Final Report

By Sid Womack

Recipient of a Professional Development Grant in November 2013

Presentation of Two Papers at the 42nd Annual Meeting of the Mid-South Mid-South Educational Research Association in Pensacola, Florida,

November 6-8, 2013

B. **Reinstatement of Problems Researched:**

Dr. David Bell, Dr. Kerry Roberts of Stephen F. Austin University, Mrs. Karen Womack, and I were accepted to speak at the Mid-South Educational Research Association annual meeting in Pensacola, Florida, November 6-8, 2013. We had two papers accepted: "A Cost-Benefit Analysis for Per-Student Revenue and Expenditures and Academic Achievement" by Womack, Roberts, Bell, and Womack, and "Most Effective Practices in Lesson Planning: Quantitative Analysis" by Sid Womack and David Bell.

Dr. Bell unfortunately was not able to attend this conference due to job demands on campus. Dr. Roberts was not able to attend due to lack of supportive funding from his institution. Mrs. Womack is a visiting lecturer for ATU and was not eligible for funding.

In the first study, data from the 50 states on per-student expenditures and ACT achievement were correlated to find out if there was any relationship between the two.

In the second study, factor analysis of the data from a Praxis-III like assessment of intern teachers was done to find out if (1) the lesson-planning factor was unitary or could be further divided (2) which items accounted for the most variance in intern effectiveness cores.

C. **Review of the professional enhancement opportunity, creative work, or research procedure.** In the first study, public-domain data were input into correlation using Statistical Analysis System software to determine the relationship between economic inputs and achievement outputs. In the second study which had been IRB'd, data gained with a Praxis-III like assessment from 130 Tech early childhood, middle level, and secondary interns from spring of 2010 were subjected to factor analysis. It was found that lesson planning was the first factor extracted, accounting for 41% of the variance in ratings. The next three factors extracted were higher order thinking by both students and teachers, safe school environment, and professionalism. Beyond the variance accounted for by those four factors,

there were no other factors found that would meet the usual mineigen value of one criteria. Exploring the lesson planning factor further with stepwise regression, five items from the PraxisIII-like instrument were found to account for over 90 percent of lesson planning variance.

Manuscripts of the studies are included at the end of this paper in Appendix 1 and Appendix 2.

D. **Summary of findings, outcomes, or experiences had**. The study on the relationship between expenditures and achievement gave a definitive answer to a question that has been "answered" in biased ways in the media for more than twenty years. The media and other critics of education have usually "cherry picked" data from four to six states and tried to use those to show that money spent on education has no relationship to how much students will learn in school. Using data from all 50 states was a much more honest way to approach the question. In addition to this paper being accepted at MSERA, it was also published last summer in the journal of the University Professors of Education Administration, giving national coverage.

The findings on lesson planning are of theoretical importance to the teaching profession. The emphasis on lesson planning can now move from "sermonization" to a much more scientific basis in the conceptual frameworks of teacher education programs. The same study was submitted to the *Administrative Issues Journal*, a national journal, and was readily accepted in the second issue of the new journal originating out of Southwestern Oklahoma State University. These findings have been discussed in a Curriculum and Instruction faculty meetings and are being quoted in various courses in teacher education at our university. These findings helped "put arrows in their quivers" for stressing the importance of lesson planning to our students.

E. **Conclusions and recommendations.** (1) How much is spent, and spent wisely, does predict academic achievement as measured by the ACT. (2) Lesson planning is vitally important in any teaching endeavor. Planning for the exceptional students in the class is the most important part of lesson planning.

Appendix 1

A Cost-Benefit Analysis for Per-Student Revenues and Expenditures and Academic Achievement

A Cost-Benefit Analysis for Per-Student Revenues and Expenditures and Academic Achievement

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Abstract: Cost-benefit correlations have been subject to "selective sampling" in the media. Usually extremes of data from a very few high-funding and low-funding states are cited in the media to construct the case that there is no relationship between economic inputs and academic outputs. This study, using average per-pupil expenditures and ACT data from all 50 states, showed a 0.54 correlation. When data were systematically reduced from 50 states to 35 to eliminate the highest- and lowest-spending states, the cost-benefit relationship improved to 0.69, accounting for 47% of the variance in ACT scores. For the 2009-2010 school year, the 35 states in the most predictive range spent from $8712 (Arkansas) to $14,531 per student. Per-pupil expenditures outside that range were not significantly predictive of academic achievement as assessed by the ACT scores of graduating senior in spring 2010.

Particularly in economically austere times, the question sometimes arises "Are we getting our money's worth for our education dollar?" Comparisons of one state's economic inputs to its students' achievement outputs (achievement test scores) are often made with other states. This study employed national data to attempt to shed light on that question.

Such inquiries are not new. The Murphy Commission report in 1998 raised questions in Arkansas that there were few relationships of money spent to the level of academic achievement coming out of that state's high schools. Fox News in 2011 used carefully selected Census data to make the case that the tax burden for education was being transferred to local districts from the states, along with at least the implication that per-pupil costs were steadily increasing while achievement was stagnant. Conservative Action Alerts on April 15, 2012 was more direct in their assertion that "hundreds of billions spent on K-12 education gets only 'stagnant test scores.'" In a lengthy history lesson about the growing education bureaucracy, that report cited Neal McClusky of DownsizingGovernment.org about the increasing size of the education establishment while students allegedly were learning no more than they were two decades ago.

Arguments about non-correlation in the press seem to include a very few "cherry-picked" data with a few achievement test scores that seem to affirm the speaker's viewpoint. We selected national data from the Census and the Public Agenda website to investigate further.

Related Literature

This writing is not the first to show a relationship between costs per student and student achievement. Rasell and Mishel pled the case that the U. S. was not spending enough on education to be competitive with other countries (1990). Berliner (1993) reported that "academically more proficient

teachers, who are more experienced, who are better educated, and who work with smaller classes, are associated with students who demonstrate significantly higher achievement" (p. 636-637).

Berliner further found (1993) that

> An unusual set of data from Texas looks at the effects of teacher ability, teacher experience, class size, and professional certification on student performance in reading and mathematics. Data on millions of students in 900 districts were examined longitudinally from 1986 to 1990 Two rather simple findings emerged. First, teachers academic proficiency explains 20% to 25% of the variation across districts in students' average scores on academic achievement tests. The smarter the teachers, the smarter their pupils appeared to be, as demonstrated by results on standardized achievement tests administer to both groups. Second, teachers with more years of experience have students with higher test scores, lower dropout rates, and higher rates of taking the SAT. Experience counts for about 10% of the variation in student test scores across districts. The effects are such that an increase of 10% in the number of teachers within a district who have nine or more years experience is predicated to reduce dropout rates by about 4% and to increase the percentage of students taking the SAT by 3%. Dollars appear to be more likely to purchase bright and experienced professionals, who, in turn, are more likely to provide us with higher-achieving and better-motivated students (Berliner, 1993, p. 638)

Dollars affect class size. Class size is another research topic almost as hoary with age as the cost-benefit issue. Of class size, Berliner continues with

> The Texas data also show that, in grades 1 through 7, once class size exceeds 18 students, each student over that number is associated with a drop in district academic achievement, This drop is estimated to be very large–perhaps 35 percentile ranks on standardized tests–between a class size of, say, 25 and a class size of 18.
>
> Furthermore, the percentage of teachers with master's degrees accounted for 5% of the variation in student scores across districts in grades 1 through 7. So we learn from the Texas study and other data that support its conclusions that academically more proficient teachers, who are more experienced, who are better educated, and who work with smaller classes, are associated with students who demonstrate significantly higher achievement
>
> . . . . For those who point out that education costs have been rising faster than inflation, it is important to note that special education populations have been rising as well. It costs 2.3 times as much money to educate a child in special education as it does to

> educate a child in the regular education program. Most of the real increases in educational expenditures over the last 20 years have been the result of increased costs for transportation, health care, and special education. They have not been connected with regular instruction or teachers' salaries. (Berliner, p. 636-637).

Part of what dollars for education do is to enable a reasonable class size for each student. The student in a class of 40 is clearly not going to get the amount of attention and help from a teacher that a student in a class of 25 will.

The Womack study of 2002 explored costs and benefits especially in Arkansas in an attempt to answer the concerns of the Murphy commission and others. The statewide per-pupil expenditures and ACT data show a correlation of 0.33, $p<0.023$, with 11 percent of the variance in Arkansas student achievement being accounted for by the level of funding. A review of national expenditure and achievement data using SAT scores showed a correlation of 0.44 in the Womack study of 2002. The present study is mostly a replication or elaboration of that study.

Method

ACT scores for all 50 states were obtained via www.publicagenda.org (2010). Financial data on per-pupil revenues and expenditures were obtained on the Internet from the 2009 Annual Survey of Local Government Finances-School Systems. In one sense, this may have been a simplistic approach to setting up the correlation problem because the graduates of any particular year were influenced by the school finance practices of not just the preceding year, but rather the preceding 13 years. However, these data were chosen partly for simplicity's sake and partly in the realization that within states and districts, it is difficult to modify taxing and allocation practices very quickly. It was assumed that the financial influences of the nation's 2010 graduating classes had been reasonably consistent for the duration of their schooling. Table 1 contains the data used for this study:

Table 1

Mean per-pupil achievement, revenue, and expenditure data for the 50 U. S. states

State	Avg_ACT	Rev_per_student	PP_expenditure
Alabama	20.3	9636	8870
Alaska	21.1	16576	15552
Arizona	20	9882	7813
Arkansas	20.3	9976	8712
California	22.2	11588	9657
Colorado	20.6	10171	8718
Connecticut	23.7	17373	14531
Delaware	23	14335	12257
Florida	19.5	10098	8760
Georgia	20.7	10893	9650
Hawaii	21.8	14987	12399
Idaho	21.8	8141	7092
Illinois	20.7	12457	10835
Indiana	22.3	12360	9369
Iowa	22.2	11337	9707
Kansas	22	11939	9951
Kentucky	19.4	10010	8756
Louisiana	20.1	11967	10533
Maine	23.2	13666	12304
Maryland	22.3	15574	13449
Massachusetts	24	16270	14118

Michigan	19.7	11967	10483
Minnesota	22.9	12664	11098
Mississippi	18.8	8919	8075
Missouri	21.8	10456	9529
Montana	22	11266	10059
Nebraska	22.1	11796	10045
Nevada	21.5	10305	8422
New Hampshire	23.7	13725	11923
New Jersey	23.2	18874	16408
New Mexico	20.1	11266	9439
New York	23.3	20645	18126
North Carolina	21.9	10613	8587
North Dakota	21.5	11664	10151
Ohio	21.8	12811	10560
Oklahoma	20.7	9353	7885
Oregon	21.5	10862	9805
Pennsylvania	21.9	15023	12512
Rhode Island	22.8	15312	13707
South Carolina	20	10719	9277
South Dakota	21.8	9913	8507
Tennessee	19.6	8324	7897
Texas	20.8	10314	8250

Utah	21.8	7954	6356
Vermont	23.2	17108	15175
Virginia	22.3	12146	10930
Washington	23	11510	9550
West Virginia	20.7	10984	10367
Wisconsin	22.1	12435	11078
Wyoming	20	19238	14573
Means	21.55	12348	10636

Descriptive statistics were calculated from these data.

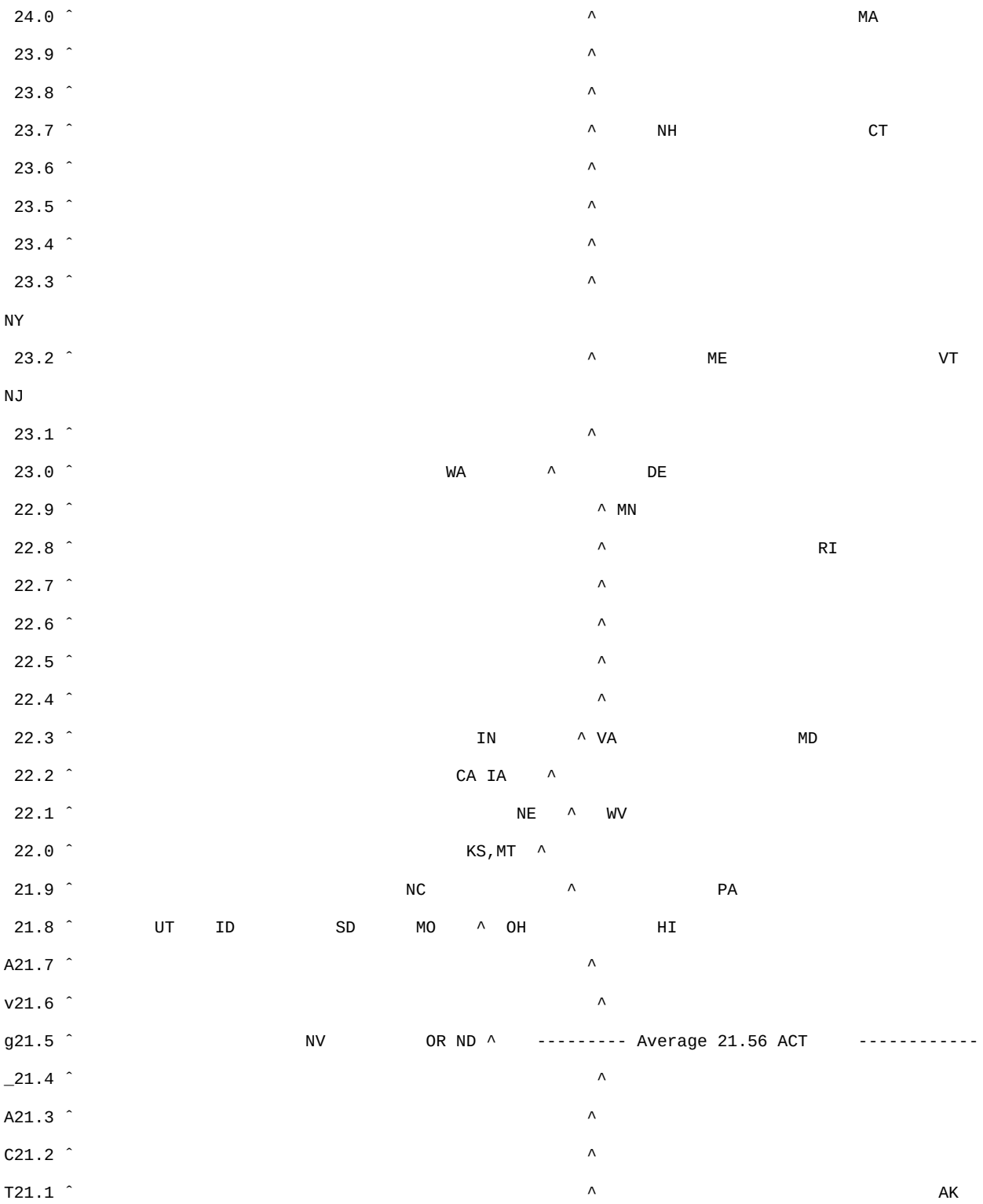
Findings

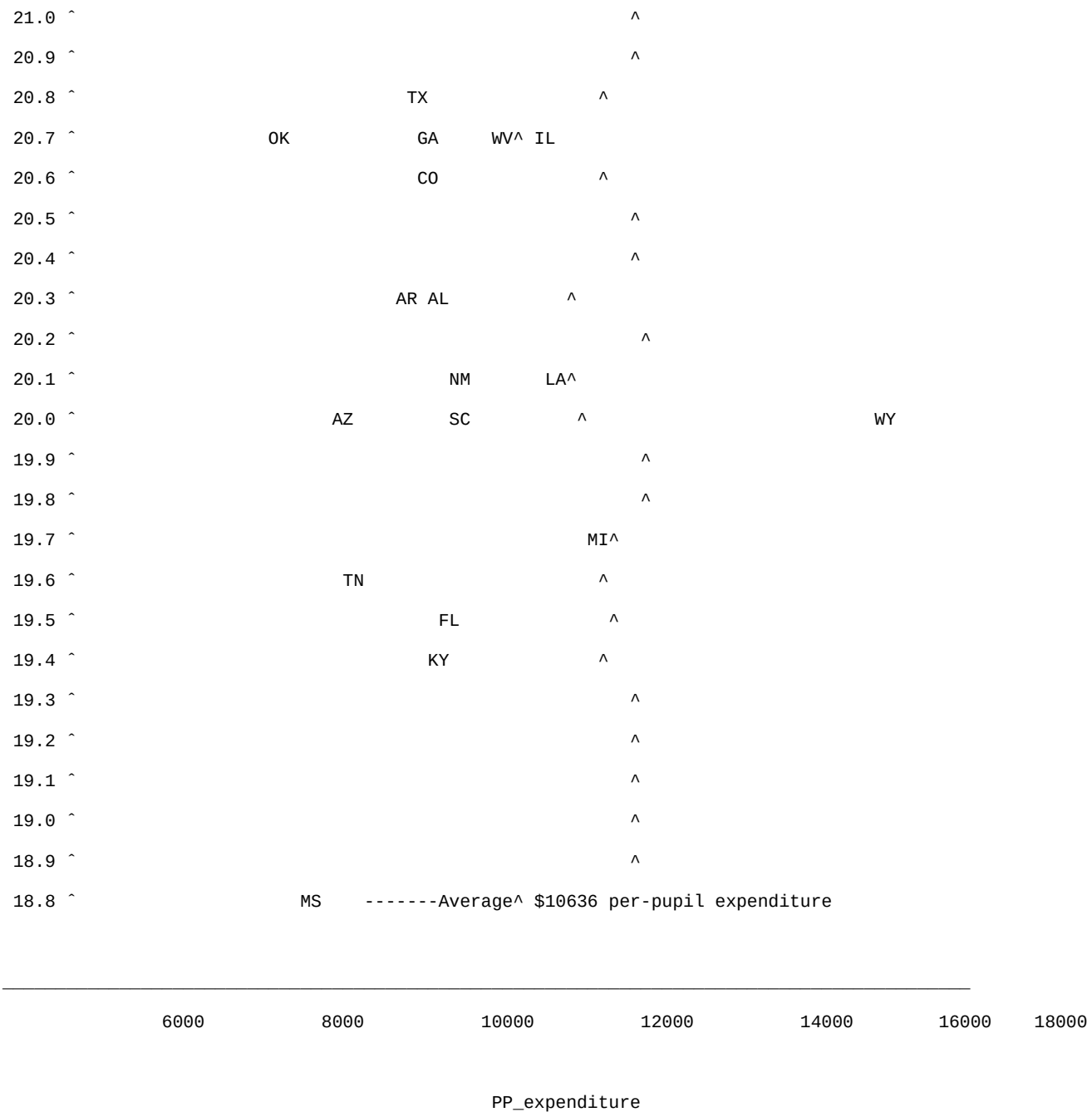
The relationship between per-pupil revenue and ACT composite scores was 0.55 ($p<0.0001$ for illustrative purposes although these are population parameters and need no probabilities). There was a significant correlation between revenues available per student and ACT scores as one outcome measure of achievement.

Would there be a relationship between money actually spent and ACT scores? The correlation was almost the same as with the revenue figures, 0.54 ($p<0.0001$). To explore these relationships visually, we plotted per-pupil expenditures against the state's average ACT scores.

Figure 1

Scatter plot of 2010 ACT scores and 2008-2009 per-pupil expenditures





The national average of elementary-secondary revenue for 2008-09 according to the Census Bureau was $12, 250; by our calculations using the same data, $12,348.04. The average for per-pupil expenditures in the same year was $10, 636.15. The standard deviations we calculated were $2945.55 and $2548.24, respectively.

We sought a way to determine which states got what they paid for. States that spent per-pupil amounts within plus or minus one standard deviation of the national average should, we reasoned, be able to expect ACT scores within plus or minus one standard deviation (1.29 ACT points) of the national average (21.56 by our calculations). By our definition, such states got what they paid for. We constructed Table 2 to see who got what they paid for.

Table 2

Depiction of which states got what they paid for, got less, got more, paid more/got more, or paid less than the national average and got less than average achievement

State	Got what paid for	Got less than paid for	Got more than paid	Paid more, got more	Paid less, got less
Alabama	X				
Alaska		X			
Arizona					X
Arkansas	X				
California	X				
Colorado	X				
Connecticut				X	
Delaware			X		
Florida		X			
Georgia	X				
Hawaii	X				
Idaho			X		

Illinois	X					
Indiana	X					
Iowa	X					
Kansas	X					
Kentucky		X				
Louisiana	X					
Maine			X			
Maryland		X				
Massachusetts				X		
Michigan		X				
Minnesota			X			
Mississippi						X
Missouri	X					
Montana	X					
Nebraska	X					
Nevada	X					
New Hampshire			X			
New Jersey				X		
New Mexico	X					
New York				X		
North Carolina	X					
North Dakota	X					

Ohio	X				
Oklahoma	X				
Oregon	X				
Pennsylvania	X				
Rhode Island		X (minimally)			
South Carolina	X				
South Dakota	X				
Tennessee					X
Texas	X				
Utah			X (considerably)		
Vermont				X	
Virginia	X				
Washington			X		
West Virginia	X				
Wisconsin	X				
Wyoming		X			
	28	7	7	5	3

Twenty-eight states **got what they paid for**: They paid per-pupil amounts within one standard deviation of the national average, and their students achieved within plus or minus one standard deviation of the national average, using ACT composite scores as the criterion. Some differences in per-pupil revenues and per-pupil expenditures are to be expected because dollars have more purchasing power in some parts of the country than others. Teachers need more money for housing or rent in

metropolitan areas than rural ones. These and other things affect the salaries that are to be offered to educators.

Seven states **got less than they paid for**: They devoted revenue within +- one standard deviation of the national per-pupil amounts and spent within one standard deviation of the national average, but the achievement of their students was more than a standard deviation below the national average. Two of those, Alaska and Wyoming, might be expected to have higher per-pupil costs than the national average due to their geographic and meteorological characteristics. The reasons why the other states did not get everything they paid for will likely vary.

Seven other states **got more than they paid for**: They dedicated and spent revenues within a standard deviation of the national average, but their students scored more than the national average. Utah was a very striking case in point, wringing more student achievement out of every education dollar than any other state in the country. Whether Utah can continue to obtain these results on such meager amounts of money remains to be seen.

While it may be tempting for states or districts to use these findings to economize on education, consider the fate of the last category, spent less/got less. When taxpayers get too greedy with dollars for long periods of time, *spent less/got less* is where they end up.

Paid more, got more: Five states spent more than a standard deviation above the national average and had elevated achievement scores to show for it. To get an extra point or two above the average on the ACT, though, it cost them in revenues and per-pupil spending. It takes a sustained effort in funding to make a real difference in this area. The money dedicated to this effort needs to be carefully and thoughtfully spent. Money needs to be directed to goods, services, and facilities that should truly make a difference in student achievement.

Spent less, got less: Three states spent less than the national average and their students paid the price in academic achievement. Upon looking at which three those were, those appear to be states

who have attempted this for long periods of time. The overall trend of all of these data is that in the long run, our children get what we pay for.

In both the "spent less, got less" schools and the "got more than they paid for" scenarios, there appears to be an underground economy of teachers spending money out of their own pockets on school supplies that is temporarily buoying education (Womack, 1990; 1992). Teachers can only be expected to give back to the school from their salaries and their free time for so long. At some point, they will vote with their feet. They will move to another state or leave teaching altogether. Ultimately the loss of talent to the education workplace via this scenario is much more expensive than dollars could ever approximate.

This depiction of the data has helped to explain why correlative studies of the past—including the 2002 Womack one—have had difficulty in showing statistically significant relationships between resources and academic outputs. Of particular interest to us was the number of states that obtained student achievement higher than that expected from monetary inputs. These instances make the case that money spent for education is money well spent, but may confound the correlative cost-benefit graphs which could look so persuasive. The outliers—the extreme disparities between monetary inputs and cognitive outputs-- make the "test cases" that are paraded in the media to dispel the notion that citizens have a material responsibility toward our young.

Additional analyses toward Best Fit:

Additional correlations and regressions were done to find the range of per-pupil funding that correlated highest with student achievement. The first iteration involved removing the five highest-funding states from the data and re-calculating. In removing the top-five per-pupil expenditure states and calculating with the remaining 45, the correlation rose from the previous 0.55 to 0.62. Removing the lowest five states in per-pupil expenditures and calculating with the data from the remaining 40 states yielded a correlation of 0.66. Further analysis using 35 states, with the lowest 10 PPE states and

highest 5 PPE states removed, correlated at 0.69, accounting for 47% of the variance in ACT achievement. This was found to be the best model and to illustrate the most effective funding range for maximum student achievement. When the data set was further truncated to 30 states by eliminating the next five highest Per Pupil Expenditure states, r dropped to 0.61 from .69 and F dropped from 29.20 (P<.0001) to 16.17 (P < .0003). accounting for 37 percent of the variance.

The most effective range of Per Pupil funding, relative to ACT achievement, was

between $8712 in Arkansas to $14531 for Connecticut in 2010 dollars. Per-pupil funding lower

or higher than that range did not correlate well with student achievement as measured by the ACT in the graduating class of 2010. Using 35-state data, in the range between $8712 and $14531, each additional $166.26 on the average was associated with an increase in ACT score of 0.13 ACT points. If Arkansas, for instance, the lowest PPE state in the 35 state analysis, wished to raise its average ACT score from 20.3 to 22, it should increase its Per Pupil Expenditure from $8712 by $2174.17 to $10.886.17.

When further regression analysis was done with the lowest-10 PPE states, an insignificant r of 0.13 was found between Per Pupil Expenditures (F=0.1396). In 2010 dollars, there was no no relationship between economic inputs and academic outputs for under-$8712 PPE states. At the other end of the expenditure range, regression analysis of PPE data and ACT scores among the top five PPE states showed no (p<.0.2239, F=2.3352) relationship. Based upon these findings, it was believed that the extremes of the funding spectrum were what had weakened the correlation of data to 0.55 when data from all 50 states were included.

The correlation between Per Pupil Expenditures and ACT scores in 35 states may be explained in part due to the fact that costs of living vary somewhat in different parts of the country. A dollar in

Arkansas likely buys more real estate than a dollar in Connecticut. A difficult-to-quantify additional variable may have to do with how education dollars are spent. In some communities, extra-curricular activities command dollars that would not have been spent on athletics, art, or music in other communities. The ACT test measures cognitive outcomes, not how well students catch footballs, paint in watercolors, or play scales on instruments. The more nearly an expenditure is aligned with core cognitive outcomes, the more predictive that expenditure correlates with improved ACT scores.

In order to make application of these findings, a little more analysis of the data could be useful. Regression analysis suggested that among all 50 states, it should have taken about $1096 in 2008-09 per-pupil expenditures to raise a state's ACT score by 1 point. A second calculation, this time using an averaging process, indicated that what happened in 2008-09 was more like $1383.66 per pupil if the states with 23.0 ACT averages or above were excluded. If data from all 50 states were left in the analysis, an ACT point above the 18.64 ACT "floor" of the regression model cost $2263.46 each. Among the seven states with ACT averages above 23.0 in 2010, their average per-pupil cost in 2008- 2009 was $14,389.14. Per-pupil costs among the 43 below-23 ACT states were $9249.27. It took about $5,000 per child more per year to leave the "got what we paid for" club and join the "paid more, got more" one. As state-level policy makers consider the implications of this study, the law of diminishing returns should be considered. Do we want to have average schools, or excellent ones? The level of funding accounted for 30 percent of the variance in the regression model.

Conclusions, Discussions, and Recommendations.

The correlation between Per Pupil Expenditures and ACT scores in 35 states may be explained in part due to the fact that costs of living vary somewhat in different parts of the country. A dollar in Arkansas likely buys more real estate than a dollar in Connecticut. A difficult-to-quantify additional variable may have to do with how education dollars are spent. In some communities, extra-curricular activities command dollars that would not have been spent on athletics, art, or music in other

communities. The ACT test measures cognitive outcomes, not how well students catch footballs, paint in watercolors, or play scales on instruments. The more nearly an expenditure is aligned with core cognitive outcomes, the more predictive that expenditure correlates with improved ACT scores.

One thing seemed mostly apparent in these data: If a state goes really low on funding for a very long period of time, what that state will purchase will be a below-average education for their students. At a time when the U. S. as a whole is suffering in the international comparisons, finishing near the bottom in the U. S. may not be a good idea for the next generation.

Fixing it. To apply these figures, let us take the case of Mississippi. In 2010, their average ACT score was 18.8, which is 2.75 ACT units below the national average of 21.56. If Mississippi could have had $1373.66 to multiply times the 2.75 ACT units needed to bring them to the national average, their 2008-09 expenditures per student would have been $10, 852.65. The national average that year was $10,636. Average costs to achieve average results? Imagine that!

It can be difficult for states to change categories from "paid less, got less" to "got what they paid for." Until the mid-1990s, Arkansas had had a long tradition of "paid less, got less." The *Lakeview* cases in the mid-1990s focused attention on the fact that the Arkansas funding mechanism was not operating within the Arkansas constitution which called for a "general, suitable, and efficient system of public schools." The Lakeview school district was able to demonstrate to the court that the system was not a suitable one. The legislature, buoyed by a change in public attitudes, raised the minimum mileages required of local school districts and appropriated other money, bringing Arkansas into the "got what they paid for" category. Arkansas' 2010 ACT average of 20.3 with a 2008-09 per-pupil revenue of $9976 and per-pupil expenditure of $8712 is on the prediction line, albeit a bit toward the lower left-hand side.

States that have recently redoubled their financial efforts may have to wait several years for the effects of those actions to take hold. States that have expropriated money originally intended for

education may get away with it for several years until "the chickens come home to roost." But in the longer term, everyone gets what they paid for.

Prudence in purchasing. For decades, there have been “cherry-picked” comparisons of per-pupil funding and achievement outcomes. Education has not usually fared well in such comparisons because the data were sometimes selected in intentionally biased ways to discourage funding for education by a press with an agenda. The national data in the present study were taken as a whole—with the occasional “flyers” (off the diagonal prediction line) included. They still showed a cost-benefit relationship. But how that that cost-benefit relationship be strengthened?

If academic achievement is what we are wanting to buy with our education dollars, then the expenditures need to be for academics. Perhaps donations or local fundraisers can help with extracurricular programs. Few events discourage millage increases more than seeing the coaches and band directors get raises while the classroom teachers get nothing. The ACT scores are being made in classrooms, not gridirons and band halls. (One of your writers is a former band director.) Educators need salaries that are high enough to enable them to live middle-class lifestyles. Few go into teaching expecting to be rich, but they don’t go into education expecting to struggle financially from year to year, either.

Educators need the basic necessities of today’s classrooms. Science labs need to be adequately equipped. Classrooms need the electronic equipment needed to bring the world to their students so the world can be studied.

Part of what is purchased with enhanced funding is reasonable class sizes. It seems likely that the only people who doubt the effects of class size upon achievement are those who have never taught as a teacher under contract.

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http://www.census.gov/newsroom/releases/pdf/cb11-94_table_11.pdf

Most Effective Practices in Lesson Planning: Quantitative Analysis

By

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Abstract

In a previous study with 130 undergraduate teacher candidates from all licensure levels, data on candidate effectiveness were examined using factor analysis. Four factors were found in effective teaching, those being lesson planning, teacher and student reflection, safe school environment, and teacher professionalism This present study followed the 2012 one and was done to (1) determine whether the lesson planning factor was unitary or could be divided into any further factors, and (2) to identify subcomponents of lesson planning in terms of impact upon teaching effectiveness.

Keywords: teaching effectiveness, lesson planning, diversity, parent-guardian communication, instructional time, clear learning objectives

In a previous study, Womack, Hanna, and Bell (2012) discovered four main factors in teaching effectiveness for Arkansas Tech University interns: Lesson planning, teacher and student reflection, safe school environment, and teacher professionalism. This study attempted to (1) determine whether the lesson planning factor was unitary or could be divided into further factors and (2) identify subcomponents of lesson planning in terms of relative impact upon teaching effectiveness.

Lesson Planning and Time Demands. People who have the dispositions to become teachers want to be effective in producing positive changes in learners. But how much lesson planning is enough planning? How much emphasis should be placed upon the written plan, compared to the emphasis on the dynamics of the classroom, as the lesson unfolds? Which elements of lesson planning should be most emphasized?

It is not uncommon among teachers in our geographical area to find public school teachers who are writing 10 to 15 pages of lesson plans to document the classroom instruction of one single day. That is a tremendous amount of writing. Can we blame our public school colleagues for getting weary of their profession if those are the demands? Even if it was only 15 pages per *week*, that would be quite a bit of writing. The present study sought to determine a reasonably level of written documentation without sacrificing pedagogical effectiveness. Which parts of lesson planning lead to the greatest increases in teacher effectiveness?

It is difficult to argue against the efficacy of lesson planning. An ERIC electronic search on June 6, 2012 with the words “lesson planning” in any searchable field disclosed no less than 3408 entries. Much has been written about the importance of lesson planning, the inclusion and use of behavioral objectives of lesson planning, including assessments in lesson planning, the

developmental appropriateness of lesson plans, and more. Our pre-service interns are told that to attempt a formal observation of a lesson without a written lesson plan is likely to result in the equivalent of a zero on a major test. Philosophically, lesson planning to some level of completeness is regarded as sacrosanct.

"A person cannot teach what he or she does not know," declared Danielson (2007, p. 44). Lesson planning includes but is not limited to selecting content, organizing content, selecting assessments, and determining pedagogy (Danielson, 2007, p. 45; Popham, 2011).

We reference two a recent studies, both by Womack, Hanna, and Bell. The study was presented at the American Institute of Higher Education's 7th International Convention in Williamsburg, Virginia, in March of 2012, and was published in *The Journal of Administrative Issues* in 2012. These studies broke ground in finding relationships between lesson planning and teacher effectiveness, at least among pre-service teachers.

The first factor analysis of effective teaching by interns. As is likely the case in most teacher education units in the United States, our college of education uses an observation form for assessing teacher intern performance and for giving feedback. When the *Formative Observation and Intervention Form* was created several years ago, it was constructed so that items and domains had a great resemblance to the Pathwise evaluation (ETS, 1996). We obtained written permission from the Educational Testing Service before beginning to use it with our candidates out of respect for intellectual property rights. This form has become useful not only for assessing intern performance, but also for identifying the most salient elements of effective teaching. Put another way, "What is *really* being identified as being effective in my teaching?"

The effectiveness of teachers during classroom settings is rated as a category one, category two, or category three, depending upon very specific scoring criteria (ETS, 1996), with a category one denoting an unacceptable level of effectiveness. The assessment of teaching competency is thus a very authentic portrayal of teaching performance since a very minimal level of subjectivity is employed. In addition to the 19 heavily research-based items related to the Pathwise system, two items were added locally for administrative and pragmatic reasons: one under Domain A to denote total preparedness to teach, and another under Domain D about the candidate meeting professional responsibilities. Table 1 depicts the content of the Pathwise-like observation form.

Table 1

Item specification and split-half reliability for a performance-based assessment of teacher effectiveness.

Item
Subscale: Domain A, Organizing Content For Student Learning
A1. Demonstrates knowledge of students' backgrounds, awareness of diversity in planning lessons
A2. Prepare clear learning objectives appropriate for all students
A3. Connect past, present, future content
A4. Vary methods and materials for learning . . . developmentally appropriate
A5. Align learning goals with assessments . . . systematic, monitoring, diagnostic
A6. Total preparedness for teaching
Subscale: Domain B. Creating Environment for Student Learning
B1. Models and promotes fairness with and among all students
B2. Generates a working rapport with all students

B3. Establishes high realistic expectations for all students

B4. Exercises consistent, appropriate behavior management

B5. Construct safe environment beneficial to learning for all students

Domain C: Teaching for Student Learning

C1. Clear Goals & Instructional Procedures

C2. Makes content Comprehensible, Meaningful Engagements, Connections

C3. Encourage all students to Extend thinking, Questioning, Critical thinking, Creative thinking

C4. Monitor understanding, give specific Feedback, and Adjust for all students

C5. Use instructional time effectively, Effective pacing, Time on Task

Domain D: Professionalism

D1. Reflect on extent of goals met

D2. Initiates modifications, accepts responsibility, efficacy

D3. Build professional relationships, collaborates

D4. Parent/guardian communication

D5. On time, professional appearance, meets deadlines, follows policies

Odds-Evens correlation	0.967, N=416 obs.

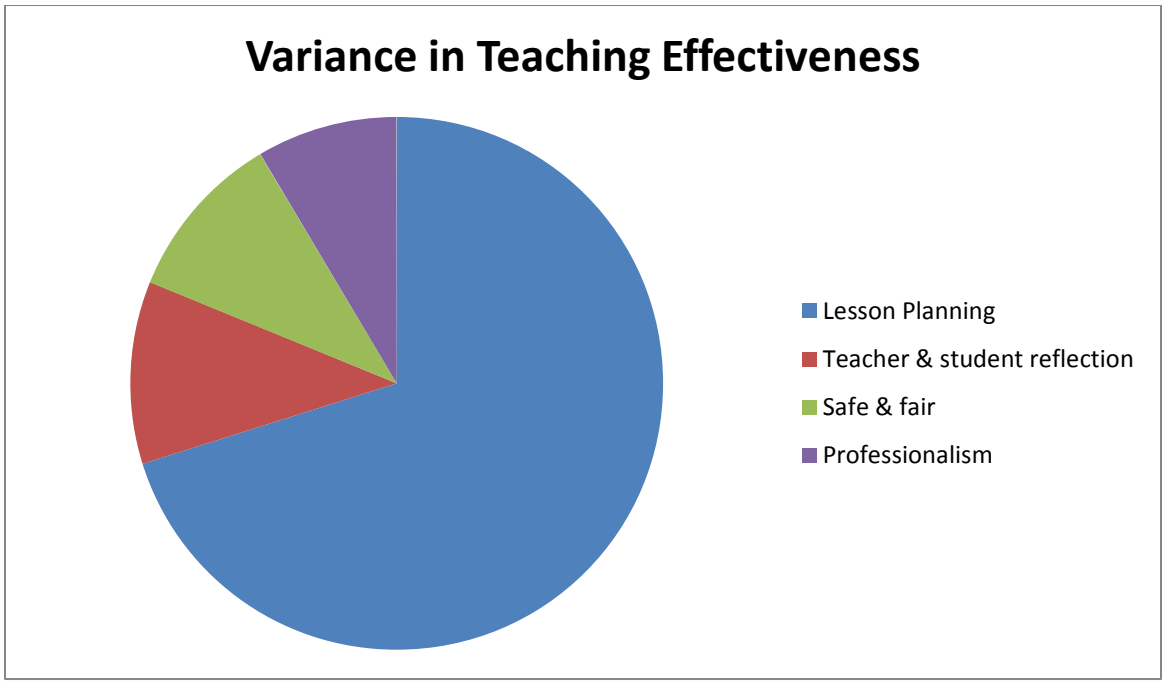
Note. Categories for each item were 1=Insufficiently motivated and insufficiently knowledgeable to perform in classrooms unless assisted 2=Sufficiently motivated and knowledgeable to perform and performs adequately appropriately in most classroom situations, meeting most learners' needs 3=Very well motivated, very knowledgeable about performance, and performs capably and flexibly in varied classroom situations with all learners

Participants were 63 early childhood, 9 middle level, and 58 secondary education interns, a total of 130 senior intern candidates. They were assigned to school campuses in the Western part of Arkansas, particularly along the I-40 corridor from Morrilton westward to the Arkansas-Oklahoma state line. All were assigned to accredited public schools and in content areas appropriate to their majors and expected licensures.

The observation form was used to collect data on 21 research-based items of teacher performance. Those 21 areas were grouped into four domains of (A) Organizing Content for Student Learning (B) Creating an Environment for Student Learning (C) Teaching for Student Learning (D) Teacher Professionalism. The initial factor analysis found four factors, but the four factors were not reflective of the domains by which the Formative Observation and Intervention form had been organized. Instead, the data from 416 observations of the 130 candidates of Spring 2010 indicated four factors: Lesson planning (41% of variance in teacher effectiveness scores), teacher and student reflection (6.5%), safe school environment (6%), and teacher professionalism (5%). Other communalities fell below the study's minimum Eigen value of one.

Figure 1

Four largest factors in teaching effectiveness (Womack, Hanna, & Bell 2012)



Results

In the present study, a second factor analysis was done, using the same data, to determine whether the *Lesson Planning* factor could be divided any further. The Statistical Analysis System suggested that there might be two sub-factors in lesson planning. The first, with a Eigen value of 6.79, accounted for 45 percent of the variance. The second accounted for only 8 percent of the variance and had an Eigen value of 1.2, barely above the Mineigen cut-off of 1.0. This raised questions about whether there actually was a second factor within the lesson planning factor.

Detailed regression analysis of effective planning practices by interns. Since *lesson planning* was the largest factor in our interns' effectiveness in teaching, we used stepwise regression to

determine, using the language of the *Formative Observation and Intervention* form, which items of lesson planning were most associated with our interns' effectiveness in the classroom. The 41% of the first analysis became the new 100% for this analysis. We used stepwise multiple regression in this second study to determine this (Table 2).

Table 2

Summary of Stepwise Selection of Praxis III-like items for Predicting Performance on Lesson Planning

Step	Variable entered	# vars. In	Partial R^2	Model R^2	F	Pr> F
1	D2	1	0.5974	0.5974	261.12	<.0001
2	D4	2	0.1776	0.7749	138.04	<.0001
3	C5	3	0.0766	0.8515	89.77	<.0001
4	A2	4	0.0413	0.8928	66.65	<.0001
5	A6	5	0.0239	0.9167	49.35	<.0001
6	C4	6	0.0199	0.9366	53.67	<.0001
7	C2	7	0.0137	0.9503	46.98	<.0001
8	A1	8	0.0133	0.9636	61.90	<.0001
9	C1	9	0.0087	0.9724	53.22	<.0001
10	B3	10	0.0064	0.9788	50.66	<.0001
11	B5	11	0.0056	0.9844	59.88	<.0001

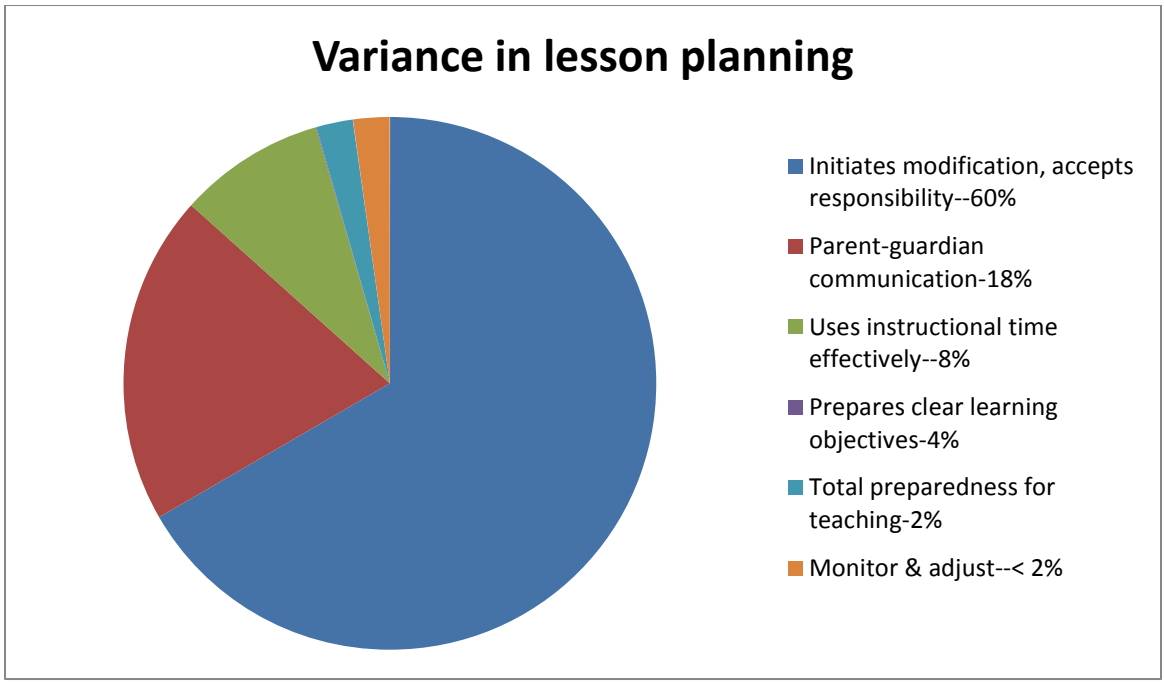
12	A3	12	0.0042	0.9886	60.00	<.0001
13	A5	13	0.0054	0.9940	145.95	<.0001
14	B2	14	0.0028	0.9968	144.72	<.0001
15	A4	15	0.0032	1.0000	Infty	<.0001

Several reflections were made after reviewing the data in Table 2. Specification of a second factor within the *Lesson Planning* one seemed spurious since 100% of the variance in intern teaching effectiveness was accounted for by the items correlated with Factor One. Lesson planning is a global and indivisible factor, although specific items used to asses lesson planning were identifiable.

Referencing the *Formative Observation and Intervention* data in Table 2, (1) accepting responsibility for initiating modifications stemming from knowledge of the learners, parent – guardian communication, using instructional time effectively and wisely, preparing clear learning objectives, and being globally prepared for teaching, were each more efficacious than monitoring and adjusting (Figure 2).

Figure 2

Factors in effective lesson planning



Initiating modifications, accepting responsibility, efficacy (Item D2) was the first and most substantial correlate (60 percent of the variance) with the lesson planning factor . Interns must know their learners well if they are to initiate modifications for them. They must be well grounded in the professional literature about diversity and must be able to recognize diversity in the classroom. They must accept responsibility for initiating modifications for atypical learners. Effective teachers must demonstrate the "I can make a positive difference" disposition.

Parent-teacher communication, accounting for 18 percent of the variance in the lesson planning factor, demonstrates the overall forward-looking dimension of the intern teacher. The intern who has planned adequately in terms of her learners and the content will have little reason

to dread contact with parents. Teachers who know where they are going in the subjects they are teaching will be much more likely to enlist support from parents than teachers who lack that sense of direction. The confidence that comes from adequate planning spill over into parent-teacher communication as well as into a number of other areas.

Uses instructional time effectively, effective pacing, time on task as a third correlate (R^2=8 %) is a natural outgrowth of adequate lesson planning. Teachers who are well prepared for the instructional moment will lead their diverse learners into the content almost all of over moment. There will not be substantial delays due to the teacher's lack of knowledge of the subject matter. There will be no delays from not having handouts, web pages, Power Points, or other learning aids ready. Students will be less likely to wander off task or to create time delays because they will be able to sense that the activities of the classroom are purposive and objective-driven.

Prepares clear learning objectives appropriate for all students (4 percent of variance in planning) is essential to focusing lessons. At first glance, the preparation of objectives might appear to be time-consuming and a mostly clerical exercise. Objective-writing is much more than a paper-work exercise. Clear learning objectives, once decided upon, determine the nature of assessments that will follow the exposition of new content. Clear learning objectives suggest a method or methods for teaching. Clear learning objectives determine the level (Bloom's) of cognitive thought expected from students.

Total preparedness for teaching is a descriptor that was prepared locally rather than being an item that was part of the original Pathwise-like instrument. The fact that it accounted for only two percent of the variance in overall lesson planning is reflective of the fact that the

other items enumerated above had already taken about 96 percent of the variance. *Total preparedness for teaching* is an item that helps in assessing a candidate's overall preparedness to teach on any given day.

Monitoring and adjusting, the sixth correlate with the planning factor, may be more highly esteemed by pre-service interns than experienced teachers. These data seem to bear out that dichotomy. Experienced teachers seem to rely less on their reflexes to solve problems and more on systematic, overall, global planning to keep them away from problems.

Discussion

The most productive way for our interns to demonstrate effectiveness and efficacy is to do an adequate job of lesson planning. If the planning isn't there, the old stand-by of "monitor and adjust" will be only one-thirtieth as effective as having accepted responsibility for planning and for making modifications for learners with diversities would have been. Preparation does not have to be long and arduous; it just has to *be there*.

How extensive does lesson planning have to be to "be there?" To obtain a qualitative perspective on this, we reviewed an English lesson plan from a finalist in the Arkansas Teacher of the Year competition. Then we reviewed a lesson plan from her intern (student teacher) who had been assigned to her and who was about to teach the same material about a contemporary Black author. What the experienced teacher noted in three sentences took the intern 2 ¼ pages, singled spaced, in Taskstream format. The intern's lesson plan received almost all perfect scores, and her lesson went well. The level of detail for her 30-plus year veteran supervisor was a lot less. Along with teaching experience comes the ability to "chunk"—to combine extensive and very detailed information into descriptive, very short titles.

The key issue for lesson planning is certainty—not exhaustiveness. The plan has to "be there," but it doesn't have to be inordinately lengthy. One assessment of whether lesson planning is adequate is to check whether the lesson can be delivered without halts or breaks in the delivery. The lesson plan exists to help the teacher know what to do next if there is a hesitation. If that goal is being met, and there is evidence that students are meeting the objectives, lesson planning is adequate.

One format for lesson planning that works well for our pre-service teachers is the Taskstream format. Taskstream (www.taskstream.com) is one of several software packages available for lesson planning. Taskstream can save time in helping teachers match what they are trying to teach to relevant state standards. The Taskstream format includes

- The author's name
- Grade level
- Subject
- Content, mapped to state standards (In Arkansas, the *Frameworks*) or national standards (Common Core)
- An objective or objectives, preferably with audience, **b**ehavior, conditions, and degree
- Learning activities and an estimate of the time required
- Closure
- Resources and handouts, if any
- Adaptations/modifications/interventions
- Technology integrated
- Assessment activity. This may include a brief rubric.

- Expectations for performance
- Reflection

The length of lesson plan that seemed adequate for pre-service teachers was typically a page and a half to two pages in Taskstream format.

Taskstream can save time in helping teachers match objectives to relevant state or national standards. Documentation is necessary for administrative purposes, but our research showed little variance accounted for the expenditure of large amounts of time in documentation beyond what was needed in addressing the elements above. At last word, a year-long subscription to Taskstream was $40.

Referencing the data in this study, lesson planning is most effective, and teaching is most effective, when the planning addresses the five items noted above.

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