Funding the Vision: The Relationship between Expenditure and Student Achievement in Seventh-day Adventist K-8 Schools in the United States

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Abstract

Although school resources are important in ensuring excellence and quality in schools, this study suggests that there is no relationship between per-student spending and achievement in Seventh-day Adventist schools. However, it was also determined from the study that a number of schools were inefficiently run: minimally acceptable results were not being achieved but the schools were spending excessive amounts of money on a per-student basis. To fund the vision for Adventist schools, some tough decisions must be made about resource allocation within and among schools. This project highlights a study that investigates the relationship between funding and achievement in Adventist schools.

Funding the Vision

The mission of Seventh-day Adventist education is to provide students with a learning environment that affords them opportunities to accept Jesus as their personal Savior. The vision for such an education system was articulated most succinctly by Ellen White, one of the founding members of the church: "[True education] prepares the student for the joy of service in this world and for the higher joy of wider service in the world to come" (White, 2007, p4).

The context in which this mission is being pursued brings many challenges to the fore, one of which is economic. The current global economic realities force the question: How do Seventh-day Adventists fund this vision for education?

The question was addressed in a research project that investigates the relationship between student achievement and school-level spending. Granted, academic achievement is only one of the products of Adventist education. There are mental, physical and spiritual aspirations

too. Following is an adaptation of the study that basically asks: Does money matter in Adventist education?

Introduction and Background

School finance literature is replete with studies that investigate the relationship between spending and student achievement (Becker, 2005; Biddle, 1997; Coleman, 1966; Colvin, 2003; Cotton, 1996; Elliott, 1998; Greenwald, Hedges, & Laine, 1996; Hanushek, 1981, Toutkoushian & Curtis, 2005; Wenglinsky, 1998). Some researchers have found positive relationships between the two variables while others found spending to have no effect on achievement. However, only few such studies have examined private schools, and no such study has ever been conducted on Seventh-day Adventist (SDA) schools.

Declining or flat student academic achievement scores in public schools (Epple & Romano, 1998) and increased school funding (Hanushek, 1981) have prompted speculation about how funding and achievement might be related. From 1965 to 2003, the federal government spent more than $242 billion to help educate children without a commensurate rise in student academic achievement (NCLB Parent Guide, 2003). Nelson & Gould (2001) report that the average total spending for public K-8 education in the United States grew at a rate of 5.7% per year during the decade of the nineties alone; that is 3.2% faster than salaries paid to teachers and 2.6% faster than the growth of inflation.

Private schools in general and Seventh-day Adventist schools in particular need be concerned about this trend to require more accountability from school administrators. The public's perception of the lack of funding is linked to poor student performance is well documented in Phi Delta Kappa/Gallup polls for at least six years (Bushaw & Gallup, 2008). The report consistently shows that the public perceives the lack of funding as the number one

problem facing public schools. And while public schools are consistently being outperformed by their private school counterparts, the gap is narrowing (Braun, Jenkins, & Grigg, 2006; Perie, Vanneman, & Goldstein, 2005).

Data Collection

The primary source of information for this study comes from the *CognitiveGenesis* (*CG*) research project, a comprehensive longitudinal study that assesses the effectiveness of Seventh-day Adventist education in North America. *CG* collects two types of data that are then merged for research analysis: survey data and test data. The *CG* research project produces, distributes, and collects surveys from students, teachers, administrators, and parents in Seventh-day Adventist Schools in North America and Bermuda. Test data include results from the Cognitive Abilities Test® (CogAT) and the Iowa Test of Basic Skills® (ITBS). School financial data required for this project was provided at the local level by respective school business officers and/or principals who self-selected to participate in the study.

Research Question and Methodology

The research question that was addressed to accomplish the purpose of this study was divided into two sections: composite achievement (and subscales) and composite achievement controlled for ability (and subscales). While achievement focuses on a student's mastery of content, ability measures developed skills. In addition, composite scores plus subscales for each section were also observed and tested. The following subscales were observed and tested: Reading, Language, Writing, Math, Science, and Social Studies. The primary research question for this study was: Is there a relationship between per-student spending and student achievement (and subscale scores) for Seventh-day Adventist K-8 schools in the United States?

Bivariate and multivariate analyses were conducted to address the research question regarding whether per-student spending is a valid predictor of a school's composite achievement as measured by achievement on standardized tests. Hierarchical multiple regression analyses were performed to assess the relationship between per student expenses, selected predictors, and the student outcomes. The variables were entered into the regression analyses in the various orders. Because a goal of regression is to find a parsimonious model that best explains the variance in the outcome (Kachigan, 1991), only variables found to significantly predict student outcome in the bivariate analyses were included in the hierarchical regression analyses.

Research Findings and Conclusions

In answer to the research question, the study found no relationship between per-student spending and each of the criterion variables. The conclusion here is that for an Adventist school with students who are performing poorly, spending more money as a school will have no effect on the student's achievement or ability.

Additional predictors were added to the tests of relationships: family income, mother's education, father's education, and student-teacher ratio, and the criterion (achievement) variables. Funding source was also added as a control variable. Mother's education, father's education, and student-teacher ratio did not add predictability to the regression models. This is not to say that these variables are not significant to the academic development of students. It simply means that what these variables cause to be available to students, and not the variables themselves, is related to student achievement. For example, a mother's education per se does not cause a student to achieve at higher levels; however, an educated mother is more likely to model the value of aiming for high academic standards for her children.

Family income was found to correlate with each criterion variable. This variable accounts for significant elements in the socio-economic status (SES) of students and have generally correlated positively with achievement (Bradley & Corwin, 2002). In fact, numerous studies have documented that poverty is associated with lower levels of school achievement (Alexander, Entwisle, & Dauber, 1993; Bradley & Corwyn, 2002; Duncan, Brooks-Dunn, & Klebanov, 1994; Escalona, 1982; Majoribanks & Walberg, 1975; Sirin, 2005). This finding supports the conclusion that the family's ability to provide learning enhancements for their students can positively influence achievement. Hence, it is reasonable to assume that a family's income, per se, does not cause academic excellence.

In the process of data analysis, a significant finding emerged: there are clearly some schools that are efficient and some that are inefficient. This finding led to the construction of an efficiency matrix to better understand how the intersection of per-student spending and achievement portends a school's efficiency.

An Efficiency Matrix

A scatter plot of the primary predictor variable (per-student spending) and the criterion variable (achievement) was constructed to visually observe the relationships that exist. The sets of variables were observed to be uncorrelated. Each data point on the scatter plot was then categorized into quadrants based on where they fell in relation to the respective variable means (see Figure 1). In addition to using the means of each variable to determine quadrants, an inner parameter was constructed to identify outliers in each quadrant. This resulted in four inner quadrants which included most schools and outliers of quadrants that depicted schools in the extremes of each quadrant. For the purpose of this study, an outlier is defined as "a value whose distance from the nearest quartile is greater than 1.5 times the interquartile range."

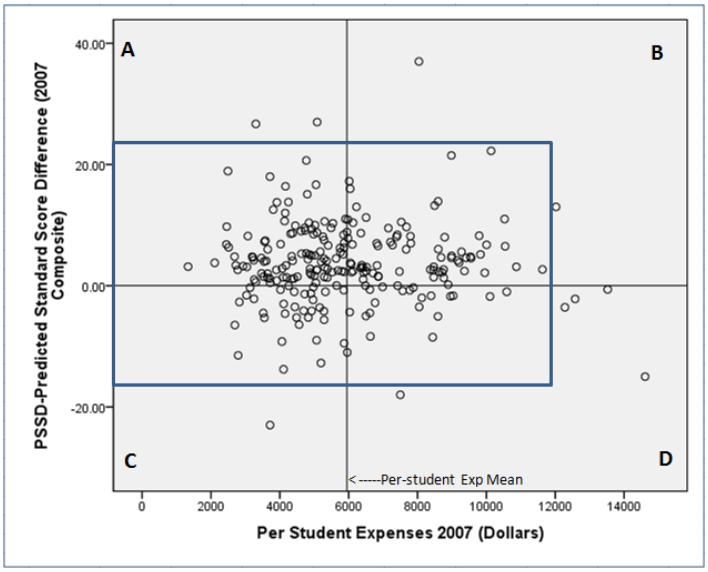

Figure 1-- Bivariate analysis of PSSD and per-student spending using quadrants in scatter plots

The following quadrants were identified:

1. Quadrant A - High achievement and low per-student expense

2. Quadrant B - High achievement and high per-student expense

3. Quadrant C - Low achievement and low per-student expense

4. Quadrant D - Low achievement and high per-student expense

Quadrant A schools have high achievement, with low per-student expense. These are the efficient schools; their students are doing very well and the cost to the school is low compared to the population under study. Efficiency, in this context, is an extremely important attribute because the input (money) is scarce and finite. Properly managed, inputs are conserved while an acceptable level of output is simultaneously maintained. By being efficient, minimal amounts of money is wasted.

Quadrant B schools have students with high achievement but the high achievement levels come at a high cost per student. This group could be concerning but it might be argued that they are getting what they pay for and it is supported in literature (see for example, Murnane, 1991). Quadrant C students are not doing well and the school does not spend much. With cost being

low, Quadrant C schools should not be satisfied with low performing students. They should focus on moving their students up the achievement axis while maximizing low cost options. The most curious grouping is Quadrant D schools: they are characterized as having students with low achievement but they have very high per-student spending.

Most schools are in Quadrants A and C, which indicates the efficacy of Seventh-day Adventist schools and the educational system in general. There are fewer schools in Quadrant B and most within that group are clustered close to the means of achievement and per-student spending. Most concerning are schools in Quadrant D. These are the inefficient schools that have high per-student spending and low student outcomes. Most of the schools in this category are clustered to the means of achievement and per-student spending. However, some are in the extreme areas where per-student spending is very high and achievement levels are very low. Schools that find themselves in the extremes of Quadrant D represent a disservice to parents and constituents and the truth about these schools addressed as a matter of utmost priority at the appropriate levels of administration.

Each quadrant was further tested for characteristics that could set them apart from each other. Except for Quadrant D that had a disproportionate number of large schools (72% large and 28% small), there were no other indentifying characteristics among quadrants. The characteristics investigated were size of school, number of students enrolled, number of teachers, as well as the secondary predictors (parents' education, teacher education, family income, and student-teacher ratio). It could be concluded, then, that inefficient schools are generally larger schools.

Linking Spending and Achievement

There is no doubt that the effort to connect spending to achievement is challenging. However, in order to better serve students, this connection should not be avoided. It is no surprise that the skillful allocation of scarce resources will be a preeminent task of administrators and policy makers. Fiscal responsibility is a valued trait of academic administrators, even within the Adventist school system. Research that informs policy in this regard should be encouraged.

Implications for Practice and Policy

These findings have significant implications for practice and policy within the Seventh-day Adventist educational system. Since per-pupil spending does not predict academic success, a discussion of efficiency is warranted. By definition, efficiency is the ability to achieve minimally desired results without extending exorbitant amounts of resources. In this context the question of efficiency is: Are schools achieving maximally desired results without wasting scarce resources? To some extent, the question can be answered in the affirmative for SDA schools. However, there are a number of schools (Quadrant D) that are clearly not being efficient; their students are achieving below average and they are outspending their counterparts on a per-student basis. The situation is most prevalent for schools that employ more than four teachers. In Hanushek's (1981) view, this is tantamount to throwing money at schools and hoping for improved performance.

As a matter of policy, schools should be required to compute an index of their spending relative to their students' achievement and make this information known to parents and constituents on an annual basis. This would require accountability of the administrators while providing a tool that parents could use to see if they are getting maximum outcomes for their input (tuition, subsidy, and philanthropy) dollars.

In an era of scarce resources and overall economic malaise, the issue of efficiency takes center stage. Funding the vision for Seventh-day Adventist education will require more than simply raising tuition, bolstering efforts to raise more philanthropic dollars, or even cutting expenses. Funding the vision will require school administrators to be wise and nimble at their resource allocation methodologies within and among schools. Tough decisions will have to be made with respect to inefficient schools: can these schools be channeled into being efficient or should they be closed and resources allocated to more efficient schools? What is the real cost of academic success? Funding the vision means being fiscally astute and being responsive to the implications of sound research findings.

Summary

There is no doubt that school resources are important in ensuring excellence and quality in schools. This study suggests that there is no relationship between per-student spending and achievement in Seventh-day Adventist schools. School resource allocation is one of many paths to student academic achievement, but it is an important one that should not be ignored.

It was also determined from the study that a number of schools were inefficiently run: minimally acceptable results were not being achieved but the schools were spending excessive amounts of money on a per-student basis.

The future of the SDA educational system will depend on church administrators instituting and enforcing policies informed by educational data, historical data, and quality research. Education is the engine that drives the goal of providing each student in a Seventh-day Adventist school with the necessary tools to live meaningful lives in this society and ultimately to discover a personal relationship with Christ.

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