Estimating the Costs Associated with Achievement Expectations for Kansas Public Education Students

*Methods, Data, and Analysis Plan*

Hearing to a Joint Session of the Kansas Senate & House of Representatives
February 23, 2018

Dr. Lori L. Taylor & Jason Willis
WestEd’s Mission

WestEd is a **nonprofit, nonpartisan research, development, and service agency** that works with education and other communities to *promote excellence, achieve equity, and improve learning for children, youth, and adults.*
Jason Willis

• Director of Strategy & Performance at WestEd overseeing the agencies school finance and school system improvement work
• 10 years experience as senior business official in school districts (Oakland, Stockton, San Jose)
• School finance expert in cost studies and district resource allocation methods
  • Work in states such as Maryland, Florida, New York, Arizona, and California
Dr. Lori L. Taylor

• Verlin and Howard Kruse ‘52 Founders Professor, Bush School of Government and Public Service, Texas A&M University
• Director, Mosbacher Institute for Trade, Economics and Public Policy
• School finance expert in regional cost, educational cost function analysis
• Board member
  • Association for Education Finance and Policy
  • Regional Education Laboratory Southwest
Quotes from a Texas Court:

• “[T]he Taylor Study overemphasizes small district behavior and understates the urban influence on cost relationships. Stated another way, the decision not to “pupil weight” likely explains the Taylor Study’s finding of lower costs in large districts.”
• “Dr. Taylor incorrectly assumes that all of the district’s funding is fungible, i.e., that a district’s revenue dollars can be freely allocated according to the efficiency dictates of the model.”
• “Dr. Taylor’s numbers simply are not credible [o]n their face.”
Prediction of various cost studies to reach state definition of adequacy in Texas West Orange Cove lawsuit (2004):

- Cost Function analysis by I&R = $457 million more
- Professional Judgement analysis by MAP = $683-$830 million more
- Cost Function analysis by Taylor = $861 thousand more

In 2004, all 46 plaintiff districts met or exceeded the performance benchmarks used in the cost studies, and all were deemed “acceptable” by the state.

Spending fell in 28 districts and rose by only $8.7 million in the other 18.
“Peer Review”

• ... the court found a number of other methodological flaws in the Taylor study. These “[flaws in the Taylor Study] included a failure to properly account for the relative size of districts in the study’s expenditure recommendations, the use of flawed methods used to compare scores on the current state achievement test with scores on a predecessor exam, and failure to capture variations in teacher salaries which result from cost of living and other factors outside a district’s control.” (Rebell 2007)

• “Little if any attention was given, however, to the critical, practical cost analysis question of what level of resources needs to be made available now in order to reach a desired outcome goal at a particular point in the future. . . . These are the types of difficult questions that must be posed and answered if the output measures used in adequacy cost study are to have any real credibility.”
Today’s Objectives

• Describe the methods, data, and analysis plan for the study

• Discuss incorporation of the Rose standards into the analysis plan

• Take any questions or comments regarding the two objectives noted above
Agenda

- Purpose & Study Aims
- Explaining Spending Variation
- Methods: Estimating the Cost of Education
- Data & Variables included in Cost Function Analysis
- Rose Standards
- Effective Resource Use
- Closing & Next Steps
Purpose & Study Aims
Study Aims

Estimate the level of spending required to produce a given outcome within a given educational environment.

• Investigate the *linkage between the Rose standards and Kansas K-12 educational spending*.

• Explain the *option or options* to “produce an education system reasonably calculated to achieving those Rose standards.”

• *Focus on the structure of the Kansas school finance system* as well as overall K-12 spending levels including forms of funding available to Kansas K-12 schools.
The information presented today remains **preliminary** and in a **formative stage**.

Information, particularly in the **Data & Variables** and **Rose Standards** section, are **preliminary** and may change between now and the final report.
Explaining District Spending Variation
Spending Differs Across School Districts in Kansas

State average per pupil spending = $10,951

286 = Number of Kansas school districts
Why Does Spending Differ?

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Costs</th>
<th>Efficiency</th>
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| Considers the different outcomes of the system relative to the make-up of the student population and services provided. | Considers the costs associated with:  
• student needs,  
• input prices, and  
• economies of scale. | Considers how schools and school districts differ in their output (student outcomes) relative to the amount of funding available. |
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Some districts are producing higher levels of core student outcomes.

Some districts are providing enrichments other districts do not provide.
Variation in Effective Rate by District

Effective rate – a composite of overall student performance – shows variation across Kansas.
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  - student needs,  
  - input prices, and  
  - economies of scale. | Considers how schools and school districts differ in their output (student outcomes) relative to the amount of funding available. |
Near consensus in research that it costs more to serve:

- Economically disadvantaged (ED) students,
- English language learners (ELL) students, and/or
- Students with disabilities (SWD).

However, and perhaps importantly to this investigation, there is no consensus as to how much more is necessary for these populations to achieve desired outcomes.
**Brief Literature Review on Student Need Costs**

**Economically Disadvantaged Students**
- Less than 1% additional funding needed\(^1\)
- More than 100% additional funding needed\(^2\)

**English Language Learner Students**
- No additional funding needed\(^3\)
- More than 400% additional funding needed\(^4\)

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For economically disadvantaged students:

- **Student poverty not well measured**
  - The poverty level income is the same in New York City as in Salina, Kansas
  - Though the costs of living are very different.

- **Being identified as economically disadvantaged means something very different in New York City than in Kansas.**
  - That is, the needs of students in New York City compared to Kansas likely require different configurations of resources with different, associated costs.
Some districts have larger concentrations of poverty. But, most districts are serving between 25% and 50% low-income students.
For English Language Learner students:

- A student who is ELL in high school likely has greater needs than a student who is ELL in kindergarten.
- States where nearly all the ELL students share a common language may have a cost advantage over other states.
- A general lack of economies of scale can make for greater cost in some states and districts.
For students with disabilities:

- Diagnosis of disability can be large and varied across physical, emotional, and behavior bounds;
- Each of which has different combinations of necessary resources to support the student.
Cost Differences Due to Differences in Input Prices

- Labor is the largest component in a school district’s budget.
  - 81% of current operating expenditures in Kansas

- The price of labor is higher in some parts of the state than in other parts.
Spending Variation: Differences in Costs – Input Prices

Kansas 2005 Comparable Wage Index by District
The per-pupil cost of operating a small *district and/or school* is much higher than the per-pupil cost of operating a larger one.¹

And, once school districts get significantly larger we can observe a diseconomies of scale take effect.²

Geography forces some districts to have smaller schools.

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Kansas is subject to these economies of scale as any other state – experiencing diseconomies of scale among the smallest and largest school districts.
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Kansas school districts experience a range of achievement relative to the amount of spending per pupil.
Methods: Estimating the Cost of Education
# Two Approaches to Costing Out Studies

<table>
<thead>
<tr>
<th>Approach</th>
<th>Input-Based</th>
<th>Output-Based</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Sum up the costs associated with building a prototype school</td>
<td>Estimates costs based on observed relationships between: (1) school spending, (2) student performance, and (3) other school characteristics</td>
</tr>
</tbody>
</table>
| **Methods** | • Professional Judgment  
• Evidence-Based | • Education Cost Function  
• Successful Schools |
### Summary of Various Methods

<table>
<thead>
<tr>
<th><strong>Professional Judgment</strong></th>
<th><strong>Education Cost Function</strong></th>
</tr>
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<tbody>
<tr>
<td>• Convene focus groups of local practitioners to design prototype schools that meet performance goals.</td>
<td>• Cost and performance data to estimate the relationship between expenditures and school outcomes, resource prices, student needs and other factors.</td>
</tr>
<tr>
<td>• Calculate the cost of the prototype in various locations.</td>
<td>• Predicts the cost of achieving outcomes.</td>
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<table>
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<tr>
<th><strong>Evidence-Based</strong></th>
<th><strong>Successful Schools</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Resource needs derived from “proven effective” school reform models.</td>
<td>• Data on student performance identifies schools that meet a designated standard.</td>
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<tr>
<td></td>
<td>• The cost is the average level of spending among those “successful schools”.</td>
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# Input-Based Considerations

<table>
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<tbody>
<tr>
<td>Both methods are simple, transparent and straightforward. But, many only be</td>
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<tr>
<td>applicable to a handful of prototypical school districts.</td>
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<tr>
<td>Professional Judgment</td>
</tr>
<tr>
<td>• Vulnerable to the <strong>blind spots and biases</strong> of panel members</td>
</tr>
<tr>
<td>• Frequently cost out performance standards that are <strong>difficult to quantify</strong></td>
</tr>
<tr>
<td>• and well beyond current levels</td>
</tr>
<tr>
<td>Evidence-Based</td>
</tr>
<tr>
<td>• <strong>Seldom specify the performance standards</strong> being evaluated</td>
</tr>
<tr>
<td>• Evidence of practitioners following evidence-based reform is lacking</td>
</tr>
<tr>
<td>• Identified, proven outcomes may be out of line with system goals.</td>
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</table>
## Output-Based Considerations

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<td><strong>Direct link between education costs and desired outcomes. And, estimates based on what districts actually do. But, method requires high-quality datasets.</strong></td>
</tr>
</tbody>
</table>

### Successful Schools
- Policymakers must designate *measurable* performance standards.

### Cost Function Analysis
- Provides a strong empirical foundation for estimates of cost differentials.
- Describe relationships within the experience of the data
- Statistical models are not transparent and explicitly involve errors of estimation and modeling.
Previous cost studies in Kansas

• **Successful schools analysis** (Augenblick & Myers, 2002; 2011)
• **Professional Judgement analysis** (Augenblick & Myers, 2002)
• **Education cost function analysis** (Duncombe & Yinger, 2005)
• **Legislative Post Audit (LPA) analysis** (2006)
Data & Variables Included in Analysis
Data Needed for Education Cost Function Analysis

- Expenditures
- Outcomes
- Prices
- Environmental factors
The information presented today remains preliminary and in a formative stage.

Information, particularly in the Data & Variables and Rose Standards section, are preliminary and may change between now and the final report.
Measuring current expenditures per pupil

• All spending included except:
  • Transportation (function 2700)
  • Food Service (function 3100 and fund 24)
  • Community Service (function 3300)
  • Construction (functions 4000 – 4900 and object code 700)
  • Debt Service (functions 5000 and 5100 and object code 820)
  • Fund Transfer (function 5200)
  • Adult Education (funds 10 and 12)
Assigning costs to the school-level

- Reported payroll for certified staff with actual salary and building assignment are assigned to each building.
- Proportion of benefits for those certified staff are assigned to the building as well.
- Remaining current expenditures for the school district are pro-rated on a per-student basis and then assigned.
- Non-payroll special education expenditures are pro-rated on a per-special-education-student basis and then assigned.
Costs associated with Special Education Co-ops

- Special Education COOP spending allocated to the member districts according to their share of special education students in the co-op.
Incorporating several outcome measures

State assessments
• English, math and (possibly) science
• Normal curve equivalent (NCE) scores measuring the growth from one year to the next

Effective rate
• Graduation rate and post-secondary pursuits and outcomes

Based on a regression analysis of the wages that teachers are willing to accept from school districts.

Wages are a function of:
- Teacher characteristics
- Building and district characteristics
- Location characteristics

A teacher salary index reflects only factors outside of school district control.
Variables Included in the Analysis

Dependent variable
• Full-time equivalent monthly salary

Independent variables
• Teacher Characteristics
• Building & District Characteristics
• Location Characteristics
Teacher Characteristics

- **Years of experience**
- **Educational attainment**
  - For example: bachelor’s degree, master’s degree, doctorate
- **Teaching assignment**
  - For example: ELA, math, computer science, social science, science, health and physical education, world language, fine and performing arts, career and technical education
- **Other assignments**
  - For example: administration, support staff (librarian/media specialists, school psychologists)
Building and District Characteristics

• Percent Free and Reduced-Price Lunch, i.e., At-Risk

• Percent Limited English Proficient

• Percent Special Education

• Campus Enrollment
Location Characteristics

- Unemployment rate
- Fair Market Rent
- Metropolitan area indicator
- Micropolitan area indicator

- Geographic isolation
  - Miles from Metro Center
  - Miles from any Core Based Statistical Area

- Climate
  - Heating degree days
  - Cooling degree days
Incorporating several environmental factors

- District size
- Building size
- Student demographics
- Remoteness
Education Cost Function Steps

Data
- Request, obtain, and clean the data
- **Product**: Validated data sets

Construct variables
- Construct variables
- **Product**: Salary index, outcome measures, school-level spending

Regression analysis
- Explain how the **variation in expenditures** is related to variation in outcomes, prices, demographics, and other cost factors
### Education Cost Function Steps (cont.)

<table>
<thead>
<tr>
<th>Rose Standards</th>
<th>Estimate Spending</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Translate to various, existing Kansas laws and regulations</td>
<td>• <strong>Product</strong>: predicted (a) <em>level of base spending</em> required to produce those outcomes and (b) <em>spending adjustments for student need, size, and labor prices</em></td>
<td>• Contextualize the spending estimates and possible implications for the Kansas public education system</td>
</tr>
<tr>
<td></td>
<td>• <strong>Product</strong>: Identify the associated, appropriate outcome measure and performance thresholds</td>
<td>• <strong>Product</strong>: Various recommendations for implementation</td>
</tr>
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</table>
Origin of the Rose Capacities

• Ruling by Kentucky Supreme Court in 1989 (Rose v. Council of Better Education)
• Court articulated seven capacities as a minimum standard for each and every child
• Kentucky General Assembly adopted KERA in response in 1990
Arkansas’ Experience with *Rose Capacities*

- In 2001, Arkansas trial court deemed education system inequitable and inadequate
- Court pointed to *Rose Capacities* as requirements for an adequate education
- Along with Arkansas’ standards and accountability system
Rose Standards

Breaking down the Rose standards, it is important to understand a bit more about the elements of the capacities. The standards contain references to:

- content, e.g., economic, social, and political systems
- skill(s), e.g., oral and written communications, and
- aspiration of a standard.

Further, other terms such as ‘sufficient’ and ‘enable’ also offer guidance
Rose Standards to Performance Measure Thresholds

**Rose Standard**: standard set by the Court in *Gannon* rulings

**College & Career Skills; Accreditation**: set broad student and system boundaries of *expectations*

**Standards for the Schools; Grad Requirements**: determine the *offerings* aligned to skills and accreditation

**Measures of Student Outcomes**: *progress towards expectations* and insight on effectiveness of offerings

**Thresholds of Performance Statewide**: *determine aggregate bar of performance* for Kansas to achieve

*WestEd*
**Sample Standard 1:** Sufficient oral and written communication skills to enable them to function in a complex and rapidly changing civilization.

<table>
<thead>
<tr>
<th>College &amp; Career Ready Skills; Accreditation</th>
<th>Minimum Standards for Schools to Teach; Graduation Requirements</th>
<th>Standard, Statewide Measures of Student Outcomes</th>
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</thead>
<tbody>
<tr>
<td><strong>KCCRES:</strong> These basic skills encompass reading, listening, speaking and performing math computations.</td>
<td><strong>Elementary schools must teach:</strong> reading, writing, spelling, English grammar and composition, arithmetic (and) such other subjects as the state board may determine. <strong>Elementary and secondary schools must provide:</strong> language arts; library services; computer literacy; counseling services; mathematics; science; services for students with special learning needs. <strong>For graduation:</strong> English language arts (4 units), including reading, writing, literature, communication, and grammar; Science (3 units), including physical, biological, and earth and space science concepts and at least 1 unit as a lab course; and Math (3 units) including algebraic and geometric concepts.</td>
<td><strong>State Assessments</strong> (as required by the federal Every Student Succeeds Act (ESSA) reauthorizing the Elementary and Secondary Act of 1965) <strong>English Language Arts and Mathematics (and alternate) Science (and alternate) Graduation rate</strong></td>
</tr>
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</table>
Addressing Rose standards without measures

• Some of the Rose standards currently do not have statewide, standard measures of performance associated with them.

• There is a *presumption* of little variation in the type of expected outcome associated with the standard.
Effective Resource Use
Addressing both ‘how much’ and ‘how well’

- Adequacy
- Equity
- Flexibility & Support
- Transparency & Accountability
Key enabling conditions are crucial

<table>
<thead>
<tr>
<th>Districts lack</th>
<th>Results in misaligned incentives that:</th>
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</table>
| **Flexibility over certain resources** | • Incentivize investments that may not be strategic  
• Encourage overspending (e.g., funds allocated in arrears)  
• Create significant compliance burden |
| **Support to inform resource choices** | • Activate decision-making processes that are incongruent with strategic planning  
• Collect data that do not inform decision-making |
| **Accountability for paying attention to the right things** | • Focus only on financial inputs  
• Measure only investments over base amount |
| **Transparency focused on compliance** | • Capture and report the wrong types of data |
Closing & Next Steps
Next Steps

- Practitioner engagement (Saturday, February 24)
- Final study report due (Thursday, March 15)
Thank you!