School District #2 and Platte County School District #2—have prevailing teacher salaries that are equal to or greater than the 10-month salaries of comparable non-teachers. Six Wyoming districts—Big Horn County School District #3, Teton County School District #1, Goshen County School District #1, Laramie County School District #1, Sheridan County School District #2, and Campbell County School District #1—have prevailing teaching salaries that are more than 100 percent of the 12-month salaries for comparable non-teachers

Figure 3: Relative Teaching Salaries for Wyoming School Districts, 2009-10

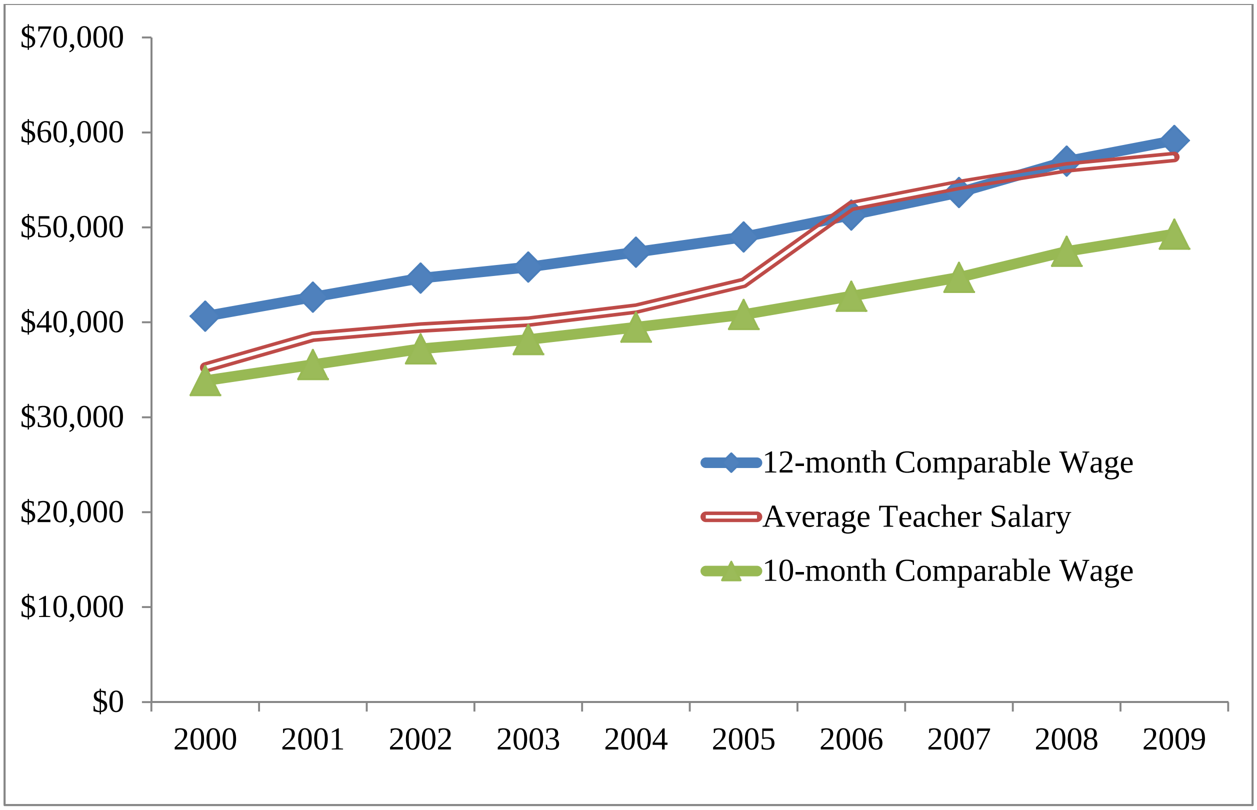


Source: Author's calculations.

The last row in Table 2 presents the statewide averages for the prevailing teacher salaries and the comparable wages. As the row illustrates, the average teacher in Wyoming earned $57,424 in 2009-2010, while the average non-teacher in Wyoming earned $59,149. In other words, the average teacher earned more than 97 percent of the annual salary for a comparable non-teacher, without any adjustments for differences in the number of days worked or the value of fringe benefits. There are no data on the benefits received by non-teachers in Wyoming, but all Wyoming teachers receive health insurance and retirement benefits, so it is unlikely that teachers receive fewer fringe benefits than comparable non-teachers. If the length of the school year and the value of fringe benefits are taken into account, then teaching positions in Wyoming become even more competitive with non-teaching positions.

Figure 4 illustrates the changes over time in the comparable wages and the state average prevailing teacher salary. As the figure illustrates, average salaries were similar to the 10-month comparable wage during the early part of the decade, but rose sharply between fall 2005 and fall 2006. Since fall 2006, the prevailing teacher salary in Wyoming has been very similar to the 12-month comparable wage. Thus, the analysis suggests that average teacher salaries in Wyoming have been competitive with those of non-teachers for the last decade, and have been highly competitive for at least the last four years.

Figure 4: Comparing Salary Levels Over Time.



Source: Author's calculations.

Relative Starting Salaries

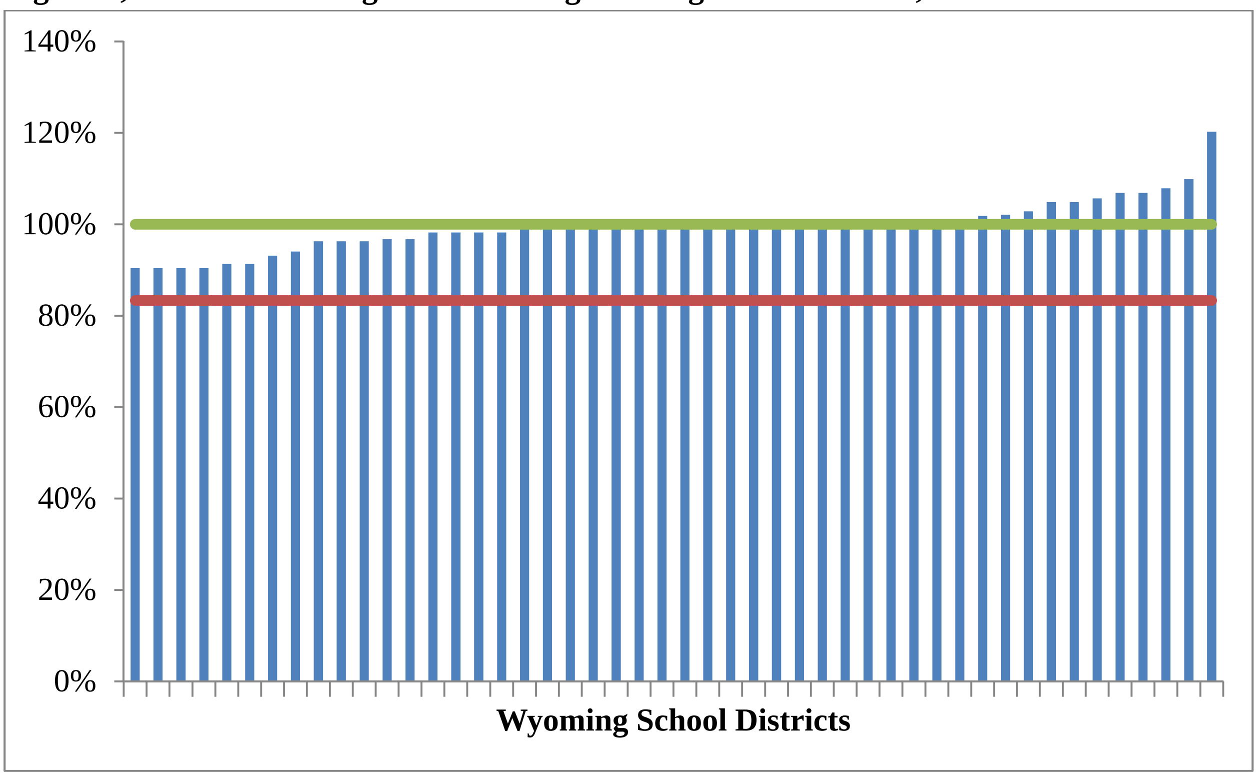
One concern that might arise from a comparison of prevailing salaries is that the average teacher may not be sufficiently similar to the average non-teacher with respect to their demographic characteristics and work experiences. To ensure an apples-to-apples comparison, this analysis now turns to focus on relative starting salaries.

I use two measures of the starting salaries for Wyoming teachers—the funding model salaries for a teacher with a bachelor's degree and zero years of experience, and the first step on the teacher salary scale for each Wyoming school district. For comparison, I used the NCES comparable wage model to predict the baseline salary for a 23-year-old with a bachelor's degree. This baseline salary was $31,348 per year in 1999. As before, multiplying this baseline by the updated CWI yields the comparable starting salary for non-teachers. In 2009, the average first step on the salary scale was $41,889, the funding model salary for a beginning teacher was $38,544 and the comparable 12-month salary for a non-teacher in Wyoming was $38,761. Thus, the evidence suggests that starting salaries for teachers in fall 2009 were highly competitive with starting salaries for non-teachers in Wyoming.

Figure 5 illustrates the relative starting salaries for Wyoming school districts based on the funding model allocations. As with the analysis of average salaries, the relative starting salary is the ratio of the annual teaching salary to the 12-month salary for comparable non-teachers. Again, each vertical bar represents one of the 48 Wyoming school districts, the higher horizontal line indicates 100 percent the 12-month comparable salary and the lower horizontal line indicates 83 percent of the 12-month comparable salary, which would be the 10-month comparable salary.

As the figure illustrates, the funding model salaries for starting teachers are very competitive with the salaries of comparable non-teachers. Funding model starting salaries are more than 90 percent of the starting salaries for comparable non-teachers in all Wyoming school districts, and

Figure 5; Relative Starting Salaries Using Funding Model Salaries, 2009-10.

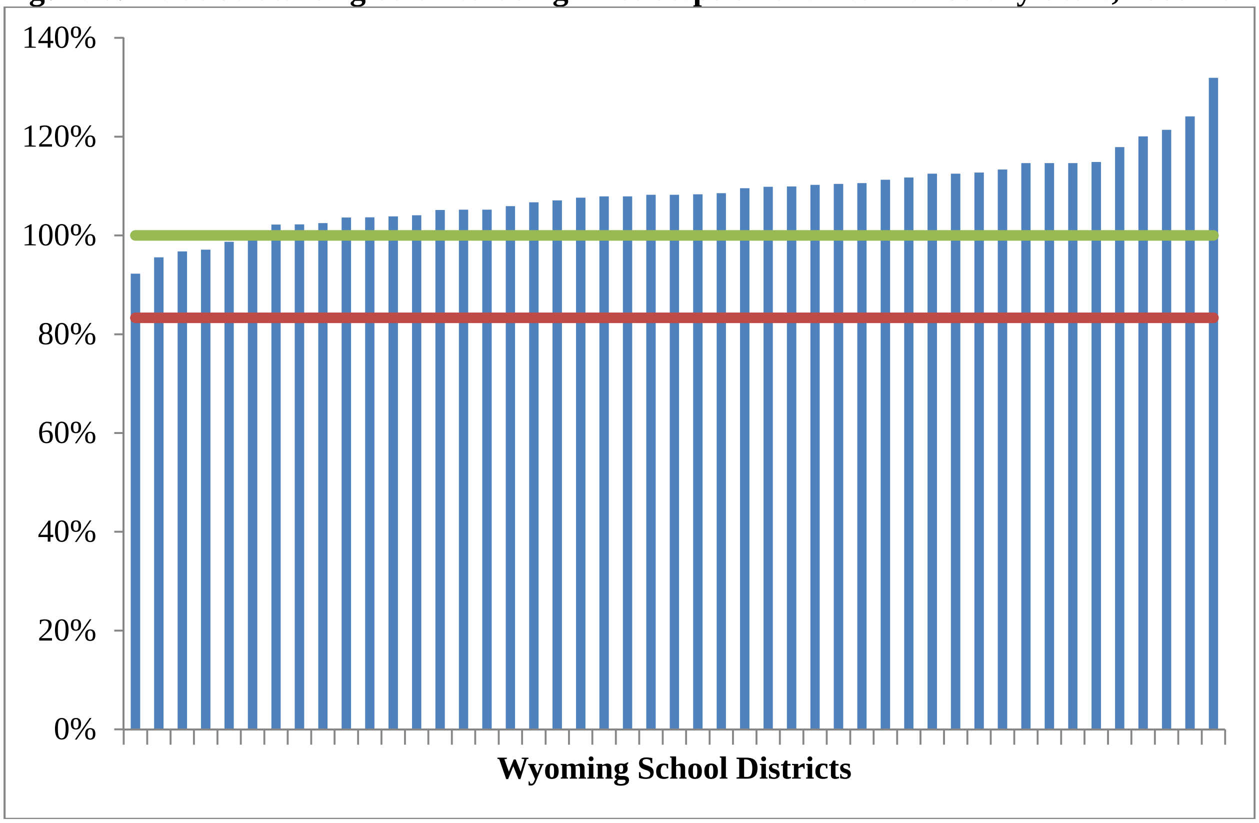


Source: Author's calculations.

equal to or greater than 100 percent of the starting salaries for comparable non-teachers in half of the Wyoming districts. Funding model starting salaries in Teton County School District #1 are more than 120 percent of the 12-month salaries for comparable non-teachers.

Figure 6 presents the same information in Figure 5, but uses the first steps on the salary scales rather than the funding model salaries. As the figure illustrates, the first steps on the salary scale are generally higher than the funding model salaries for starting teachers, making the relative starting salaries also higher. Only six school districts—Uinta County School District #6, Carbon County School District #2, Lincoln County School District #1, Park County School District #16, Washakie County School District #2 and Sublette County School District #9—have first steps on the salary scale that are lower than the 12-month starting salary for comparable non-teachers.

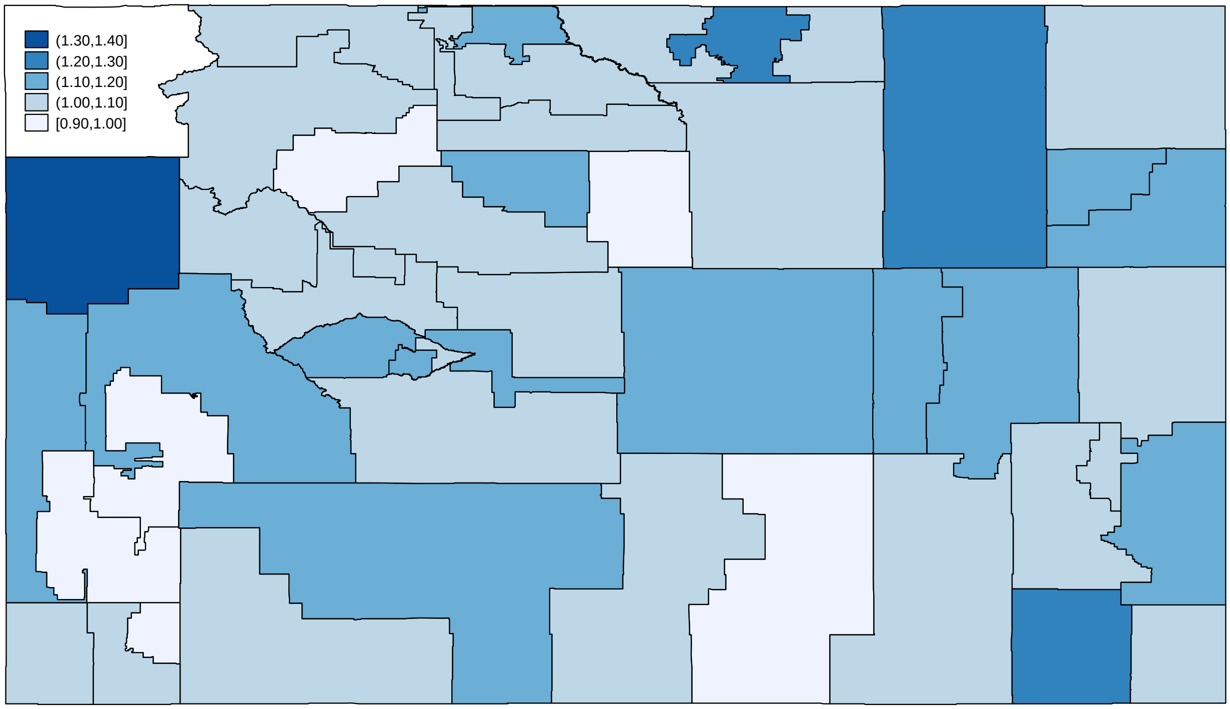
Figure 6: Relative Starting Salaries Using First Steps on the Teacher Salary Scale, 2009-10



Source: Author's calculations.

Figure 7 maps the relative starting salaries for 2009-10 based on the first steps on the salary scales. As the figure illustrates, there is no obvious geographic pattern to the relative starting salaries. The highest relative starting salaries and the lowest starting salaries were both found in the western third of the state. Relative starting salaries are unusually high in Teton County School District #1, Campbell County School District #1, Laramie County School District #1 and Sheridan County School District #2, but not in the surrounding school districts. The first step on the salary scale in Teton County School District #1 is more than 130 percent of the 12-month

Figure 7: The Geography of Relative Starting Salaries Using First Steps on the Teacher Salary Scale, 2009-10



Source: Author's calculations.

salary for comparable non-teachers. The first step on the salary scale in Campbell County School District #1 is more than 120 percent of the 12-month comparable wage.

Summarizing the Evidence

All told, the evidence is compelling. Teacher salaries in Wyoming are highly competitive with non-teacher salaries in Wyoming, and have been for some time. Starting salaries for teachers exceed the 12-month salaries of comparable non-teachers in most Wyoming school districts, and the average salary for teachers in Wyoming is 97 percent of the average 12-month salary for comparable non-teachers. There are two districts where average teacher salaries are lower than the 10-month salaries of comparable non-teachers, but those districts employ less than 0.6 percent of Wyoming teachers. For the vast majority of Wyoming teachers, the salaries they receive from teaching meet or exceed the salaries received by comparable non-teachers in their community.

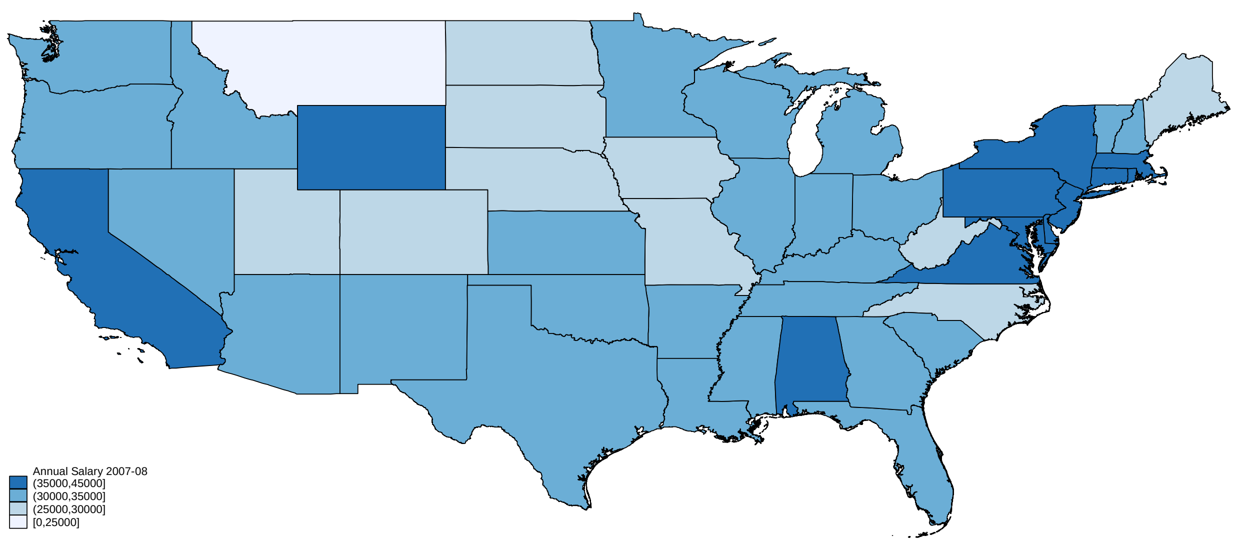
Comparisons Across States

The Schools and Staffing Survey (SASS) is conducted periodically by the National Center for Education Statistics. Public school districts, principals and teachers throughout the nation are surveyed about a variety of education topics, including school and teacher characteristics, teacher salaries and benefits, and teacher workloads.[6] Those survey responses are the best available evidence for determining whether or not teacher salaries in Wyoming are competitive with those in other states and form the basis for the analysis in this section of the report. The most recent SASS collected data about the 2007-08 school year, so this part of the analysis analyzes teacher compensation and working conditions during the 2007-08 school year.

Comparing Teacher Salaries

Figure 8 illustrates the average annual starting salary for a teacher with a bachelor's degree, by state. As the figure illustrates, starting salaries in Wyoming are among the highest in the nation. According to the SASS, in 2007-08 the average starting salary for teachers in Wyoming was $38,500, or $4,900 per year above the national average of $33,600. Only six states (Connecticut, California, New York, Maryland, Hawaii, and New Jersey) had starting teacher salaries higher than those in Wyoming during 2007-08.

Figure 8: Annual Starting Salaries for Teachers with a Bachelor's Degree, 2007-08

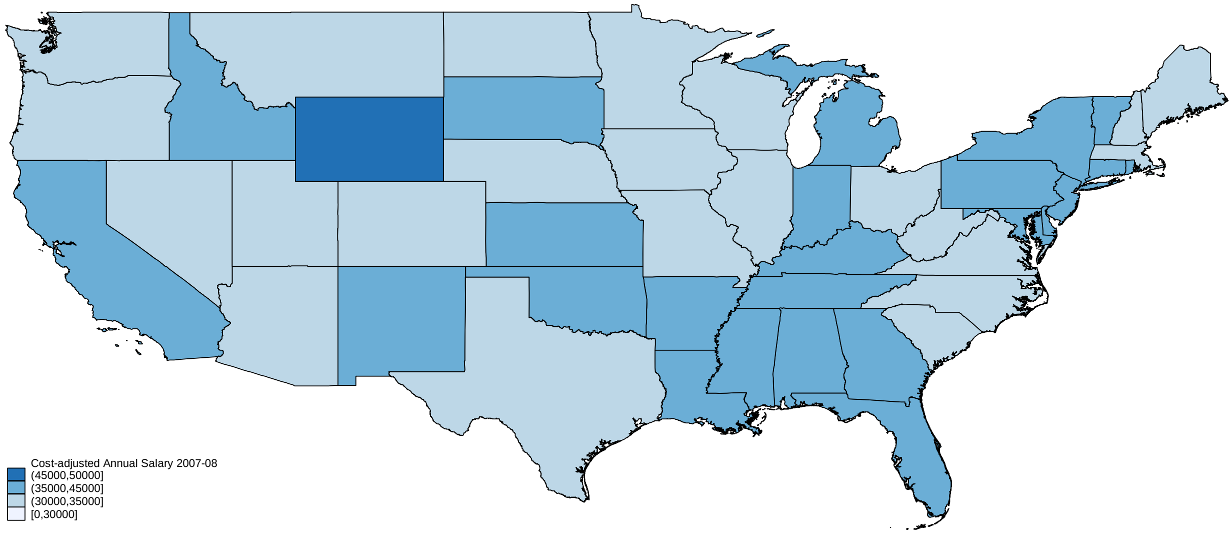


Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08.

Furthermore, all of the states with starting salaries higher than in Wyoming are high cost-of-living states. As figure 9 illustrates, once you adjust for regional variations in the wage level using the updated CWI, it becomes clear that starting salaries are higher in Wyoming than in any other state. After cost-adjustments, starting salaries are at least 14 percent higher in Wyoming than in any other state except Hawaii.

[6] Private schools and Bureau of Indian Affairs schools are surveyed separately. This analysis focuses only on the public school responses. Department of Defense schools are not included in the SASS sample, nor are schools that serve only kindergarten and pre-kindergarten students. For more on the 2007-08 SASS, visit http://nces.ed.gov/surveys/sass

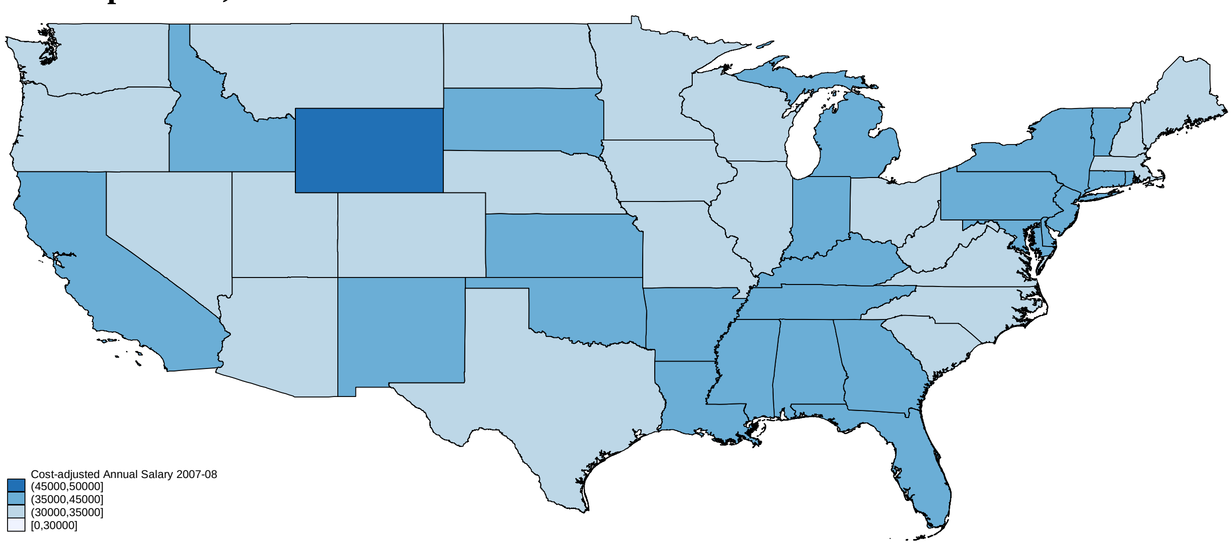
Figure 9: Cost-Adjusted Starting Salaries for Teachers with a Bachelor's Degree, 2007-08



Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08 and author's calculations using the updated CWI

Cost-adjusted salaries for experienced teachers are also high in Wyoming. Figure 10 illustrates the cost-adjusted annual salaries for teachers with a Master's degree and 10 years of teaching experience. The cost-adjusted annual salary for an experienced teacher with a Master's degree in Wyoming was 21 percent higher than the national average of $49,900. Only two states—Alaska and Rhode Island—had higher cost-adjusted salaries for experienced teachers in 2007-08.

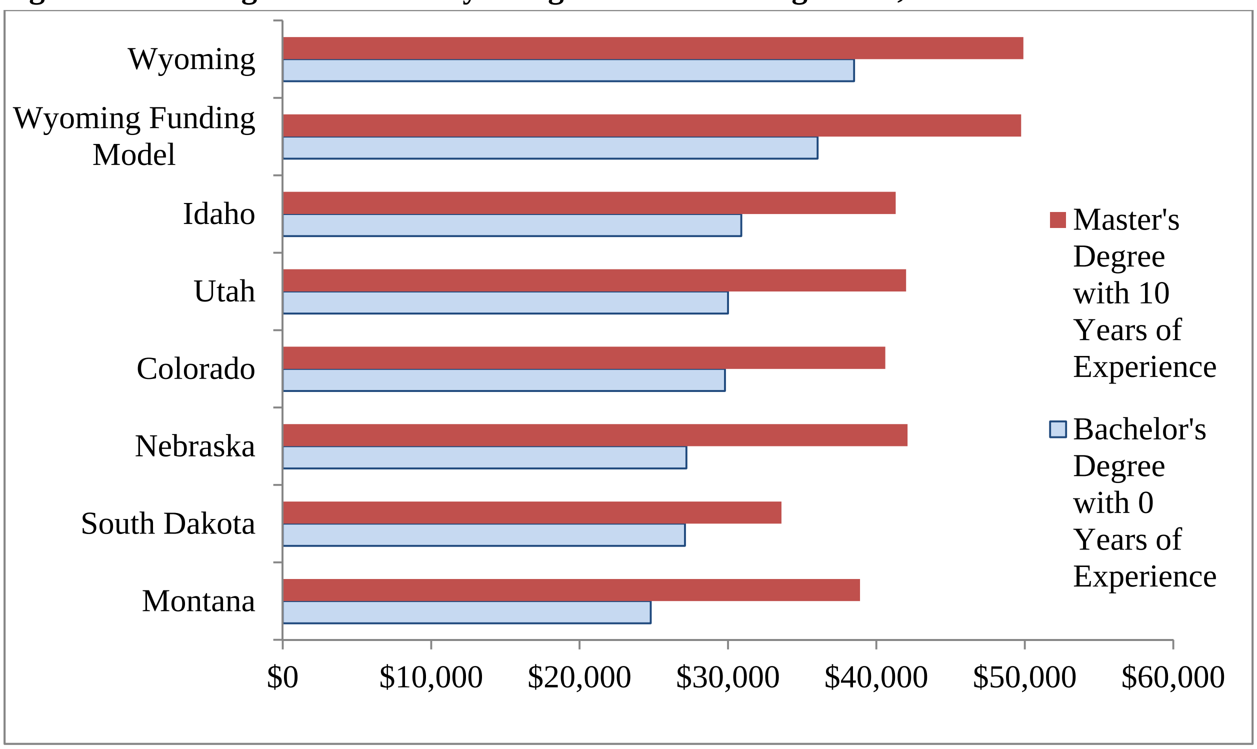
Figure 10: Cost-Adjusted Starting Salaries for Teachers with a Master's Degree and 10 years Experience, 2007-08



Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08 and author's calculations using the updated CWI

Figure 11 compares the average teacher salaries in Wyoming with the average teacher salaries in the surrounding states and with the average salaries used in the Wyoming funding model for the 2007-08 school year. None of the salaries have been cost-adjusted. As the figure illustrates, average starting salaries in Wyoming were slightly higher than those used in the funding model while average salaries for teachers with a Master's degree and 10 years of experience were nearly identical to those used in the funding model. Strikingly, both the average salaries in Wyoming and the average salaries used in the Wyoming funding model were higher than the average salaries in every surrounding state. Funding model starting salaries were more than $5,000 per year higher than average starting salaries in Idaho, and more than $11,000 per year higher than average starting salaries in Montana. Funding model salaries for teachers with a Master's degree and 10 years of experience were at least $7,600 higher than the average salaries for comparable teachers in the surrounding states, and more than $16,000 per year higher than the average salaries for comparable teachers in South Dakota.

Figure 11: Average Salaries in Wyoming and Surrounding States, 2007-08

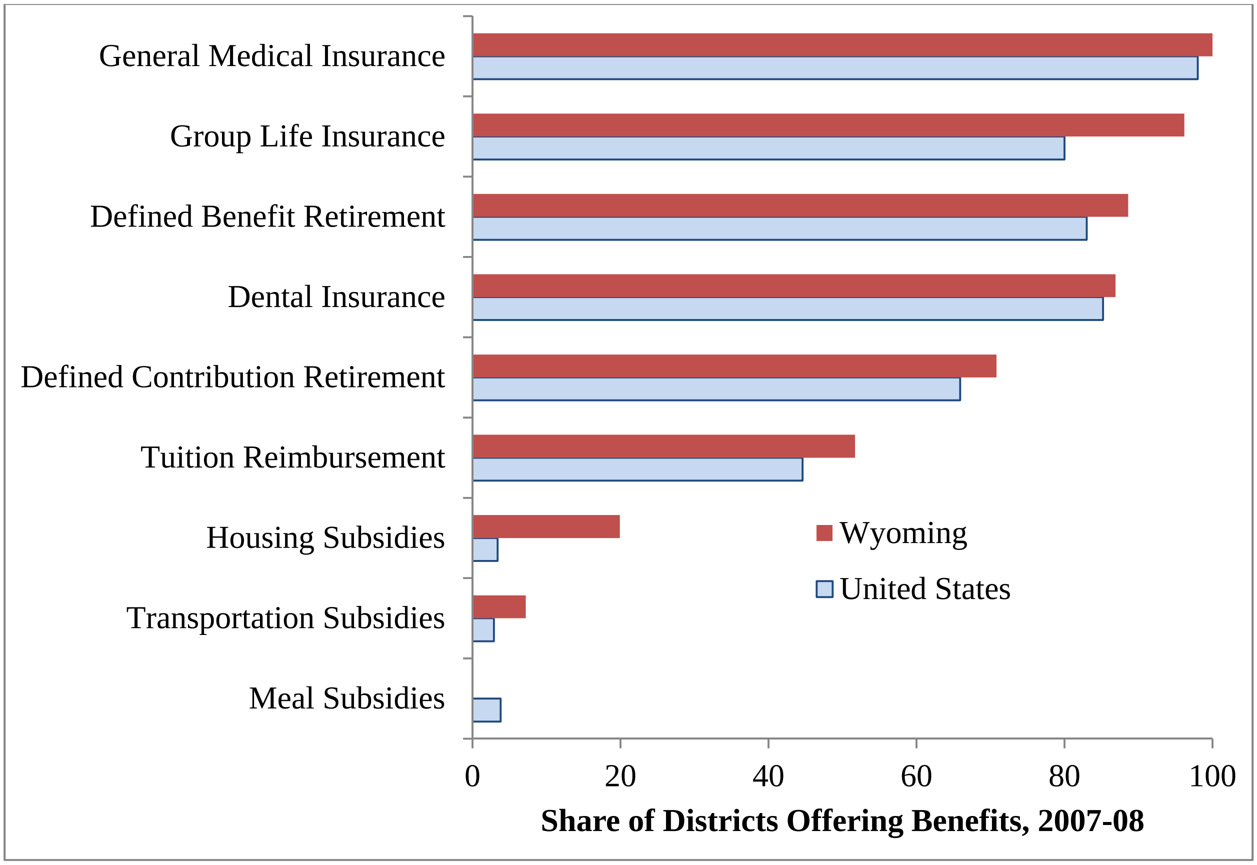


Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08 and Wyoming Department of Education.

Comparing Teacher Benefits

Not only are teacher salaries above the national average in Wyoming, but so are teacher benefits. Figure 12 compares the share of school districts offering various types of benefits in Wyoming to the national average. As the figure illustrates, school districts in Wyoming are more likely than the national average to offer general medical insurance coverage, group life insurance, retirement benefits, tuition reimbursements and housing subsidies. The only category of benefits reported in the SASS that Wyoming districts are less likely to provide are meal subsidies.

Figure 12: Share of Public School Districts Offering Benefits to Teachers, by Type of Benefits, 2007-08

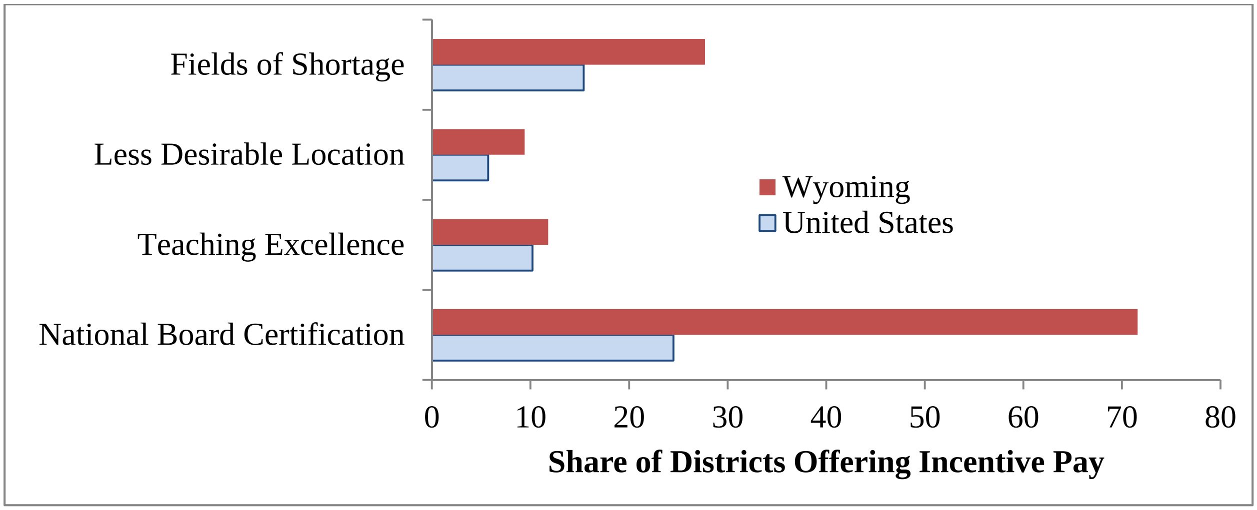


Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08

Comparing Incentive Pay

School districts in Wyoming are also more likely to offer incentive pay to teachers. As figure 13 illustrates, school districts in Wyoming are more likely than the national average to offer incentive pay for teaching in a shortage field, for teaching in a less desirable location or for teaching excellence. Wyoming school districts were much more likely to offer incentives to teachers who are National Board Certified. Wyoming school districts are nearly three times as likely as the national average to reward National Board Certification.

Figure 13: The Share of Public School Districts Offering Teacher Incentive Pay by Type of Incentive, 2007-08

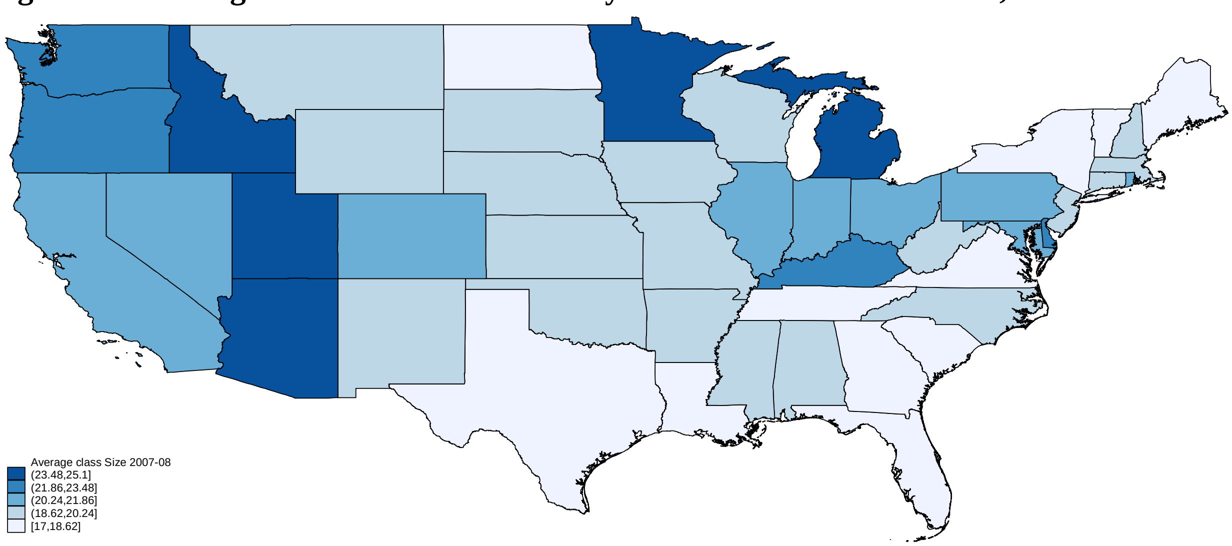


Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08

Comparing Working Condition

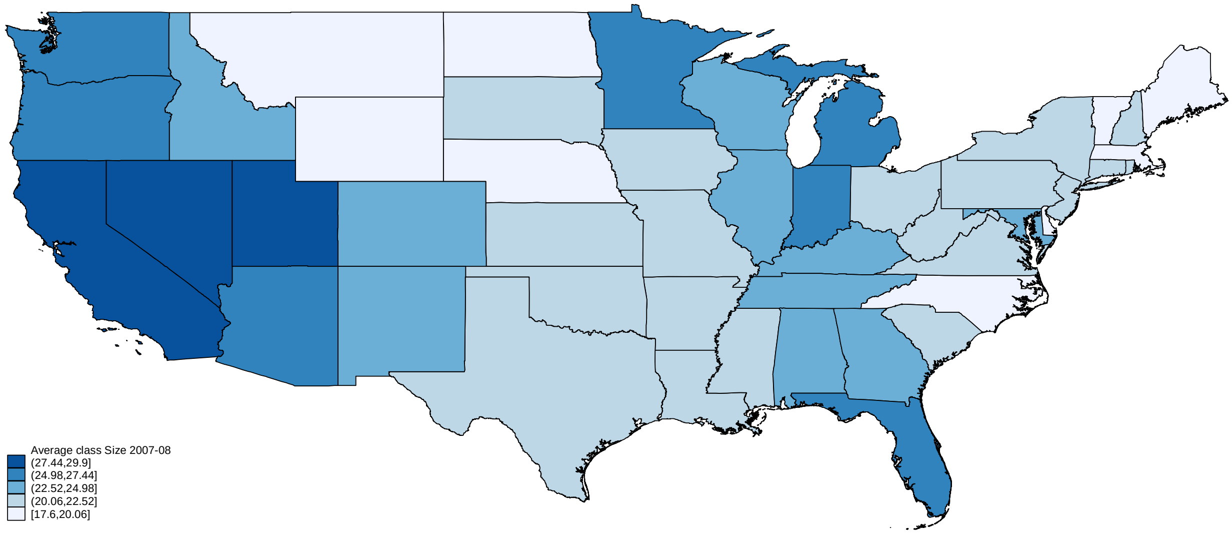
Working conditions in Wyoming also tend to be favorable. One of the most important aspects of working conditions is class size, and average class sizes in Wyoming are lower than the national average. Figure 14 illustrates the average class size for elementary self-contained classrooms in 2007-08, while Figure 15 illustrates the average class size for secondary departmentalized classrooms. As the figures illustrate, class sizes in Wyoming are below the national average, and well below those in many surrounding states. In 2007-08, Wyoming ranked 13th in the nation with respect to elementary class size, and 4th in the nation with respect to secondary class size.

Figure 14: Average Class Size for Elementary Self-Contained Classrooms, 2007-08



Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08

Figure 15: Average Class Size for Secondary Departmentalized Classrooms, 2007-08



Source: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School District Data File," 2007-08

Summarizing the Evidence

All told, the evidence from the SASS suggests that teacher salaries in Wyoming are highly competitive with teacher salaries in other states. Even without cost adjustments, salaries in Wyoming are above average. Once regional variations in amenities and the cost of living are taken into account, Wyoming teacher salaries are among the highest in the nation, and starting salaries in Wyoming are by far the highest in the nation. Furthermore, Wyoming school districts are more likely to offer fringe benefits than are school districts in other states, and more likely to offer teachers relatively attractive working conditions such as small class sizes.

Conclusions

The evidence presented in this report strongly suggests that teacher salaries in Wyoming are highly competitive with non-teaching salaries in Wyoming and with teaching salaries in other states.

- Teacher salaries in Wyoming are among the highest in the country.
- Teacher benefits are more extensive in Wyoming.
- Working conditions are more favorable in Wyoming.
- Average teacher salaries in Wyoming have been competitive with those of non-teachers for the last decade, and have been highly competitive for at least the last four years.
- On average, Wyoming teachers earn 97 percent of the average annual salary for comparable non-teachers, even though teachers work fewer weeks each year and are more likely to receive fringe benefits than non-teachers.
- Most starting teachers earn more in ten months than comparable non-teachers earn in twelve.

- Funding model starting salaries are higher than 10-month starting salaries for comparable non-teachers in all Wyoming school districts, and equal to or higher than 12-month starting salaries for comparable non-teachers in half of the Wyoming districts.

Although teacher salaries are currently highly competitive, there is no guarantee that they will remain that way. Over time, inflationary pressures will lead to increases in the salaries of non-teachers inside Wyoming and teachers outside Wyoming. Such increases could erode the relative position of Wyoming school districts.

There are a number of signs that could signal a worrisome decline in the competitiveness of Wyoming teacher salaries.

- First, teacher salaries could fall below the 10-month salaries of comparable non-teachers. Declines in teacher salaries relative to those of non-teachers would indicate that teaching is becoming a less attractive occupation for college graduates and could lead to a decline in the qualifications of new teachers or an increase in the number of highly skilled individuals leaving the teaching profession.
- Second, unexpected increases in turnover or absenteeism could indicate that teaching is becoming a less attractive occupation. Turnover among teachers nearing retirement age is to be expected and need not signal anything about the relative attractiveness of the teaching profession in Wyoming. However, increases in turnover among teachers who are not eligible for retirement and increases in the number of teachers leaving the state or leaving the teaching profession can be strong indicators that teacher compensation in Wyoming is no longer competitive.
- Third, persistent shortages in teaching specialties or specific communities could signal that teacher compensation is not competitive in those fields or locations. Other occupations and other states may pay a premium for specific teacher skills like math and science ability. If Wyoming school districts start to experience persistent difficulties hiring, then that would suggest that teacher salaries are not competitive in those fields and locations.
- Finally, unexplained declines in the number of job applicants or the qualifications of those applicants could signal that teaching jobs in Wyoming are no longer competitive. The number of individuals applying for a position is one indicator of the attractiveness of that position. If fewer qualified individuals are applying and there are no other obvious explanations for the decline in the number of applicants, then there is evidence that teacher salaries in Wyoming are no longer competitive.

At the present time, teacher salaries in Wyoming are high not only with respect to teacher salaries in other states, but also with respect to non-teacher salaries in Wyoming. While it seems appropriate to keep a weather eye on the warning signs listed above, the best available evidence suggests that teacher salaries in Wyoming are more than sufficient to attract and retain a highly qualified labor force. Therefore policymakers may wish to turn their attention to ensuring that the quality and effectiveness of the labor force is commensurate with those high salaries.

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Appendix A: Updating the NCES Comparable Wage Index

The basic premise of the CWI is that all types of workers demand higher wages in areas with a higher cost of living or a lack of amenities. One should be able to measure the effect of teacher wages of differences in amenities and the cost of living by observing systematic variations in the earnings of comparable workers who are not educators. If Laramie construction workers are paid 5 percent less than the national average construction wage, Laramie engineers are paid 5 percent less than the national average engineering wage, Laramie nurses are paid 5 percent less than the national average nursing wage, and so on, then the cost of hiring teachers in Laramie should also be paid 5 percent less than the national average.

The NCES CWI measures the prevailing wage for college graduates in 800 U.S. Labor markets. The baseline estimates (for 1999) come from a regression analysis of the individual earnings data from the 2000 U.S. Census. Annual updates to that baseline come from regression analyses of occupational earnings data provided by the U.S. Bureau of Labor Statistics (BLS).[7]

The baseline analysis yields predicted wages in each labor market, adjusted for regional differences in worker characteristics and the mix of industries and occupations in each location. As such, the NCES CWI does not indicate that the wage level is low in an area simply because most of the workers are young and inexperienced, nor does it indicate that the wage level is low in an area simply because there are a disproportionate number of low-skill jobs. Rather, the NCES CWI isolates the regional variation in wages that is attributable specifically to differences in location.

The labor markets in the NCES CWI are based on “place-of-work areas” as defined by the Census Bureau for the 2000 Census. Census place-of-work areas are geographic regions designed to contain at least 100,000 persons. The place-of-work areas do not cross state boundaries and generally follow the boundaries of county groups, single counties, or census-defined places (Ruggles et al. 2003). Counties in sparsely-populated parts of a state are clustered together into a single Census place-of-work area. Each labor market in the NCES CWI is either a single place of work, or a cluster of the places-of-work that comprise a metropolitan area. There are four NCES CWI labor markets in the state of Wyoming—Western Wyoming (Park, Teton, Sublette, Sweetwater, Lincoln and Unita counties), Central Wyoming (Fremont, Natrona and Carbon counties), Eastern Wyoming (Big Horn, Hot Springs, Washakie, Sheridan, Johnson, Campbell, Crook, Converse, Niobrara, Platte, Goshen and Weston counties) and the Cheyenne and Laramie metropolitan areas (Albany and Laramie counties).

Taylor and Fowler (2006) used data from the Bureau of Labor Statistics’ Occupational Employment Survey (OES) to extend the baseline estimates of the NCES CWI and provide annual index values for 1997 through 2005. The OES is a BLS database that contains average annual earnings by occupation for states and metropolitan areas. Each year, the BLS samples and

[7] For more on the estimation of the NCES CWI, see Taylor and Fowler (2006).

contacts approximately 400,000 civilian, nonfarm establishments for the OES survey.[8] Survey respondents in the 2009 OES dataset employed 74.5 percent of the civilian, nonfarm workers in the United States.

When extending the baseline CWI, Taylor and Fowler used the OES data to estimate an occupationally adjusted wage in each labor market area, and then adjusted the baseline NCES CWI to reflect the annual growth in those wage estimates in each location.[9] For example, if their analysis of the OES data indicated that the wage level in Laramie increased by 5 percent between 1999 and 2001, they revised the baseline CWI for Laramie upward by 5 percent to generate an estimate of the Laramie CWI in 2001.

Following the same methodology as in that earlier work, I have updated the NCES CWI through 2009. Thus, I have used OES data for 2006, 2007, 2008 and 2009 to estimate the occupationally adjusted wage level in each state and major metropolitan area in the United States. Using those estimates, I have also calculated the implied average wage level in the non-metropolitan remainder of each state. I then calculated the annual rate of change in the OES wage estimates and adjusted the baseline CWI accordingly.

Table 1 presents the updated values of the NCES CWI for the 4 labor market areas in Wyoming. As the table illustrates, the wage differences among Wyoming labor market areas have remained generally stable over the last five years. Wages were 9.7 percent higher in Western Wyoming than in Cheyenne and Laramie in 2005 and 9.5 percent higher in 2009. The only exception is Central Wyoming, where wage levels went from below the state average in 2005 to slightly above the state average in 2009.

Table A.1: Comparable Wage Index Values

	NCES CWI 2005	Updated CWI 2006	Updated CWI 2007	Updated CWI 2008	Updated CWI 2009
Cheyenne and Laramie	0.999	1.035	1.086	1.155	1.196
Eastern Wyoming	0.983	1.023	1.069	1.134	1.183
Central Wyoming	1.010	1.080	1.135	1.202	1.238
Western Wyoming	1.096	1.141	1.191	1.265	1.319
State average	1.024	1.072	1.122	1.191	1.237
National average	1.265	1.313	1.355	1.408	1.437

[8] Details on the OES survey come from Bureau of Labor Statistics (2003).

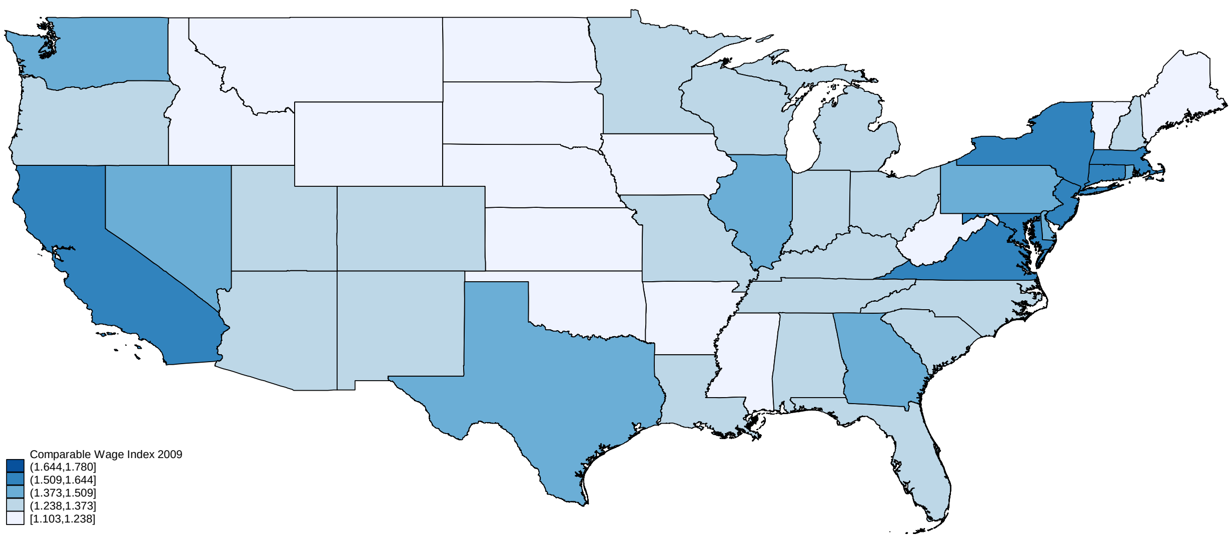
[9] The local wage level is a weighted average of the local predicted wages by occupation, where the weights are each occupation's share of total employment among the national sample of college graduates in the census database. Thus, occupations that are held only rarely by college graduates are given little weight in the construction of the OES wage levels, while occupations that employ college graduates intensively are given greater weight. See Appendix A of Taylor and Fowler (2006) for details.

Meanwhile, the difference between Wyoming and the national average has narrowed substantially. In 2005, the prevailing wage for college graduates in Wyoming was 81 percent of the national average; in 2009, it was 86 percent.

The updated CWI also indicates substantial increases in the cost of college educated labor between 2005 and 2009. On average, wages for college graduates in Wyoming increased 4.8 percent per year over the four-year period.

Figure A.1 illustrates the state-to-state variation in the CWI. As the figure illustrates, the prevailing wage for college graduates in highest in California and along the eastern seaboard. It is lowest in the Great Plains and Mountain West. The CWI for Wyoming is among the lowest in the nation, but comparable to that for the surrounding states.

Figure A.1: The Updated CWI for 2009

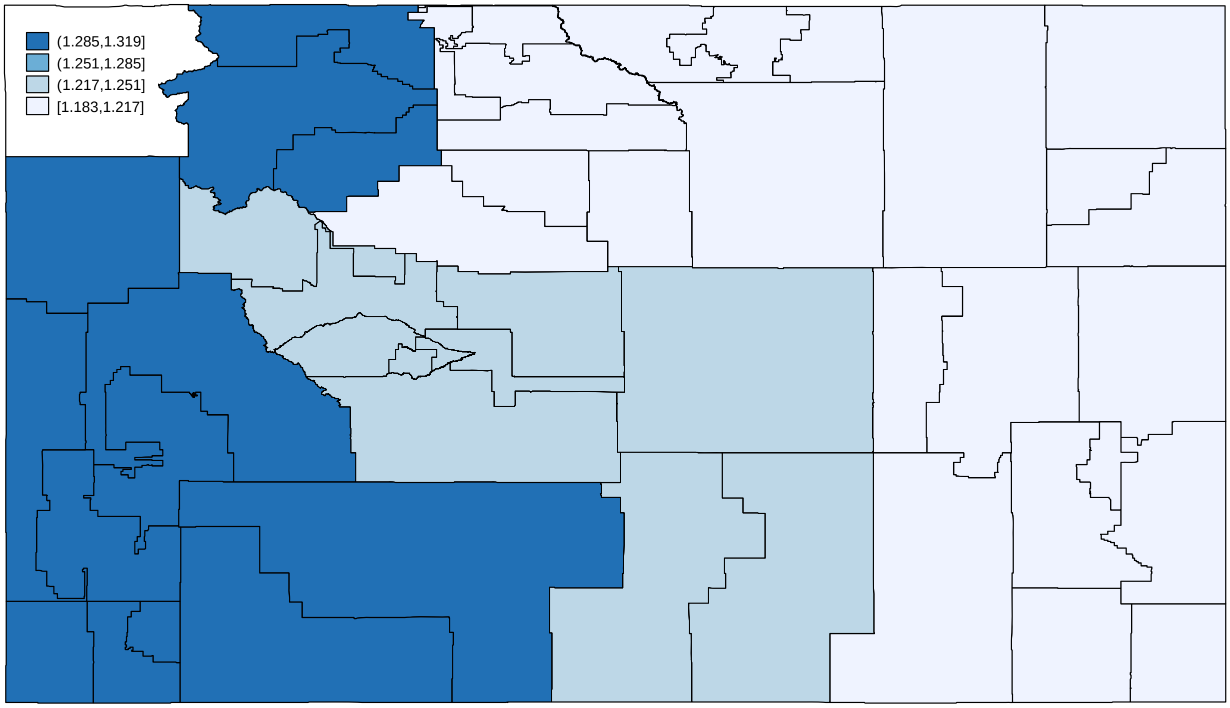


Source: Author's calculations using OES data and the NCES CWI

Each Wyoming school district has been matched to the CWI for its corresponding county. Figure A.2 illustrates the updated CWI for 2009 for each Wyoming school district. As the figure illustrates, there is little different between the CWIs for Cheyenne and Laramie and the rest of eastern Wyoming. The prevailing wage for college graduates is substantially higher in Western Wyoming than in other parts of the state.

The wage differentials indicated by the updated NCES CWI are large, but they are dwarfed by the differences in the cost of housing. According to the U.S. Department of Housing and Urban Development (HUD), the fair market rent for a two-bedroom apartment in Teton county was $1,155 per month in 2009, while the fair market rent for a comparable two-bedroom apartment was $709 in Cheyenne and $577 in Carbon County. Because housing costs are the primary determinants of the cost of living, the HUD data suggest that the cost of living in Teton County is nearly double the cost of living in some other parts of Wyoming. A smaller variation in wages than in housing costs implies that the relatively high rent parts of the state must also boast local amenities that make people willing to accept a lower real wage than they would otherwise require. In other words, the attractions of living in Cheyenne or Teton county make people willing to accept salaries that are not high enough to fully offset the higher cost of housing.

Figure A.2: The Updated CWI for Wyoming School Districts



Source: Author's calculations using OES data and the NCES CWI

Table B.1: The Hedonic Salary Model for All Teachers, 2007-08

	Coefficient	Standard Error	
Percent time teaching	0.236	0.012	***
BA	-0.005	0.003	
MA	0.061	0.003	***
PhD	0.032	0.005	***
Years of district experience (log)	0.024	0.001	***
Years of total experience (log)	0.116	0.001	***
Experience missing indicator	0.304	0.005	***
Non-teaching assignments			
Other administrator	0.030	0.002	***
Advisor/sponsor	0.025	0.001	***
Assistant principal	0.161	0.014	***
Assistant coach	0.058	0.001	***
Classified staff position	0.011	0.003	***
Coach	0.065	0.001	***
Head teacher	0.044	0.004	***
Principal	0.236	0.011	***
Support staff position	0.032	0.001	***
Professional tutor	0.013	0.003	***
Teaching assignments			
Fine Arts	0.004	0.006	
Elementary education	0.005	0.002	***
English	0.002	0.002	
Bilingual/ESL	0.024	0.006	***
Foreign Language	0.006	0.005	
Health and Physical Education	0.003	0.003	
Mathematics	-0.001	0.002	
Science	0.003	0.002	
Special Education	0.003	0.002	
Social Science	-0.001	0.003	
Vocational/technical	-0.001	0.003	
R-squared		0.9633	
Number of observations		79,290	
Number of individual teachers		13,441	

Note: The model also includes individual teacher fixed effects and school district-by-year- fixed effects. The asterisks indicate a coefficient that is significant at the 1-percent (***) or 5-percent(**) level.

Table B.2: The Characteristics of the Average Wyoming Teacher, 2009-10

	Mean	Standard Deviation
FTE Total Salary	$58,325.57	10330.85
Percent time teaching	0.9982	0.0276
BA	0.5557	0.4969
MA	0.4252	0.4944
PhD	0.0085	0.0920
Years of district experience (log)	2.0304	1.0446
Years of total experience (log)	2.3946	0.9568
Experience missing indicator	0.0075	0.0862
Non-teaching assignments		
Other administrator	0.0212	0.1441
Advisor	0.1695	0.3753
Assistant principal	0.0003	0.0186
Assistant coach	0.1060	0.3079
Classified staff position	0.0074	0.0856
Coach, non football	0.0580	0.2337
Head teacher	0.0025	0.0503
Principal	0.0012	0.0339
Support staff position	0.1511	0.3582
Professional tutor	0.0340	0.1812
Teaching assignments		
Fine Arts	0.0627	0.2424
Elementary education	0.3042	0.4601
English	0.0811	0.2731
Bilingual/ESL	0.0070	0.0836
Foreign Language	0.0202	0.1406
Health and Physical Education	0.0573	0.2324
Mathematics	0.0596	0.2367
Science	0.0512	0.2204
Special Education	0.1244	0.3300
Social Science	0.0483	0.2144
Vocational/technical	0.0551	0.2282

Table B.3The Occupations Used to Generate the Baseline Comparable Wage

Occupation	Percent
Chief Executives	2.142
General and Operations Managers	1.589
Legislators	0.037
Advertising and Promotions Managers	0.181
Marketing and Sales Managers	2.421
Public Relations Managers	0.163
Administrative Services Managers	0.142
Computer and Information Systems Managers	0.811
Financial Managers	2.054
Human Resources Managers	0.786
Industrial Production Managers	0.488
Purchasing Managers	0.390
Transportation, Storage, and Distribution Managers	0.207
Farm, Ranch, and Other Agricultural Managers	0.097
Construction Managers	0.478
Education Administrator	0.891
Engineering Managers	0.494
Food Service Managers	0.338
Funeral Directors	0.042
Gaming Managers	0.026
Lodging Managers	0.123
Medical and Health Services Managers	0.891
Natural Sciences Managers	0.070
Postmasters and Mail Superintendents	0.036
Property, Real Estate, and Community Association Managers	0.388
Social and Community Service Managers	0.617
Managers, All Other	3.437
Agents and Business Managers of Artists, Performers, and Athletes	0.049
Purchasing Agents and Buyers, Farm Products	0.013
Wholesale and Retail Buyers, Except Farm Products	0.219
Purchasing Agents, Except Wholesale, Retail, and Farm Products	0.341
Claims Adjusters, Appraisers, Examiners, and Investigators	0.457
Other Compliance Officers	0.177
Cost Estimators	0.112
Human Resources, Training, and Labor Relations Specialists	1.459
Logisticians	0.061
Management Analysts	0.989
Meeting and Convention Planners	0.053
Other Business Operations Specialists	0.297
Accountants and Auditors	4.117
Appraisers and Assessors of Real Estate	0.111
Budget Analysts	0.106

Occupation	Percent
Credit Analysts	0.060
Financial Analysts	0.143
Personal Financial Advisors	0.529
Insurance Underwriters	0.149
Financial Examiners	0.037
Loan Counselors and Officers	0.538
Tax Examiners, Collectors, and Revenue Agents	0.126
Tax Preparers	0.077
Financial Specialists, All Other	0.073
Computer Scientists and Systems Analysts	1.423
Computer Programmers	1.449
Computer Software Engineers	2.036
Computer Support Specialists	0.526
Database Administrators	0.182
Network and Computer Systems Administrators	0.333
Network Systems and Data Communication Analysts	0.533
Actuaries	0.073
Operations Research Analysts	0.246
Miscellaneous Mathematical Science Occupations	0.092
Architects, Except Naval	0.464
Surveyors, Cartographers, and Photogrammetrists	0.092
Aerospace Engineers	0.530
Chemical Engineers	0.219
Civil Engineers	0.808
Computer Hardware Engineers	0.145
Electrical and Electronics Engineers	0.907
Environmental Engineers	0.125
Industrial Engineers, Including Health and Safety	0.457
Marine Engineers	0.029
Materials Engineers	0.093
Mechanical Engineers	0.719
Nuclear Engineers	0.031
Petroleum, Mining and Geological Engineers	0.062
Miscellaneous Engineers, Including Agricultural and Biomedical	0.906
Drafters	0.141
Engineering Technicians, Except Drafters	0.246
Surveying and Mapping Technicians	0.015
Agricultural and Food Scientists	0.080
Biological Scientists	0.309
Conservation Scientists and Foresters	0.110
Medical Scientists	0.296
Astronomers and Physicists	0.075
Atmospheric and Space Scientists	0.031

Occupation	Percent
Chemists and Materials Scientists	0.365
Environmental Scientists and Geoscientists	0.020
Physical Scientists, All Other	0.054
Economists	0.012
Market and Survey Researchers	0.022
Psychologists	0.072
rban and Regional Planners	0.090
Miscellaneous Social Scientists, Including Sociologists	0.106
Agricultural and Food Science Technicians	0.025
Biological Technicians	0.034
Chemical Technicians	0.093
Geological and Petroleum Technicians	0.012
Miscellaneous Life, Physical, and Social Science Technicians	0.166
Counselors	0.879
Social Workers	1.717
Miscellaneous Community and Social Service Specialists	0.554
Clergy	1.206
Directors, Religious Activities and Education	0.104
Religious Workers, All Other	0.128
Lawyers	2.069
Judges, Magistrates, and Other Judicial Workers	0.187
Paralegals and Legal Assistants	0.386
Miscellaneous Legal Support Workers	0.215
Postsecondary Teachers	3.279
Artists and Related Workers	0.184
Designers	0.821
Actors	0.025
Producers and Directors	0.285
Athletes, Coaches, Umpires, and Related Workers	0.180
Dancers and Choreographers	0.007
Musicians, Singers, and Related Workers	0.118
Entertainers and Performers, Sports and Related Workers, All Other	0.014
Announcers	0.053
News Analysts, Reporters, and Correspondents	0.232
Public Relations Specialists	0.310
Editors	0.452
Technical Writers	0.174
Writers and Authors	0.215
Miscellaneous Media and Communications Workers	0.044
Broadcast and Sound Engineering Technicians and Radio Operators	0.081
Photographers	0.074
Television, Video, and Motion Picture Camera Operators and Editors	0.033
Chiropractors	0.040

Occupation	Percent
Dentists	0.157
Dietitians and Nutritionists	0.161
Optometrists	0.045
Pharmacists	0.679
Physicians and Surgeons	1.851
Physician Assistants	0.121
Podiatrists	0.013
Registered Nurses	4.245
Audiologists	0.032
Occupational Therapists	0.152
Physical Therapists	0.360
Radiation Therapists	0.014
Recreational Therapists	0.042
Respiratory Therapists	0.088
Speech-Language Pathologists	0.103
Therapists, All Other	0.156
Veterinarians	0.127
Health Diagnosing and Treating Practitioners, All Other	0.007
Clinical Laboratory Technologists and Technicians	0.608
Dental Hygienists	0.120
Diagnostic Related Technologists and Technicians	0.170
Emergency Medical Technicians and Paramedics	0.055
Health Diagnosing and Treating Practitioner Support Technicians	0.123
Licensed Practical and Licensed Vocational Nurses	0.187
Medical Records and Health Information Technicians	0.042
Opticians, Dispensing	0.021
Miscellaneous Health Technologists and Technicians	0.063
Other Healthcare Practitioners and Technical Occupations	0.152
Nursing, Psychiatric, and Home Health Aides	0.336
Occupational Therapist Assistants and Aides	0.003
Physical Therapist Assistants and Aides	0.030
Massage Therapists	0.024
Dental Assistants	0.051
Medical Assistants and Other Healthcare Support Occupations	0.182
First-Line Supervisors/Managers of Correctional Officers	0.053
First-Line Supervisors/Managers of Police and Detectives	0.153
First-Line Supervisors/Managers of Fire Fighting and Preventions Workers	0.041
Supervisors, Protective Service Workers, All Other	0.093
Fire Fighters	0.131
Fire Inspectors	0.016
Bailiffs, Correctional Officers, and Jailers	0.182
Detectives and Criminal Investigators	0.225
Miscellaneous Law Enforcement Workers	0.011

Occupation	Percent
Police Officers	0.671
Animal Control Workers	0.004
Private Detectives and Investigators	0.090
Security Guards and Gaming Surveillance Officers	0.271
Crossing Guards	0.002
Lifeguards and Other Protective Service Workers	0.027
Chefs and Head Cooks	0.081
First-Line Supervisors/Managers of Food Preparation and Serving Workers	0.144
Cooks	0.122
Food Preparation Workers	0.035
Bartenders	0.110
Combined Food Preparation and Serving Workers, Including Fast Food	0.021
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	0.009
Waiters and Waitresses	0.330
Food Servers, Nonrestaurant	0.018
Dining Room and Cafeteria Attendants, Bartender Helpers, and Misc.	0.013
Dishwashers	0.007
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	0.020
First-Line Supervisors/Managers of Housekeeping and Janitorial Workers	0.041
First-Line Supervisors/Managers of Groundskeepers	0.049
Janitors and Building Cleaners	0.153
Maids and Housekeeping Cleaners	0.058
Pest Control Workers	0.014
Grounds Maintenance Workers	0.109
First-Line Supervisors/Managers of Gaming Workers	0.045
First-Line Supervisors/Managers of Personal Service Workers	0.070
Animal Trainers	0.009
Nonfarm Animal Caretakers	0.029
Gaming Services Workers	0.034
Motion Picture Projectionists	0.002
Ushers, Lobby Attendants, and Ticket Takers	0.009
Miscellaneous Entertainment Attendants and Related Workers	0.035
Funeral Service Workers	0.005
Barbers	0.005
Hairdressers, Hairstylists, and Cosmetologists	0.058
Miscellaneous Personal Appearance Workers	0.020
Baggage Porters, Bellhops, and Concierges	0.021
Tour and Travel Guides	0.022
Transportation Attendants	0.107
Child Care Workers	0.170
Personal and Home Care Aides	0.053
Recreation and Fitness Workers	0.222
Residential Advisors	0.037

Occupation	Percent
Personal Care and Service Workers, All Other	0.009
First-Line Supervisors/Managers of Retail Sales Workers	1.719
First-Line Supervisors/Managers of Non-Retail Sales Workers	1.083
Cashiers	0.342
Counter and Rental Clerks	0.033
Parts Salespersons	0.028
Retail Salespersons	1.559
Advertising Sales Agents	0.330
Insurance Sales Agents	0.552
Securities, Commodities, and Financial Services Sales Agents	0.763
Travel Agents	0.101
Sales Representatives, Services, All Other	0.837
Sales Representatives, Wholesale and Manufacturing	1.957
Models, Demonstrators, and Product Promoters	0.016
Real Estate Brokers and Sales Agents	0.486
Sales Engineers	0.085
Telemarketers	0.061
Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	0.033
Sales and Related Workers, All Other	0.302
First-Line Supervisors/Managers of Office and Administrative Support Workers	1.582
Switchboard Operators, Including Answering Service	0.016
Telephone Operators	0.021
Communications Equipment Operators, All Other	0.007
Bill and Account Collectors	0.099
Billing and Posting Clerks and Machine Operators	0.170
Bookkeeping, Accounting, and Auditing Clerks	0.649
Gaming Cage Workers	0.003
Payroll and Timekeeping Clerks	0.089
Procurement Clerks	0.031
Tellers	0.109
Brokerage Clerks	0.011
Court, Municipal, and License Clerks	0.046
Credit Authorizers, Checkers, and Clerks	0.038
Customer Service Representatives	1.261
Eligibility Interviewers, Government Programs	0.092
File Clerks	0.098
Hotel, Motel, and Resort Desk Clerks	0.039
Interviewers, Except Eligibility and Loan	0.094
Library Assistants, Clerical	0.088
Loan Interviewers and Clerks	0.079
New Accounts Clerks	0.011

Occupation	Percent
Correspondence Clerks and Order Clerks	0.058
Human Resources Assistants, Except Payroll and Timekeeping	0.036
Receptionists and Information Clerks	0.279
Reservation and Transportation Ticket Agents and Travel Clerks	0.124
Information and Record Clerks, All Other	0.042
Cargo and Freight Agents	0.010
Couriers and Messengers	0.062
Dispatchers	0.087
Meter readers, Utilities	0.010
Postal Service Clerks	0.093
Postal Service Mail Carriers	0.184
Postal Service Mail Sorters, Processors, and Processing Machine Operators	0.067
Production, Planning and Expediting Clerks	0.328
Shipping, Receiving, and Traffic Clerks	0.110
Stock Clerks and Order Filers	0.208
Weighers, Measurers, Checkers, and Samplers, Record keeping	0.025
Secretaries and Administrative Assistants	1.584
Computer Operators	0.180
Data Entry Keyers	0.210
Word Processors and Typists	0.056
Desktop Publishers	0.015
Insurance Claims and Policy Processing Clerks	0.152
Mail Clerks and Mail Machine Operators, Except Postal Service	0.032
Office Clerks, General	0.501
Office Machine Operators, Except Computer	0.015
Proofreaders and Copy Markers	0.022
Statistical Assistants	0.025
Office and Administrative Support Workers, All Other	0.506
First-Line Supervisors/Managers of Farming, Fishing, and Forestry Workers	0.034
Agricultural Inspectors	0.017
Graders and Sorters, Agricultural Products	0.004
Miscellaneous Agricultural Workers, Including Animal Breeders	0.102
Fishing and Hunting Workers	0.004
Forest and Conservation Workers	0.006
Logging Workers	0.007
First-Line Supervisors/Managers of Construction and Extraction Workers	0.233
Boilermakers	0.002
Brickmasons, Blockmasons, and Stonemasons	0.009
Carpenters	0.151
Carpet, Floor, and Tile Installers and Finishers	0.013
Cement Masons, Concrete Finishers, and Terrazzo Workers	0.004
Construction Laborers	0.090
Paving, Surfacing, and Tamping Equipment Operators	0.000

Occupation	Percent
Miscellaneous Construction Equipment Operators	0.027
Drywall Installers, Ceiling Tile Installers, and Tapers	0.009
Electricians	0.124
Glaziers	0.004
Insulation Workers	0.004
Painters, Construction and Maintenance	0.045
Paperhangers	0.001
Pipelayers, Plumbers, Pipefitters, and Steamfitters	0.060
Plasterers and Stucco Masons	0.002
Roofers	0.010
Sheet Metal Workers	0.014
Iron and Steel Workers	0.005
Helpers, Construction Trades	0.004
Construction and Building Inspectors	0.056
Elevator Installers and Repairers	0.006
Fence Erectors	0.001
Hazardous Materials	0.007
Highway Maintenance Workers	0.010
Rail-Track Laying and Maintenance Equipment Operators	0.001
Septic Tank Servicers and Sewer Pipe Cleaners	0.001
Miscellaneous Construction and Related Workers	0.003
Derrick, Rotary Drill, and Service Unit Operators, and Roustabouts	0.002
Earth Drillers, Except Oil and Gas	0.002
Explosives Workers, Ordnance Handling Experts, and Blasters	0.002
Mining Machine Operators	0.006
Miscellaneous Extraction Workers, Including Roof Bolters and Helpers	0.003
First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	0.169
Computer, Automated Teller, and Office Machine Repairers	0.149
Radio and Telecommunications Equipment Installers and Repairers	0.080
Avionics Technicians	0.004
Electric Motor, Power Tool, and Related Repairers	0.007
Electrical and Electronics Repairers, Industrial, Utility, and Transportation Equip.	0.006
Electronic Equipment Installers and Repairers, Motor Vehicles	0.007
Electronic Home Entertainment Equipment Installers and Repairers	0.009
Security and Fire Alarm Systems Installers	0.009
Aircraft Mechanics and Service Technicians	0.051
Automotive Body and Related Repairers	0.011
Automotive Glass Installers and Repairers	0.001
Automotive Service Technicians and Mechanics	0.077
Bus and Truck Mechanics and Diesel Engine Specialists	0.023
Heavy Vehicle and Mobile Equipment Service Technicians and Mechanics	0.020
Small Engine Mechanics	0.005

Occupation	Percent
Miscellaneous Vehicle and Mobile Equipment Mechanics, Installers, and Repairers	0.004
Control and Valve Installers and Repairers	0.004
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	0.031
Home Appliance Repairers	0.005
Industrial and Refractory Machinery Mechanics	0.069
Maintenance and Repair Workers, General	0.083
Maintenance Workers, Machinery	0.003
Millwrights	0.010
Electrical Power-Line Installers and Repairers	0.015
Telecommunications Line Installers and Repairers	0.038
Precision Instrument and Equipment Repairers	0.027
Coin, Vending, and Amusement Machine Servicers and Repairers	0.008
Locksmiths and Safe Repairers	0.004
Manufactured Building and Mobile Home Installers	0.001
Riggers	0.001
Helpers--Installation, Maintenance, and Repair Workers	0.001
Other Installation, Maintenance, and Repair Workers	0.047
First-Line Supervisors/Managers of Production and Operating Workers	0.686
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	0.001
Electrical, Electronics, and Electromechanical Assemblers	0.041
Engine and Other Machine Assemblers	0.004
Structural Metal Fabricators and Fitters	0.004
Miscellaneous Assemblers and Fabricators	0.148
Bakers	0.022
Butchers and Other Meat, Poultry, and Fish Processing Workers	0.023
Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	0.002
Food Batch-makers	0.009
Food Cooking Machine Operators and Tenders	0.001
Computer Control Programmers and Operators	0.011
Extruding and Drawing Machine Setters, Operators, and Tenders	0.002
Forging Machine Setters, Operators, and Tenders	0.001
Rolling Machine Setters, Operators, and Tenders	0.001
Cutting, Punching, and Press Machine Setters, Operators, and Tenders	0.011
Drilling and Boring Machine Tool Setters, Operators, and Tenders	0.001
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders	0.006
Lathe and Turning Machine Tool Setters, Operators, and Tenders	0.002
Machinists	0.057
Metal Furnace and Kiln Operators and Tenders	0.004
Model Makers and Patternmakers, Metal and Plastic	0.006
Molders and Molding Machine Setters, Operators, and Tenders	0.009

Occupation	Percent
Tool and Die Makers	0.019
Welding, Soldering, and Brazing Workers	0.039
Heat Treating Equipment Setters, Operators, and Tenders	0.001
Lay-Out Workers, Metal and Plastic	0.002
Plating and Coating Machine Setters, Operators, and Tenders	0.002
Tool Grinders, Filers, and Sharpeners	0.001
Other Metal Workers and Plastic Workers, Including Milling, Planing, and Machine Tool Operators	0.068
Bookbinders and Bindery Workers	0.007
Job Printers	0.016
Prepress Technicians and Workers	0.034
Printing Machine Operators	0.034
Laundry and Dry-Cleaning Workers	0.015
Pressers, Textile, Garment, and Related Materials	0.004
Sewing Machine Operators	0.024
Shoe and Leather Workers and Repairers	0.001
Shoe Machine Operators and Tenders	0.001
Tailors, Dressmakers, and Sewers	0.017
Textile Bleaching and Dyeing Machine Operators and Tenders	0.001
Textile Cutting Machine Setters, Operators, and Tenders	0.001
Textile Knitting and Weaving Machine Setters, Operators, and Tenders	0.003
Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	0.002
Upholsterers	0.004
Miscellaneous Textile, Apparel, and Furnishings Workers, Except Upholsterers	0.009
Cabinetmakers and Bench Carpenters	0.011
Furniture Finishers	0.004
Sawing Machine Setters, Operators, and Tenders, Wood	0.006
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	0.004
Miscellaneous Woodworkers, Including Model Makers and Patternmakers	0.006
Power Plant Operators, Distributors, and Dispatchers	0.021
Stationary Engineers and Boiler Operators	0.036
Water and Liquid Waste Treatment Plant and System Operators	0.030
Miscellaneous Plant and System Operators	0.014
Chemical Processing Machine Setters, Operators, and Tenders	0.030
Crushing, Grinding, Polishing, Mixing, and Blending Workers	0.016
Cutting Workers	0.008
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	0.004
Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	0.003
Inspectors, Testers, Sorters, Samplers, and Weighers	0.348
Jewelers and Precious Stone and Metal Workers	0.014

Occupation	Percent
Medical, Dental, and Ophthalmic Laboratory Technicians	0.032
Packaging and Filing Machine Operators and Tenders	0.025
Painting Workers	0.014
Photographic Process Workers and Processing Machine Operators	0.035
Cementing and Gluing Machine Operators and Tenders	0.002
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	0.001
Etchers and Engravers	0.003
Molders, Shapers, and Casters, Except Metal and Plastic	0.007
Paper Goods Machine Setters, Operators, and Tenders	0.006
Tire Builders	0.003
Helpers--Production Workers	0.004
Other Production Workers	0.189
Supervisors, Transportation and Material Moving Workers	0.128
Aircraft Pilots and Flight Engineers	0.301
Air Traffic Controllers and Airfield Operations Specialists	0.044
Bus Drivers	0.060
Driver/Sales Workers and Truck Drivers	0.399
Taxi Drivers and Chauffeurs	0.062
Miscellaneous Motor Vehicle Operators	0.003
Locomotive Engineers and Operators	0.019
Railroad Brake, Signal, and Switch Operators	0.002
Railroad Conductors and Yardmasters	0.019
Subway, Streetcar, and Other Rail Transportation Workers	0.003
Sailors and Marine Oilers	0.004
Ship and Boat Captains and Operators	0.015
Ship Engineers	0.004
Parking Lot Attendants	0.009
Service Station Attendants	0.014
Transportation Inspectors	0.021
Miscellaneous Transportation Workers	0.007
Crane and Tower Operators	0.008
Dredge, Excavating, and Loading Machine Operators	0.004
Hoist and Winch Operators	0.001
Industrial Truck and Tractor Operators	0.035
Cleaners of Vehicles and Equipment	0.018
Laborers and Freight, Stock, and Material Movers, Hand	0.193
Machine Feeders and Offbearers	0.006
Packers and Packagers, Hand	0.034
Pumping Station Operators	0.005
Refuse and Recyclable Material Collectors	0.007
Miscellaneous Material Moving Workers	0.009

Teacher Labor Markets In Wyoming

Final report to

Wyoming Select Committee

on School Finance Recalibration

Dr. Christiana Stoddard

December 10, 2010

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Executive Summary

How attractive is the teaching profession in Wyoming? The first section of this report shows that teaching salaries in Wyoming rose rapidly since 2000, and rose especially sharply after 2005. Model funded salaries have also increased over time, but actual salaries rose by even more. Teaching salaries rose more quickly in Wyoming than in neighboring states, and Wyoming teachers are now the highest paid teachers in the region. Teaching salaries also increased rapidly relative to other professional occupations and relative to other comparable workers in Wyoming. By 2008, Wyoming teachers were paid more highly relative to their non-teaching counterparts than in any other state in the nation.

The second section of the report then asks how this increase affected the recruitment and retention of teachers. Overall teacher turnover remained constant during this period, but the turnover rates of inexperienced teachers fell. This is in contrast to the rest of the nation and the region, where new teachers left teaching at a higher rate over time. By 2007, the exit rate of new teachers in Wyoming was lower than in any other state. Turnover rates are fairly similar across the state and across different fields, with modestly higher rates in rural areas, in a few counties, and for inexperienced math and science teachers. Wyoming increasing recruits teachers from out of state, with 70 percent of new hires coming from other states in 2009.

The third section examines the effects of the salary increase on teacher quality. There was no change during this period in the percentage of uncertified teachers, already a very low percentage. More Wyoming teachers have National Board certification and master's degrees than in the past, although these measures are not strongly associated with student achievement. Fewer teachers are inexperienced. However, the academic qualifications of new hires in Wyoming have not responded to rising salaries. Undergraduate grades, institutional quality, and major field have remained unchanged since 2000.

The final section presents recommendations. Chief among them is that teacher quality should be an important focus going forward for the state. High salaries in Wyoming mean that the state is in a strong position to actively recruit high quality teachers. Part of that effort should include continued tracking of teacher quality measures to monitor the influence of salary as new graduates enter the teaching work force.

I. How Competitive are Wyoming Teaching Salaries?

How attractive is the teaching profession in Wyoming? The first section of this chapter compares teaching salaries in Wyoming both over time and compared to the model funded salaries. While this clearly shows that teaching salaries have increased sharply over time, the attractiveness of teaching still depends in part on how teaching salaries compare with other alternatives.

Several comparisons are relevant for different groups of potential and actual teachers. New teaching graduates and other existing teachers in the region likely compare salaries in Wyoming with salaries in other states when deciding where to live. These cross-state comparisons reflect the attractiveness of Wyoming to individuals who have already decided to become teachers. The second section of this chapter therefore contrasts the trends in Wyoming teaching salaries with trends in teaching salaries in other states.

It is also important, however, to consider the relative attractiveness of teaching and other occupations. The third section compares Wyoming teaching salaries to the average salary in other professional occupations in Wyoming. For example, a college student who plans to live in Wyoming might compare teaching salaries in Wyoming with salaries in a broad range of professional fields in the state when deciding what occupation to choose. This comparison reflects that decision.

Finally, current teachers in Wyoming weigh their teaching salary against their options in other occupations in Wyoming when deciding whether to remain in teaching. Current teachers' options may depend on their age, education level, gender, number of hours they would like to work, and other individual characteristics. The fifth section therefore compares Wyoming teaching salaries to the salaries of other individuals with similar characteristics in different occupations.

Each of these comparisons is relevant for some group (new teaching graduates, college students deciding on a career, current teachers), and so there are alternative ways to rank the attractiveness of teaching in Wyoming relative to other states. However, the final section shows that regardless of the metric used, Wyoming ranks very highly as one of the most attractive places to be a teacher in the United States.

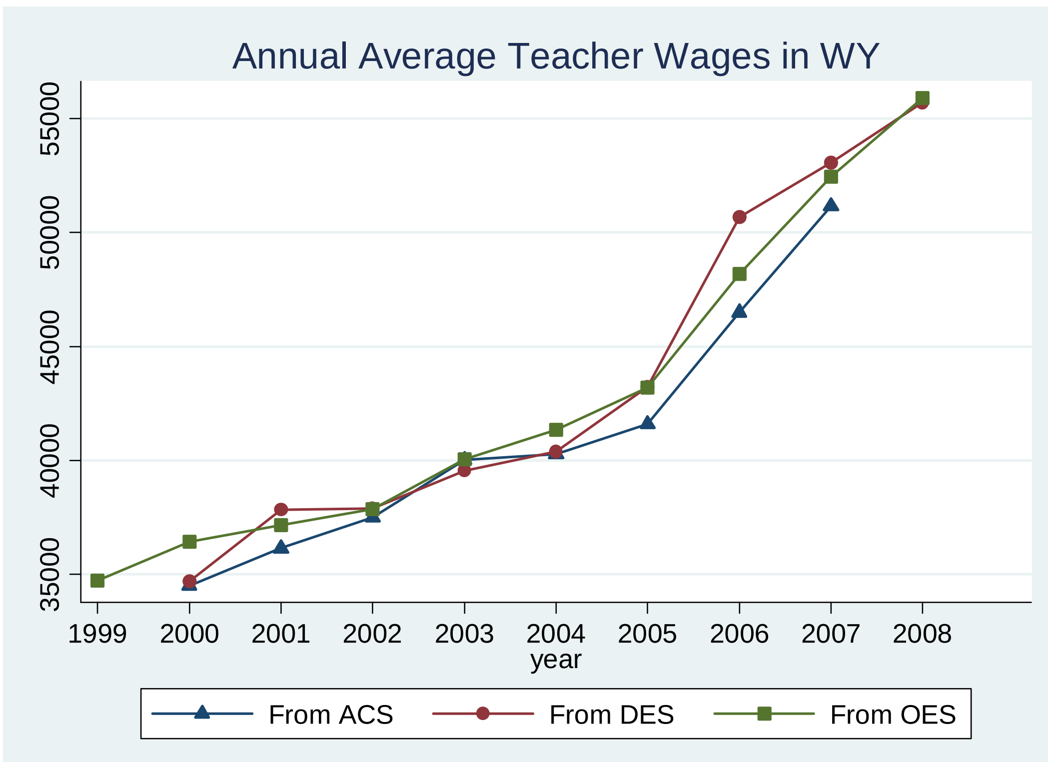
There are a number of sources of information about teaching salaries and salaries of other workers used in this chapter and throughout the report. Each of these is discussed in more detail in Appendix A. Briefly,

- The Wyoming Department of Education staffing files report salaries for all teachers in Wyoming. This is the most complete source of information about the characteristics and salaries of teachers in Wyoming.
- The Digest of Education Statistics (DES) reports average teaching salaries in all states, allowing for the most recent comparisons of teaching salaries across the United States.
- The Schools and Staffing Survey (SASS) is a sample of teachers across the United States. It allows for comparisons across states, but it is only conducted every four years, most recently in 2007-08.
- The American Community Survey (ACS) is a mini-Census survey of individuals who report their own salary as well as their own characteristics. This source has smaller samples of individuals, but allows for comparisons of teachers with other workers who have similar personal and job characteristics.
- The Occupational Employment Statistics (OES) is a survey of employers who are covered by the unemployment insurance. This contains more complete information about salaries in different professions, but does not have information about the characteristics of workers in those jobs.

A. How have salaries in Wyoming changed over time?

All of these sources show an increase in teaching salaries in Wyoming over time, with a particularly sharp increase after 2005. Figure 1 shows the annual average teacher wages as reported in the Digest of Education Statistic s survey of all school districts (DES), the American Community Survey of individuals (ACS), and the Occupational Employment Statistics (OES) survey of employers. (These trends are not identical in part due to differences in the reporting year.)

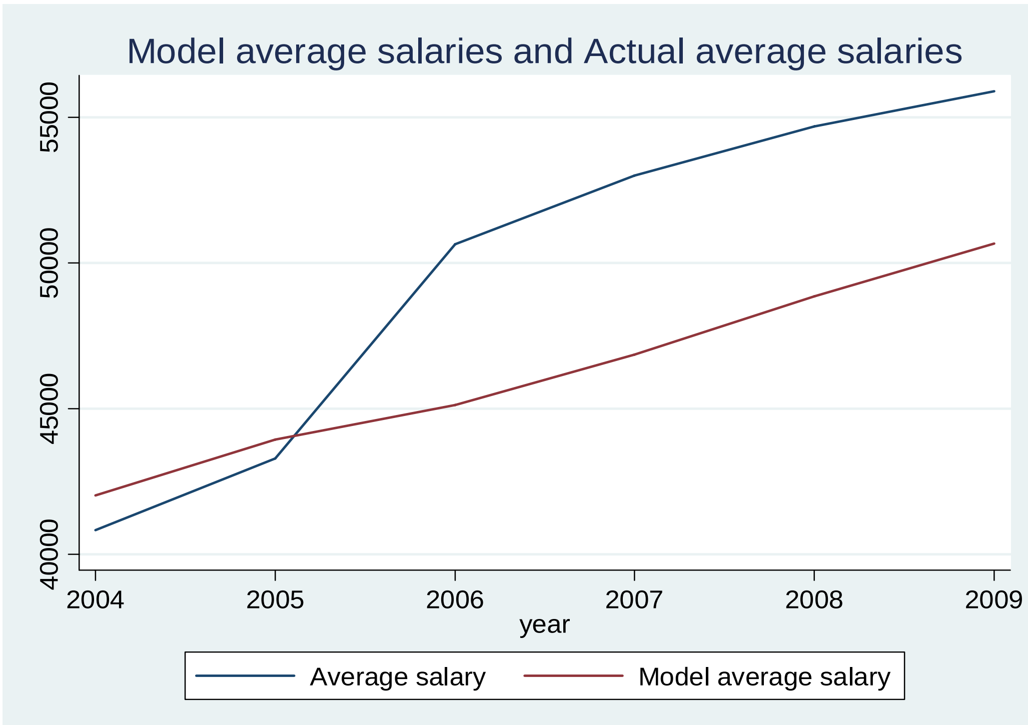
Figure 1 Annual Average Teacher Wages in Wyoming



Source: American Community Survey, Digest of Education Statistics, Occupational Employment Statistics.

Not only have salaries risen rapidly, but the actual salary increases are larger than the salaries increases in the Wyoming funding model, implying that districts spent more on teaching salary and less on other components than the model would have implied. Figure 2 shows the average base salary of Wyoming teachers who are employed full time compared to the model funded average salary. In 2004 and 2005, model funded salaries were actually slightly higher than the actual average salary, but after 2005, actual salaries exceeded model salaries by more than 10 percent.

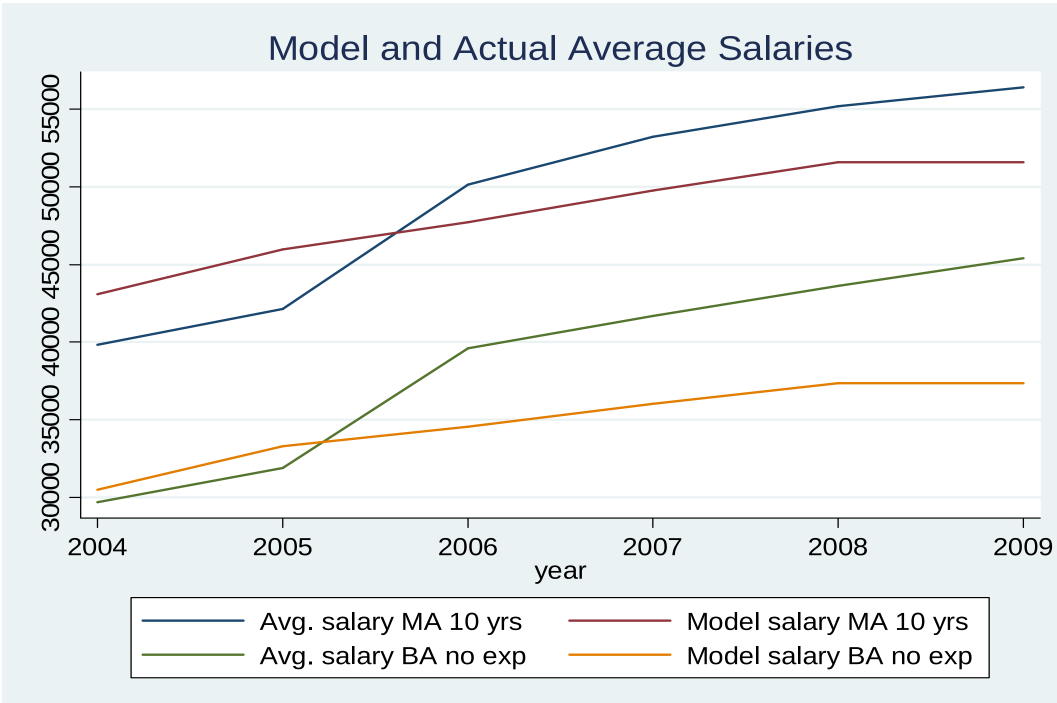
Figure 2 Actual Average Teaching Salaries and Average Teaching Salaries in the Wyoming Funding Model



Source: Wyoming Department of Education staffing files.

Actual salaries are higher than model salaries both on average, as well as by education and experience level. Figure 3 reports the model salaries and actual salaries for two extremes: a brand new teacher with a BA and no experience, and a teacher with a master's degree and 10 years experience. In both cases, actual salaries are far above model salaries by 2009, suggesting that the increase in salaries was an increase to base salaries for all teachers, rather than being targeting towards a particular group of teachers.

Figure 3 Actual Average Teaching Salaries and Average Teaching Salaries in the Wyoming Funding Model by Degree and Experience



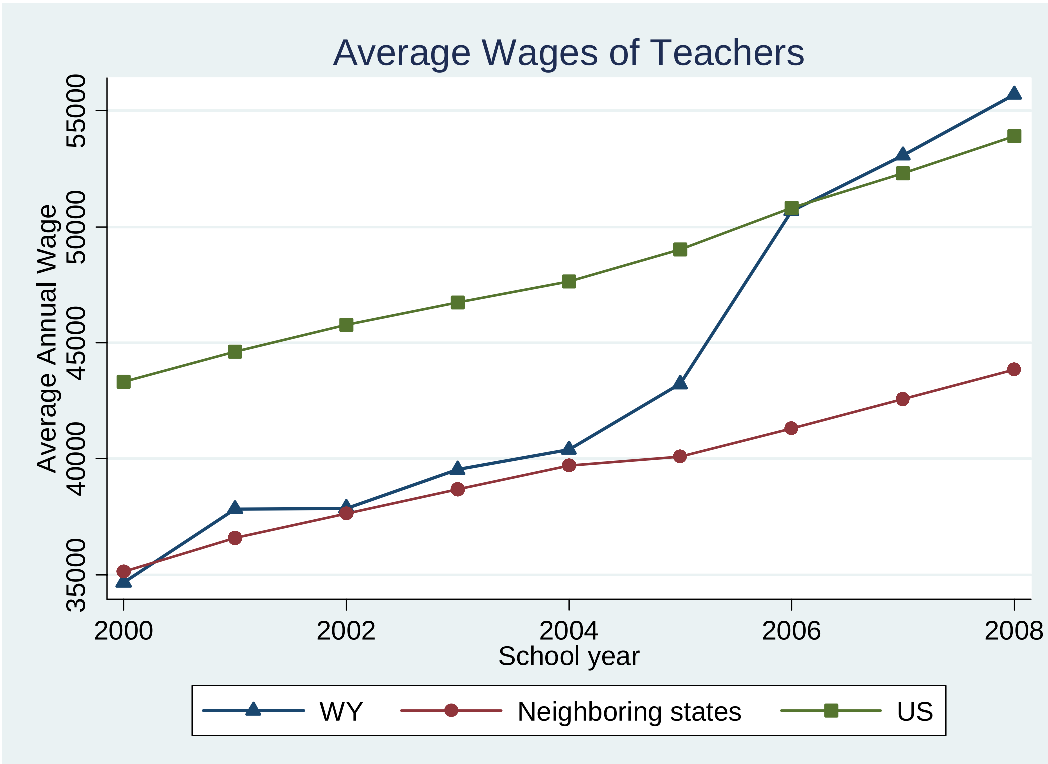
Source: Wyoming Department of Education staffing files.

B. How do teaching salaries in Wyoming compare with salaries in other states?

The rise in salaries indicates that Wyoming is likely to have become a more attractive place to teach relative to the past. High teaching salaries relative to other locations enable Wyoming to recruit new teaching graduates and existing teachers from other states into Wyoming, and allow Wyoming to retain Wyoming teaching graduates and existing teachers in the state. How has the rise in salaries changed the attractiveness of Wyoming with other states?

In 2000, average teaching salaries in Wyoming were about 20 percent below the US average, as shown in Figure 4. However, the cost of living and teaching conditions vary widely across the United States, making this comparison problematic. As Figure 4 shows, salaries in Wyoming in 2000 were very similar to the average in neighboring states.

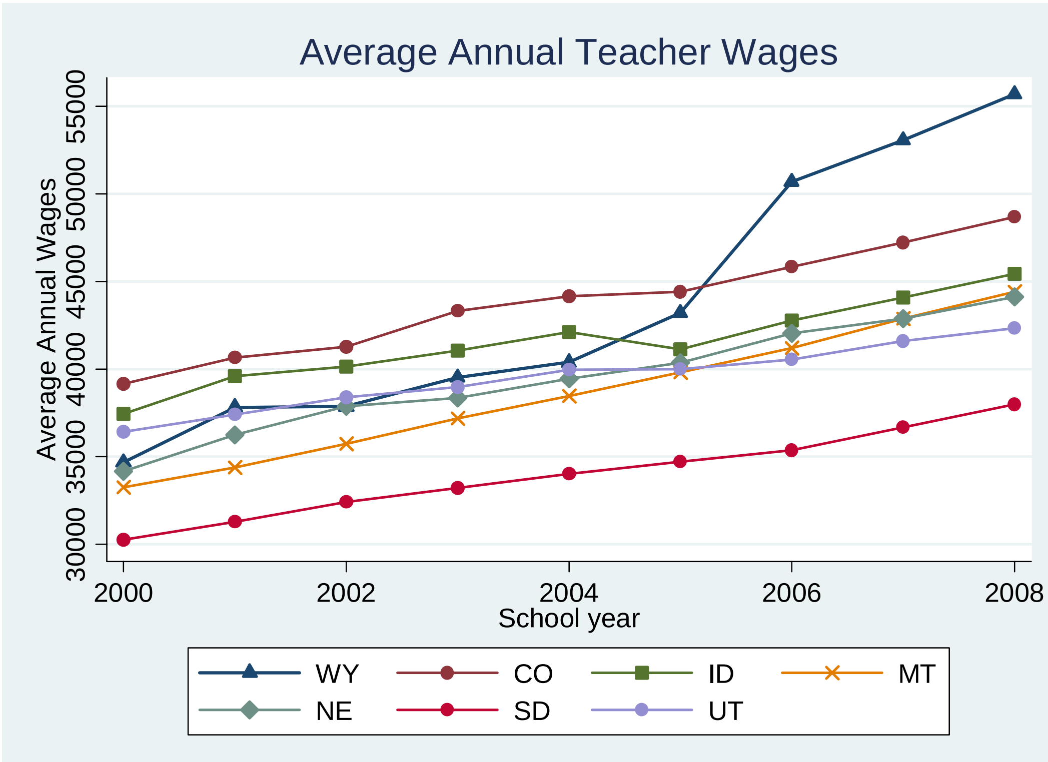
Figure 4 Comparing Average Teaching Salaries in Wyoming, in Neighboring States, and in United States



Source: Digest of Education Statistics, 2009.

Figure 5 disaggregates this comparison across states. It shows that average salaries in Wyoming were roughly in the middle of other states in the region: higher than salaries in Montana and South Dakota, roughly comparable to salaries in Utah and Nebraska, and lower than salaries in Colorado and Idaho. This was true until 2005, when Wyoming salaries increased sharply. Salaries are now well above the average salaries of all other states in the region and exceed the average salary for the United States as a whole.

Figure 5 Comparing Average Teaching Salaries in Wyoming and in Neighboring States

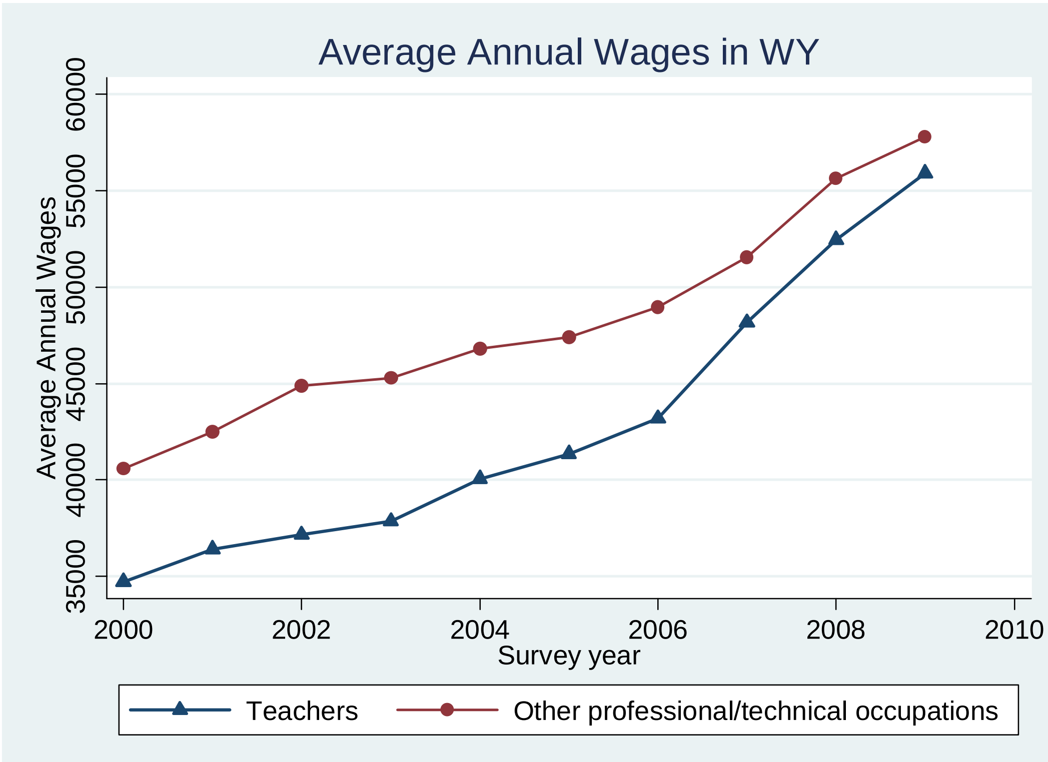


Source: Digest of Education Statistics, 2009.

C. How do salaries compare with nonteaching salaries for all professional occupations?

How attractive is teaching in Wyoming compared with other occupations? This broad comparison is most relevant when considering the occupational choice of an individual who plans to live in Wyoming and is choosing a profession. For example, a college student will compare salaries in teaching with salaries in other professional and technical occupations. This is also a useful comparison when thinking about macroeconomic trends. If all salaries in Wyoming rose after 2005 (for both teaching and nonteaching professions), the relative attractiveness of teaching would be unchanged.

Figure 6 Comparing Average Teaching Salaries in Wyoming with Salaries for other Professional and Technical Occupations

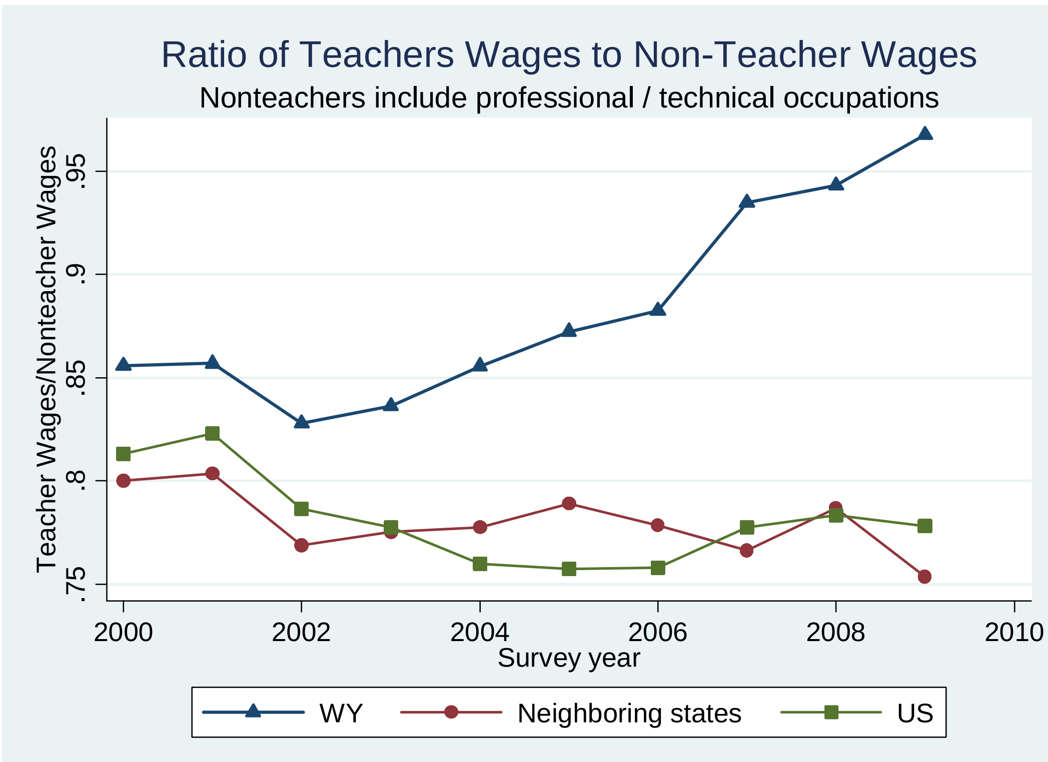


Source: Occupational Employment Statistics.

Figure 6 is based on the salaries reported in the Occupational Employment Statistics. Many occupations are unlikely to be relevant comparison to teaching: for example, while many college students may compare their prospects in teaching with their prospects in accounting, fewer probably compare their prospects in teaching with their prospects in construction. Figure 6 compares teaching salaries with salaries in other professional and technical occupations. These occupational categories are listed in Appendix B. Figure 6 shows that annual salaries in teaching are lower than those in other professional and technical occupations (although hours and weeks of work are lower and benefits are higher). However, this gap shrank considerably over this period. Teaching salaries currently are about 95% of the salaries of other professional and technical occupations.

Figure 7 shows that this increasing ratio is unique to Wyoming. In 2005, the ratio of annual teaching wages to wages in other professional occupations was already higher than in the United States and in nearly all other states in the region, at about 85%. The ratio rose steadily in Wyoming over the period to 95%, while in the rest of the United States and in all other neighboring states, teaching salaries declined relative to other occupations.

Figure 7 Comparing Teaching Wage Ratios in Wyoming and Other Areas, Professional and Technical Occupations



Source: Occupational Employment Statistics.

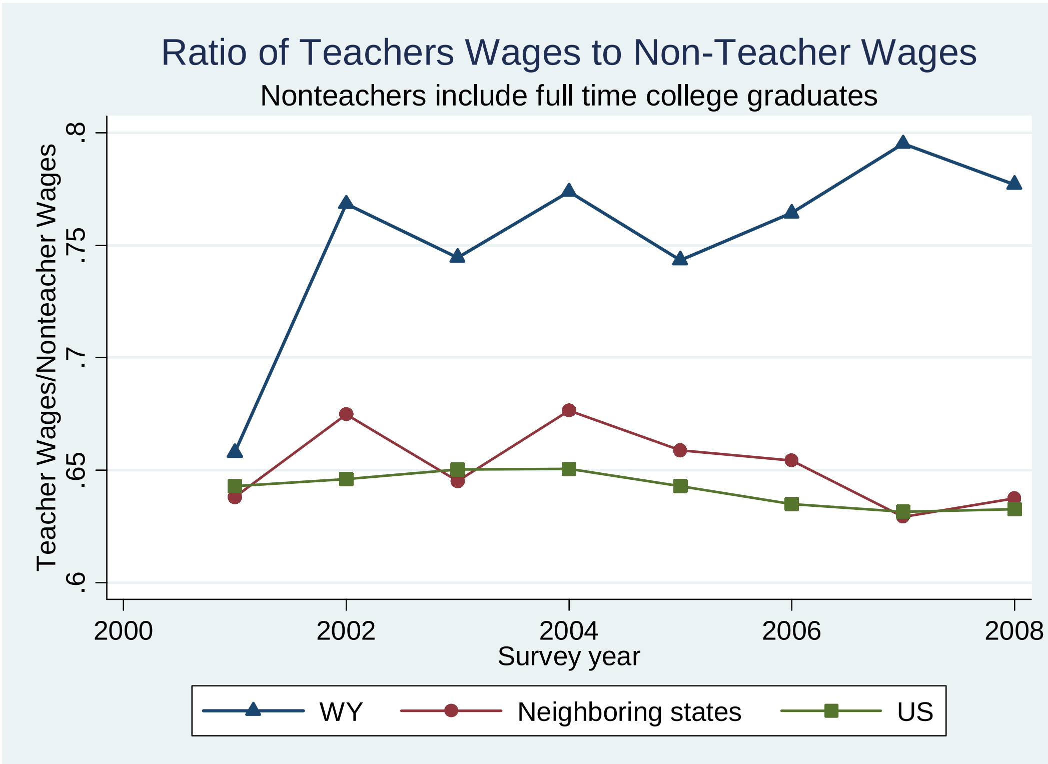
D. How do salaries compare with nonteaching salaries for similar workers?

These comparisons are useful when thinking about the occupational choices of all individuals in Wyoming. However, when current teachers consider staying in the profession or leaving for another occupation, it is more useful to compare their salaries to those of similar workers in jobs with similar characteristics. For example, all teachers in Wyoming have a bachelor's degree, so their salaries are best compared to those of other college graduates. Teachers in Wyoming are slightly older than other workers in Wyoming and therefore have more work experience. They are much more likely to be female and to have an advanced degree. They also work fewer hours and weeks of work than the average worker in Wyoming.

The American Community Survey is used to make these comparisons, as it has information about personal and job characteristics of individual workers. The most appropriate way to make these multiple comparisons simultaneously is to use multivariate regression analysis. Details about these regressions are reported in Appendix C. Based on these regressions, wages for non-teachers are predicted using the average characteristics of teachers. These predictions will adjust the average wages for individuals to match the characteristics of teachers. Wages for teachers outside of Wyoming are also adjusted using these regressions to match the characteristics of Wyoming teachers.

How attractive is teaching in Wyoming after making these adjustments? Like with the results for all professional and technical occupations, Wyoming's ratio of teaching to non-teaching wages far surpasses the average in other neighboring states and in the US as a whole. While teaching wages have eroded relative to wages for similar workers in other states, teaching wages in Wyoming have increased.

Figure 8 Comparing Teaching Wage Ratios in Wyoming and Other Areas, Wages Adjusted to Match Characteristics of WY Teachers



Source: American Community Survey. Salaries adjusted to match the characteristics of Wyoming current teachers.

E. How does Wyoming rank relative to other states?

The previous sections each report a different type of comparison of teaching salaries in Wyoming relative to salaries of other groups. However, regardless of which measure is used, teaching has become very attractive in Wyoming relative to other states. Table 1 shows the rank of Wyoming across other states based on these various comparisons in the latest year available for each data source. In nearly every instance, Wyoming ranks as one of the top states in terms of relative salaries. For example, if we only compare teaching salaries across states, Wyoming ranks 14th. However, since cost of living and alternative employment opportunities in Wyoming are so different from other states, this comparison is somewhat misleading. Non-teaching wages also vary across states because of difference in state characteristics. After comparing the ratio of teaching salaries to the salaries of other professional workers in each state, Wyoming emerges as the state with the highest ratio except for Alaska, indicating that teaching in Wyoming compares very favorably relative to other states. When comparing the ratio of teaching salaries to the salaries of other employed college graduates in the state, Wyoming ranks first. This is true whether or not those salaries are adjusted to match the characteristics of teachers.

The final column uses the model salary in Wyoming for the relevant year instead of the actual average salary in Wyoming in that year. If actual salaries had been as low as the model salaries, Wyoming would have ranked in about the middle of US states. However, compared to other workers in the state, Wyoming teachers still would have ranked very highly even if salaries had remained at model levels. Depending on the specific comparison group, salaries would have ranked from second to fourth in the nation.

Table 1: Rank of Wyoming Teaching Salary Relative to Other States Based on Comparisons with Alternative Workers

	WY Rank Among US States	WY Model Salary Rank Among US States
Wyoming teacher salaries compared to US teacher salaries (Source: DES, 2008-09 school year)	14	28
Ratio of teacher salaries to salaries of other professional/technical occupations in the state (Source: OES, 2009)	2	4
Ratio of teacher salaries to salaries of other college graduates in the state (Source: ACS, 2008)	1	3
Ratio of teacher salaries to salaries of other college graduates in the state, adjusted for age, gender, degree, hours and weeks of work (Source: ACS, 2008)	1	2

The first section of this chapter indicated that actual salaries have overshot the salaries given by the Wyoming funding model. If salaries had remained at model levels, how would Wyoming rank? Compared to other professional and technical occupations, Wyoming would have ranked 4th instead of second if salaries had remained in line with the funding model. Compared to other college graduates, Wyoming would have ranked 6th instead of first if salaries had stayed in line with model salaries. Clearly, even with somewhat lower salaries, Wyoming would have remained very competitive in the market for teachers.

II. How have rising teacher salaries affected teacher recruitment and retention?

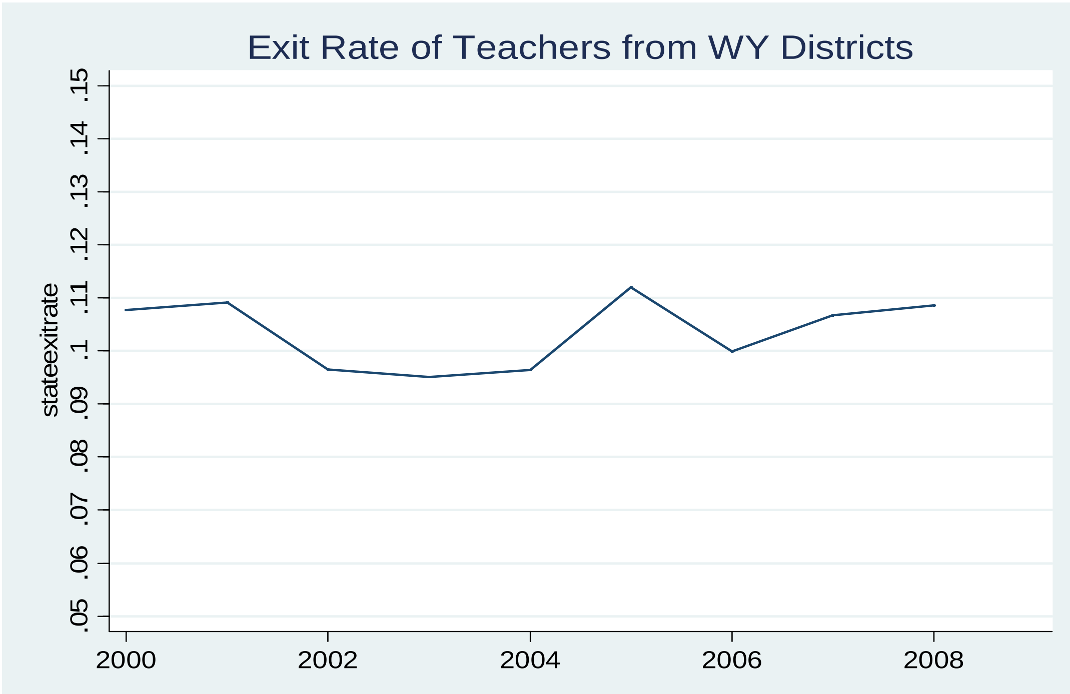
Part I of this report shows that Wyoming salaries have risen rapidly, both relative to other states and other occupations in Wyoming. How has the increase in teacher salaries affected recruitment, retention, and teacher quality in Wyoming?

This is not a simple question to answer. First, a number of factors beyond salary affect the decision to become or to remain a teacher. Many teachers exit teaching or leave the state for reasons unrelated to the attractiveness of the job, including retirement, the need to care for other family members, or relocation due to spousal job constraints. However, the turnover rates of new teachers in particular are likely to be more sensitive to the relative attractiveness of teaching in Wyoming, and so the analysis below examines both overall turnover rates and the exit rates of new teachers. This chapter examines the following recruitment and retention indicators: (A) exit rates for all teachers and for new teachers, (B) changes in district reported difficulty filling positions, (C) variation in turnover within the state, (D) transfers across districts, and (E)recruitment from other states.

A. Turnover rates

Teacher turnover rate are based on the Wyoming department of education fall staffing files. Full time teachers in the fall staffing files in one year are compared to teachers in the following year. For example, the exit rate for 2008 is the percentage of teachers in October of 2008 who are not teaching in October of 2009. Figure 9 reports exit rates of full time teachers from Wyoming. Over time, about 10 ½ percent of teachers in a given year are no longer teaching in Wyoming in the following year. Figure 9 also shows that this exit rate has remained relatively constant at between 9 ½ percent to 11 percent since 2000, with no marked trend over time.

Figure 9 Trends in Teacher Turnover

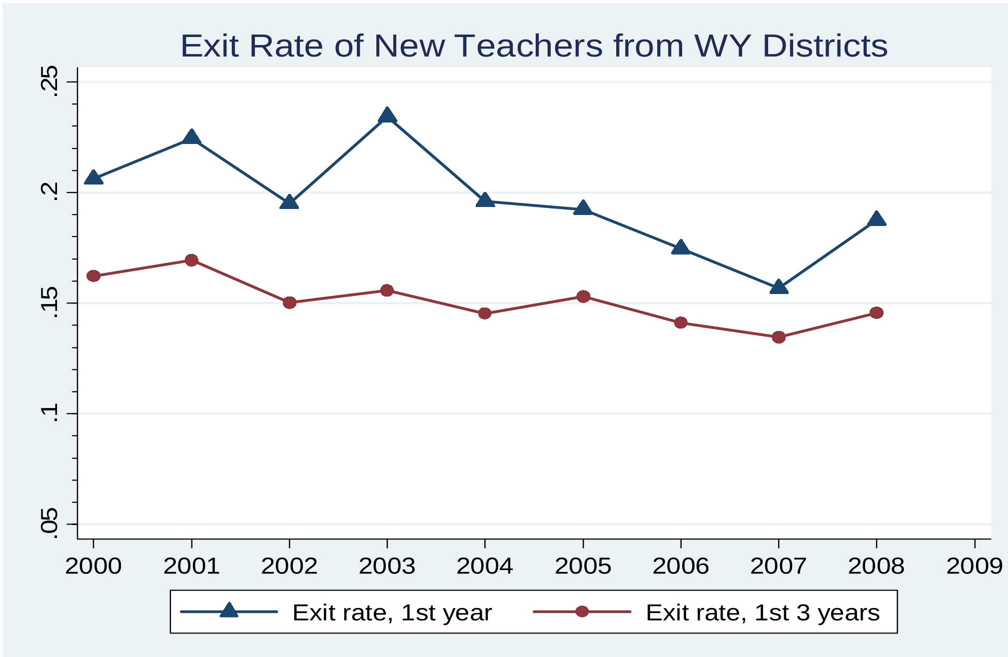


Source: WY Department of Education Staffing Data, full time teaching assignments.

Some exit is always inevitable—for example, retirements make up a large fraction of exits. Exit of lower quality teachers would potentially be beneficial if they were replaced with higher quality new hires.[1] The exit rate of new teachers is more of a concern as new teachers tend to be associated with lower student achievement in their first three years. In the last two years of available data, about a third of teachers leaving Wyoming schools were close to retirement age (55 or older). On the other hand, about 36 percent had less than three years experience. New teachers are likely to be more sensitive to other employment opportunities, as they have acquired little experience on the job. Furthermore, turnover of new teachers is more problematic for schools, as teachers are generally less effective in their first 3 years of teaching. Figure 10 reports exit rates for teachers with 1-3 years of experience and for brand new hires.

[1] Note that the results later in the report suggest that the quality of new hires is unchanged.

Figure 10 Trends in Turnover of Inexperienced Teachers



Source: WY Department of Education Staffing Files, full time teaching assignments.

Figure 10 shows that the salary increases in Wyoming were accompanied by declining exit rates of new teachers. Between 2000 and 2004, about 21 percent of first year teachers exited teaching in Wyoming in the following year. From 2005 through 2008, about 18 percent of new teachers exited Wyoming schools.

How do these turnover rates in Wyoming compare with those in United States and in the region? Table 2 uses data from the Schools and Staffing Survey to answer this question. The Schools and Staffing Survey randomly surveyed about 10 percent of teachers across the nation in 1999-00, 2003-04, and 2007-08 school years. In each year, the survey contains about 600 teachers from about 40 districts Wyoming. Principals were asked in the following year whether each of the teachers surveyed was still teaching in the same school. As a result, these turnover rates will include teachers who moved to another school in the same district or to another school in the same state.

Table 2: Indicators of Teacher Recruitment and Retention Across States

	Percent Teachers Left School in Next Year			Percent New Teachers Left School			Principals with Vacancies that had at least one Hard to Fill		
	1999	**2003**	**2007**	**1999**	**2003**	**2007**	**1999**	**2003**	**2007**
WY	13	14	12	17	24	11	45	36	35
Region	15	15	17	25	24	24	44	25	40
US	14	15	16	22	22	23	43	34	34

Source: Schools and Staffing Survey, various years.

Table 2 indicates that total exit rates in Wyoming were between 12 and 14 percent, slightly higher than the exit rate in the DOE staffing files because these figures include within district and within state moves. Wyoming's turnover rates have always been lower than those of other states in the region and in the US as a whole. As in the Department of Education staffing files, these turnover rates have not changed much over time. However, the SASS shows that exit rates have generally risen in other states.

The SASS also shows a decline in exit rates of teachers with one to three years experience in Wyoming. While exit rates of new teachers have always been somewhat lower in Wyoming than in other states, by 2007-08, exit rates for new teachers in Wyoming were less than half the rate in the US or in the region as a whole.

Because the exit rate of new teachers is so low in Wyoming, exits in Wyoming are more driven by factors other than salary. For example, the percentage of exiters in Wyoming who are close to retirement (over age 55) in the SASS in2 007 was the highest in the United States, at 36 percent. This is true even though the average age of teachers in Wyoming was similar or younger than in 16 other states.

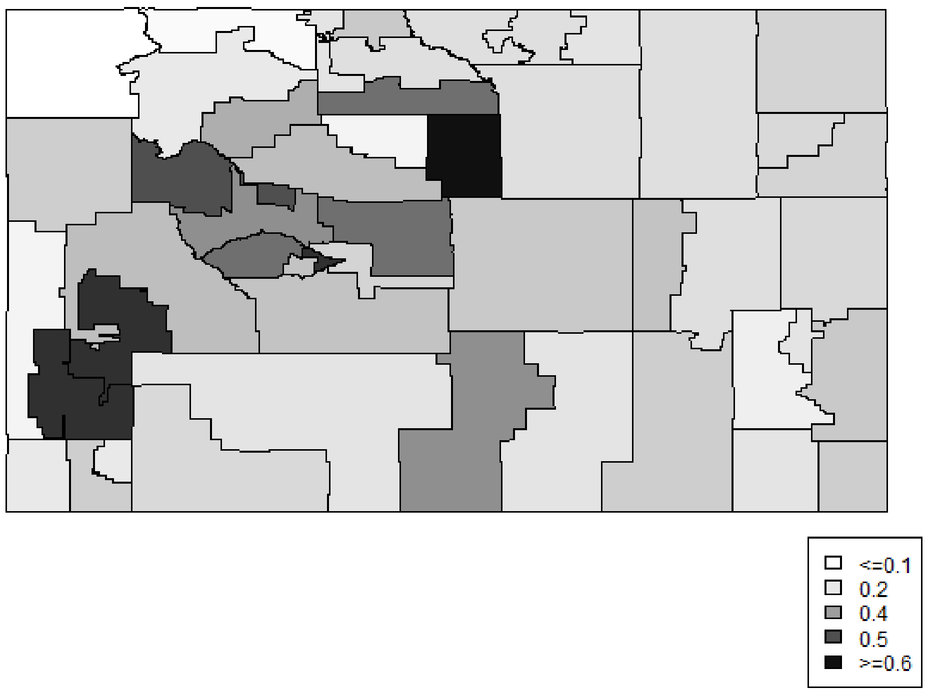
B. Difficulty filling positions

The SASS also asks principals who have openings in their school if they had at least one opening that was "very difficult" or "impossible" to fill. The SASS does not indicate if all of the opening were hard to fill or if only one of the school's openings was hard to fill, and answers reflect the principals' subjective evaluations. Table 2 above also reports the responses to this question. Principals in Wyoming were much less likely to report hard to fill positions in 2007 than in 1999, but the trend was similar to that in the United States overall.

C. Variation within Wyoming

How do these exit rates compare across the state? The Wyoming Department of Education staffing files allow for detailed comparisons of turnover rates across teaching fields and districts. Figure 11 presents a map of exit rates by county for the latest three year period. The highest exit rates were in parts of Fremont, Washakie, Sublette and Lincoln counties, where in some school districts more than fifty percent of the teaching work force in fall of 2006-07 had exited by 2009-10 school year. These tend to be more rural districts with small numbers of teachers

Figure 11 Fraction of Teachers who Exited by District, 2006-2008



How does turnover vary by other characteristics of schools? Table 3 shows exit rates for three sets of comparisons: (a) by level of urbanization, (b) by teaching field, and (c) by the percentage of minority students in the school. This table shows that turnover rates do not vary much based on the characteristics of school districts. The exceptions are that school districts in rural areas and math and science teachers, particularly new teachers, have higher exit rates.

Table 3: Variation in Turnover Rates Across Wyoming

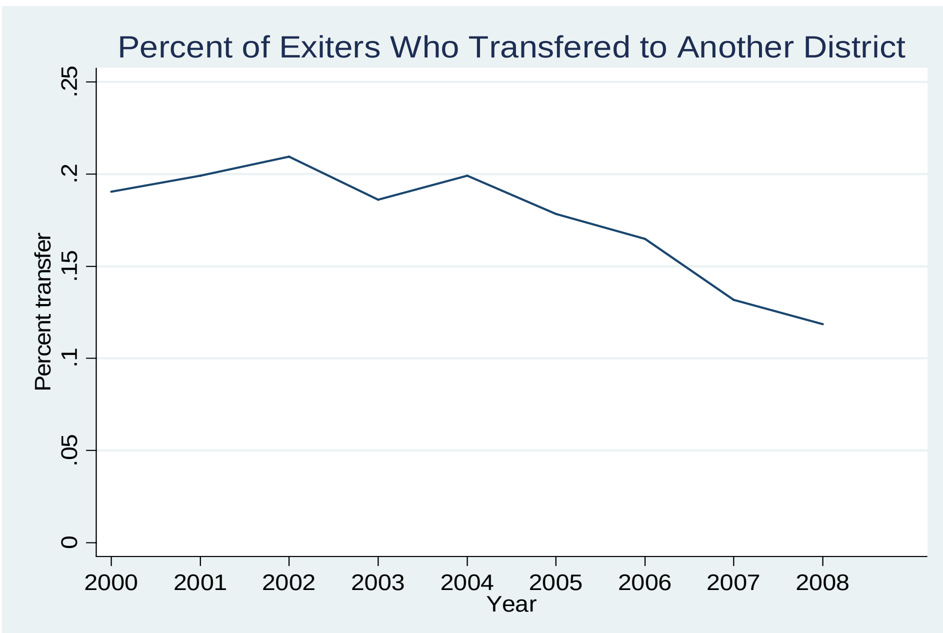
	Exit rate of all teachers	Exit rate of new teachers
Wyoming Average	10	14
By Urbanization		
Urban area	10	11
Town	9	12
Rural	13*	18*
By Field		
Elementary	10	12
Language arts and social studies	11	14
Math and science	12	16*
Special education	11	14
Other fields (art, music, foreign languages, vocational, etc.)	9	14
By Percent Minority		
Less than 10 percent minority students	10	14
10-20% minority students	10	14
Greater than 20 percent minority students	11	14

Source: 2007-08 and 2008-09 WY Department of Education Staffing Files
Asterisks (*) indicate turnover rates that are statistically significantly higher than overall average.

Note that although the turnover rate is higher in rural areas than other parts of the state, the 18 percent turnover rate for new teachers in rural areas is still much lower than the average rate for new teachers in neighboring states and the United States as a whole. Similarly, the turnover rate for new math and science teachers is higher than for all teachers, but is still relatively low. The higher rate in these areas may reflect the inability of districts to offer pay premiums for specific fields because of the single salary schedule.

Did the higher salaries in general cause districts to be more competitive with one another, leading to more teacher transfers across districts? To answer this question, the analysis identified teachers who left a district in a given year. How many of these exiters were employed in another Wyoming district in the following year? Figure 12 indicates that as salaries rose, the fraction of teachers who left one district in Wyoming for another Wyoming district fell from about 20 percent in 2000 to about 12 percent in 2008. Higher salaries appear to have led to less competition among districts.

Figure 12 Movement of Teachers Across Wyoming Districts



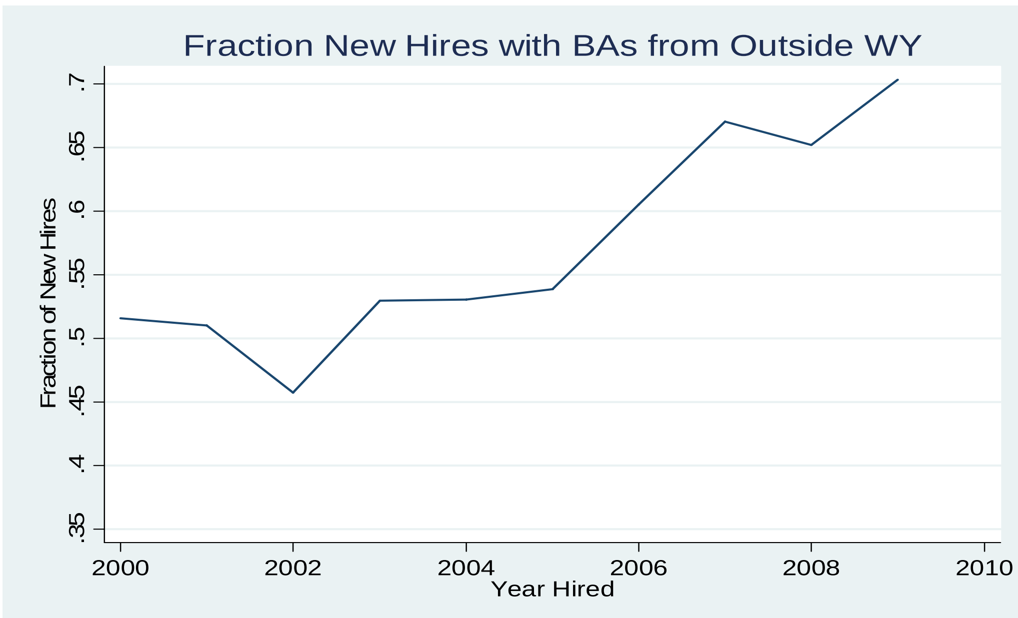
Source: WY Department of Education Staffing Data, full time teaching assignments.

D. Recruitment from other states

The first section of this report showed that salaries in Wyoming are high relative to other states in the region and relative to other occupations. Has this led to increased recruitment of teachers from other states? Data on this question are hard to come by, as teachers are not tracked across state lines. However, the Professional Teaching Standards Board data for Wyoming includes the undergraduate institution of teachers licensed in Wyoming. This data is matched to the Wyoming Department of Education staffing files to identify new full time hires. How many of new full time hires have a degree from an undergraduate institution outside of Wyoming?

Figure 13 shows that in the 2009-10 school year, about 70 percent of all new hires had a degree from another state. This represents a sharp rise since 2005, the year when salaries began increasing. From 2000 through 2005 about half of new teachers had degrees from another state, with a fairly flat trend over this period. After the salary increases in 2005, this fraction rose rapidly. This is consistent with the fact that teaching in Wyoming has become very attractive relative to other areas.

Figure 13 Recruitment of Teachers from Other States



Source: Wyoming Professional Teaching Standard Board.

III. How have rising teacher salaries affected teacher quality?

Part I of this report showed teaching salaries in Wyoming have gone up rapidly, and are now very high relative to other states and occupations. The first section of Part II indicated that while this did not affect overall turnover rates, it did lead to reduced turnover of new teachers and more recruitment from other states. An important remaining question is what impact this salary increase has had on the quality of the teaching work force.

Effects of salaries on teacher quality are even more difficult to assess than effects on recruitment and retention, as teacher quality itself is hard to measure. Ultimately, the best indicator of quality is a measure of how much teachers improve the learning of the students in their classroom. Wyoming does not currently report data that allows for this kind of measure. Unfortunately, the research on teacher quality suggests that many more easily measured characteristics of teachers are not strongly associated with student outcomes. In general, the main findings of current research suggest the following:

- Certification of teachers is not strongly associated with student outcomes.[2]
- National Board certification is also not generally associated with student outcomes.[3]
- Having a master's degree is not associated with better student outcomes.[4]
- Inexperienced teachers have lower performing students. After the first three years, additional experience does not appear to increase student outcomes. [5]
- Higher teacher ability leads to greater student achievement. The selectivity of a teacher's undergraduate institution and a teacher's own achievement test scores (SAT or ACT) are associated with higher student performance.[6]

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[2] For example, see Darling-Hammond, Berry and Thorenson (2001), Goldhaber and Brewer (2000), Smith, Dasimone and Ueno (2005).

[3] Harris and Sass (2008) find no effect of NBPTS Certified teachers. Clotfelter, Ladd and Vigdor (2007) find the exam identifies better quality teachers in North Carolina, although the licensing process does not increase their quality.

[4] Rivkin, Hanushek, and Kain (2005) review some of this evidence.

[5] For example, see Hanushek (1997), Jacob and Lefgren (2008), Rivkin, Hanushek, and Kain (2005), Rockoff (2004),.

[6] For example, see Ballou (1996), Clotfelter, Vigdor and Ladd (2006), Ehrenberg and Brewer (1994), Ferguson and Ladd (1996).

- Having a major in a non-education related field is associated with better student outcomes.[7]

However, even though many of these measures are imperfect, together they may indicate something about the depth of the applicant pool. For example, given that schools have as strong incentive to hire certified teachers, a large proportion of uncertified teachers may indicate a weak pool of teaching applicants. The set of indicators in this section include trends in (a) certification type, (b) the proportion of teachers with advanced degrees, (c)years of teacher experience, (d) the average undergraduate GPA of new teachers, (e) the selectivity of undergraduate institution attended by new teachers, and (f)the degree field of new teachers.

A second difficulty in identifying the effect of salary on teacher quality is that teacher quality is likely to respond slowly to changes in salary. Higher salaries may increase the quality of the applicant pool, but if high salaries also decrease the exit rates of existing teachers, there will be few positions for these new, better quality applicants. The higher salaries in 2006 may have influenced better quality college students to choose teaching as a career, but it will take several years before these students complete their education and apply for teaching positions. To help mitigate this problem, much of the analysis below focuses on the characteristics of new hires, rather than the characteristics of the entire teaching workforce. The effects of salary increases up through 2005 may be reflected in these new hires, and the next several years are likely to be important ones for assessing the effects of the salary increases. This highlights the need for continued tracking of teacher quality over time.

A. Certification

Table 4 reports trends in the types of teaching certifications in Wyoming and other states based on the Schools and Staffing Survey. Nearly all teachers in Wyoming are certified, with only 3 percent no holding a regular teaching certification in 2007. This rate is lower than the rate for all other neighboring states, and is about a fourth the rate in the United States. However, the low rate of uncertified teachers was present in Wyoming even before the recent salary increases.

[7] For example, see DarlingHammond (2000), Murname and Phillips (1981), Rivkin, Hanushek, and Kain (2005).

National Board certification in Wyoming has responded strongly to the salary premium for this certification. While the percentage of National Board certified teachers was only 7 percent in 2003, about half the percent as in the United States, it more than tripled in just four years, and is now higher than any other state in the region.

Table 4: Certification and Advanced Degrees Across States

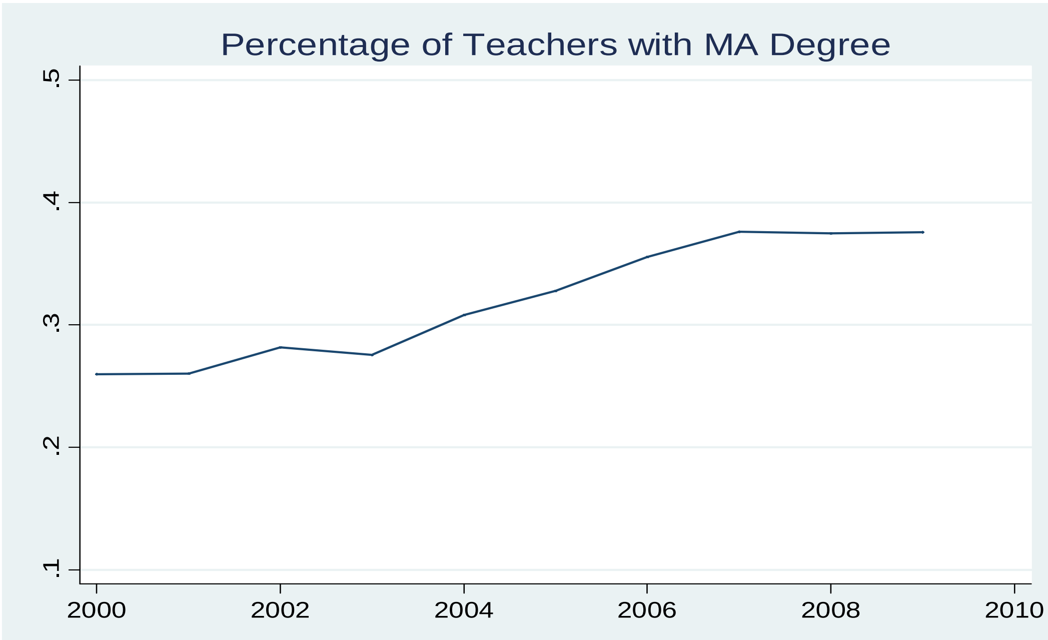
	Percent Uncertified			Percent National Board Certified		Percent with Master's Degree		
	1999	2003	2007	2003	2007	1999	2003	2007
WY	4	2	3	7	23	30	36	42
Region	11	9	10	10	16	38	39	43
US	13	12	12	15	19	44	47	50

Source: Schools and Staffing Survey.

B. Advanced Degrees

Table 4 also shows that the number of teachers with master's degrees has increased rapidly in Wyoming in recent years. In the United States in 1999, 44 percent of teachers had a master's degree, while only 30 percent of teachers in Wyoming had a master's degree. This percentage has increased rapidly in Wyoming, and is now similar to the percentage in other neighboring states, although still slightly lower than the rate in the United States as a whole. Figure 14 shows that the percentage of teachers with master's degrees rose rapidly in the early part of the 2000's, but has remained relatively constant since about 2007. Consequently, the recent increases in salary do not appear to be the major cause of the rise in master's degrees.

Figure 14 Trends in Percentage of Teachers with Master's Degrees



Source: Wyoming Department of Education staffing files.

C. Years of Experience

The next table, Table 5, shows trends in average years of teaching experience and the percentage of teachers who have less than three years experience, again from the Schools and Staffing Survey. In general, Wyoming teachers are more experienced than their counterparts in other states, with on average 2 more years of experience than the average teacher in the region or in the United States. Part of this stems from the older age distribution of teachers, but part also stems from the low turnover rates of new teachers. As in the United States and neighboring states, teachers are slightly younger and less experienced in 2007 than they were in 1999.

Table 5: Teacher Experience Across States

	Average Years of Experience			Percent of Teachers with Less than 3 years Experience		
	1999	2003	2007	1999	2003	2007
WY	16.0	16.3	15.5	11	10	12
Region	14.8	14.3	13.6	15	15	17
US	14.8	14.2	13.6	16	16	17

Source: Schools and Staffing Survey.

D. Average Undergraduate Grade Point Average

Most of the indicators of teacher quality discussed so far are indicators of the characteristics of all teachers in Wyoming. However, characteristics of new hires may respond more rapidly to salary increases. Salary increases may mean a larger pool of potential applicants. Salary increases may also draw in individuals who are more qualified and have higher abilities. With a larger pool and more qualified applicants, districts may be able to be more selective in their choice of teachers from the pool of applicants.

Measures of the quality and ability of prospective teachers are difficult to obtain. The data from the Professional Teaching Standards Board include the grade point average of individuals hired by Wyoming districts, their undergraduate major, and their undergraduate institutions. These data are discussed in more detail in Appendix A. These measures are associated with student outcomes in research on teacher quality, and they can indicate shifts in the aptitude of the teaching pool.

The average GPA of new hires may indicate whether new applicants had higher performance in college than new hires in the past. Are districts able to hire even higher performing students? Figure 15 shows this trend since 2000 for the new hires with PTSB information. It shows that average undergraduate GPAs of new hires are virtually unchanged since 2000, at around 3.75.

Figure 15 Average Grade Point Average of New Wyoming Hires

Source: Professional Teaching Standard Board files.

E. Selectivity of undergraduate institution

Grade point averages are a problematic measure of quality because different universities and different disciplines have varying standards for what merits an "A." No information is available for other specific measures of individual teacher ability. However, the PTSB data does indicate the institution that the teacher attended as an undergraduate. About thirty percent percent of new Wyoming teachers in 2009 attended the University of Wyoming, with 70 percent coming from other institutions. Some of these are highly selective, while others are less selective. If teachers are increasingly coming from more selective universities, this may indicate that the overall ability of new hires is rising.

One measure of the selectivity of a university is the ACT scores for its student body. The IPEDS is a survey of all institutions of higher education in the United States. It reports ACT scores for incoming freshman at the 25th percentile and at the 75th percentile for each institution. For example, scores at the 75th percentile are 30 or higher for several private schools in the region (for example, Colorado College or Brigham Young University), but are less than 22 for some of the smaller state schools (For example, Montana State University-Northern). By matching each new hire with the ACT scores for his or her institution, we can see the trends in college selectivity over time.

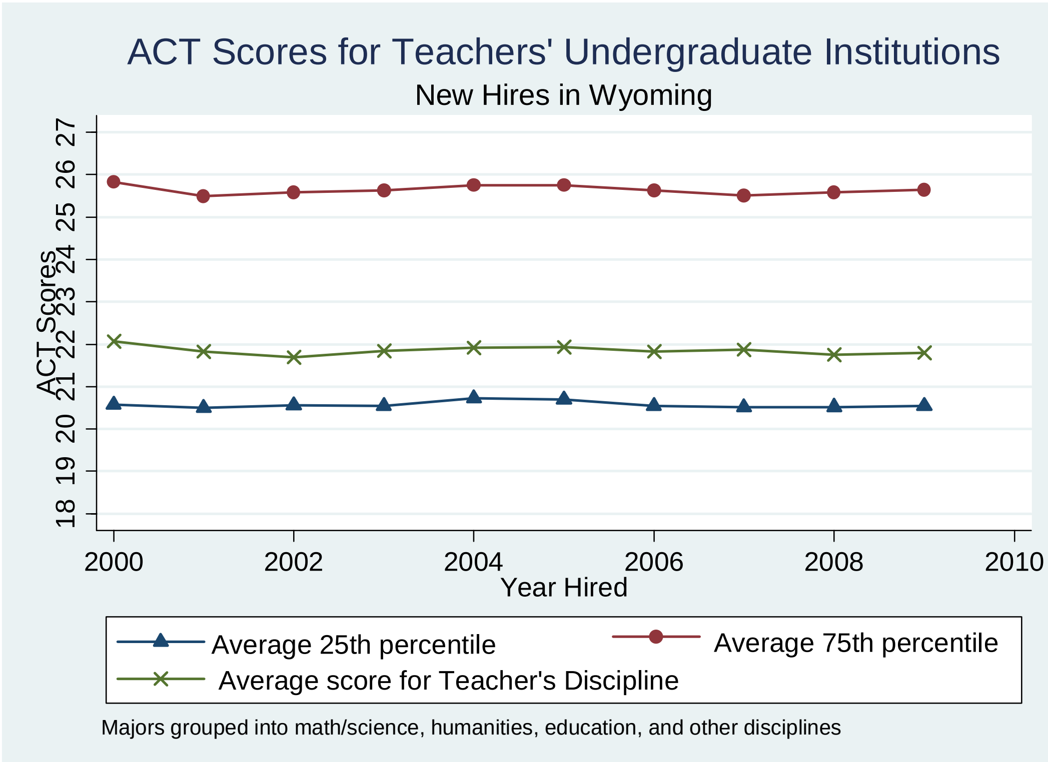
This only gives the overall selectivity of the school, but teachers may come from various points in the ability distribution within a school. Even if teachers may attend the same quality of schools, it may be that they have increasingly been drawn from the more able students at these schools.

To identify the relative performance of students, the analysis uses data from the NPSAS. This is an annual survey of a sample of college students. Students in this sample report, among other things, their ACT or SAT scores. (SAT scores are converted to ACT scores using the College Board ACT equivalence scale.) These ACT scores are averaged by the major of students at each university. To get large enough samples of student, the analysis grouped majors into three categories: education majors, math and science majors, humanities majors, and all other majors. Wyoming teachers are matched with the average ACT score of the major group and institution that he or she attended. For example, if a new hire was an education major at the University of Wyoming, the ACT score she was assigned was 22, which is the average University of Wyoming teaching major ACT score. Similarly, a teacher who was a math major from the University of Wyoming was assigned an ACT score of 25.

Figure 16 reports these trends. The top and bottom lines show the ACT scores for the 25th percentile of students and the 75th percentile of students at the schools Wyoming teachers attended. This figure shows essentially constant ACT scores for the institutions that Wyoming teachers attended. In other words, teachers are not coming from more selective universities in recent years.

The middle line shows the average ACT score, based on the institution and major for each Wyoming teacher. This shows that teachers tend to major in fields where ACT scores are lower in the distribution of all students. This also has not changed over time—teachers are no more likely to be drawn from higher ability college students, but tend to come from about the bottom third of college students.

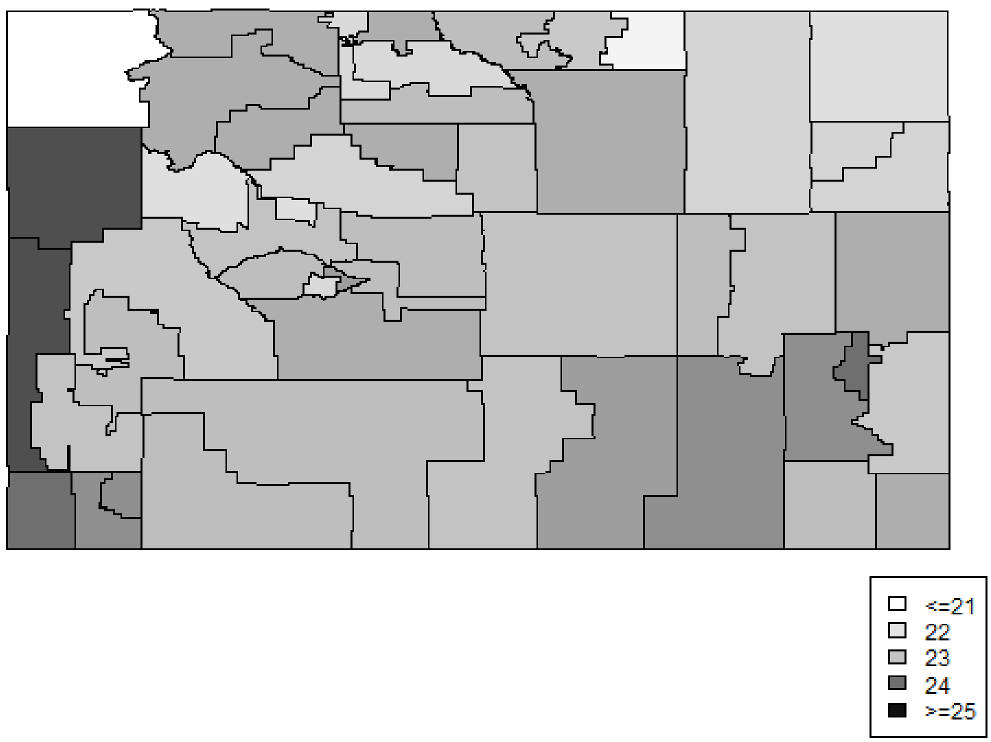
Figure 16 Trends in Selectivity of Teachers' Undergraduate Institutions



Source: Professional Teaching Standard Board files.

Figure 17 shows the distribution of new hires across districts, based on the ACT scores of their undergraduate institutions. It shows that districts near Utah and near the University of Wyoming tend to attract new hires from more selective institutions.

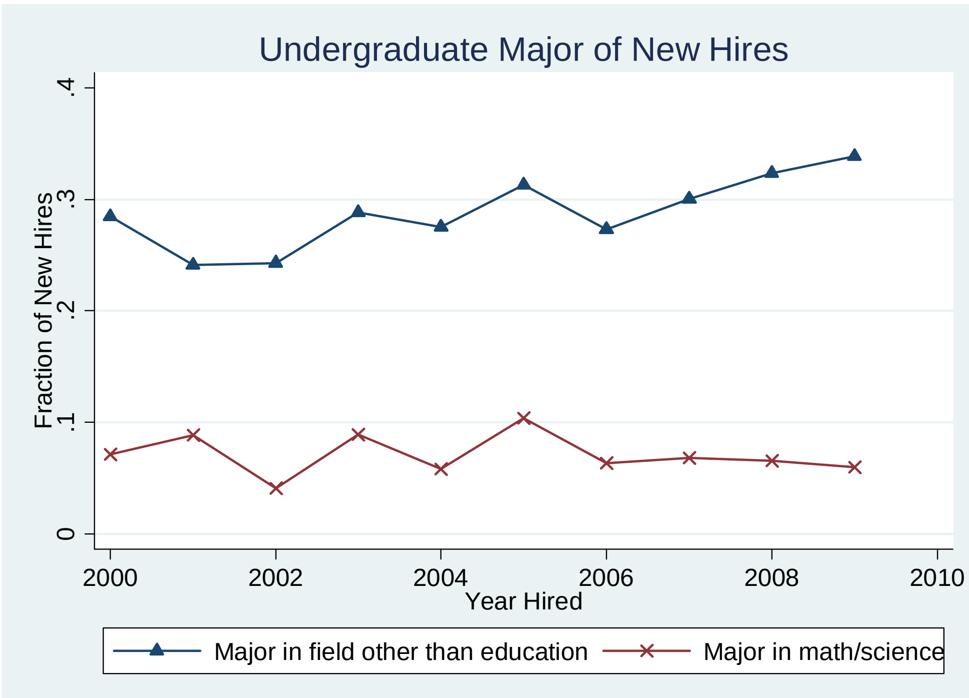
Figure 17 Average ACT Scores at Undergraduate Institutions, 2006-09 Hires



F. Degree field

Another indicator of teacher quality is the undergraduate major of the teacher. Research shows that teachers with discipline specific majors (for example, math) tend to have higher student test score gains than teachers with education majors (like math education). Figure 18 shows that the proportion of new teachers with a major in a math or science field has remained unchanged since 2000. The proportion of teachers with a major in a field outside of education has risen slightly over time, from about 27 percent for the 2000-2002 hires to about 32 percent for the most recent hires.

Figure 18 Trends in Undergraduate Major of New Hires



Source: Professional Teaching Standard Board files.

IV: Conclusions and Recommendations

This labor market study finds that salaries in Wyoming are now at very high levels, relative to model salaries, salaries in neighboring states, salaries for other professional occupations, and salaries for other comparable workers in the state. Wyoming is now ranked at the very top of the United States in terms of the relative attractiveness of the teaching profession.

The increase in salaries was associated with reduced turnover of new teachers and greater recruitment from other states. Specific salary policies in Wyoming have also increased the fraction of National Board Certified teachers. However, overall turnover rates remained unchanged over this period. This may be in part because turnover rates in Wyoming are now very low and are more likely related to retirements and other factors than to salary.

Teacher quality has been slow to respond to the salary increases. Part of this may be due to the low turnover, creating few positions for applicants that have been attracted by the higher salaries. The characteristics of new hires are very similar to those in the past, with the exception that they are more likely to have a degree from another state. Overall institutional quality, major, and grade point averages have not changed. Student outcomes have remained constant. While there may still be improvements as new positions become available, existing trends suggest little quality responsiveness to the salary increases.

These conclusions suggest that Wyoming is in a strong position to actively focus on teacher quality, and that a more active focus on recruiting quality may be necessary to lead to more improvements. Part of this focus should include tracking the teacher quality effects of salaries. These measures could include the following:

- **Turnover rates of new teachers**. This report suggests this indicator is the most sensitive to salary changes. Tracking this will allow state policy makers to identify when salary changes may be necessary.

- **Quality indicators of new hires**. These measures could include scores on certification exams, the quality of the undergraduate institution, and whether the teacher has a degree in a subject matter field. These should be collected in a systematic way to allow for future observation of the long run effects of salary changes.

- **Number of applicants for positions**. Wyoming currently does not collect this information, but it is a clear metric of the attractiveness of teaching. It also is an indicator of how selective districts could be when choosing new hires.

- The best measures of teacher quality **connect individual teachers with improvements in student outcomes.** Existing measures of quality in Wyoming are more indirect, but improvements in student learning are the ultimate objective of the system. Wyoming could consider these types of value-added types of systems, similar to those increasingly being used in other states, to more sharply focus on teacher quality.

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Appendix A: Data Sources

- The Wyoming department of education staffing files report salaries for all teachers in Wyoming, along with details about their experience level, assignment type, and FTE. These files are merged with school level characteristics reported in the Common Core of Data to identify teachers working in small schools, rural schools, or schools with varying levels of student minorities.
- The Digest of Education Statistics (DES) reports average teaching salaries for all states over time.
- The American Community Survey (ACS) is conducted by the US Census Bureau. It is essentially a mini-census conducted in each year between 2000 and 2008. This is a survey of individuals, and reports an individual's occupation, salary from employment, age, education, race, gender, hours and weeks of work. This survey is used to adjust salaries of non-teachers and teachers in others states to match the characteristics of teachers in Wyoming.
- The Occupational Employment Statistics survey (OES) This is a quarterly survey conducted by the Bureau of Labor Statistics of employers who are paid wage or salary income. Self employed individuals, owners and partners in unincorporated firms, and household workers are not included in this survey. This survey reports the number of individuals in each occupation in each state and the average salary.
- The Schools and Staffing Survey (SASS) is a survey that has been conducted by the National Center for Education Statistics since 1987. This survey occurs roughly every four years. About 10 percent of all teachers in the United States are surveyed, and principals are surveyed in the following year to find out how many teachers remain employed in the same school.
- The Wyoming Professional Teaching Standards Board (PTSB) collects data on licensed teachers in Wyoming. This data includes the date and type of license, education degrees, institutions attended, and undergraduate GPA. Information about PRAXIS scores are available for some teachers, but this data does not appear to be consistently collected over time.
- The Integrated Postsecondary Education Data System (IPEDS) is an annual survey of all institutions of higher education in the United States conducted by the National Center for Education Statistics. This survey contains information about the type of institution. The IPEDS also report the ACT and SAT scores for

students scoring at the 25th percentile for the institution and at the 75th percentile. The SAT scores can be converted to ACT scores using the College Board conversion tables.

Appendix B: Comparable Professional and Technical Occupations

Teacher salaries reported in the Occupational Employment Statistics are compared to the salaries of other professional and technical occupations. These include occupation in the following categories:

- Management Occupations
- Business and Financial Operations Occupations
- Computer and Mathematical Science Occupations
- Architecture and Engineering Occupations
- Life, Physical, and Social Science Occupations
- Community and Social Services Occupations
- Legal Occupations
- Education, Training and Library Occupations
- Arts, Design, Entertainment, Sports, and Media Occupations
- Healthcare Practitioner and Technical Occupations

Teachers are not compared to employees in other occupations. The excluded occupational categories are

- Personal Care and Service Occupations Healthcare Support Occupations
- Protective Service Occupations
- Food Preparation and Serving Related Occupations
- Building and Grounds Cleaning and Maintenance Occupations
- Sales and Related Occupations
- Office and Administrative Support Occupations
- Farming, Fishing, and Forestry Occupations
- Construction and Extraction Occupations
- Installation, Maintenance, and Repair Occupations
- Production Occupations
- Transportation and Material Moving Occupations
- Military Specific Occupations (not surveyed in OES)

Appendix C: Estimating Comparable Non-Teaching Wages

Teaching wages are compared to the wages of non-teachers using the American Community Survey. To make this comparison, the analysis used ACS data from 2001 through 2008. The sample was restricted to all employed individuals with a bachelor's degree between the ages of 22 and 65 who were employed at least 27 weeks in the year and usually worked at least 35 hours a week. Individuals living in group quarters were dropped. Self employed individuals were also dropped. Teachers were defined as those working in the public sector. Individuals in each survey year reported their income from salary and wages for the previous year.

Separate regressions were run for teachers and non-teachers. These regression included age, age squared, an indicator variable for female, an indicator variables for race, an indicator for whether or not the individual was enrolled in school, an indicator variable for whether or not the individual held an advanced degree, and usual hours worked, and indicators for categories of hours of work and weeks of work. These categories were for working 35 to 48 hours, 49-59 hours, or 60 or more hours a week; and working 27-39 weeks a year, 40-47 weeks a year, 48-49 weeks a year, or 50-52 weeks a year.

The analysis then calculated the average characteristics of teachers in Wyoming in each year. The comparable non-teaching wage was then calculated by predicting wages using the average characteristics of Wyoming teachers. Teaching wages in other states were similarly adjusted.

State of Wyoming

Analysis of School Districts' Salaries
Final Report
December 14, 2010

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In conjunction with the LSO School Finance Office

Background

- In the period April 2008 – March 2010, Hay Group partnered with the State of Wyoming in the development and implementation of a new classification, job evaluation and compensation plan for Classified and At Will employees
  - A key component of that project was the development of a Compensation Philosophy for the State, including a change in the definition of the comparator market. The key change was to include to give greater recognition to In-state employers within Wyoming
  - This change led to the gathering of market data from an extensive range of employers within the State (more than 100 organizations), as well as relevant other State Governments
    - A custom survey was conducted for 65 benchmark positions with data collected from organizations in the following sectors: Cities, Counties, Education, Healthcare, Insurance, Hospitals, Construction, Auto Repair & Services, Energy, Engineering, Environmental Services, Mines, Oil & Gas, and US Forestry Service
    - In addition to the custom survey, the following surveys were utilized in building the State structure
      - State Government data from the Central States Survey
      - Wyoming Hospital Association Survey
      - Prevailing Wage Survey for Contractors
      - Hay Group's database of Wyoming organizations in a variety of industries

Background

- The use of such an extensive database in developing salary structures and salary recommendations brought credibility and defensibility to both the Executive and Legislative Branches, who had accountability for the approval and funding of the project recommendations
  - The process for developing State salary structures included:
    - Utilizing the database for benchmark jobs, Hay Group aligned State of WY positions by job size and determined market anchors for positions and grades
    - Separate salary structures (State MPPs) were constructed for General Classified employees, Nursing, Law Enforcement, Highway Patrol, Correctional Investigation and Prisons, and At-Will employees (now split into two pay plans, the Executive Pay Plan and the Attorney pay plan)

- The number of benchmarks used for the custom survey PLUS the number of benchmarks that already were used for comparison to other States AND the vast amount of salary data collected meant that there was a sound basis for not only the adoption of the recommended State of Wyoming salary structures but a sound basis for the ongoing setting of salary structures

Background

- In May 2010, Hay Group was contacted by the LSO School Finance Office to conduct a crosswalk between employee categories used in the State of Wyoming education funding model and those used in the new Classified Employee and At Will employee pay plans
  - The intent was to determine the extent to which data used in the development of the Classified Employee and At Will employee pay plans could be utilized to make market pay determinations as a basis for developing funding for the Wyoming's School Districts
  - In addition, consideration was to be given to the extent to which years of experience should be a factor in analyzing salary data and in the calculation of the funding formula
  - In conducting this analysis, the biggest challenge has been a clear definition of job content in School District positions due to the fact that the Wyoming Education funding model has generic and brief descriptions of roles

    For example:

    - Business Manager/Financial Officer
    - Secretary
    - Maintenance Worker
    - Media/Technology Technician
    - Aides

Process

To achieve the desired outcomes, the following steps have been undertaken:

- Hay Group met with the LSO School Finance team and its Consultants to agree on the project scope and process
  - It was agreed that job content matches would be made based on positions in small, medium and large representative School Districts
- School District personnel made a preliminary match of their positions with what was deemed to be the relevant classification in the State's classification plan
- Hay Group consultants and LSO School Finance Office personnel reviewed and refined/fine tuned the initial matching
- Hay Group prepared a report for presentation to the September 2010 meeting of the Select Committee on School Finance Recalibration
- Based on feedback from that meeting, LSO School Finance Office personnel provided Hay Group with additional data
- A further presentation was made to the November 2010 meeting of the Select Committee on School Finance Recalibration
- This project report has been prepared containing the latest version of market comparison analysis and observations

Process

The following markets were used for comparison:

- School District positions were compared to the Education Research Service (ERS) salary survey for Rocky Mountain (The states of Colorado, Idaho, Utah, Montana, North Dakota, South Dakota and Nebraska) school districts including: “Small Rural,” “Mid-Size, Small Town,” and “Large”
  - Small School Districts are compared to those school districts identified as “Rural”
  - Medium School Districts are compared to the Mid-Size, Small Town market, and were those school districts identified as "Small Town" or "Mixed" or "Medium Urban" who had enrollments less than 10,000 students
  - Large School Districts to the Suburban, Medium Urban, and Mixed market and approximately 10,000-15,000 enrollment size
- A comparison is also made to the “Overall Rocky Mountain Average”
- In addition, comparisons were made with the MPP (market policy position) for the matched position in the State of Wyoming General Pay Plan adopted and implemented in March 2010 and the Executive Pay Plan adopted and implemented in June 2010

Process

Determination of a market anchor for each job category

- While the funding model groups jobs into broad categories, there are often different levels of work being performed within each category (sample jobs are shown below)

General Classification	Small School Districts	Medium School Districts	Large School Districts
Secretary/Clerical	School Secretary	Associate Secretary/Data Clerk	Office Assistant
	Senior Level Secretary	Admin Asst/Print Shop	Secretary
	District Office Data Management Tech	Executive Admin Asst	Administrative Specialist

- The consultants considered the level of work performed when analyzing comparator School District data and State Midpoint Policy Positions (MPPs). However, there are inconsistencies in the way School Districts allocate funds among jobs within each category
  - Districts may choose to hire one "large position" as opposed to two smaller positions
    - As a result, direct comparisons of average pay to the market is more difficult when jobs are grouped by broad categories

Observations

The tables in the Appendix detail the job classifications as they compare to comparator school districts and the State of Wyoming MPP

- The funding model and actual average pay values for the small, medium and large School Districts as defined below were compared to Comparator School Districts and to the State of Wyoming MPP equivalents
  - 39 small School Districts were averaged for small School District comparisons
  - Sweetwater #1 and #2, Lincoln #2, Uinta #1, Sheridan #2, Albany #1 were used for medium School District comparisons
  - Campbell #1, Natrona #1, and Laramie #1 were used for large School District comparisons
- Large differences exist in the average funding model dollars compared to the average pay dollars for many positions
  - For example the Business Manager in large School Districts is funded, on average, at $116,106 but the average actual pay is $91,829

Observations

- Where noted, State MPPs were adjusted to be comparable when hours worked per year are considered
  - For example the Aide position, when aligned to the State classification “Supervisory Aide,” utilizes an annual MPP divided by 2080 hours to get the hourly rate, then multiplied by 1440 hours per year to be comparable with a 9 month schedule
- Superintendents
  - Small and large School Districts fall above comparator School Districts for funding and average actual pay. Medium School Districts fall at market for funding and above market for average actual pay. Both funding and average actual pay fall above the State MPP for all three SD sizes
- Assistant Superintendents
  - Medium School Districts fall below comparator School Districts for funding and above comparator School Districts for average actual pay, and above the State MPP for both average actual pay and funding. Data were insufficient for small and large school districts for the School Size cuts, however compared to the overall Rocky Mountain market, in both funding and average actual pay, small are behind market and large are above. All funding and average actual pay values fall near or above the State MPP

Observations

- Business Managers
  - Small School Districts fall below comparator School Districts for funding and average actual pay, and at or above the State MPP. Medium and large fall at or above comparator School Districts for funding and at or above State MPP. Large School Districts fall below market for average actual pay and at State MPP
- Principals and Assistant Principals
  - All levels of Principals fall near or above School District markets and State MPP for both average actual pay and funding
- Custodians and Maintenance
  - For the most part these are 12 month positions. Compared to School District markets and the State MPP for 12 month positions, these generally fall at or above market in both funding and average actual pay

Observations

- Secretary/Clerical
  - Central Office Secretaries are 12 month positions and fall at or above comparator markets and MPPs at all levels for funding and average actual pay
  - School Clerical/District Office Clerical Staff are typically 12 month positions and fall at market for comparator School Districts for funding and below market for average actual pay. Both funding and average actual pay fall above the State MPP
  - School Secretaries' hours vary as noted in the appendix. These positions fall below market for both funding and average actual pay, and above the hours-adjusted State MPP at all levels for both funding and average actual pay
- The remaining positions, Library Media Techs and Supervisory Aides, are above comparator School Districts and above the State of Wyoming MPP for the matched position, for both funding and average actual pay

Summary of Conclusions and Issues for Consideration

- While Hay Group recognizes that the analysis, findings and observations made in this presentation are just one among many factors that need to be considered in the school funding process, it is our opinion that this work shows:
  - The very generic descriptions of work used for funding purposes and the variance of the existence of Job Descriptions means that there are challenges in matching like-kind job content with the market and with comparable jobs in the State of Wyoming Classified and Executive Pay Plan
    - In particular, the Business Manager roles vary significantly among school districts, making direct comparisons to the State Pay Plan more difficult
    - Superintendent and Principal positions did not have direct matches to State MPPs for each school size category, however these were aligned by utilizing the job evaluation methodology which measures knowledge, problem solving and accountability. This enabled a comparison of similarly weighted positions to the State structure. These are reasonable matches based on job size and content
    - Custodian positions can be matched with a greater degree of confidence, as these duties are generally the same within the schools and State facilities

Summary of Conclusions and Issues for Consideration

- There are some considerable variances between the amount of funding for positions as determined through the current funding formula and the amount of actual salary being paid
- For most positions for which a like-kind comparison of job content could be made, the levels of salaries paid in School Districts is higher than the State of Wyoming MPP and State of Wyoming actual pay
  - This may be influenced by the fact that the current funding formula is required to provide additional funding in recognition of experience and the different definition of the market
- The requirement for experience based funding, combined with the current workforce demographics, can lead to a potential reaction of “our funding is being cut” when in fact the funding formula is only reflecting the lower costs associated with a lesser experienced staff

Summary of Conclusions and Issues for Consideration

- Based on the conclusions and recognizing the legal parameters and constraints within which school funding needs to be considered, it is the opinion of Hay Group that the following key issues should be considered in the recalibration process and the school funding formula:
  - Revisit the definition of the market. Should it include only a comparison with other Schools as currently exists or should it include other In-State employers?
  - While recognizing the need to maintain flexibility of job definition, particularly for the smaller School Districts, consideration should be given to firming up the definition of jobs from broad occupational groups into more specific jobs. This will enable:
    - More accurate job content to job content comparisons with the market; and
    - More precise funding for positions
  - Revisit the use of experience based funding. This current practice can potentially mean over funding for some positions and underfunding for others, as it places an over emphasis on incumbent based funding and under emphasis on market based funding
  - Establish mechanisms by which to monitor why there is such a variance between the level of funding for some positions and the actual level of pay

Summary of Conclusions and Issues for Consideration

- It is the opinion of Hay Group for the potential to create a “salary plan” template that could be used as the basis for a salary plan for all school districts. Recognizing the local autonomy of school districts, each district could then “customize” their own plan based on the template to take into consideration local considerations such as size, location, local employment issues, funding, etc.

- All Salary funding decisions should be considered within the context of:
  - Turnover
  - Workforce demographics; and
  - Affordability

Appendix

HayGroup®

Summary of Salary Analysis

Superintendent

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	18.3%	-5.2%	14.8%	28.9%	3.3%	25.1%
Medium	-1.2%	7.7%	21.8%	25.3%	36.6%	54.5%
Large	11.0%	36.2%	42.9%	28.2%	57.3%	65.1%

Summary of Salary Analysis

Assistant Superintendent C&I

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	-23.2%	-2.2%	NA	-8.1%	17.0%
Medium	-13.1%	-12.6%	11.2%	7.1%	7.7%	37.1%
Large	NA	10.4%	32.0%	NA	24.3%	48.5%

Summary of Salary Analysis

Assistant Superintendent Business/HR

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	-20.3%	3.9%	NA	-4.7%	24.3%
Medium	-9.4%	-9.4%	18.1%	11.6%	11.6%	45.6%
Large	NA	14.5%	40.6%	NA	28.8%	58.2%

HayGroup®

Summary of Salary Analysis

Business Manager

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	-15.7%	-21.5%	0.4%	-5.6%	-12.1%	12.5%
Medium	0.2%	-5.9%	9.2%	17.8%	10.6%	28.5%
Large	11.9%	28.5%	25.0%	-11.5%	1.6%	-1.2%

Summary of Salary Analysis

Principal High School

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	4.9%	-1.7%	-2.0%	9.0%	2.2%	1.8%
Medium	3.1%	4.5%	-1.9%	8.8%	10.3%	3.5%
Large	-3.8%	11.9%	5.0%	6.6%	24.0%	16.3%

Summary of Salary Analysis

Principal Middle School

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	11.8%	0.0%	-2.0%	16.2%	3.9%	1.8%
Medium	3.7%	6.3%	4.2%	9.4%	12.2%	9.9%
Large	2.0%	13.8%	5.0%	13.1%	26.1%	16.3%

Summary of Salary Analysis

Principal Elementary School

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	13.3%	6.9%	-2.0%	17.8%	11.1%	1.8%
Medium	12.3%	13.6%	4.2%	18.5%	19.9%	9.9%
Large	13.0%	21.6%	11.5%	25.2%	34.8%	23.5%

Summary of Salary Analysis

Assistant Principal

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	-3.6%	-3.1%	-5.5%	12.0%	12.7%	9.8%
Medium	4.1%	4.0%	1.4%	20.3%	20.2%	17.2%
Large	8.1%	12.2%	-0.7%	23.2%	27.9%	13.2%

Summary of Salary Analysis

Library Media Technician

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	NA	3.1%	NA	NA	3.3%
Medium	NA	NA	11.9%	NA	NA	5.6%
Large	NA	NA	9.6%	NA	NA	18.4%

Summary of Salary Analysis

Aides

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	11.5%	7.0%	6.6%	16.3%	11.6%	11.2%
Medium	4.2%	5.9%	5.6%	4.3%	6.0%	5.6%
Large	15.5%	8.0%	7.7%	20.5%	12.6%	12.2%

*State MPP was adjusted to 1,440 hours per year for comparisons to the school districts.

Summary of Salary Analysis

Custodians*

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP**	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP**
Small	5.8%	2.5%	23.4%	12.6%	9.1%	31.4%
Medium	10.3%	8.8%	31.0%	12.3%	10.8%	33.4%
Large	5.3%	10.3%	32.8%	17.0%	22.5%	47.5%

*Funding model calculation includes both levels of Custodian. Actual pay calculation is based on an average of custodians, maintenance workers and groundskeepers.

**State MPP is based on 2080 hours per year.

Summary of Salary Analysis

Lead Custodians*

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	NA	-6.5%	NA	NA	-0.4%
Medium	NA	NA	-0.7%	NA	NA	1.1%
Large	NA	NA	0.6%	NA	NA	11.8%

*Funding model calculation includes both levels of Custodian. Actual pay calculation is based on an average of custodians, maintenance workers and groundskeepers.

Summary of Salary Analysis

Maintenance Workers

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	27.4%	23.5%	12.7%	12.6%	9.1%	-0.4%
Medium	31.8%	30.1%	18.7%	12.3%	10.8%	1.1%
Large	26.1%	32.1%	NA	17.0%	22.5%	NA

Summary of Salary Analysis

Central Office Secretary

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	60.1%	29.9%	14.6%	57.1%	27.5%	12.5%
Medium	30.3%	31.6%	16.2%	16.5%	17.7%	3.9%
Large	5.2%	32.5%	17.0%	-2.3%	23.1%	8.6%

Summary of Salary Analysis

School Clerical

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	0.4%	26.5%	NA	-1.5%	24.2%
Medium	1.7%	1.7%	28.3%	-9.0%	-9.0%	14.7%
Large	NA	2.4%	29.1%	NA	-4.9%	19.9%

Summary of Salary Analysis

School Secretary – Elementary School

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	-17.4%	35.4%	NA	-21.5%	28.6%
Medium	-16.3%	-16.3%	37.2%	-22.9%	-22.9%	26.4%
Large	NA	-15.8%	38.0%	NA	-22.2%	27.5%

*State MPP is based on 1600 hours per year.

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Summary of Salary Analysis

School Secretary – Middle School/Junior High

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	-17.4%	28.9%	NA	-21.5%	22.5%
Medium	-16.3%	-16.3%	30.7%	-22.9%	-22.9%	20.4%
Large	NA	-15.8%	31.4%	NA	-22.2%	21.5%

*State MPP is based on 1680 hours per year.

Summary of Salary Analysis

School Secretary – High School

	Funding Model compared to:			Actual Average Pay compared to:		
	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP	ERS SD Size (Comparator School Districts)	ERS SD Overall Rocky Mountain Average	State MPP
Small	NA	-17.4%	23.1%	NA	-21.5%	16.9%
Medium	-16.3%	-16.3%	24.8%	-22.9%	-22.9%	14.9%
Large	NA	-15.8%	25.4%	NA	-22.2%	16.0%

*State MPP is based on 1760 hours per year.

ACCOUNTABILITY IN WYOMING
BASED ON STUDENT PERFORMANCE

Prepared for
The Wyoming Select School Finance Recalibration Committee

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ACCOUNTABILITY IN WYOMING
BASED ON STUDENT PERFORMANCE

Contents

ACCOUNTABILITY IN WYOMING BASED ON STUDENT PERFORMANCE

INTRODUCTION

This report is written as background for the Wyoming Select School Finance Recalibration Committee's work in designing the first phase of an accountability system for Wyoming. Early in the Committee's deliberations, the issue of accountability emerged. There was general consensus that the state had provide substantial – more than adequate – resources for the state's schools, but many if not most members of the Committee – as well as many citizens – were disappointed in the modest student performance gains that had been made. The Committee also learned that many districts and schools, though not producing large student performance gains, had been spending dollars provided by the funding formula in ways that differed substantially from the theory of improvement built into the Funding Model, a model which was generally supported by many of the state's top education leaders. Thus the Committee began talking about "accountability" as the phrase expressing the desire for student performance to improve at greater rates, rates that were more commensurate with the overall level of education funding. At the Committee's June meeting, we identified the core features of performance-based accountability, and outlined what a first and second phase of accountability could include for the state. We recommend starting with a simple approach to accountability while recognizing that there are a large number of important, value-laden, complex decisions that must be made even at this beginning stage of the development of an accountability system in Wyoming.

What is discussed in this document is <u>very different from the federal AYP</u>. First, it is more straight forward. Second, we believe it is much fairer, recognizing improvements made in some areas even if improvements do not emerge in all areas. Third, it will show a profile of accomplishments and needed improvements for each school – not just an up or down score. Fourth, it is Wyoming focused; the Wyoming Legislature and not the federal government will determine the core indicators, how they are measured and what rewards and sanctions should be used. Finally, the intent of a state-wide accountability system should be to provide real consequences for schools not meeting improvement targets, the system should not let non-improving schools languish – something that has happened under AYP.

This report draws from shorter reports prepared for the Committee for its July, August and September meetings, which led to the Accountability bill that is being forwarded to the legislature. To move the accountability process forward, the Committee first needed to decide on the **core indicators** to include in a Phase One accountability program. At its July and August meetings, the Committee received suggestions about these indicators from the Wyoming Education Association, the Wyoming School Boards Association, and the Wyoming Association of School Administrators. This report summarizes the suggestions that were made by all three education groups, suggestions made by the Wyoming State Board of Education, and by Lawrence O. Picus and Associates, as well as several issues related to the various proposed indicators.

After deciding on the core indicators, the state must make several other key technical decisions. This report makes recommendations for most of the key decisions necessary to design a Phase One Accountability program. That would create an accountability system that would enable state policy makers to track student progress and, over time, hold school districts, their boards, administrators, teachers and other staff accountable for ensuring students meet Wyoming's student learning standards.

This report identifies six decision categories, the **first of which** is deciding on the **core indicators of student performance**. In some categories multiple decisions may be required. All the recommendations contained in this report are just that, recommendations that can be modified by the Committee, by subsequent legislation and through the regulations developed to implement any legislation that is enacted. We recommend that Wyoming begin its accountability push in simple but sound ways, and embellish it over time as an accountability culture takes hold. In this context, in the future it will be possible to implement more sophisticated accountability elements linked to measuring student performance.

The six basic steps to address in developing a performance-based accountability system are:

1. Identifying the core student performance indicators for the system
2. Deciding how to measure those indicators
3. Setting rules for "leveling the playing field"
4. Deciding how to "calculate" change for those measures to show growth or decline
5. Setting targets for desired improved performance
6. Determining consequences for meeting or not meeting targets – rewards and sanctions

Each of these steps is described in detail in separate sections on the pages that follow. Our intent is to lay out the decisions that must be made if Wyoming is to move forward with the development of a comprehensive and sound accountability system. This system should focus initially on what the State wants from its education system– **higher levels of student performance –** having provided large increases in educational funding over the last decade.

The Core of the Issue and Needed State Decisions

As the rest of this document indicates, designing even a straight forward accountability system is no simple task. Dozens of decisions must be made. It is easy to get lost in the accountability trees and lose sight of the accountability forest. The report recommends starting with a school-based accountability program. To operationalize that system, the state needs to make three major decisions, as well as devolve some technical details to a Technical Design Team. The three major decisions are:

1. What are the core indicators? Generally, we suggest multiple rather than just one indicator, and we recommend focusing exclusively on student achievement – reading, writing, math and science, and some college readiness indicators for middle and high schools.

2. How should each indicator be measured? We recommend using a statewide summative testing system for the achievement indicators. If a statewide summative assessment is

not used, then implementation of an accountability program will be delayed for 3-4 years while a new state testing system is developed.

3. What are the consequences – rewards and sanctions? This report does not elaborate on these, leaving those decisions largely to the Legislature.

Though the report provides detail on other important technical issues – leveling the playing field, calculating change and setting improvement targets – we recommended and the Accountability bill calls for these issues to be addressed by a Technical Design Team, rather than addressed in a specific bill.

Contextual Comment on an Assessment System

Most accountability systems use state summative measures of student performance, but a comprehensive assessment system should include more than those measures. And at the informal level, Wyoming already has the core elements of a comprehensive assessment system:

a. The most instructionally useful assessments are those that help teachers plan instruction before it is delivered. These assessments include screeners that indicate whether young students are at risk of reading failure, as well as diagnostic and formative assessments that indicate the learning profile of students and which are used to design curriculum units and instructional strategies before they are deployed in classrooms. Wyoming now requires all districts to use reading screeners, and the state has encouraged districts to reduce the number of such screeners to those based on DIEBELS and those available from the NWEA MAP system. Districts also use a variety of diagnostic and formative assessments. These assessments are given often in "short cycles," sometimes bi-weekly or monthly.

b. A second set of assessments are what typically are called interim or benchmark assessments. These are usually given over longer periods of time, such as after the first quarter (nine weeks of instruction), after the second quarter or first semester, and after the third quarter. The data are typically used to determine how well instruction worked over that time period, with the results used to group students as well as slot students into extra help interventions. The NWEA MAP assessments, which all Wyoming districts use, are an example of benchmark assessments (even though they are often called "formative" assessments).

c. Finally, at the end of the year there are state summative, or accountability assessments. These test scores indicate the impact of an entire year of instruction, and are typically used to identify "macro" issues, such as how well students do on basic skills, and whether or not they do poorly on application and problem solving. These assessments are also used to measure core elements of state and local accountability systems, and are required by the federal No Child Left Behind program.

Though Wyoming has not designated all of the above measures as formal components of its overall assessment system, nearly all districts are using all of those approaches to assessment. Thus, in an informal way, the state already has in place a comprehensive assessment system, one that has in place nearly all the elements needed to produce results that can be used for instructional purposes.

Although this informal battery of assessments can be augmented and improved, it nevertheless represents the existence of a relatively full-fledged assessment system, and offers an excellent foundation on which to build an accountability system starting with the summative measures currently available.

We also note that as part of the Race to the Top program, the federal government will support consortia of states to create a new or enhanced battery of screener/diagnostic/formative, benchmark and summative assessments that are linked to the emerging common reading and mathematics curriculum standards. Wyoming has joined one of these consortia, and has adopted the common reading and math curriculum standards. Consequently, policymakers as well as local educators should be aware that over the short to medium term, enhancements to the current informal, comprehensive assessment system that is already in place should emerge as the common math and reading standards are implemented and as additional assessments emerge from the state assessment consortia.

Finally it is important to note that at its August meeting, the Select Committee heard testimony from the WDE, as well as from Dr. James Popham, emeritus professor at the University of California at Los Angeles and Dr. James Pellegrino, professor at the University of Illinois at Chicago. Both professors are top national experts on assessment, and are members of the state's technical advisory committee for the statewide summative assessment. Both testified that the Wyoming's statewide summative assessment test is a rigorous and solid test. Moreover, Dr. Popham, testified in response to queries that the Wyoming statewide summative assessment test is the "best summative state test in the country" and is suitable for use in an accountability system based on student academic performance. This statement is important because Dr. Popham has been one of the strongest skeptics and critics of state summative assessments and of their use in accountability systems. This suggests that Wyoming already has in place the most critical component of a good accountability program – a useable state summative assessment. Although some short term "fixes" are needed for the statewide summative assessment (discussed below), the state should feel comfortable in using statewide summative assessment scores as the foundation of its Phase one accountability program.

1. IDENTIFYING CORE STUDENT PERFORMANCE INDICATORS

This section is divided into two parts. The first part addresses "macro" decisions, i.e., the major decisions that must be made before actually designing the specifics of a school-based accountability system. The second part addresses the issue of selecting the core indicators for the system.

Macro Decisions

There are several "macro" decisions that must be made in developing a school-based accountability system (or any accountability system for that matter).

Just student performance OR student performance and process indicators. The first macro decision is whether to only use student performance indicators (such as student proficiency in reading, math or other subjects), or along with student performance indicators also include process indicators (such as attendance or class size). As indicated in our July report, we recommend only using student performance indicators at this time to keep the effort focused on what the state most wants – *improvements in student performance and achievement*.

Multiple OR single indicators. The second macro decision is whether to have multiple indicators or just one or two performance indicators. As indicated in our July report, we recommend having multiple indicators. Multiple indicators give more stability to the overall system; ensuring that such a system would not rise or fall on just one item or one measure.

If multiple indicators, how many? If multiple indicators are used, the third major decision is to decide how many indicators should be used. The general principle is to have multiple but a parsimonious number of indicators. The multiplicity makes the system more comprehensive and more reliable, but the parsimonious number keeps the system more manageable and understandable. As we note later, teachers, principals, schools and central offices will need to track more indicators than are in the accountability system, to be sure they can meet the system's improvement targets, but to be useful on a state-wide basis, the accountability system needs to pick a select few of the most key performance indicators. We have recommended "more than one but less than ten" core indicators.

The Accountability bill drafted for the Select Committee's consideration generally reflects these recommendations.

Which multiple indicators. If the decision is to have multiple indicators, then the next big decision is to identify those multiple indicators, and to determine them separately for elementary, middle and high schools. This section summarizes the indicators that have been suggested so far by various Wyoming educator groups as well as by Lawrence O. Picus and Associates, and concludes with a recommended set of indicators for elementary, middle and high schools in Wyoming. Our general recommendation is to use indicators of all subjects tested – reading, writing, math and science. We also suggest some additional performance indicators for middle and high schools – high school graduation, ACT scores and eligibility for Hathaway Scholarships.

Reporting format. The issue here is whether to use scale scores, performance at various levels (such as below basic, basic, proficient or advanced performance), growth scores, value added or some other format. We suggest for Phase One accountability the use of multiple measures of proficiency performance, an aggregated measure of advanced performance, and an aggregated measure of the achievement gap. We suggest using more complex, as well as perhaps more sophisticated approaches, including growth scores and value added, at some point in the future.

School wide or grade level. The last macro issue is whether to use measures that are school wide or disaggregated into grade levels, such as reading in grades 3, 4 and 5, or a school wide measure of reading. In order to keep the number of indicators under ten as well as to have stable measures, we recommend using school wide measures when possible.

The first four macro decision areas identified above are addressed in this section and the last two macro decision topics are addressed in the next section. All of these issues were discussed by the Select Committee at its August meeting, and a number of decisions regarding these issues were made by the Select Committee at its November and December meetings that shaped the specifics of the plan that is part of the Select Committee's Accountability bill.

Selecting the Core Indicators

Table 1 indicates the core student performance indicators that have been recommended to date as part of a school-based Wyoming accountability system that measures student performance. The table represents our understanding of the written documents and testimony presented to the Select Committee. The table includes the indicators suggested by the Wyoming Education Association, the Wyoming School Boards Association, the Wyoming Association of School Administrators, the Wyoming State Board of Education, and Lawrence O. Picus and Associates.

First, the WEA, WSBA, WASA and the Strategic Plan from the State Board of Education, as well as the reports prepared by Lawrence O. Picus and Associates, all suggest that an accountability system should at least initially be focused on student performance.

Second, all parties suggest using a high school graduation rate.

Third, the State Board and Lawrence O. Picus and Associates both suggest using percent of high school students eligible for Hathaway Scholarships,[1] an indicator of college readiness. Both also suggested an indicator on taking advanced classes in high school, but Lawrence O. Picus and Associates now feels that indicator is similar to Hathaway eligibility and recommends dropping that indicator to keep the overall number of indicators less than ten.

[1] Though Hathaway eligibility is the preferred indicator, the state does not currently collect that number but only Hathaway recipients; efforts should be made to collect Hathaway eligibility to include top performing students who were eligible for the Hathaway scholarship but decided to attend college elsewhere outside of the state.

Fourth, the WEA and WSBA suggest using ACT scores as one of the indicators. Lawrence O. Picus and Associates concur with this suggestion. This kind of indicator not only would allow Wyoming to compare itself to a nationally normed test, but also to a national measure that over time will become more aligned with the emerging common reading and math standards as states adopt those standards. We would more specifically suggest a Grade 11 ACT score.

Fifth, and interestingly, only Lawrence O. Picus and Associates suggest a subject area achievement indicator other than reading. Yet, across the country, policymakers have been criticized for designing accountability systems that focused on just two (reading and math), let alone only one subject (reading). The fact is that what gets measured and put into accountability systems gets more attention. We believe Wyoming does not want local educators to focus only on reading, even though reading is foundational and obviously critical. Thus, Lawrence O. Picus and Associates recommends what Wyoming's school-based accountability system not only include reading, but that it also have a proficiency indicator for writing, mathematics and science (where there are sufficient numbers of students at the one grade that is tested for science). This not only signals that these other subjects are important, but also gives the overall accountability system "multiple indicators," which itself makes the system more robust.

We note that there has been discussion of developing "end of course" examinations for courses in high school, such as for Algebra 1 and 2, Geometry, Chemistry, Biology, U.S. History, English 9 or 10, etc. Performance on those measures would be prime candidates to use at the high school level should they be adopted and used in Wyoming in the future.

Sixth, Lawrence O. Picus and Associates also recommend indicators for performance at the advanced levels, as well as an indicator for the achievement gap. To keep the number of indicators below ten, we recommend that the advanced indicator be calculated by aggregating the number of students scoring at the advanced levels across all four subjects as well as across grades 3-5 in elementary schools, grades 6-8 in middle schools and grade 11 in high school. For the achievement gap indicator, we recommend a measure that compares the scores of Wyoming's at-risk[2] students (which are the non-duplicated count of students eligible for free and reduced price lunch and ELL students in all schools as well as mobile students in sixth grade and higher) to students who are not at-risk, again aggregated over all four subject areas and the appropriate grade levels for elementary, middle and high schools.

[2] Using the definition of *at-risk* students as it is used in the Wyoming Funding Model.

Table 1
Suggested Core Student Performance Accountability Indicators

	Wyoming Education Association	Wyoming School Boards Association	Wyoming School Administrators	Wyoming State Board of Education	Lawrence O. Picus and Associates
Core Indicator					
Reading Proficiency – Grade 3, statewide summative assessment	Not clear	Not clear	Yes	Yes	
Reading Proficiency – Grade 8, statewide summative assessment				Yes	
Reading proficiency across Grades 3-5, across Grades 6-8, in Grade 11, statewide summative assessment					Yes
Writing proficiency across Grades 3-5, across Grades 6-8, in Grade 11, statewide summative assessment					Yes
Math proficiency across Grades 3-5, across Grades 6-8, in Grade 11, statewide summative assessment					Yes
Science proficiency in Grade 5, 8 and 11, statewide summative assessment					Yes
Advanced across subjects and Grades 3-5, 6-8 and 11, statewide summative assessment					Yes
Achievement Gap across subjects and Grades 3-5, 6-8 and 11, statewide summative assessment					Yes
Growth Model, MAP	Yes	Yes	Yes		No
Growth Model, statewide summative assessment					Yes, over time
ACT – grade 11	Yes	Yes			Yes, added from July
Use MAP scores	Yes	Yes		No	No
Attendance Rate	Yes			Yes	No
4-Year High School Graduation Rate	Implied, but with a rigorous diploma		Yes	Yes	Yes
9^{th} Grade Failure Rate			Yes		
Percent Hathaway Scholarship Eligible				Yes	Yes

Table 1 (continued)
Suggested Core Student Performance Accountability Indicators

	Wyoming Education Association	Wyoming School Boards Association	Wyoming School Administrators	Wyoming State Board of Education	Lawrence O. Picus and Associates
Core Indicator					
% Advanced or Comprehensive Diplomas				Yes	Use Hathaway eligibility instead
Bullying Rates				Yes	No, though it is appropriate for the state to monitor this indicator

Seventh, the WEA, WSBA and WASA suggest using a "growth model" for student performance. We agree with that recommendation but suggest the state incorporate that indicator into Phase 2 of the system. Individual student "growth scores" can be and most typically are calculated from the state summative tests, which is the approach all other states have taken.

Eight, in their July testimony on core indicators, both the WEA and WSBA addressed what we would call "system issues" that went beyond core indicators. These included having a comprehensive assessment system, enhancing the rigor of the high school diploma, strengthening teacher and principal licensure, developing a teacher and leader evaluation system, and supporting and strengthening the state's accreditation process. At a general level, Lawrence O. Picus and Associates agrees with those suggestions. However, they go beyond identifying a set of "core indicators" for an accountability system. Moreover, as mentioned earlier, Wyoming already has a relatively comprehensive assessment system when all the existing elements are recognized, even though all elements are not formally defined as being part of comprehensive state assessment system.

Ninth, the WEA and State Board recommended an attendance indicator. While good attendance is linked to better performance, Lawrence O. Picus and Associates recommends not using it as an accountability system indicator based on the principle of using only student performance and achievement indicators.

Tenth, and finally, we note that the core indicators in a school-based accountability system are not the only measures that local educators, principals and teachers should monitor. Teachers should track individual student performance over time in all subjects, and at intervals of 2-3 weeks. Principals should monitor student performance at all performance levels (below basic, basic, proficient and advanced), in all subjects and at all grade levels, as well as the achievement gap in all grades and subjects. They should do this to ensure that each individual student and the school as a whole are moving forward, raising overall performance and closing any achievement gaps. A parsimonious set of accountability indicators simply takes some of the most critical indicators and gives them prominence, but teacher, principal, school and management must track many, many more outcome indicators, as well as multiple process indicators in order to do the job of raising the scores of the core accountability indicators.

In sum, based on our research, practice in other states and our continuing discussions with Wyoming educators and the Select Committee, the student performance indicators we recommend –and which was generally supported by the Select Committee – are:

1a. Elementary Schools (K-5 or K-6)

1. School level (grades 3-5) proficiency in reading
2. School level (grades 3-5) proficiency in writing
3. School level (grades 3-5) proficiency in mathematics
4. School level (grades 3-5) proficiency in science
5. An indicator of the "achievement gap," which would be test scores for at-risk children compared to those of non-at-risk children.
6. A school wide and cross subject area indicator of advanced performance.

1b. Middle Schools (Generally grades 6-8)

1. School level (grades 6-8) proficiency in reading
2. School level (grades 6-8) proficiency in writing
3. School level (grades 6-8) proficiency in mathematics
4. School level (grades 6-8) proficiency in science
5. An indicator of the "achievement gap," which would be test scores for at-risk children compared to those of non-at-risk children.
6. A school wide and cross subject area indicator of advanced performance.

1c. Grade 9-12 (high schools)

1. School level (grade 11) proficiency in reading
2. School level (grade 11) proficiency in writing
3. School level (grade 11) proficiency in mathematics
4. School level (grade 11) proficiency in science
5. An indicator of the "achievement gap," which would be test scores for at-risk children compared to those of non-at-risk children.
6. A school wide and cross subject area indicator of advanced performance.
7. ACT scores for all students in Grade 11
8. Four year (and perhaps 5 year) high school graduation rate
9. Percent of students who qualify for Hathaway Scholarships.[3]

In short, we recommend 6 core indicators for elementary and for middle schools and 9 core indicators for high schools, keeping the number of core indicators for any school under ten.

[3] The Select Committee also added 5 and 6 year high school graduation rates, and percent of students needing remediation in postsecondary programs; the latter is a sound indicator but at the present time Wyoming does not have comparable data on remediation across its postsecondary institutions.

In the future, we also would suggest adding a “growth score” indicator for each school (by aggregating each individual student’s growth score from the statewide summative assessment). However we suggest this issue not be addressed in the development of Phase One of the accountability system.

Finally, if the State Board tracked the overall student attendance rate in Wyoming along with the incidence of bullying, it would complement the accountability system. However, we would not recommend including those measures in the school-based accountability system, as they are process and not result indicators.

2. DECIDING HOW TO MEASURE THE STUDENT PERFORMANCE INDICATORS

There are three major issues related to determining how the student performance indicators should be measured:

a. Determining what instrument to use to measure each indicator
b. Identifying the appropriate "scale" or reporting format/score to use for each measure
c. Ensuring that the state has "stable" measures for each indicator (i.e., whether to "aggregate" scores across grades because of small sample sizes).[4]

This assumes, of course, that the assessments themselves have content or core validity, i.e., are tightly connected to and aligned with the state's content standards, measure the key concepts in each content area, and return test results to teachers for each individual student for all key concepts in each subject tested. These issues have been addressed by the outside advisory committee that the Wyoming Department of Education has used to construct and administer the statewide summative assessment system. It is our understanding that the committee has concluded that statewide summative assessment does meet these psychometric standards.

2a. Determining what instrument to use to measure each indicator

To operate an accountability system or simply to have solid information on student learning in core academic areas, Wyoming needs a reliable and valid measure of achievement across all students, schools and districts and tested content areas. Currently, the only such measure for student achievement is the statewide summative assessment. Appropriately administered, a statewide summative assessment is a test suitable for use in accountability systems; it is linked to state content standards, is instructionally sensitive and instructionally informative (to the degree a state summative test can be) and is complemented by other tests, locally administered, that are more benchmark and formative oriented.

The other option is to use scores on the MAP tests. However, to use MAP scores as a consistent state-wide measure of student performance, Wyoming would need each district to:

1. Use the same unique student identifier as is used for the statewide summative assessment
2. Use the same unique teacher identifier as is used for the statewide summative assessment
3. Administer the exact same MAP test for each student and each subject and grade level in each subject (reading, mathematics and science, (there is no MAP test for writing)
4. Administer the MAP in exactly the same way across all schools and districts
5. Submit the student test scores and the teacher links to the state at approximately the same time, and
6. Have the entire system "audited" to ensure correct identification of the teacher of record.

[4] Stability in this instance refers to ensuring that the scores reflect the general performance of students at each school from year to year without tremendous fluctuations resulting from measurement errors due to small sample sizes. The major threat to stability is having fewer than 20-25 students in a grade, which could very well be the case in schools that have only one or fewer sections per grade.

In other words, MAP would need to be turned into a formal, state structured benchmark testing system. Moreover, MAP would need to be altered to qualify for use in accountability systems, both state and federal. Further, using MAP scores – either the end of year score or the quarterly MAP scores – in addition to the statewide summative assessment, would add complexity but not necessarily depth or comprehensiveness to the accountability system. We see no gain in substituting MAP for the statewide summative assessment and many challenges to doing so.

Further, the NWEA, the organization that operates the MAP testing system, has sent a letter to the Wyoming Department of Education stating that as currently administered, MAP cannot be used for a state summative test of student achievement.

Therefore, <u>we do not recommend using MAP in a state accountability system</u>. State accountability systems should only use official and formal state tests, and that is the statewide summative assessment for Wyoming.

However, we strongly recommend that districts continue to administer MAP as benchmark assessments, and that they use the results to: assess the impact of curriculum and instruction; to group students and slot students into interventions; and, as indicators of whether each individual student is on track to score at or above the proficient level on the end-of-the year state statewide summative assessment.

Nevertheless, there are issues that need to be addressed for the statewide summative assessment. In August, the Select Committee heard testimony from several state and national experts on the statewide summative assessment. Aside from admitted difficulties in administration in Spring 2010, particularly glitches associated with the online platform created by vendor Pearson, the primary message of these experts was that Wyoming's statewide summative assessment was one of, if not the best, state summative assessment of student achievement across all 50 states. They said the statewide summative assessment is suitable for ongoing use in testing Wyoming student achievement, and appropriate for use in school, principal and teacher accountability. Moreover, even if the state wanted to move to a new test, it could not do so for at least two years, the minimum time frame it would take to create, pilot and produce a new test. So for the short term the state must use the statewide summative assessment as its summative test of student achievement if it wants to have a strong accountability system.

However, there are several specific issues that the state must address with the statewide summative assessment test. For example, given the state's adoption of the new common reading and math curriculum content standards, the state's summative assessment will need to be changed by the opening of the 2013-2014 or subsequent school year so it is suitable for measuring achievement to those standards. Moreover, the state is part of the Smarter Balanced Assessment Consortium, which itself might create a new comprehensive assessment the state could use, or partially use.

Thus, the state needs to review its current testing systems, make the appropriate short term changes, and be positioned to move – hopefully seamlessly – to a new or modified state student testing system that will be fully aligned with the new reading and math standards, probably during the 2013-2014 or subsequent school year.

The major issues to address for the statewide summative assessment are:

a. Several administrative issues with the current statewide summative assessment , not only those problems associated with administration in 2010 but also those issues from previous years. Issues the Select Committee discussed include:
    i. Whether the statewide summative assessment should continue to test reading, writing, math and science
    ii. The time it takes to administer the statewide summative assessment
    iii. Whether the statewide summative assessment should have some time limits for students and more uniform administrative procedures
    iv. The burden of both administering the statewide summative assessment as well as piloting new items for the revised form of statewide summative assessment in the next year
    v. Other administrative issues the Design Team might identify.
b. Longer term, the state will need to review the new common reading and math standards and make recommendations for how the statewide summative assessment would need to change to be fully aligned with those standards.
c. The state also will need to review its involvement in the Smarter Balance Assessment Consortium to ascertain the degree to which the state will likely adopt or adapt the assessment system and materials emanating from this Consortium or adapt its statewide summative assessment to the new reading and math standards, or create some new testing system on its own.

For performance indicators other than achievement, the state would need to formalize standard ways to calculate:

- Grade 9-12 four year high school graduation rates
- Number and percent of students who qualify for Hathaway Scholarships
- Number and percent of students taking the ACT Explore and ACT in grade 11.

2b. Identifying the appropriate "scale" or reporting format/score to use for each measure

Assuming the statewide summative assessment test is used to measure student performance, a determination of what measure within the assessment needs to be made. Options include: the scale score, a percentile equivalent, the percent of students at or above proficiency, the percent of students at advanced, and/or a growth or value-added score for students.

We suggest using the statewide summative assessment test to report:

a. Percent of students at or above <u>proficient</u> on each statewide summative assessment subject measure
b. Percent of students meeting the <u>advanced</u> standard of the statewide summative assessment, and
c. The <u>achievement gap</u> between at-risk and non at-risk students.

In future years, we recommend that Wyoming address the following questions related to reported scores from the statewide summative assessment:

a. Would it be better to use "scale" scores of students, and if so, how could they be used to determine the degree to which students are on pathways towards proficiency and advanced performance, and to measure the achievement gap?
b. Should the state shift to either a "growth" or "modified growth" score or value-added score for student achievement, i.e., more complex achievement indicators, rather than the more straight-forward and widely understood way of reporting scores by achievement levels of below basic, basic, proficient and advanced?
c. Given that the bulk of Wyoming's student already achieve at or above the proficiency level, would it be wiser for the accountability system to have more aggregate measures of achievement to proficiency, including the proficiency gap, but more detailed indicators – one for each subject tested – of student performance to the advanced level of performance?

2c. Ensuring that the state has "stable" measures of each indicator

The major issue in ensuring that there are "stable" achievement scores for schools revolves around the small number of students in each grade in Wyoming. Given the large number of small schools in the state, our judgment is that there are insufficient numbers of students in each grade to use grade level scores for all schools in a school-based accountability system.

We therefore suggest "aggregating" the percent of students scoring at or above proficiency across grades to get stable school level scores. This means that each of reading, writing, mathematics and science proficiency scores would be aggregated across grades 3, 4 and 5 in K-5 elementary schools and across grades 6, 7 and 8 in Grade 6-8 middles schools. This would provide a <u>proficiency score for reading, writing, mathematics and science</u> for each school – 4 subject area proficiency performance indicators.[5]

We also note that if scores were not aggregated across grades, then the system, for elementary and middle schools, would have 4 subject scores for each of 3 grades which would produce 12 performance indicators, and an additional 12 performance indicators if the results for advanced performance were also used. We believe 24 indicators are too many.

We recommend calculating the achievement gap indicator by comparing the percent of non at-risk students scoring at or above proficiency in all subject areas and at all grades tested to the percent of at-risk[6] students scoring at or above the proficiency level, so this indicator would be a <u>proficiency achievement gap measure</u>.

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[5]For schools that did not conform to the prototypical school models, scores would be aggregated across appropriate grade, with K-8 schools having scores for the elementary grades as well as for middle grades, and with 7-12 schools having scores for middle and high school grades.

[6]Again, we purposively use the phrase "at-risk" students to indicate that pupil count used in the Wyoming Funding Formula.

We also suggest aggregating scores across grades as well as subjects (at least for reading, mathematics and science) to produce a school wide measure of the percent who are at the advanced level. This provides an indicator of advanced performance but, as well be seen below, also keeps the total number of indicators manageable.

High schools provide a different challenge. First, there is only one grade that is tested in high schools, thus aggregating across grades is not possible. On the other hand, high schools are larger so the number of students might be sufficient in most high schools to produce stable scores. WDE staff will need to determine whether stable individual subject scores can be produced for all WY high schools, but we expect that stable scores can be calculated for all high schools that have more than 20-25 students in each grade. If not, then we would suggest aggregating first across two subjects: reading together with writing, and mathematics together with science. If that did not produce stable scores for small high schools, then we would recommend aggregating across all four subjects.

The state already has determined the process for calculating the four year high school graduation rate, which should be the number of students graduating, compared to the number of students in that graduating class who began grade 9 together, adjusted for students who moved out of the district.

If ACT scores are used, the state needs to insure that all grade 11 students take the regular ACT test, at state expense. Currently, Wyoming *allows* all Grade 11 high school students to take the ACT, with the state paying the costs; this recommendation would *require* all high school juniors to take the ACT, again with the state covering the costs. Further, it would be helpful for overall accountability if Wyoming's colleges and universities used the ACT score as one indicator for admission and/or placement. That would mean the ACT score would have some additional significance for all students taking it.

3. Setting Rules for "Leveling the Playing Field"

This issue addresses how to deal with the "rules" for calculating school scores and how to address mobility, presence of ELL students, students with disabilities and the percentage of all students needed to take the test.

We do not suggest specific solutions to these issues, but give examples of the kind of issues that need to be addressed and resolved. The Committee does not have to take a position on these issues and might better devolve them to be addressed and resolved through regulations proposed by a Technical Design Team after legislation is enacted. Each issue is described below.

Mobility

For mobility, the issue is to determine the conditions under which mobile students scores would or would not be included in the accountability system. Currently, Wyoming terms a student a "mobile" student if he or she enters a school system after October 1. A more fine-tuned definition of mobility is needed if it is to be included in a school-based accountability system. Accountability systems usually set minimum number of days for such students to have been in the school, like 100 out of a 180 day school year, in order to be included in the accountability system. The other issue, of course, is the need for both a pre-test (or the previous spring test) and a post-test (or the current spring test) because both are needed to calculate a change score for each student. Sometimes, education systems give such tests when a mobile student enters the system and when they exit the system, though the latter is often not possible.

ELL Students

For ELL students, the issue is whether to allow the student to take the test in their native language, and at what point to require the test be taken in English and in some instances, at what point it should be counted. Typically students are required to take the reading tests in English when they reach some minimum level of English proficiency, or after they have been in the Wyoming education system for a minimum number of years. This approach reduces the initial scores but allows for more growth over time. However, some argue for longer periods of testing in the native language on the basis of appropriateness and fairness.

Students with Disabilities

For students with disabilities the issues are whether to provide those students accommodations and at what point not to include their scores. For example, should the scores of students with moderate mental retardation, severe retardation, and/or severe and profound disabilities be included in the system? A related issue for high school students with disabilities would be any element of the IEP that would extend the time needed for high school graduation. For example, if the IEP allowed 6 years for high school graduation, a determination would need to be made for when to begin counting such a student in the calculating the four-year high school graduation rate.

Minimum Percentage of Eligible Students Taking the Test

Another issue is the minimum percentage of eligible students actually taking the test. One way to "inflate" school scores is to have lower performing students be absent on test day. A related issue is to ensure that the school score reflects the achievement of the students in the school. The solution to each of these issues is to set a minimum percentage of students that must take the test; of course, this must be followed by having "make up" days for the test for those legitimately absent, as well as a different form for the make-up test.

These are all "tricky" issues and there may be other issues that emerge as well. There is no one right answer for any of them. In the final design of the accountability system, a group – like a technical design team – will need to convene and discuss each issue and decide on the rules that will apply. Given that there is no single way to address each of these issues, process is very important, and Wyoming needs a system for identifying these issues and for finding a thoughtful approach to resolving each of them. Having such a process in place signals that the state is aware of the above (and perhaps other) issues that need to be addressed to "level the playing field" and to ensure that different compositions of students do not advantage or disadvantage any school.

4. Deciding How to "Calculate" Change for Those Measures to Show Growth or Decline

There are several possible ways to calculate change, some more statistically elegant than others, but the more statistically elegant designs tend to be more complex in implementation and analysis of results.

An initial issue is whether to use the scores of all students and show performance growth over time, or to compare each grade's performance from year to year – e.g., this year's fourth graders versus last year's fourth graders. Since all students are tested in grades 3-8 and 11, we strongly suggest using the scores of all students and showing change (hopefully growth) over time.

The <u>first way</u> to calculate change is a simple difference: this year's score minus last year's score. This is the approach taken for the proposed balanced scorecard below. It is the simplest and most easily understood and we believe it is adequate for Phase 1 accountability in Wyoming.

A <u>second way</u> to calculate change is to measure change to a standard. Suppose the goal is to have 90% of students at or above proficiency. Assume also that the school's current score is 50% at or above proficiency. The difference is 40 percentile points. So a target could be to reduce the difference between current status and the goal by 20 percent, which in this case would translate to 8 points (.2 times 40), or an increase from 50 to 58 percent at or above proficiency. A version of this approach has been used for the calculation of Adequate Yearly Progress (AYP) under the federal No Child Left Behind program.

A variation of this second approach has been used in Kentucky. That state's goal was to have each school reach a score of 100. Each student's score was "weighted." Those scoring at just Basic were weighted 60 percent; those at proficiency 100 percent; and those at the advanced level at 140 percent. This approach allowed the higher scoring students to offset -- to some degree – the lower scoring students, which gave each school a reasonable chance to get a score of 100 (unlike the current AYP that requires EVERY student to be at or above proficient by 2014, unless the law is changed).

A <u>third approach</u> would be to calculate a "value added" for each school. This has become quite popular across the country, but there are multiple issues to be addressed in value added. Further, most "value added" models compare results to the average, so a positive value added score only means the school produced more gains than the average school and a negative value added score only means the school produced less gains than the average school. Of course, the average improvement could be quite modest, making even a positive value added less meaningful.

There are many variations of the above approaches, but they represent the three basic choices. We recommend that Wyoming <u>use the simple difference approach</u> for Phase 1 accountability.

As we mentioned earlier, over time the state could calculate a "<u>growth score</u>" for each student. Typically, such a growth score would be the student's scale score on the statewide summative assessment in one year, minus the scale score in the previous year. Growth scores pick up all increments of student growth, even if the growth is not sufficient to move the student from one performance category to the next (such as from basic to proficient, or proficient to advanced). We suggest postponing the use of growth scores until Phase One accountability is firmly in place and the state can move on to more sophisticated indicators as well as accountability indicators for individual teachers and principals and other staff.

5. SETTING TARGETS FOR DESIRED IMPROVED PERFORMANCE

Having calculated change, the next decision concerns setting targets for improved performance; setting such targets is as much art as science. The general principle is to set “stretch” targets, but targets that are reachable, i.e., seem possible to attain. We do that for the balanced score card below.

As we reported earlier, in our studies of schools and districts in other states that have dramatically improved student performance, we found many targets that were “bold” and “eye popping” – to get 95% of students at or above proficiency, to double student achievement levels, to increase performance at the advanced levels, to be the best school or district in the state or country. Below we recommend the initial, Wyoming school-based accountability system establish “stretch” goals. It may be better if the state or school districts (rather than individual schools) set “bolder” goals like, as the State Board has stated, to be the best education system in the country.

Another principle in setting improvement targets is that the target should be larger than “measurement” error, otherwise meeting the target could be a random event rather than a statistically meaningful event. And “measurement” error quickly gets complicated. We will simply note some issues; WDE assessment staff will need to determine the details. First, the measurement error for each individual student can be large. But measurement error gets reduced the larger the number of students in the school and we believe that once there are scores for at least 20-25 students the threat of measurement error has been addressed. For this discussion, let’s take a score of percent advanced. Assume we have the school score, aggregated over several grades, for mathematics; let’s further assume the measurement error is 1.5 percentage points. When one takes this year’s score minus last year’s score, the measurement error would apply to each year and thus needs to be added together, meaning that measurement error for the change score is now 3.0 percentage points. Therefore any target for improvement would need to be more than 3.0 points to be larger than measurement error. In other words if the improvement goal were only two percent more students reaching the advanced level, and the school achieved that goal, it would not be clear if they did so because of improved student performance or simply a random result due to measurement error. Although we give many specifics in the example below, each will need to be reviewed by WDE assessment staff to ensure that for whatever system is finally designed, the improvement targets are larger than measurement error.

As the state moves forward with increasingly sophisticated accountability system, it should continually address the following issues:

a. The calculation of “improvement targets” for each school wide indicator used in a school level accountability program.
b. Degree to which any improvement targets are larger than measurement error for every core indicator for each school level in Wyoming – elementary, middle and high school.
c. Alternative approaches to improvement targets and how school performance to the improvement targets can give a “profile” of school performance and not just a pass or fail report, and

d. Various ways school performance to the improvement targets can be “added up” to give an overall performance score for the school which would be the basis for rewards or sanctions. In this vein, the ongoing assessment would review the “power” of using the proposed “balanced scorecard” to calculate accountability performance for each school, discussed below, and to assess the impact of using such a scorecard for the school level accountability program, or the details of a different approach and reasons for why a difference approach is better.

6. A PROPOSED BALANCED SCORECARD

For the initial effort to develop an accountability system, we recommend that rewards and sanctions be developed on a school wide basis. For subsequent years, we recommend that the state consider rewards and sanctions focused on individual – teachers, principals and perhaps even students. Indeed, the WEA in their July testimony discussed several issues related to teacher evaluation; we leave those important and complex issues for a future discussion.

We see Phase 1 accountability as the first step toward dramatic change in the state and thus recommend starting carefully and slowly. Below we also recommend a design for the use of a balanced scorecard. Chart 1 below shows a possible Elementary School Scorecard. Similar scorecards would need to be developed for middle schools, which we recommend have 7 core indicators, and for high schools, which we recommend have 9 core indicators.

Column 1 of Chart 1 shows the key performance indicators – proficiency in mathematics, reading, writing, and science, the achievement gap and performance at the advanced level. These represent six key student performance indicators. A general rule is to have a limited number of indicators so that the scorecard does not get too complex, and the message about what performance to emphasize is clear to all stakeholders. For example, if there were an achievement gap for each subject area, there would be 4 achievement gap indicators; if there were an advanced achievement score for each subject area, there would be 4 advanced achievement indicators. Though Wyoming might want to have a 12 element scorecard or accountability system, the scorecard example in Chart 1 includes just six key indicators by aggregating the Achievement Gap and Advanced Achievement indicators across all four subjects as well as across grades.

Second, the example scorecard also shows that a "weight" needs to be given to each indicator; each could be equally weighted but that also would be a conscious decision. The example score card weights the subject scores for percent at least proficient at 20 percent each, and then weights the achievement gap and advanced achievement indicators at 10 percent each.

Wyoming could choose alternative weights as these are just presented as suggestions. Indeed, the Committee might want to have a considerable discussion of the weights for each indicator. As proposed, the Scorecard signals that the most important goals are student proficiency in each of the four subject areas, and that some attention should be focused on the Achievement Gap as well as Advanced Performance. But the Scorecard could weight the subject area proficiencies lower, say at 10% each, and then weight each of the Achievement Gap and Advanced indicators at 30 percent, sending the signal that advanced performance and closing the achievement gap are the most important.

Chart 1

A Balanced Elementary School Scorecard

1	2	3	4	5	6	7	8	9	10
Core Indicator	Performance Level PAWS	Weight of Core Indicator	Prior Year Actual	Below Threshold	Threshold - maintain	50% of Target	Target Stretch Goal	125% of Target	Percent Accomplishment
							100%		
Grade 3-5 Mathematics	Proficiency	20%	60		60	62.5	65	66.25	
Grade 3-5 Reading	Proficiency	20%	70		70	72	74	75	
Grade 3-5 Writing	Proficiency	20%	75		75	78	81	82.5	
Grade 3-5 Science	Proficiency	20%	50		50	53	56	57.5	
Grade 3-5 – all subjects	Achievement Gap	10%	40		40	37.5	35	33.75	
Grade 3-5 – all subjects	Advanced Achievement	10%	30		30	35	40	42.5	
Totals		100%							

With weights for various levels of rewards:

1	2	3	4	5	6	7	8	9	10
Core Indicator	Performance Level PAWS	Weight of Core Indicator	Prior Year Actual	Below Threshold	Threshold - maintain	50% of Target	100% of Target Stretch Goal	125% of Target	Percent Accomplishment
				0 %	25%	50%	100%	125%	
Grade 3-5 Mathematics	Proficiency	20%	60		60			66.25	25%
Grade 3-5 Reading	Proficiency	20%	70		70		74		20%
Grade 3-5 Writing	Proficiency	20%	75		75		81		20%
Grade 3-5 Science	Proficiency	20%	50	44	50				0
Grade 3-5 – all subjects	Achievement Gap	10%	40	42	40				0
Grade 3-5 – all subjects	Advanced Achievement	10%	30		30	35			5%
Totals		100%							70%

The example scorecard also has multiple performance targets, ranging from a desired "target" stretch goal improvement (column 8), to just 50% of the target (column 7), to simple maintenance of past performance (column 6), and then to 125% or more above the target gain (column 9). These design elements are included to indicate that some improvement will be recognized even if it is not the target improvement, and that improvement beyond the target or stretch goal will also be recognized.

This approach is very different from the AYP calculations under the federal No Child Left Behind Program. For AYP, every improvement target must be met for every student group (which is very difficult) or the school misses AYP completely (too often the case). We believe that is too harsh an approach and that the balanced scorecard approach is, if you will, more "balanced" and "nuanced," recognizing that some improvement is better than no improvement at all, and giving credit for improvement in some areas even where there is insufficient improvement in other areas.

Column 8 of the example score card shows the "stretch goal" or "target" improvement for each performance indicator: 5 percentile points increase for math, 4 percentile points increase for reading, 6 percentile points increase for writing, 6 percentile points increase for science, a 5 percentile point reduction in the achievement gap, and a 10 percentile point increase in advanced achievement. Again, these numbers are all just suggestions. Wyoming would need to decide on the target changes for each indicator.

As just mentioned, the example scorecard not only has columns for desired or "target" improvement hoped for (column 8), but also the ability to recognize partial improvement (50% of target in column 7) and more than target improvement (125% of target in column 9). These two additional elements further complicate the system but provide for a more "nuanced" school score, where advanced performance on one indicator could offset below target performance on another. Again, these are all possible design parameters.

The "threshold" improvement (column 6) is maintenance of current performance. This is a design suggestion. While improvement is desired, maintenance of performance is at least better than performance loss. Column 6 recognizes this reality. The state could decide to retain or eliminate a "threshold" or maintenance element for the scorecard.

Finally, the scorecard in the bottom half of the above Chart 1 shows a school's actual scores (shaded in green) and then uses the weights in column 3 times the percentages earned in columns 5-9 to get a final school example score of 70 percent. This shows substantial improvements but short of the target improvement.

Finally, for this example scorecard, Wyoming would need to decide what final percentile score would indicate a "passing" score for accountability and what score would trigger what kind of intervention.

[We note that this kind of scorecard also could be used to provide monetary awards, with the percentage applied to a dollar amount for each teacher in the school, for example, but going this direction is far away and for future discussions, if a decision is made in the future to tie financial rewards to the accountability system.]

7. DETERMINING CONSEQUENCES FOR MEETING OR NOT MEETING TARGETS – REWARDS AND SANCTIONS

As the state moves forward in designing an accountability program there will be considerable discussion of rewards and sanctions. Generally, we recommend that the primary “reward” be non-interference from the state and the primary “sanction” be some combination of restrictions on use of block grant dollars (e.g., use of tutoring dollars just for teacher tutors) and/or technical assistance from the state to help the school and district improve, that could or could not be linked to the state’s accreditation process. We also would suggest that when adding resources to salaries, the state seriously consider putting those funds – and over time current salary dollars – into performance pay structures, so that all educators earn pay increases based on knowledge and skills, as well as bonuses for improved student performance.