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2. Impact on student learning requires deliberate, long-term support that assists educators in accomplishing high-quality implementation of new practices. The study's findings include that sustained and intensive professional learning for teachers is related to student achievement gains. What does this mean in practical terms? Intensive professional learning equals an average of 49 hours in a year. When this threshold is reached, it boosted student achievement by approximately 21 percent. This intensive work included building background content knowledge, demonstrations, practice and planning lessons, co-teaching with a coach or colleague, receiving feedback on the use of practice, and revising or amending strategies. It also can involve monitoring student work throughout the process to determine whether new strategies are making a difference in student learning.

Implication: The most effective professional learning supports teachers from beginning awareness of an innovation or program through skill development and continues through job-embedded support, in order to ensure teachers use new practices within the classroom with quality. If you "launch 'em and leave 'em" (Kanter, n.d.) the innovation will only be used by a few trailblazers within the system and not have a significant impact for most students.

Many principals can repeat the mantra that follow-up is necessary for effective professional learning but when pressed can't really give an example. Some of the tasks that need to be accomplished after beginning awareness and understanding have been developed include the following:

- *Clearly define new practice in operation.* What are the critical attributes (Marzano, Pickering, & Pollock, 2001) of the new practices or essential components? What components are nice but not essential? Is there a clear picture of

the new practice in operation? Critical attributes are essential characteristics of an instructional strategy. For example, the critical attributes for cooperative learning are (1) positive interdependence, (2) individual accountability, (3) face-to-face mutually beneficial interaction, (4) development of collaborative skills, and (5) process or debriefing (Marzano, Pickering, & Pollock, 2001). These components need to be in place before any small group can be considered a cooperative learning group.

The critical attributes of new strategies and models, or essential elements, need to be identified, reviewed, repeated, and accompanied by demonstrations or video examples until they are obvious and apparent to practitioners. (An Innovation Configuration map accomplishes this task; it is explained in depth in the Implementation volume of this series.)

- *Clarify misconceptions.* Despite our best efforts, adults walk away from good training with misconceptions about the new practice. For example, I found many educators believed that creating cooperative learning groups by counting off in Japanese (or some other interesting way) was a critical attribute. In fact, we consistently modeled interesting techniques during trainings, so it should not have been a surprise that this was misconstrued. Misconceptions reveal themselves as educators work with each other on learning tasks, planning, and observing classrooms.
- *Reinforce critical attributes (review using a new learning modality).* We might introduce critical attributes by giving a lecture accompanied by a video. The follow-up challenge is to create learning experiences that use different modalities—provide a video of a new strategy and engage small groups in labeling each critical attribute, or develop a written example of a lesson and cut it into components and ask staff members to reconstruct the lesson. You might ask small groups to create a metaphor for each critical attribute or make a poster that they could hang in their rooms, which reminds them of each essential part. This strategy also allows for differentiation by employing multiple intelligences within professional learning.

- *Plan for the use of new curriculum or strategies (with feedback)*. According to Bruce Joyce and Emily Calhoun (2010) we are more likely to achieve successful implementation, especially of new curriculum, when we provide time for teachers to plan lessons, gather materials, and prepare for implementation. They found that educators are more likely to use new curriculum when they have had time to develop skills in planning lessons. These skills need to be at their fingertips and deeply understood, so they can use them with ease when planning courses and units of study, as well as individual lessons.

  Central office administrators in Kentucky upped the ante by also reviewing and providing feedback to planning teams early in the process of adopting Common Core curriculum in their districts; this review provided needed refinements to lessons and also allowed central office staff to diagnose misconceptions (Learning Forward, n.d.).

- *Problem-solving*. When implementation begins, there will be problems of practice that educators might not have encountered before. It might be as simple as a quick way to distribute manipulatives to small student groups or larger issues of students' reaction to inquiry lessons. These problems—large and small—can stop implementation of new practices. There are problem solving protocols which PLCs or other small groups can use to address these challenges and generate a list of possible solutions. (See Appendix A for Problem Solving Protocol).

- *Coaching (monitor and give feedback)*. Coaching strategies can be conducted by an instructional coach or a knowledgeable peer. The power of coaching lies within a common understanding of the critical attributes—the person being observed as well as the coach need to know the attributes or components that are being looked for during the lesson. There should be no surprises. A second skill also required is the ability to give constructive feedback. Constructive feedback helps the observed teacher be open to learning and making revisions to practice rather than feeling evaluated (Armstrong, 2012).

- *Celebrate progress*. Celebrations always seem to occur at the end of a project. Celebrations also need to occur

in-process, in order to acknowledge that educators and the organization are making progress, to signal that the organization has accomplished one of its intermediate benchmarks, and to recognize staff's efforts in making a change with the intention of impacting student learning. In an elementary school in Arizona, we stopped and celebrated their progress in improving reading achievement in the building. A decorated cake and sparkling apple cider were brought in during a staff meeting while the principal thanked staff members for their efforts towards meeting their school's goal of improved reading instruction. The cost was minimal—the impact on staff significant. (See Armstrong, 2013, for more on celebration.)