Technical Support, Fidelity, and Retaining Direct Instruction in the Guam Public School System

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A large body of evidence has shown that Direct Instruction (DI) programs result in significant increases in academic achievement for students and that the benefits are most likely to occur when teachers are well trained and implement the programs with fidelity. Fidelity of implementation, and the associated increases in student achievement, are more likely to occur with extensive technical support, including on-going training and coaching (Benner, Nelson, Stage, & Ralston, 2010; Carlson & Francis, 2002; Gersten, Carnine, & Williams, 1982; Gersten, Carnine, Zoref, & Cronin, 1986; Ross et al., 2004; Stockard, 2011).

While the relationship of training, coaching, and fidelity of implementation to student achievement is relatively well documented, much less is known about the ways in which these variables are related to the decisions of schools to maintain Direct Instruction programs. This brief report begins to bridge this gap by examining the relationship of technical support and implementation fidelity to decisions regarding the retention of DI programs by schools in the Guam Public School System. It was hypothesized that schools with more extensive technical support would have better implementation fidelity and that schools with better implementation fidelity would be more likely to continue using the program. The analysis described below provides strong support for these hypotheses.

Background and Methodology

In the fall of 2003, 24 of the 25 Guam Public School System elementary schools that were then in existence began systematically implementing Direct Instruction with training and implementation support from the National Institute for Direct Instruction (NIFDI). A five day in-service for all teachers, administrators, and teaching assistants was held in the summer of 2003, before the first year of implementation. Beginning that same year, a Guam-based DI specialist, affiliated with NIFDI, provided general support and "trouble shooting" services to all the schools, working with building administrators to help support the implementations at their sites. In addition, schools were provided NIFDI-based consulting services to help teachers implement the program with greater fidelity within their classrooms, including support such as modeling, coaching, and further training. However, the amount of support varied across the system. Six schools received twenty days each year in direct consultation services, which is described as "extended support" in the discussion below. The other schools received only six days of services each year.

The NIFDI personnel involved with training and implementation support reported varying levels of commitment and implementation of the Direct Instruction model across the schools in the system. For instance, some administrators did not attend the pre-service sessions, and the extent of administrative support and acceptance of the approach was reported to vary from one site to another. A consulting firm, unaffiliated with NIFDI, examined the implementation in 2008. Based on multiple observations they reported ratings of schools in three areas: 1) the quality of implementation, including elements such as the nature of school leadership, following the model, accountability, stability of administration and reading coordinators, and quality of peer coaching; 2) the quality of instruction, reflecting acceleration of students, accountability, and teaching to mastery; and 3) the quality of lessons, defined as appropriate pacing and lesson coverage given the time allotted. Results were reported for the end of the third, fourth, and fifth years of implementation (2005-06 to 2007-08) for the quality of implementation and instruction and for the fourth and fifth years for the quality of lessons. Schools were assigned a numeric score indicating whether they were in the top, middle, or bottom third relative to other schools in the district in a given area and year. The evaluators stressed that a top ranking should not be construed as indicating that a school met all the model requirements, but simply that their performance was better than that of other schools in the system (Robinson, Towner, Caros, & Billups, 2008). For this analysis, the fidelity scores across areas and years were averaged and schools with average scores greater than 2.5 (n=6) were compared with those with lower scores (n=17).[1]

In the fall of 2008 fifteen of the schools stopped using the program, while nine continued to use the programs and work with NIFDI. The associations between the amount of technical support, implementation fidelity, and the decision to retain DI were examined with cross-tabulations and three statistics: odds ratios, gamma, and Fisher's Exact Test. Odds ratios are often used as effect size measures with dichotomous variables. As described more fully in the example in footnote 2 below, the "odds" report the relative chance of one or another event occurring and the "odds ratio" compares these probabilities or odds across two groups or categories. An odds ratio of 1.0 occurs when there is no relationship between variables. Gamma is a measure of association used with categorical variables that varies from -1.0 to +1.0. Zero reflects no association, and higher absolute values indicate stronger associations, with the sign depending on the coding of the attributes. Fisher's Exact Probability is an inferential test appropriate for small samples and dichotomous variables. Values indicate the probability that a relationship would occur by chance.

[1] Fidelity data were not available for one of the 24 schools and it was omitted from the analysis that follows. Data were combined across years and areas measured because the of the high correlations across the areas and years.

Results

The results supported the hypotheses. Schools with more extensive support had, as expected, higher levels of fidelity. Of the six schools that received extended NIFDI support (20 days a year), four had higher fidelity scores. Among the other 17 schools with data, only four had higher fidelity scores. The odds of a school having higher fidelity was 2.0 for those with extended support, but only .31 for those without such support, resulting in an odds ratio of 6.45.[2] In other words, *the odds of a school having higher fidelity was over six times as great for those with more extensive support than for those without extensive support.* The measure of association, gamma, for the relationship of extended support and fidelity was .73, and the one-sided Fisher's Exact Probability (one sided) was .08. Thus, all three statistical techniques provided strong support for the hypothesis that more extensive technical assistance would be related to higher levels of implementation fidelity.

Schools with higher fidelity were more likely than schools with lower fidelity to continue to use DI. Of the eight schools with higher fidelity scores, six retained the model; while of the 15 schools with lower scores, only three retained the model. The odds of a school retaining the model were 3.0 for those with higher fidelity, but only .2 for those with lower implementation fidelity, resulting in an odds ratio of 15. In other words, the *chance of a school retaining the DI model was fifteen times as great for those with high fidelity than for those with low fidelity*. The measure of association, gamma, for the relationship of fidelity and retaining the model was .85, and the one-sided Fisher's Exact Probability was .02, again indicating a very high degree of association.

Summary

Numerous authors have highlighted the key role of technical assistance in promoting teachers' skills and their fidelity of implementation. The literature increasingly recognizes that teaching is a highly technical and involved process. It also describes the ways in which training and support are crucial for developing and honing excellent teaching skills. Studies suggest that this assistance should be ongoing and intensive, ideally involving on-site support (Berends, Bodilly, & Kirby, 2002; Blakeley, 2001; Bodilly, 1998; Bodilly, Glennan, Kerr, & Galegher, 2007). Such support may be particularly significant for programs, such as Direct Instruction, that require more extensive changes in teacher behavior (Engelmann &

[2] For this example the odds were calculated within each category of support by dividing the number of schools with high fidelity by the number of schools without high fidelity. For those with extended support, 4/2 = 2.0; for those without extended support 4/17 = .31. The odds ratio is the ratio of the odds of the two calculated odds, in this case comparing the probability of high fidelity for schools with more extensive support and those without extensive support: 2.0/.31 = 6.45. In other words, the probability of a school having high fidelity ratings was 6.45 times as great for those with more extensive support than for those without such support.

Engelmann, 2004). A high level of involvement by the program developers may be especially important in promoting effective outcomes (Fixsen et al., 2005).

The work summarized in this short paper supports this literature. The schools that received extended on-site support from NIFDI, an implementation support organization founded by the developer of Direct Instruction, had implementations that were of higher quality, with significantly higher levels of fidelity to the DI model. The results also extend this literature by showing that more extensive technical support and higher fidelity appear to promote greater commitment to continuing to work with the DI model. The schools that had more support and higher fidelity of implementation were significantly more likely than other schools to retain the model in later years.

The present study was limited by having only aggregate level data, and future researchers could explore these relationships in much more detail. Focusing at the organizational level, researchers could examine the ways in which variations in technical support influence the decisions of schools and districts to retain or change instructional programs and variables that might intervene and help explain this process. At the classroom level, researchers could examine the relationship of technical support and fidelity of implementation to variables related to teachers' sense of efficacy and work satisfaction. Given the importance of helping schools maintain adherence to effective curricula, such work is, no doubt, going to be increasingly important.

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