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HANDBOOK OF RESEARCH ON TEACHING THE ENGLISH LANGUAGE ARTS

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The Consideration of Costs in Improving Literacy

HENRY M. LEVIN

Several decades ago, I courted a young woman who had latched on to the "new" feminism. We went on dates and enjoyed each other's company. But, she warned me there was no future because: "A woman needs a man like a fish needs a bicycle." At first I thought this was an item she was repeating from the Miller Analogy test, but I eventually got her point. From the perception of educators, there are probably no two subjects as distant from each other as the English language arts and economics. Nevertheless, just as I tried to convince my prospective paramour that the two genders were hardly as estranged as fish and bicycles, I will contend that the economics of education can be usefully mated with the English language arts.

In this chapter I will begin by providing a brief introduction to the challenge in choosing programs and interventions that might improve student learning in the English language arts. I will proceed to point out that program selection must be assessed not only by its effectiveness, but what it can achieve within a given cost constraint. I will then endeavour to provide a brief picture of why costs are important, how they can be measured, and how they can be used as one dimension of program choice. Finally, I will provide a presentation of costs of program interventions for struggling adolescent readers with some surprising results and the lessons that they might hold.

Why Worry?

Why worry about costs of programs? That is something that administrators and accountants do, and educational professionals try to avoid. Many professionals in the English language arts believe that their principal goal is to infuse school personnel and students with enthusiasm for and proficiency in the many dimensions of the English language arts. They wish to focus single-mindedly on empowering the young as critical readers, writers, listeners of and contributors to our common language.

Certainly, this is an idealized view of the world. Edu-

cational professionals have made a lofty commitment to education, and it is up to those who value what they can accomplish to fund it. Sadly, we cannot escape the fact that we live in a world of limited resources relative to demands. Not only do the English language arts compete with other subjects and school activities for resources, but education must further compete for resources with health care, housing, transportation, public assistance, defense, natural resources, the environment, justice system, and other public goods. And, in the larger sense, public activities compete for resources with the needs of families who must pay taxes to fund the public sector. Thus we are confronted with how to allocate available resources to a plethora of competing ends to obtain the highest level of wellbeing for society.

In the more limited framework of the English language arts we must seek to attain the best results with the resources that are provided to us. We may believe that the resources are inadequate and that expanding them is justified. But, whatever the resource limits that we work with, it is important that they be used most effectively. And, it is productive and efficient use of resources that is often the best argument for increased resources.

Pursuing this quest has two components. The first is that educators seek to develop and promote instructional approaches that are demonstrably effective. Much of this volume is devoted to that goal. It is clear that not everything works and that even among those interventions that are effective, some are superior to others in improving knowledge, use, and appreciation of the English language. We want to identify these strategies, focusing especially on the contextual conditions that promote results for particular approaches.

But, knowing that a particular intervention yields better results relative to the status quo or another intervention is not enough. One of the greatest flaws in educational evaluation policy has been recommending any alternative that seems to do better without consideration of costs. For example, a pioneering use of computer-assisted instruction

in the 1960s showed strong positive results on mathematics achievement for educationally at-risk students. On that basis it was recommended strongly as an educational reform. But, within the experiment were data that showed that additional teacher focus on the same mathematics goals could produce equivalent results for less than one fifth of the cost of this early version of computer-assisted instruction. Nevertheless, the evaluators argued for the use of computers over teachers. The fact that costs were not included in the article imparted a policy gloss to the computer strategy, despite the fact that it would have bankrupted most school systems.

Cost-effectiveness analysis compares not only the effectiveness of educational alternatives in terms of what they might achieve, but also the cost of obtaining such results. The goal of this approach is to ascertain how to obtain the largest educational impact for any given budgetary and non-budgetary assistance such as support from sources outside the schools. Cost-effectiveness analysis has only rarely been applied in educational policy, in part, because educational administrators and policy makers are not trained in the subject and, in part, because program and instructional decisions are often based upon ideologies and politics rather than costs and effectiveness. Nevertheless, the use of cost-effectiveness analysis in education is growing rapidly with a considerable number of studies emerging (Levin & McEwan, 2001, pp. 265–284).

Application to English Language Arts

The practice of cost-effectiveness analysis in the English language arts comprises a number of steps. First, it is important to consider goals and how they should be measured. For example, a school may perceive that its performance on a standard assessment of writing is lacking. If it accepts that system of assessment—and in some cases it will have little choice because of district or state adoption—it may seek ways to improve student writing within that format. Among the alternatives are the adoption of a new writing curriculum, training all subject matter teachers in how to assist students in writing assignments, computer-based approaches to writing improvement, increased writing requirements, and teacher professional development in writing instruction. These are only examples of the many possible alternatives that might be considered.

The second step is to consider the potential effectiveness of each alternative for improving the writing of the students in the school. Obviously, this will entail an evaluation of typical student challenges in writing as identified in both the external assessments such as analysis of results on district or state tests and in teacher evaluations of their own students' work. Detailed scrutiny of student writing may identify strengths and weaknesses of students on particular types of writing. This type of careful analysis can help to set priorities with regard to what specific needs should be addressed by the writing intervention with priorities given to the greatest challenges.

Data should be gathered on each alternative under consideration to ascertain its likely effectiveness. Of course, particular attention should be focused on addressing effectiveness of alternatives for the particular types of students in the school and particular areas of weakness. Information might be derived from research reports, experiences of districts with similar students who have adopted the intervention, and evaluations by independent agencies such as the What Works Clearinghouse, a federally sponsored effort (<http://ies.ed.gov/ncee/wwc/>). Although publishers and developers of specific interventions can also be sources of data, one must be cautious with their claims which are often self-serving and promotional rather than objective. A systematic analysis of the information should be assembled so that the probability of success of each can be viewed according to the same criteria, for example, those used in the rubric for writing assessment. A numerical rating system can be used such as a scale from 1 to 10 where 1 might be a ranking for no evidence of success to 10 where the evidence suggests high effectiveness on a criterion. These ratings can then be used to assess the probability of success in adopting specific writing interventions, either by adding the ratings for each alternative or possibly weighting those more heavily where the dimension is of higher priority. It is obvious that while some of the evaluation process can rely on relatively objective information, some must necessarily be subjective and based upon the theory of action behind interventions and the experiences of the educational professionals making the judgments.

In some cases it might be possible to project effectiveness from formal evaluations in the research literature which compare interventions using experimental or quasi-experimental designs (Shadish, Cook, & Campbell, 2002). Such evaluations are becoming increasingly available over time because of the importance given these methods in the research community. The What Works Clearinghouse considers only these types of evaluations in making its assessments of effectiveness.

Once one has obtained a comparative evaluation of the specific alternatives that are under consideration, one needs to evaluate their costs (Levin & McEwan, 2001). The proper method for evaluating costs of interventions is to assess what additional resources will be required and what their cost is in the marketplace. This cost analysis can answer two questions. (a) Which interventions can be implemented within the resources that are available? This is a feasibility question in determining if the costs can be accommodated. Those interventions that are substantially more costly than available resource provision need to be omitted from consideration or subjected to a major effort to obtain additional budgetary and other support to implement. (b) Which of the interventions is most promising in terms of effectiveness relative to its cost? That is, information on effectiveness of each alternative can be combined with cost to determine which alternatives promise the largest writing improvement per dollar of investment. Clearly, much more

can be accomplished by investing in programs that are highly effective relative to their costs than ones that have high costs relative to their effectiveness.

Determining Costs of Interventions

Although there is a common belief that the business office of a school district can identify the potential cost of an intervention, that is rarely the case. School accounting methods are designed for purposes other than the costs of instructional interventions. It is usually necessary for those considering program innovation to assist the business office and consultants with estimating the costs of alternative interventions as discussed in detail in Levin and McEwan (2001).

Fortunately, there are relatively simple tools to identify the resources and costs that are needed to implement reforms. The basic model used to evaluate costs of alternatives is what is known as the "ingredients method" (Levin & McEwan, 2001). The first step is to identify the "ingredients" or resources that will be required (Levin & McEwan, 2001, pp. 43–58). This must be done in a systematic way and entails participation by both school and district staff. School leadership and teachers need to understand what it takes to implement the reform. Most of this type of analysis can be done by using a financial spread sheet such as EXCEL. Personnel positions are listed according to their qualifications and the portion of time that will be needed. At the same time it is important to begin to identify where these personnel will come from. Will substitute teachers be needed to free-up time for professional development and teacher discussions and deliberations? If so, how many positions will be needed and with what qualifications?

Facilities needs and specific furnishings and equipment are also identified. If additional classroom space is needed for reductions in class size, that space should be specified. If computers, software, instructional materials, and other equipment are required, these also need to be specified. Ultimately, all of the ingredients will be listed with sufficient detail on qualities and characteristics. The compiling of the needed ingredients is important for developing a complete list of resources associated with the intervention. It also gives school and district personnel a better understanding of planning needs and enlists broader support in obtaining resources. Specific sources of information in identifying ingredients include the descriptive materials on the reform and interviews with the sponsor or developer of the intervention; articles and reports on experiences of other schools in adopting the intervention; and observations and interviews (often by email or telephone) with personnel in other schools or districts that have adopted the intervention.

The second stage in using the ingredients method is to determine their costs. These methods are well-developed in the literature (Levin & McEwan, 2001, pp. 59–76). A complete listing of the ingredients and their costs will provide an estimate of the overall cost of the intervention. This step also clarifies the resources that must be in place to promise success.

With systematic estimates of costs of the different types of interventions, it is possible to compare these with their predicted effectiveness. Those with the highest effectiveness per unit of cost are those that should have priority for consideration. However, when cost-effectiveness among alternatives does not differ substantially, it is important to bring other considerations to bear as well. For example, schools might consider issues of implementation, differences in the ability to accommodate specific alternatives and use them effectively. Clearly, if teaching staff have specific skills and professional development experience that is supportive of some of the alternatives, this should be taken into account.

Costs of Programs for Struggling Adolescent Readers

One of the pressing challenges for educators in the English language arts is the challenge of low adolescent literacy and struggling readership. The Carnegie Advisory Council on Advancing Adolescent Literacy has studied the challenge of improving adolescent literacy and has found a large number of interventions that address that goal (Deshler, Palincsar, Biancarosa, & Nair, 2007). The purpose of the Carnegie effort was to assist school decision makers and schools to select strategies to improve literacy among their students.

To demonstrate how costs might be assessed in making these decisions, Levin, Caitlin, and Elson (2007) used the method described above to estimate costs for three proposed interventions: Read 180, Question the Author, and Reading Apprenticeship. Because of space limitations here, the reader should refer to the backgrounds and descriptions of each of these approaches in Deshler et al. (2007) which also comprises reviews of evidence on effectiveness. Detailed reviews of evidence are also found in Slavin, Cheung, Groff, and Lake (2008) and Shanahan (2005) illustrating that different studies of the evidence may draw somewhat different conclusions. Many of the interventions that are reviewed use cooperative learning or computers, curriculum reform or specific instructional approaches. From the perspective of resource use, a common element found across many of the interventions is increasing instructional time on reading to 90 minutes a day and limiting reading groups to no more than 15 students. These substantial increases in time devoted to reading in combination with large reductions in the size of reading groups could account for most of the gains in effectiveness, despite the fact that advocates herald the other features of their interventions as accounting for the gains.

For estimating costs we sought information from program developers, program reports, and interviews with school personnel at both district and school sites. From these we assembled ingredients lists for the interventions and national costs for each ingredient. These were converted to cost per student for the intervention at each site as well as costs based upon the recommended ingredients of the developer or publisher.

Read 180 Read 180 is a widely used intervention sponsored by Scholastic. Lessons consist of whole group, small group,

and individualized literacy instruction. During whole group instruction teachers read aloud, engage students in shared and choral reading, and model fluent reading and the use of reading strategies. The class is then divided into three groups that rotate through three reading stations: small group instruction, computerized instruction, and independent reading. In small group instruction, the teacher gives more personalized reading instruction to a small group of students. At the computer station which has access to Read 180 courseware, students receive individualized instruction via a program that advances to new text only after students demonstrate mastery in fluency, word recognition, spelling and comprehension. Read 180 recommends a minimum of 90 minutes a day devoted to reading and reading groups no larger than 15, both requiring substantial additional resources.

Ingredients were compiled for three Read 180 sites with considerable assistance from school personnel at these sites, and costs were evaluated in detail (Levin, Caitlin, & Elson, 2007). The cost per student at the three sites varied widely from the estimate of about \$1,100 per student that we constructed from the developer's ingredients recommendations. At the three sites the costs varied from \$285 per student to \$611 to \$1,514 per student. Differences were mainly due to differences in implementation and the extent of modifications in time devoted to reading instruction and reading group size. The low cost site lacked the available resources to adopt the smaller groups and greater reading time recommendations.

Questioning the Author Questioning the Author is a professional development program developed by Isabel Beck, Margaret McKeown and colleagues at the University of Pittsburgh that aims to equip teachers with new tools for engaging students in text and curriculum (Beck, McKeown, Sandora, Kucan, & Worthy, 1996). Students are taught to attempt what an author is trying to express to construct a representation. It does not require additional materials or modifications to the school day. Because there are very broad guidelines for class size and no recommendations for period length, it is extremely unlikely that schools will hire additional staff for the express purpose of implementing QTA; however, it is suggested that a minimum of two teachers per school are trained so that they can plan lessons and provide support to each other.

We were able to obtain detailed information from only a single site. Almost all of the cost is attributable to professional development, a relatively low cost ingredient when compared to additional personnel to reduce group size and obtain more reading instructional time. The cost of ingredients for the developer's recommendation was only \$11 per student per year. The cost at the site was about \$35 per student reflecting investment in more professional development time than the developer requires.

Reading Apprenticeship Reading Apprenticeship (RA) was developed by the research and development organization, WestED, an intervention that trains teachers to think

and teach in a new way (Jordan, Jensen, & Greenleaf, 2001). Subject-area teachers attempt to inculcate among their students the skills and strategies that expert readers of their subjects use. There are no facilities or equipment costs associated with implementation nor instructional time nor group size requirements. The program is delivered by the existing content-area teachers in their content-area classes. While the personnel costs for teachers do not change with RA, the program does incur costs for the time of school and district level administrators.

The developer did not have a specific estimate of ingredients, so we relied on our evaluators for the two sites using RA. Both sites had very low costs consisting primarily of the costs of administration and coordination and professional development. At one site the annual cost per student was only about \$9, and at the other \$31.

Some Conclusions

The policy implications of costs and cost differences of interventions for an English language arts program or intervention are fairly obvious. Differences in costs among interventions are enormous, from about \$9 per student to more than \$1,500 per student. Even within interventions, site-based costs can differ by large magnitudes. It is rare that differences in effectiveness among interventions vary so substantially. Moreover, the differences in resource implementation are substantial, raising questions about whether the effectiveness of a "model" implementation should be generalized to all sites and situations without consideration of resource use.

It is clear that differences in costs among interventions must be taken account of rather than simply examining effectiveness ratings. By no means does this suggest that costs be considered in the absence of educational impacts. Costs and effectiveness need to be considered jointly. But, Questioning the Author and Reading Apprentice account for only 1%–3% of the estimate of more than \$1,000 per student for Read 180 based upon the ingredients required by its developer. Even if Read 180 were 10 times as effective overall as these other two interventions (and we have no such evidence), the difference in costs would make it considerably less effective per dollar of cost. Costs and effectiveness must be considered jointly in making professional and policy decisions in the English language arts as in other areas of education if we are to use resources in their most effective manner.

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