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Center on Innovations in Learning

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Plans are only good intentions unless they immediately degenerate into hard work. (Peter Drucker)

Ever since the 1957 Soviet Union's launch of Sputnik, it seems the United States has been in a constant state of school reform. That event galvanized the United States to enact reforms in science and engineering education (Powell, 2007), to be followed over the years by a dizzying array of "innovations" in instructional practices (teacher-led, child-centered, Response to Intervention, evidence-based), in structural innovations (small schools, small class sizes, classrooms without walls, charter schools), in personnel preparation (extra years of training, alternative routes to credentials), and in accountability (pay for performance, value-added modeling, changing evaluation procedures). Yet the student achievement data have remained remarkably flat since the 1970s (National Center for Education Statistics, 2011). During this time, educators have seen reform initiatives quickly come and go; researchers have estimated that the average life span of an educational innovation is only 18–48 months (Aladjem & Borman, 2006; Latham 1988). Each of these reform efforts represents an attempt to solve an educational problem. Despite strong evidence of effectiveness when evaluated in research settings, many of these so-called innovations often returned disappointing results when taken to scale. The problem may be not in the innovations themselves but rather in the manner in which they have been implemented (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005).

Generally, educators adopt educational reforms because they are seen as advantageous, producing either greater benefit to the student (Martens, Peterson, Witt, & Cirone, 1986), equal benefit as current practice but requiring

less effort, or equal benefit but more acceptable by being more positive and constructive.

Recent reform efforts include the use of evidence-based interventions to solve educational problems (Coalition for Evidence-Based Policy, 2003). For the promise of the evidence-based reform movement to be realized, the recommended practices will require high-quality implementation. Regrettably, many reform practices do not meet the standards required to consider them evidence-based or to support their claims of effectiveness. To create true change in the effectiveness of schooling, educators must adopt, implement, and scale up only practices that are evidence-based. Not only do school officials have a fiduciary responsibility to spend taxpayer dollars on practices that have evidence of effectiveness, they are ethically bound to provide students the best chance of success. Otherwise, widespread implementation is nothing more than a large research project.

Evidence-based practices selected for implementation constitute an intervention. In this chapter, intervention refers to *any systematic effort to change behavior at any level of the system*. For example, instructional curricula are interventions, as is training staff to implement a curriculum. Providing feedback to principals about how well their schools are performing is also an intervention. This chapter will review what is known from the growing field of "implementation science" that can contribute to high-quality implementation of innovative, effective practices at scale.

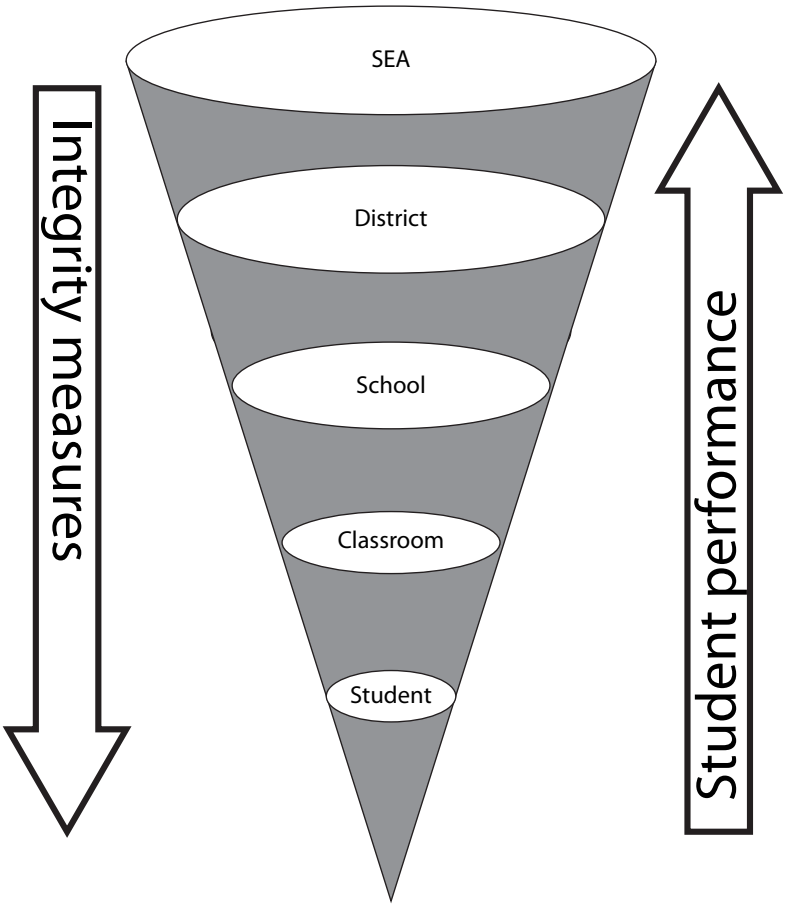
A Framework to Guide Implementation

It is axiomatic that student outcomes are significantly influenced by the quality of the teacher and the classroom environment. Students do well when the teacher is skilled and has created a constructive learning environment. An extension of this logic can only conclude that the school team, the principal, the district, and the state education agency (SEA) are successful to the extent they create supportive functional environments for those operating at lower levels in the system. The ultimate criterion for success is student achievement. Figure 1 describes the interdependence of the different levels in an educational system.

In Figure 1, the student is the focal point of all activity for the other levels in the system, with the student's performance conceptualized as a motivator for change. Viewing student performance in this way affects implementation in two major ways: (a) student underperformance can initiate change; and (b) change initiatives can be evaluated by how they affect student performance. All activities across all levels of the system can be informed by the answer to one critical question: What is necessary for each student to succeed?

Scaling up an innovation is a significant undertaking, requiring many levels in the system to alter the way they do business. As a result, in many instances, reforms intended for students never reach the classroom intact (Brown, Hess,

Figure 1. The Interdependence of the Different Levels in an Educational System



Lautzenheiser, & Owen, 2011), the result of a breakdown in the implementation effort somewhere between the initiating agency and the classroom. Viewing the educational system as an ecosystem highlights the need for all parts of the system to be organized to support the implementation effort. Alignment (i.e., when policies, practices, and goals within a system are organized to facilitate action at other levels of the system, in the service of the same goals) must occur, or the reform effort will not be implemented with fidelity, produce the desired results, or be sustained.

When an innovation is introduced into a system, it is necessary to evaluate its impact. Many of the difficulties associated with implementing innovations in the classroom can be successfully addressed by employing a data-based, decision-making approach in which *all* activities are evaluated for their impact on student outcomes. The data derived from measures of implementation give context and meaning to the data about student performance. That is, understanding student performance data also requires data on how well interventions are implemented in the classroom and how well teachers are supported in their implementation

by training, coaching, and constructive feedback. In our multitiered educational system, measures of student performance that can be aggregated into increasingly larger units for higher levels in the system and measures of the quality of implementation at each level are two key features of data-based decision making in implementation.

A broad view of the use of data within systems of education is shown in Figure 1. Data about student achievement are collected at the level of the individual student and classroom and flow up from the student through the various levels of the system to the SEA. Data about the quality of implementation are generally collected at a level above the one responsible for implementation; data flow down the levels in the form of performance feedback to the responsible persons. When this occurs, the system is aligned and working towards the same outcomes. From a top level, SEAs support and evaluate districts' efforts at implementation and understanding performance data, while districts support and evaluate school implementation efforts. When data systems are organized this way, any misalignment between levels can be identified and corrected. For example, if student progress is lacking and data indicate a subpar implementation, a review of the data regarding the training, support, and the sufficiency of the support plan for the teachers can be used to inform system improvement.

The research on implementation indicates that even initially high-quality implementations will deteriorate over time without feedback about performance.

In all cases, the support plan needs to include performance feedback. An extensive literature supports this practice as a means of enhancing the quality of implementation in classrooms and schools (Bartels & Mortenson, 2005; Burns, Peters, & Noell, 2008; Mortenson & Witt, 1998; Myers, Simonsen, & Sugai, 2011; Noell et al., 2000). The research on implementation indicates that even initially high-quality implementations will deteriorate over time without feedback about performance. For example, Newton and colleagues (2009) noted that school-based, problem-solving teams trained to use a specific protocol for decision making will begin basing choices on unalterable and irrelevant variables if they are not provided feedback about how well they are following the protocol.

If data suggest that the teachers are implementing with integrity and that the teacher training and support plan, including performance feedback, are sufficient and being implemented with integrity but student performance does not improve, then it may be reasonable to conclude that the intervention is not effective in a particular context. Some interventions are simply not appropriate for some settings due to the mismatch between the requirements of the intervention and the resources and capacity of the setting. If high-quality implementation cannot be achieved or can be achieved only at great cost, then it may be necessary to abandon the innovation. A careful evaluation of the research base of any

given intervention should preclude most discordant applications. Nevertheless, changes in contextual factors—demographics, for example—may impact any intervention, so once a highly successful implementation is achieved, its effects on student performance must continue to be reevaluated.

The Science of Implementation

"Implementation science" is an emerging field that studies how changes are successfully introduced and implemented within a system. Just as the movement toward evidence-based practices derived from medicine, the systematic study and experimentation of implementation variables also started there (Carroll et al., 2007) and has now moved into education. Currently, the primary methods of analysis for studying the implementation process—both descriptive and experimental methods—are maturing, yet there is much useful information to be gleaned from the data so far (Rubenstein & Pugh, 2006).

Implementation refers to the set of activities that are necessary for an innovative practice to produce desired outcomes (Fixsen et al., 2005). The benefits are most likely to be accomplished by implementing with integrity, that is, with a consistency of values, actions, methods, measures, principles, and, ultimately, outcomes. If a practice—all, not just certain features of it—is not implemented with integrity, it could be argued that it has not actually been implemented. Furthermore, implementation is not complete until the innovation has become routine practice within a school or district and new hires continue to implement it (Coburn, 2003). Since teacher turnover data indicate that almost 50% of teachers leave the profession within 5 years of entry (Heyns, 1988) and Fixsen and colleagues (2005) estimate at least 4–5 years to fully implement an innovation within a system, many teachers will not see the full implementation of an innovation. If an intervention is to be sustained, additional "generations" of teachers will be responsible for implementation. As generations of teachers enter the system, a culture and an infrastructure must be established to support their integration.

So how does an innovation get "fully implemented" within a system? Two approaches have been described to characterize implementation efforts: *letting* it happen and *making* it happen (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004). Given the importance of education, "making" an effective implementation happen is the necessary choice. But how? Rogers (2003) argued that the diffusion of an innovation is a function of social processes more than a matter of its features (counter to the proverbial notion "build a better mousetrap, and the world will beat a path to your door"). Rogers (2003) suggested several guiding principles for the effective diffusion of innovations:

a. The adoption rate of an innovation is a function of its compatibility with the values, beliefs, and past experiences of the members of a social system.

b. Innovations have to solve a problem that is important for the person who is expected to adopt it.
c. The innovation must have a relative advantage over the current practice.
d. It is necessary to gain the support of opinion leaders within the social system if the adoption of the innovation is to reach critical mass and become self-sustaining.
e. The innovation is perceived as being simple to understand and implement.
f. The innovation can be implemented on a small, limited basis before being broadly adopted.
g. The benefits of innovation are observable to others.

Seven Principles of Successful Implementation

The next sections consider supporting evidence for Rogers's (2003) principles and describe how these principles can guide "making implementation happen." Throughout this section of the chapter, schoolwide positive behavior support (SWPBS) will be used as an example of thoughtful, systematic implementation and scaling up. SWPBS has been developing and evolving over the past 30 years. Initially, it was implemented in one school in Oregon; now it is used in approximately 16,000 schools nationwide.[1]

A key feature of SWPBS is its emphasis on data-based decision making and development of the internal capacity of the school to solve its own problems. School leadership teams lead the development of interventions and evaluate their impact. The primary measure of effectiveness is changes in office discipline referrals (ODRs). In addition to measuring student behavior, school data are routinely reviewed by administrators or consultants to determine the quality of implementation.

Principle A: Insure Compatibility With Values, Beliefs, and Experiences

Fixsen and colleagues (2005) have proposed a model of the stages of implementation in which adoption is one of the earliest stages. In many instances, programs are adopted at one level of a system (administration), but if a program is not adopted and accepted by those directly responsible for its implementation, the probability of effectiveness and sustainability are very low. Several authors have argued that educational innovations are more likely to be adopted/accepted if they fit well with the culture of a classroom or a school (Albin, Lucyshyn, Horner, & Flannery, 1996; Detrich, 1999; Kealey, Peterson, Gaul, & Dinh, 2000). Several factors are associated with acceptability (Elliott, 1988), including, for teachers, an intervention's agreement with their view of what constitutes effective instruction or behavior management, the time required to implement it in the classroom, and its perceived ease of implementation. Teachers are more likely to agree to implement interventions if they feel they have the skills and

[1]For more detailed information on SWPBS and its methods of behavior management at the school-wide level, see Sugai and Horner (2009).

resources necessary (Elliott, 1988). The data on acceptability illustrate that adoption of an innovation is often less about the scientific evidence of its effectiveness and more about the social acceptability of an innovation, its fit with current practices, the ease of transition and support available, and the consequences of not adopting.

Since the adoption of an innovation and implementation fidelity are influenced by many variables, the introduction of a comprehensive data-based decision-making system into a school or district requires a systematic implementation. When decisions are based on data, the relevant data must be presented in a format that decision makers will use. The function of streaming data up and down the educational system, as depicted in Figure 1, is to provide feedback about the effects of the innovation on students and the effects of the support activities on staff. If the data are to function effectively as feedback, then they must be displayed in a manner that is most likely to get the decision makers to interact with it. One of the considerations of data presentation is the users' preferences about how it will be displayed (Hojnoski et al., 2009). Easton and Erchul (2011) report that educators have preferences about the frequency and the format (graph, written summary of data, face-to-face meetings) of feedback. High-quality implementation of data-based decision making requires interaction with the data. Preferences of the users of the data must be identified and feedback loops developed that match those preferences as much as possible.

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Principle B: Innovation Must Solve a Problem for the Implementer

High-quality implementation is partially a function of the perception of the intervention as solving a problem important to those implementing it (Rogers, 2003). Further, if implementers do not experience a benefit from the intervention, they are unlikely to continue using it (Gingiss, 1992). For example, quick, credible measures of student learning (such as curriculum-based measures, or CBMs) are one way for teachers to perceive the early stage effects of an intervention, just as a scale provides feedback about weight loss before clothes fit differently. CBMs provide timely feedback to teachers, allowing adjustments to the instructional practice and real-time evaluation of its effectiveness. This short cycle of analysis helps implementers to have an indication of effects in time to change practices if necessary. At other levels of the system, data on the quality of implementation provide early feedback about the likelihood of positive student outcomes. By routinely monitoring the quality of implementation across all levels, corrective actions can be taken before student data indicate a problem.

In SWPBS, at least 80% of a school's faculty must identify behavioral problems as one of their three top concerns and commit to working on behavioral issues for at least 3 years; only after these conditions are met will external coaches begin implementation of the SWPBS systems (McIntosh, Horner, & Sugai, 2009). This commitment is established after meetings with school administrators and faculty to describe what SWPBS is and what will be required of the school personnel. Teachers often consider behavior problems to be one of their greatest concerns; however, reaching agreement on how to manage them has proven elusive. Perhaps one of the features of SWPBS that makes it attractive to school personnel is its positive reinforcement of socially desirable behavior, a method rated more highly than negative, consequence-based interventions (Elliott, 1988; Miltenberger, 1990). SWPBS addresses the problem in a way consistent with the values of the teachers responsible for implementation.

Principle C: The Innovation Must Have an Advantage Relative to Current Practice

Any time teachers are asked to adopt and implement an innovation, they are being asked to replace an existing practice. Harris (1979) has argued that cultural practices are adopted and maintained to the extent that they have favorable outcomes at a lower cost than the alternatives. If teachers perceive no advantage to a new program or practice when compared to the current practice, they are unlikely to adopt it. This principle is related to but distinct from Principle B above. It may be that a proposed innovation solves a teacher-defined problem, as exemplified in Principle B. But if that innovation requires (costs) so much effort that its benefit is negated, it has no advantage over the existing "solution." Such inadequate advantages are likely to occur when the intervention does not directly affect the teacher. For example, teachers do not directly experience the consequences of students failing to make adequate progress in reading in the same way that they experience the effects of poor behavior management practices.

One of the ways that an innovation has an advantage over an existing practice is the reduction in effort required to implement it. Several studies demonstrate the effect of effort as a variable in adopting an intervention (Martens et al., 1986; Martens & Elliott, 1984; Witt, Witt, & Martens, 1983). Demands on time can be conceptualized as a dimension of effort. Teachers frequently cite lack of time as a primary reason for failing to implement an intervention with integrity (Dusenbury, Brannigan, Falco, & Hansen, 2003; Klingner, Vaughn, Hughes, & Arguelles, 1999). The demands of time also impact the acceptability of interventions more broadly (Elliott, 1988), as new interventions almost always require training of those implementing the changes and, often, personnel in other parts of the system. In SWPBS, staff are trained to enter the ODR data and distribute reports to the decision-making teams in a timely manner; yet, over the long run,

SWPBS may reduce time spent addressing issues related to behavior management. When successful, there are fewer ODRs, giving teachers more time for instruction. Principals and administrative staff spend less time dealing with disruptive students. Those are the long-term benefits of SWPBS; yet the short-term costs are real. Informing the school faculty of what is expected of them in an SWPBS implementation and gaining a commitment from 80% of the faculty before initiating often minimizes the negative reaction to time costs when they are directly experienced.

Principle D: Opinion Leaders Must Support the Innovation

Adopting a practice is a social process (Rogers, 2003), and variables other than the features of the intervention and data about its effectiveness influence decision making. If an opinion leader, a credible individual within the social system, endorses an innovation and becomes a "local champion," others are more likely to adopt it. If there is no local champion, high-quality implementation and sustainability are less likely (Elliot & Mihalic, 2004). In SWPBS, opinion leaders are school leadership teams, comprised of faculty from different disciplines and staff (Sugai & Horner, 2009). The leadership teams can be selected in a variety of ways, but to maximize their influence, it is best when the school faculty has chosen the members. Opinion leaders have established relationships with their colleagues, earned their trust and respect, and gained influence with their peers. The school leadership team, working with the school faculty, establishes the priorities and determines the interventions for the school. Because the school leadership team is made up of credible, influential opinion leaders, proposed solutions stand a better chance of being adopted by the majority of the school faculty.

Strong administrative support is also important to successful implementation. When the principal and other district leaders act as advocates for a particular initiative, it is more likely to be successfully implemented (Fixsen et al., 2005; Han & Weiss, 2005; McIntosh, Filter, Bennett, Ryan, & Sugai, 2010; Simmons et al., 2002; Sugai & Horner, 2009). To build support and garner the positive influence, principals in SWPBS implementations are required to participate in all trainings (Sugai & Horner, 2009). When principals and other school administrators champion an innovation, they can work to resolve institutional barriers to implementation and facilitate alignment across levels.

Principle E: The Innovation Is Perceived as Simple to Understand and Use

Teachers consistently rate interventions they perceive as being simple to use as more acceptable than those perceived as having greater complexity (Elliott, 1988; Miltenberger, 1990). Innovations are more likely to be perceived as easy to implement if they can be modified to fit local circumstances (Klingner et al., 1999). It has been well demonstrated that teachers adapt programs to better accommodate their own teaching styles, the needs of their students, and the time

and material resources available (Dusenbury et al., 2003; Han & Weiss, 2005). Of course, a flexible program design must ensure that any modifications leave its core features intact so as to avoid rendering the program ineffective (McLaughlin & Mitra, 2001). Understanding the permissible latitude in implementation requires training in the details of the intervention and in the principles that inform it. Klingner et al. (1999) demonstrated that yearlong training and support for the implementation of different reading programs resulted in teachers continuing to implement at least one of the programs at moderate levels of integrity three years later. Teachers' familiarity with the principles of an innovation tended to increase the acceptability and likelihood of adoption (Elliott, 1988; Reimers, Wacker, & Koeppl, 1987).

Principle F: The Innovation Can Be Implemented on a Limited Basis

Rogers (2003) suggests that innovations are more likely to be adopted if they can be implemented on a small scale, such as a pilot study, before being disseminated more broadly. Implementation sites can be selected that are most able to implement with sufficient quality, providing useful initial data on what might be larger barriers that all schools might encounter, as well as initial conditions for success (Elliott & Mihalic, 2004). Successful outcomes can also increase the interest of other educators in replicating the innovation, while those individuals who participated in the successful pilot implementation can become champions for the intervention and facilitate the dissemination to other sites.

Implementing at a small scale allows those responsible for implementation to identify unanticipated barriers to implementation; as additional schools and districts adopt the innovation, possible solutions to institutional barriers have already been developed. This strategy functions to reduce the effort of later adopters and increases the probability they will maintain the initial implementation until benefits are realized. Implementation on a limited scale is one of the core features of SWPBS (Sugai & Horner, 2009).

Starting small and phasing in an innovation reduces its impact on the resources within a district. If all of its schools were to adopt a new program at once, a district would likely be pressed to assure high-quality implementation. Applying the lessons learned from a small, high-quality implementation can provide better estimates of resources needed as the intervention is expanded in a second phase. As implementation of the intervention expands to other schools, it is more likely that conditions are created to organize internal capacity to support it. Those who were part of the initial implementation may function as coaches for later phases. This is part of the logic of implementing SWPBS (Sugai & Horner, 2009).

Principle G: The Results of Innovation Are Observable to Others

This principle is related to Principle F, advocating a limited initial implementation. If a school site successfully implements an innovation that

solves a common problem within a district, then these results can motivate other schools to adopt the innovation. For SWPBS, the common measure of success of the program is a reduction in ODRs, and dissemination of early successes is a cornerstone of scaling-up practices within districts and states (Herman et al., 2008, esp. pp. 22–26; Sugai & Horner, 2009). Several mechanisms within the model publicize these successes, such as data sharing at district-wide meetings (informing district leaders of success) or SWPBS school personnel working in leadership teams with other schools (sharing successful practices). By making the outcomes visible, the activities increase the motivation of others to participate. In turn, they help sustain implementation in at least two ways: the reporting of positive effects often results in positive feedback from peers, and an individual's public identification with SWPBS helps maintain commitment to the program.

An Example of Implementation Failure

The evidence from implementation science demonstrates that for implementation to be successful, careful planning and involvement of multiple levels of the educational system are necessary. High-quality implementation can be time consuming and expensive. It requires vigilance on the part of those responsible, or the initiative will end prematurely or simply fail to effect the desired improvements. California's experience with class size reduction (CSR) should serve as a cautionary tale about failing to follow the principles of implementation science.

The California CSR initiative began in 1996 as the result of a $1 billion windfall in the California budget for education. The governor, Pete Wilson, launched the CSR effort out of his office rather than through the California Department of Education. The initiative was passed in July 1996, taking state and district educational officials by surprise. Districts were directed to reduce class size in grades K–3 to 20 or fewer students by October. This legislation created an overnight need for 18,000 additional classrooms (a 28% increase), 12,000 new teachers for the 1996–1997 school year, and an additional 15,000 over the next 2 years. In the first year, $1 billion was spent on implementation. The second year, $1.5 billion was spent to train teachers and fund facilities (Wexler et al., 1998).

Why did the state of California scale up CSR so rapidly? There were several sources of influence: The budgetary windfall created the fiscal opportunity; the results of a Tennessee experiment with a class size reduction program had garnered significant national attention (Word et al., 1990); and California students' literacy rates ranked next to last among the states in 1994 (Wexler et al., 1998). The effort to improve educational outcomes for California students was a laudable goal for the CSR initiative, but several variables were overlooked in the rush to implement.

One of the findings from the Tennessee CSR effort (Word et al., 1990) was that benefits were obtained when class sizes were between 13–17 students. By

setting the maximum class size of 20, California ignored the available evidence about requirements to achieve benefit. Further, by rushing to implement, there was no time to develop a thoughtful, systematic plan to phase in the reduction, and by failing to plan, no contingency was made for the lack of available space or teachers. The Tennessee benefits were obtained when fully credentialed teachers led instruction. No benefits were obtained when instructional assistants taught classes.

In California, the rush to implement resulted in many classrooms being led by teachers with emergency credentials, personnel who may have had less experience in classrooms than Tennessee's instructional assistants. The opening of so many teaching positions also resulted in fully credentialed teachers moving to higher socioeconomic status schools, leaving instruction in the high-poverty, high-minority schools to teachers with emergency credentials. Further, because there was insufficient space for the new classrooms and portable classrooms could not be built and delivered fast enough to keep up with the demand, schools were forced to convert other instructional areas, such as gyms, into classrooms. After billion of dollars spent and a massive disruption of its educational system, California's CSR program improved student test scores only minimally at best (Bohrnstedt & Stecher, 1999).

Could these negative consequences have been avoided? Guidance from implementation science may have minimized some of these missteps. The stated goal of CSR in California was to improve literacy scores; however, the details from Tennessee on its improved outcomes were ignored. CSR—consistent with most educators' values and beliefs about how to best provide instruction—automatically gained widespread support, as evidenced by the participation of 873 of 895 eligible school districts in the 1997–1998 school year. By involving individuals from the California Department of Education and district officials, the governor's office and the legislature could have developed a more systematic implementation plan. Districts that had the capacity (credentialed teachers and space) to immediately implement could have piloted California's CSR and identified difficulties and developed solutions. In the meantime, other districts could have begun to increase their capacity to implement CSR by increasing teacher recruitment activities and purchasing portable classrooms. Those districts with successful early implementations could become champions for class size reduction and supply coaches for other schools beginning implementation. The costs of implementation could have also been phased in over a number of years rather than profligately spent in the first few years of the effort. It is not possible to know if literacy scores would have improved if implementation had been more systematic, but there would have been a better chance for midcourse corrections and adjustments, and the overall costs of CSR would have been smaller.

Conclusion

No matter how small or how large the size of the change, principles of implementation science must be followed to maximize the benefits of the innovation. We can only wonder how many previous innovations would have succeeded if they had been guided by the principles from implementation science. Certainly, implementation science can provide guidance and improved outcomes for future innovations. There appears to be very little to lose by adhering to these principles and, potentially, a great deal to gain. At minimum, reducing the rapid churn of introducing and discarding effective innovations would be a significant contribution.

This chapter's opening epigraph emphasized that hard work is required to bring about change, an observation certainly true of educational reform. Because innovations are always implemented in a specific human context with its own preferences, values, and beliefs about how to best educate children, those interested in implementing an educational innovation must act as cultural anthropologists. For successful implementation, they must understand that different districts and schools develop different cultures and that the same innovation may have to be introduced and implemented differently across schools. Given the uncertainty of implementation, any systematic effort at change will require ongoing measurement of both the important outcomes and the processes required to produce the outcomes. Implementation is an iterative process; without data to inform what is working and what requires change, decisions will be based on unknown and unreliable variables. If the improvement promised by the innovation is important, then the implementers must care enough to do the hard work.

Action Principles

States or Districts

a. Engage all agents. Involve all who will be responsible for an innovation in the planning for implementation. Build partnerships across all levels of the educational system to facilitate implementation of an innovation.
b. Systematize decision making. Systematically introduce or support a comprehensive, data-based, decision-making system, including measurement of the quality of implementation, into a school or district.
c. Start small. Initially introduce new interventions or innovations on a small scale (such as a pilot study) before more broadly disseminating (as early successes are a cornerstone of scaling-up practices within districts and states).
d. Assess the fit. Before introducing an innovation, assess the culture of the setting to assure the "goodness of fit" between the innovation and the setting.

e. Plan support. Establish comprehensive support plans across all levels for those who are responsible for implementation prior to initiating an innovation.
f. Instill a mindset. Foster a culture of innovation and the implementation practices that support it.

Schools and Classrooms

a. Assess the fit. Select innovations that fit into the culture of the school or classroom and shape the culture to support the innovation.
b. Set school-specific priorities. Leverage the school leadership team, working with the school faculty, to establish priorities and adopt innovations for the school.
c. Verify capacity. Ensure that there are adequate time and resources to implement the innovation.
d. Institute new structures and operating procedures. Build in teacher- and administrator-level data-based decision making and foster development of the internal capacity of the school to use data to solve problems.

States, Districts, Schools, and Classrooms

a. Align problems with appropriate solutions. Ensure that any innovation introduced into the system solves a problem or has a perceived advantage over current practice.
b. Make data easily useable. Present data on implementation and the effects of an innovation in a format that decision makers will understand and use.
c. Monitor implementation. Regularly and routinely monitor the quality of implementation of an innovation across all levels, so that corrective actions can be taken early in the process.
d. Look again. Establish recursive feedback systems across all levels.
e. Model decision making. Routinely model data-based decision making as the way of doing business.
f. Provide proactive support. Learning a new skill is difficult and takes time. Support for those learning to implement an innovation should be proactive rather than being reactive and waiting for the learners to identify that there is some difficulty.
g. Be principled. Follow the principles of implementation to maximize the benefits of the innovation. Use implementation principles to provide guidance and improve outcomes for future innovations.

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