

How Do I Know It's Working? A Teacher's Search for Evidence

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Abstract: Most educators agree that educational efficacy increases when teachers use data to make instructional decisions. Teachers also develop experiential knowledge that assists in many of the day-to-day decisions made in the classroom. When teachers begin using adaptive online programs to deliver individualized instruction, the roles of data-driven decision making and personal practical knowledge shift. The online program can continually assess the needs of each student and deliver targeted instruction to meet these needs, diminishing teachers' need to guide daily instruction. Teachers are left with the task of evaluating the online program, a task that calls for greater reliance on measurable evidence. In this paper, we present a summary of one teacher's experience shifting from directing all instruction to searching for evidence that technology is meeting student needs. We then discuss implications for pre- and in-service teacher education.

Introduction

Teachers' experiential knowledge developed through practical experience appropriately guides many of their instructional decisions (Clandinin & Connelly, 1995). Clandinin and Connelly (1995) described teacher knowledge as a "body of convictions and meanings, conscious or unconscious, that have arisen from experience (intimate, social, and traditional) and are expressed in a person's practice . . . it is a kind of knowledge that has arisen from circumstances, practices, and undergoings that themselves had affective content for the person in question" (p. 7). To further clarify the epistemological nature of teacher knowledge, Connelly and Clandinin (1988) coined the term "personal practical knowledge." They explained, "Personal practical knowledge is in the teacher's past experience, in the teacher's present mind and body, and in the future plans and actions. Personal practical knowledge is found in the teacher's practice. It is, for any one teacher, a particular way of reconstructing the past and the intentions of the future to deal with the exigencies of a present situation" (p. 25). Personal practical knowledge is acquired through experience and expressed through practice as teachers evaluate student understandings and decide what and how to teach.

While personal practical knowledge informs much of teacher decision making, the current emphasis on data-based instruction changes the role personal practical knowledge plays in the classroom. Research has shown that when teachers base instructional decisions on data, student achievement and instructional quality increases (Goldring & Berends, 2009; Means, Chen, DeBarger, & Padilla, 2011; Spillane, 2012; Thomas & Huffman, 2011). However, teachers must learn to use data effectively to reap these benefits (Mandinach & Jimerson, 2016; Means et al., 2011), and this type of decision making can seem to conflict with the more intuition-based personal practical knowledge.

Mandinach and Gummer (2012) posited that data use must be integrated with other teacher knowledge to be effective. Mason (2014) described a hybrid approach to decision making, using a combination of data and intuition. Using a similar hybrid of data and personal practical knowledge to make instructional decisions increases teacher effectiveness, and effective data-using teachers have demonstrated the ability to blend these types of knowledge (Mandinach & Jimerson, 2016). However, when teachers begin using adaptive online programs to

deliver individualized instruction, the roles of both data-driven decision making and personal practical knowledge shift. The online program can continually assess the needs of each student and deliver targeted instruction to meet these needs, diminishing the teacher's ability to use personal practical knowledge and need to analyze data to guide daily instruction. Teachers are left with the task of evaluating the efficacy of the online program, a task that calls for greater reliance on high-level program evidence. The changes can be jarring to experienced teachers, and both pre- and in-service teachers need to increase their capacity to effectively evaluate online programs to successfully navigate this shift. We need to understand teachers' experiences with this transition in order to support them through the change.

Method

To learn more about teachers' experiences adopting adaptive technology, the first author interviewed 14 elementary school teachers from four schools across two states. Each of these teachers had used Imagine Learning, an adaptive language and literacy program, for at least one year. The first author conducted multiple interviews with most of the participating teachers. Interviews included an initial phone interview (10-15 minutes) focused on basic information about how the teacher used Imagine Learning in her classroom; a full on-site interview (45-90 minutes) focused on the teachers' experiences with educational technology, including their experiences with Imagine Learning; and a follow-up interview (10-15 minutes) to check her interpretations of their experiences.

Before each follow-up interview, the primary author sent teachers a narrative summary of her understanding of their experiences. Teachers were invited to edit the narrative, and in the follow-up interview they discussed the veracity of her interpretations as well as any changes they made to the narrative. Seven teachers completed all three interviews. Four teachers completed all but the follow-up interview, while the remaining three participated in only the on-site interview.

Gary: "One of those people who like to have proof"

Eight of the teachers in this study described an experience where they sought evidence that Imagine Learning was beneficial to students. They couldn't rely on personal practical knowledge to determine program efficacy; they looked for other types of evidence, including test scores, changes in reading fluency, participation in class, and student engagement. They also saw evidence when students connected Imagine Learning instruction with classroom activities. In this paper, we focus on Gary (pseudonym), one of these teachers.

Gary is positive, enthusiastic, and quick to celebrate success. At the time of our interview, he was in his 21st year of teaching—he had taught two years of second grade, 17 years of kindergarten, and he was in his second year teaching first grade. He is results-driven: it is important to him to have evidence that each of his students is learning. And when he sees something is effective, he is all-in. Gary's choices about what, when, and how he uses technology echo these themes: he is open to new possibilities, but he wants evidence that it is benefiting students. He gets excited when students grow, and when he sees something work, he commits to it.

Gary provided several examples of how he judged if a tool or program was effective. Two descriptions were particularly salient: using Schoolhouse Rock videos and including writing as a key element in grammar lessons. Gary cited two primary reasons for using Schoolhouse Rock in his classroom: he had positive personal experience with the videos, and students were engaged when he used them:

[Schoolhouse Rock is] how I knew what adjectives were because I can sing the song verbatim . . . My sister used to brag that the only reason she passed government in high school was because she had to write the preamble, and she said the only way I did that was to sing it because she saw it on Schoolhouse Rock. So, I show those and they're all glued to it and it's short, it's catchy, and I still remember that from when I was a kid.

Gary's description fits inside Clandinin and Connelly's (1995) description of teacher knowledge as "the kind of knowledge that has arisen from circumstances, practices, and and undergoings that themselves had affective content for the person in question" (p. 7). He judges Schoolhouse Rock as effective because he has personal experience with it. Although he also mentions engagement as a reason to use Schoolhouse Rock, later in the interview he emphasized that he doesn't consider engagement itself as evidence students are learning. When he described his

approach to whole-class grammar lessons, he said he chose to have students write as they practice grammar so he can find direct evidence that they understand concepts:

In grammar, when they're writing to practice whatever the concept is, I know everybody is engaged and when they're done I can see evidence [of] what they're doing . . . Johnny's not getting it because here's what he did . . . that's one thing I really like about them writing the grammar part . . . I know that they're working and it differentiates itself because the higher kids will write with prepositional phrases going on and on until I stay stop, then other kids are struggling getting four or five words or a sentence that is legible and makes sense. That's one reason I'm big on the writing part of the grammar . . . whereas, if I show them something on the Smartboard . . . even though they're looking, I don't know how much they are taking in. It's too passive for the students . . . They can do a lot of talking with partners, that's good to get them engaged so I know at least they're interacting, but I don't have the proof of learning or where there might be misconceptions or errors.

When students wrote during grammar lessons, he could see either “proof of learning or where there might be misconceptions of errors,” and could adjust instruction accordingly. He used both data (student writing) and his own personal practical knowledge (finding proof of learning or misconceptions in their writing) to determine whether to review, reteach, or move on to new content.

Although Gary could cite clear reasons for using Schoolhouse Rock and grammar writing in his classroom, he struggled to identify similar evidence of Imagine Learning’s effectiveness. He was required to use the program so evidence of efficacy didn’t necessarily influence his actions, but as “one of those people who likes to have proof,” he still wanted to know if the program was effective. In the springtime of the school’s first year on the program, Gary started looking for hard evidence that the program was effective:

Last Spring, we started getting nervous about students hitting the target reading number for the end of the year . . . We have this law that if third graders aren't reading at grade level at the end of the year, they have to repeat third grade. So, that's why we're very focused on reading in kinder, first, and second grades so we don't have to have that conversation in third grade . . . I was thinking, “Wait a minute, I don't really know if Imagine Learning is helping, or how do I know? I don't know. Is there a way to figure this out?” So, it was shortly after I started questioning that, [an Imagine Learning representative] came . . . and they answered that question and said, “Here's how you find out which letters they know, or at the time letter sounds or sight words, things like that. [I thought], "Oh, OK, that's what I needed to see if they're progressing,” so it was good that . . . we were able to see that. But, it seemed like Imagine Learning was showing growth that I didn't see in other areas, in other assessments . . . I didn't know why there was a disconnect there.

Gary was confused by the incongruity between Imagine Learning data and other assessments. However, even if program data better reflected other assessment data, Gary still would not have had a clear answer on whether Imagine Learning was helping students. At his school, students were engaged in a large number of interventions and programs, all which could influence their progress. He explained:

There are so many variables, there's whole group, there's small group, there's the computer programs, Imagine Learning, there's homework that they do with their parents, parent involvement. There's so many little variables, how can you isolate Imagine Learning and say, “Oh, here Imagine Learning is making this effect on the students,” or how could you say any of those variables. It takes all of them together, so I guess I was just asking the question "Is there a way to know how this is affecting the kids?" . . . I questioned our reading interventionist about the efficacy of Imagine Learning and how she knew students were benefiting. I don’t remember her response, it was about the same time as having the meeting with [the Imagine Learning representative] about seeing reports. I trust our interventionist, our literacy coach, and our principal to vet any program they set up for student use. It is obviously a well-designed program, and I wouldn’t think about not using it unless I were forced to stop—I’m just one of those people who likes proof.

Gary was enthusiastic about Imagine Learning, but he struggled to judge efficacy. Unlike Schoolhouse Rock, Gary did not have any personal experience with Imagine Learning. He could not adapt instruction in response to student writing samples; the program selected activities for each individual student. On the other hand, Gary was able to observe student engagement and relied heavily on these observations when evaluating the program. However, as he explained when he discussed whole-class grammar lessons, seeing students engaged in the instruction did not provide proof of learning.

When Gary was invited to edit a narrative summary of his experiences, he emphasized anecdotal evidence that the program worked for his students. He wrote about observing English language learners sing along with the songs in the program, emphasizing the difference he could see the program made for these students:

This is a little anecdote that might be worth noting: sometimes the students will sing along with a song but not realize how loud they are because of their headsets. It is very cute and humorous. We were told about this when we were introduced to the program but to carry this idea further . . . sometimes English language learners are reluctant to speak because they don't want to make mistakes and are afraid of being teased. When they have headphones on and are focused on the computer screen they forget that other people can hear them and their affective filter goes away and allows them to open up and do things that they would never do in class or even in front of peers. Singing is the activity where I see this effect the most because it is so obvious when they sing out loud.

He also clarified his position in the follow-up interview. He explained:

It sounds like I'm sort of questioning, "Should we really do Imagine Learning?" But there's no way I would stop doing Imagine Learning, I'm very sold, I love Imagine Learning and I would never stop it unless they took it away . . . I'm just one of those people, I like to see the proof. If you can show me it's effective, let's put more time and effort into that and less on something else.

When it came to Imagine Learning, Gary felt tension between his positive feelings about the program and search for proof it was effective. He could see students were engaged in the program and could provide anecdotal evidence of the affective impact the program had on English language learners. He also trusted the principal, interventionist, and literacy coach to select evidence-based programs. However, he did not know how to determine if the program was increasing his students' academic performance and expressed some ambivalence about the amount of time his students spent on the program.

Discussion

Like other teachers we interviewed, Gary found himself unable to determine if Imagine Learning was affecting his students' academic progress. His usual methods of determining efficacy, such as drawing from personal experience or reviewing student work samples, were not available in the program. In order to determine if the program was effective, Gary needed to either find research on the program or conduct his own evaluation study, neither of which he mentioned considering. In the end, he relied on a combination of anecdotal evidence, observations of student engagement, and informal observations of the program itself. He indicated that none of these methods provided solid evidence of program efficacy.

Many teachers have experiences similar to Gary's, and we must prepare them to effectively integrate personal practical knowledge and student data while using personalized learning software. The first step in supporting teachers is to help them increase their capacity to use data when making both small and large instructional decisions. Means et al. (2011) noted, "Teachers' likelihood of using data in decision making is affected by how confident they feel about their knowledge and skills in data analysis and data interpretation" (p. viii). This conclusion extends to evaluating personalized learning programs; teachers who feel confident in their ability to find and understand information about program efficacy are more likely to critically examine the program and voice support for or concerns about its use.

Developing the data literacy skills necessary for making evidence-based decisions is an ongoing and complex process (Mandinach & Gummer, 2012). Mandinach and Jimerson (2016) emphasized data literacy education is vital for both pre- and in-service teacher educators. Preservice teacher education must lay the

foundation for effective data use, but learning to make effective decisions with different types of data requires ongoing professional development. Benjamin (2014) suggested educators move from talking about data to talking about evidence. He explained, “Data can lead to knowledge, knowledge to right action, and action to improvement, but the entire process turns on the quality of data that educators are examining” (p. 45). Such an emphasis on evidence aligns more closely with evaluating personalized learning software. Whether the emphasis is on data or evidence, in order to blend personal practical knowledge and data to teach with personalized learning software, educators need to feel confident in their ability to decide what is and is not working for their students.

Although it is important we incorporate data analysis and interpretation skills in pre- and in-service teacher education courses, we must be careful not to fall into the trap of pushing theory or policy separate from its epistemological base (Clandinin & Connelly, 1995). Clandinin (2015) described:

Too often, the talk is filled with discussion of mechanistic knowledge, skills, and attitudes, talk which seems to imply that not only do we, as experts, know what teachers need to know but that we can fill up teachers, and prospective teachers, with what they need to know . . . [Teachers] want to engage in different conversations, with a different language, around questions of what it is important for teachers to know and how we can know what teachers know. They want to engage in discussions about teacher knowledge. (p. 183)

Perhaps striving to better understand teachers’ experiences as they attempt to align personal practical knowledge, student data, and personalized learning software is the first step towards helping teachers identify what is important to know and how they can come to know it.

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