

Taking a Deep Dive: Investigating the Impact of PD on Teachers uptake

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TaDD- Taking a Deep Dive

This three-year impact study, Taking a Deep Dive (TaDD) is collecting qualitative data from three large U.S. National Science Foundation PD projects in order to use case studies and cross case analysis to further inform:

- *What teachers retain and implement in different PDs in different contexts;*
- *Why some teachers appear to retain and implement more than others; and*
- *Why some PDs have better results than others.*

Adaptive Versus Specified PD Models

PD models fall on a continuum from adaptive to specified (Borko, Koellner, Jacobs, & Seago, 2011)

Adaptive: learning goals and resources are derived from the local context and artifacts are from teachers' classrooms. The artifacts are selected and sequenced by the facilitator and/or the participating teachers, and the related activities are based on general guidelines that take into account the perceived needs and interests of the group.

Specified models of PD typically incorporate published materials that specify in advance teacher learning goals. In video-based specified PD, the video clips are typically pre-selected and come from other teachers' classrooms.

Three NSF PD Projects

The TaDD project uses a comparative case analysis and investigates self-reported learning related to pedagogy, content and resources retained and implemented from the following three NSF PD projects one to two years after the project and funding ended:

- **Learning and Teaching Geometry (LTG) PD**

The goal of LTG was not only to improve teachers' conceptual content knowledge and increase their ability to engage students in mathematical practices but to also increase students' conceptual understanding of transformations-based geometry.

- **Lesson Study (LS) PD**

Aimed to engage in design research to develop and implement a replicable model for a coherent, department-wide approach to professional learning focused on creating classroom environments that produce students that can be powerful mathematical thinkers.

- **Visual Access to Mathematics (VAM) PD**

VAM's goal was to improve teachers' representational fluency in addition to teachers' interpretation of student produced diagrams.

Methodology

Sixty-six participants from the three NSF projects took a 32-question survey (LTG had 28 participants, VAM had 25 and Lesson Study had 13).

This survey included questions that asked participants to reflect back on their PD experience and characterize their past and/or current use of the PD content, pedagogy and materials.

The survey included seven Likert scale questions, where participants responded to statements on a scale of 1-10, as well as eighteen follow up questions that allowed the participants to explain and provide more details about their numeric response.

We collected classroom video data and conducted Think Aloud Interviews to understand their learning in practice

Analysis

Descriptive statistics, ANOVAs and pairwise comparisons to understand uptake among and between participants and projects (LTG, VAM, Lesson Study)

Qualitative responses were coded to move deeper into the data and unpack the quantitative results.

The seven Likert scale questions were used as the baseline and the coded eighteen qualitative questions were used to analyze participants perception and vision of uptake from their learning experiences in PD.

Think aloud protocols were used with video tapes from participant classrooms to triangulate

Across Results

We found one-way differences by project by finding averages of the seven Likert scale questions on the survey. Results are found in Table 1 of our paper.

In comparing the three projects, VAM participants had consistently higher average ratings than LTG and Lesson Study.

While all three projects reported a high degree of established community within their respective PD experiences, VAM participants reported a stronger ($p < .10$) sense of community than Lesson Study participants.

Furthermore, VAM participants reported greater ($p < .10$) use of materials and resources than Lesson Study.

Within Results - Visual Access to Mathematics (VAM)

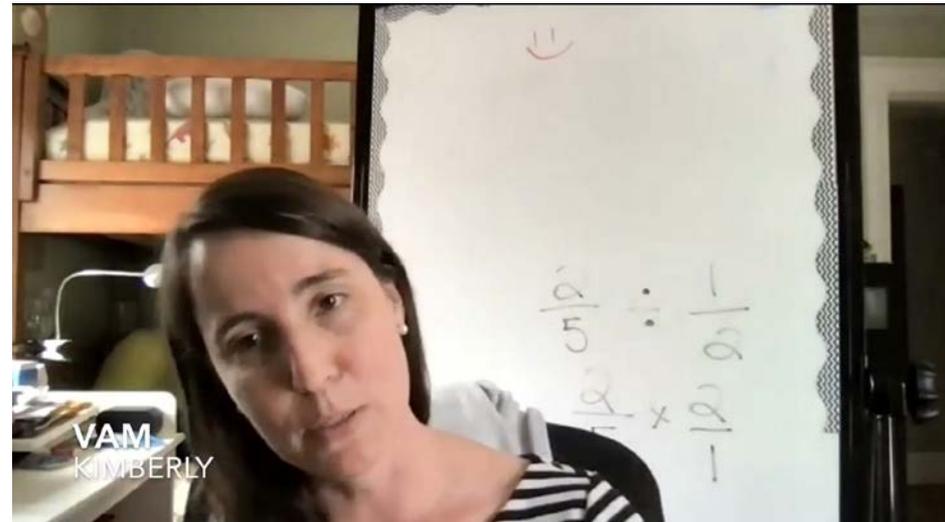
VAM aimed to build skills in mathematical problem solving and communication through the use of visual representations or teachers of English learners.

Content. Almost all of the VAM participants were able to identify representations from the PD that they used to teach relevant content including ratio, proportion, percent, dilation, and scaling.

Pedagogy. Approximately 50% of participants mentioned specific pedagogical strategies such as the Three Read Strategy that they learned in the PD.

Resources. Participants described how they used resources such as specific tasks, applets, and computer-based activities from the PD in their classroom practice.

The majority (92%) of the participants responded with an abundance of retention.



Within Results- Learning and Teaching Geometry (LTG)

Participants reported lower levels of retention for LTG than VAM but more than LS.

Content. About 50% of participants responded “none” or “nothing” in terms of content they currently use in their classroom. Several noted that this was because they were not currently teaching geometry.

The participants who did report content uptake mentioned specific transformation-based content from the PD.

Pedagogy. LTG teachers mentioned using dynamic strategies related to the transformation-based geometry content, including the use of manipulatives and representations. Other teachers mentioned more general pedagogical strategies that the PD facilitator modeled, such as how to facilitate discussions, incorporate vocabulary and help students develop explanations.

Resources. 75% of participants described how they currently used specific resources, such as patty paper or tasks and activities from the binder they were given at the PD. However, 25% of participants reported that they did not use any resources from the PD.



Within Results - Lesson Study (LS)

The LS project also had much lower responses than VAM when looking at the quantitative findings for each category.

Content. LS participants did not perceive that they took up any content-Not one of the respondents referred to specific mathematics content in their responses.

Pedagogy. When responding to pedagogical uptake, many responded positively and focused on different aspects of pedagogy that they took up and new instructional strategies that they were continuing to try to use.

Three participants mentioned the TRU framework that was used to analyze lessons related to effective instruction throughout their PD.

The other three responses were focused on aspects they learned around assessment and questioning strategies.

Other LS teachers discussed focused on questioning. For instance, one teacher reported that she has changed, “questioning strategies during a lesson to cultivate student’s critical thinking.”



Discussion

Not surprisingly, teachers perceptions of uptake differed across the three sites and types of PD.

The nature of where a PD fell on the continuum was related to the degree with which they identified specific content, pedagogy and resources.

The more specified the goals, the clearer teachers were able to indicate whether the PD was useful to the types of mathematics classes they were currently teaching. On the other hand, if the PD was more adaptive and the nature of the goals and intentions were evolving, teachers were less clear about the aspects of the PD that were relevant to their planning and teaching.

There are a lot of questions still unanswered since we have only fully analyzed the survey data.

Final thoughts and next steps

Teachers had clear recollections of the PD that they experienced.

We hypothesize that case study and cross case analyses – will contribute more to our understanding of teacher learning over time.

- Currently 20 of our participants are part of our qualitative cross case analysis.
- They are collecting videotapes monthly from January 2021-December 2021. Participants are asked to timestamp videos that are related to their learning from the PD experience that they participated in.
- We hypothesize that teacher learning is greater and more robust than projects originally reported from their quantitative RCTs.
- Stay tuned!



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