

Activity 6.2

Case Example: Usable Innovations and PDSA



PDSA cycles are fundamental to the work of Implementation Teams with the intentional use of data for decision-making. Implementation Teams use PDSA Cycles to help them make meaningful changes, alleviate barriers, and achieve expected outcomes. Many of us engage informally in these cycles as we think through and test out hypotheses, or go about improving our work and lives. We often start by getting clear about what we want to do; then we make a plan (PLAN), engage in behavior as planned (DO), evaluate (STUDY) how effective our behavior was, then we make more plans based on how well we did (ACT). In a team setting, these roles and functions may be performed by different team members.

Instructions

This case provides an example of an approach to establishing usable innovations. Note how PDSA is used to simultaneously develop the innovation *and* the implementation supports for the innovation. Review the case example, then go through the *discussion questions* yourself, or with your team.

Case Example

The process outlined below employed 9 teachers over the course of 4 months. In a usability testing¹ format, the Implementation Team worked intensively with 3 teachers at a time to maximize the learning and to quickly make use of learning in the work with the next group of 3 teachers. This provided more learning and improvement opportunities for the Implementation Team as compared to one experience with 9 teachers. The result is a usable innovation and a good start of developing Implementation Drivers² to support the use of the innovation (intervention) in classrooms.

As you read the case example below, notice how quickly improved versions of the innovation (instruction for early literacy) were generated. Notice too how the Implementation Drivers were a natural and necessary part of developing a usable innovation.

¹Usability testing is well suited to situations where the innovation is complex and involves more people or several aspects of an organization or system working together. In these cases, there are more examples (3 to 5 at a time) and the use of an innovation can be observed frequently (daily, weekly, monthly). For example, 3 District Implementation Teams (DITs) can be initiated and the challenges of having the DIT begin working with school staff to support teachers in schools can be noted and corrected. Armed with these changes and improvements, 3 additional DITs can be initiated to see if the improvements are realized with a new group of DITs and to detect any further changes that need to be made. Data from other fields indicate that most of the critical problems can be detected and corrected by the end of the third or fourth usability test. Usability Testing quickly can identify trouble spots that otherwise would torpedo success if innovations were rolled out all at once.

²For more information about Implementation Drivers, see AI Module 2 at: <http://implementation.fpg.unc.edu/module-2>

PDSA #1

Plan	<p>The state of Pangaea legislature just passed a law mandating new standards for grade 3 literacy. The SEA asked faculty of the Pangaea state university to summarize the research on early literacy instruction with an emphasis on instructional practices that might be useful for children and students from age 3 through grade 3. The summary specified the following two instruction practices found to be effective in the literature (e.g. Hattie, 2009):</p> <ul style="list-style-type: none"> • Effective instructors encourage high levels of student engagement with education content • Effective instructors provide frequent, prompt, and accurate feedback to students when they respond
Do	<p>Based on the summary, the Regional Implementation Team contacted Springfield, a nearby school district. After some Exploration Stage work with principals and teachers, they secured the cooperation of principals in 3 schools and 9 K-3 teachers (3 in each school). The teachers agreed to try to use the instruction methods, participate in training, allow two people to observe their classroom every day for two weeks, give students a weekly quiz related to literacy content taught that week, and participate in up to one-hour of debriefing discussion during each week. In a meeting with the teachers and their principals, a schedule was developed so teachers 1-3 would participate during Month 1, teachers 4-6 would begin to participate in Month 2, and teachers 7-9 would begin to participate in Month 3.</p> <p>Just prior to Month 1, the Implementation Team developed a two-hour training workshop to review and discuss the literature regarding the two key instruction practices, model the two key components, and provide opportunities for teachers 1-3 to practice the skills in a mock classroom. The Implementation Team debriefed with the teachers at the end of training to obtain their opinions of the training methods and content.</p> <p>Prior to Month 1, the Implementation Team drafted 4 fidelity items to assess the use of the two key instruction practices. During the behavior rehearsal section of training, one member of the Implementation Team used the items to observe teacher instruction in the mock classroom. The items were modified based on those observations. The scores for each item related to teacher instruction at the end of training were analyzed to see how training could be improved next time.</p> <p>Immediately after training, the 3 teachers began using the instruction practices in their classrooms. Starting on the third day and every other day thereafter, a member of the Implementation Team observed each classroom for 2 hours with two members of the Team jointly observing one classroom. The Team members used the Practice Profile outline to note instances of expected, developmental, and poor examples of instruction. At the end of week 1 and again at the end of week 2, two members of the Implementation Team did a teacher instruction fidelity assessment using the 4 items developed prior to training and modified during training. Each teacher provided the Implementation Team with the average scores for the weekly student quiz related to literacy content taught that week.</p> <p>At the end of each week, 2 Implementation Team members met with the 3 teachers to discuss the instruction practices. Teachers provided their perspectives on what was easy or</p>

	<p>difficult for them to do in their interactions with students and what they thought was working. Implementation Team members offered suggestions for using the instruction practices based on their observations of all 3 teachers. Implementation Team members began drafting a coaching service delivery plan based on teachers' input.</p>
Study	<p>At the end of weeks 2 and 3 the Implementation Team met to consider the information being developed. The information and data being gained from the experience with the first 3 teachers was used to revise the innovation and improve implementation supports as noted in the Act section.</p>
Act	<p>Based on classroom observations and comments from teachers, the Implementation Team re-defined the key instruction components of the innovation. The Implementation Team expanded the component, "Instructors encourage high levels of student engagement with education content" to include "provides explicit instruction" and "models instruction tasks." The Implementation Team drafted a Practice Profile (including the new components) with detail based on the classroom observations. The draft of the Practice Profile was reviewed with the 3 teachers and their ideas were included regarding how to define expected, developmental, and unacceptable examples of use of each component of the innovation.</p> <p>The Implementation Team compared notes on the fidelity assessments to see if they agreed or not on scoring each of the 4 items. Since agreement was not good, the items were revised to be more specific, and the number of items was increased to include the new components being operationalized in the Practice Profile. A protocol for how a fidelity observer should enter the classroom and conduct the observation was drafted for use in subsequent fidelity observations. The fidelity scores and the scores for the weekly student quizzes were summarized. No discernable relationship between the two was apparent.</p> <p>As noted above, the Implementation Team began studying training during and after the training session for teachers 1-3. In week 3 the Team began work on how to improve training methods and how to include the new content in training for the next 3 teachers.</p>

PDSA #2

Plan	<p>The Implementation Team met with the principal and teachers to set the time for a two-hour training workshop for teachers 4-6. The Implementation Team discussed the work during Month 1 and invited questions about the classroom observations and the de-brief times.</p>
Do	<p>In Month 2, the Implementation Team provided the revised training to teachers 4-6. The training content was based on the expanded essential functions. The revised training methods were based on the experience and feedback from teachers 1-3.</p> <p>The Implementation Team provided a two-hour training workshop to review and discuss the literature regarding the key instruction practices, model the key components, and provide opportunities for teachers 4-6 to practice the skills in a mock classroom. During training, practice continued until the teachers felt competent and confident. The Implementation Team debriefed with the teachers at the end of training to obtain their opinions of the training methods and content.</p> <p>During the behavior rehearsal section of training, one member of the Implementation Team used the revised fidelity items to observe teacher instruction in the mock classroom. The fidelity items were modified further based on those observations.</p> <p>To collect pre-post training data, a version of the behavior rehearsal (used in training) was conducted individually for each teacher just prior to training. The teacher's behavior was scored using the fidelity criteria. The scores for each fidelity item prior to training and during the last behavior rehearsal at the end of training were analyzed to see the extent to which teachers improved instruction skills. The data provided direction on how training could be improved next time.</p> <p>Immediately after training, teachers 4-6 began using the instruction practices in their classrooms. Starting on the third day and every other day thereafter, a member of the Implementation Team observed each classroom for 2 hours with two members of the Team jointly observing one classroom. For teachers 1-3 one observation per week was conducted. During the observations, the Team members used the Practice Profile outline to note instances of expected, developmental, and poor examples of instruction.</p> <p>Two members of the Implementation Team conducted a fidelity assessment using the revised items. The new fidelity assessment was used for assessments of teachers 1-6 each week to gain more experience with the items and to continue to develop the observation protocol. Each teacher provided the Implementation Team with the average scores for the weekly student quiz related to literacy content taught that week.</p> <p>At the end of each week, two Implementation Team members met with the 6 teachers to discuss the instruction practices. Teachers provided their perspectives on what was easy or difficult for them to do and what was working for student learning. Implementation Team members offered suggestions for using the instruction practices based on their observations of all 6 teachers. Implementation Team members revised the coaching service delivery plan based on teachers' input.</p>
Study	<p>The Implementation Team now has two months of information from teachers 1-3 and one month of information from teachers 4-6. In Month 2, Teachers 1-3 were gaining</p>

	<p>experience and using the innovation with confidence in their interactions with students. The Implementation Team began seeing more nuanced versions of the 4 key components of the innovation.</p> <p>The pre-post training data were summarized to see where training produced more or less improvement in teachers learning the instruction skills. Those data were compared to the ongoing fidelity assessments to see if the post-training scores for teachers predicted later fidelity scores.</p> <p>The fidelity scores for the 6 teachers and the scores for the weekly student quizzes were summarized. A pattern emerged indicating a possible relationship between higher fidelity scores and better scores on student quizzes.</p>
<p>Act</p>	<p>Based on observations and teacher comments, the Implementation Team again refined the definition of the key instruction components of the innovation. The Implementation Team expanded the component, “Effective instructors provide frequent, prompt, and accurate feedback to students when they respond” to include “corrects errors by modeling a correct response” and “limits corrective feedback to the task at hand.” These new components were included in the draft Practice Profile. The draft of the Practice Profile was reviewed with the 6 teachers and their ideas were included regarding how to define expected, developmental, and unacceptable examples of use of each component of the innovation.</p> <p>The Implementation Team compared notes on the fidelity assessments to see if they agreed or not on scoring each of the items. The items were revised to be more specific and the number of items was increased to include the new components being operationalized in the Practice Profile. The protocol for how a fidelity observer should enter the classroom and conduct the observation was revised based on the experiences with all 6 teachers.</p> <p>The pre-post training data summary made it clear that trainers were more effective when teaching the instruction components related to delivering information to students. However, the trainers were producing mixed outcomes when teaching instruction components related to providing feedback to students after they responded. The Implementation Team developed new behavior rehearsal scenarios to provide more training on those skills.</p>

PDSA #3

Plan	<p>The Implementation Team met with the principal and teachers to set the time for a two-hour training workshop for teachers 7-9. The Implementation Team discussed the work during Months 1 and 2 and invited questions about the classroom observations and the debrief times.</p>
Do	<p>In Month 3, the Implementation Team provided the revised training to teachers 7-9. The training content was based on the expanded essential functions. The revised training methods were based on the experience and feedback from teachers 1-6. The Implementation Team debriefed with the teachers at the end of training to obtain their opinions of the training methods and content.</p> <p>During the behavior rehearsal section of training, one member of the Implementation Team used the revised fidelity items to observe teacher instruction in the mock classroom. The fidelity items were modified further based on those observations.</p> <p>Pre-post training data were collected by using a version of the behavior rehearsal (used in training) individually for each teacher just prior to training. The teacher's behavior pre and post training was scored using the revised fidelity criteria. The scores for each fidelity item prior to training and during the last behavior rehearsal at the end of training were analyzed to see the extent to which teachers improved instruction skills. The data provided direction on how training could be improved next time.</p> <p>Immediately after training, teachers 7-9 began using the instruction practices in their classrooms. Starting on the third day and every other day thereafter, a member of the Implementation Team observed each classroom for 2 hours with two members of the Team jointly observing one classroom. For teachers 1-6 one observation per week was conducted. During the observations, the Team members used the draft Practice Profile to note instances of expected, developmental, and unacceptable examples of instruction.</p> <p>For teachers 1-9, at the end of week 1 and again at the end of week 2 two members of the Implementation Team did a fidelity assessment. The revised fidelity assessment was used for assessments of teachers 1-9 each week to gain more experience with the items and to continue to develop the observation protocol.</p> <p>At the end of each week, two Implementation Team members met with the 9 teachers to discuss the instruction practices. Teachers provided their perspectives on what was easy or difficult for them to do. Implementation Team members offered suggestions for using the instruction practices based on their observations of all 6 teachers. Implementation Team members revised the coaching service delivery plan based on teachers' input.</p>
Study	<p>The Implementation Team now has three months of information from teachers 1-3, two months of information from teachers 4-6, and one month of information from teachers 7-9. With daily use of the new instruction methods in the classroom, teachers 1-6 were using the innovation with confidence in their interactions with students. As each teacher "made the new skills her own," the Implementation Team began seeing nuanced versions of the key components of the innovation.</p> <p>Fidelity scores for teachers 1-3 and 4-6 seemed to be improving from the first week after training to Month 3. The continued revision and expansion of the fidelity items made the</p>

	<p>fidelity data difficult to interpret, but the impression from observations and teacher reports seemed to confirm the fidelity information. The fidelity scores and the scores for the weekly student quizzes were summarized. Analysis of Month 3 data for all 9 teachers resulted in a positive correlation of 0.50 between fidelity and student quiz outcomes. This was the first evidence that the instruction as defined and used in practice was effective for producing improved student learning.</p> <p>For two teachers in the 4-6 group, fidelity scores were good and their student outcomes were outstanding! The Implementation Team and teachers met to review the classroom observations and to engage the teachers in discussion of their instruction practices. It turned out these two teachers had been mentored by the same master teacher. During their induction into teaching, they had been taught to stand by the door and greet each student by name as he/she entered the classroom at the start of the school day and again after lunch period (Embry & Biglan, 2008). They felt this “primed the pump” and helped with student engagement.</p> <p>The pre-post training data were summarized to see where training produced more or less improvement in teachers learning the instruction skills. Those data were compared to the ongoing fidelity assessments to see if the post-training scores for teachers predicted later fidelity scores.</p>
Act	<p>Based on observations, the Implementation Team again revised the definition of the key instruction components of the innovation. The Implementation Team expanded the key components to include greeting each student by name at the beginning of the school day. This new component was included in the draft Practice Profile. The draft of the Practice Profile was reviewed with the 6 teachers and their ideas were included regarding how to define expected, developmental, and poor examples of use of each component of the innovation.</p> <p>The Implementation Team compared notes on the fidelity assessments to see if they agreed or not on scoring each of the items. The items were revised to be more specific and the number of items was increased to include the new component being operationalized in the Practice Profile. The protocol for how a fidelity observer should enter the classroom and conduct the observation was revised based on the experiences with all 9 teachers.</p> <p>The pre-post training data summary showed that trainers produced better outcomes when teaching instruction components related to providing feedback to students after they responded. However, there was need for further improvement. The Implementation Team decided to revise how they were giving feedback to teachers during training (e.g. focus comments on the positive behavior; model expected behavior prior to asking the teacher to practice again) during the behavior rehearsal scenarios.</p>
Cycle	<p>After 4 months, the Implementation Team was refining the fine points of the Practice Profile, assessing pre-post training knowledge and skills of teachers participating in training, using a good set of items to assess instruction practices in the classroom, and collecting information to correlate fidelity scores with student quiz scores. The innovation still needed improvement, but now met the basic criteria for a usable innovation.</p>

Discussion Questions

- With your team, identify and discuss the sources of information collected and utilized to inform improvements to the practice profile, fidelity assessment, and training. Was this information sufficient to establishing the usable innovation? If not, how would you plan for another PDSA cycle? If so, what would be your next steps for continued implementation of the intervention?
- How were the Implementation Drivers utilized during the usability testing for the establishment of a usable innovation? What were the key functions?
- What are potential strengths of utilizing usability testing to establish usable innovation within your organization? What are possible challenges?

The Active Implementation Hub, AI Modules and AI Lessons are developed by the State Implementation & Scaling-up of Evidence-based Practices Center (SISEP) and The National Implementation Research Network (NIRN) located at The University of North Carolina at Chapel Hill's FPG Child Development Institute. Copyright 2013.