2017

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Citation Details

Fagan, J., Melhuish, K. M., Thanheiser, E., Fasteen, J., Guyot, L., & Rosencrans, B. (2017). Connecting teachers' buy-into professional development with classroom habits and practices. In E. Galindo & J. Newton, (Eds.), Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 459-462).

CONNECTING TEACHERS' BUY-INTO PROFESSIONAL DEVELOPMENT WITH CLASSROOM HABITS AND PRACTICES

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While professional development (PD) provides an opportunity for teachers to cultivate skills that are consistent with best practices in the field, it is their buy-into the PD that ultimately determines the effectiveness of the PD. We examined how teacher buy-in affected the classroom habits and practice of four elementary teachers who took part in a district wide PD. Using baseline and first-year implementation video recordings, in conjunction with frameworks for discourse analysis, cognitive demand, and tools built specifically to measure PD implementation, we found that varying combinations of teachers' beliefs served as a mitigating factor for PD implementation.

Keywords: Teacher Education-Inservice/ Professional Development, Teacher Beliefs

In this report, we explore the effect of teachers' buy-in for a high-quality, sustained, district-wide professional development (PD), Mathematics Studio PD (Foreman, 2013), on improving their classroom habits and practices. Systematic change requires coordination and cooperation between the system (school and PD program) and the participants (teachers). Without high buy-in, teachers will likely implement little of what they learn in even the strongest of PD programs. We present four divergent cases to illustrate the relationship between the exhibited level of buy-in and how it affected their mathematics teaching practice in their elementary classrooms.

Background and Theoretical Framing

Field-endorsed best practices for PD often exist at the program level with recommendations like "intensive, ongoing, and connected to practice; focuses on the teaching and learning of specific academic content; is connected to other school initiatives; and builds strong working relationships among teachers" (Darling-Hammond et. al, 2009, p. 5). We challenge that program level recommendations are insufficient without looking at individual participating teachers. As PD represents an appeal to change, the inclination of a teacher to making said changes in their teaching practice is an important factor in the success of the PD. We capture this inclination using the construct of *buy-in* from the management and leadership field (Thomson et al., 1999). We adopt Thomson et al.'s two types of buy-in: *intellectual* and *emotional*, where intellectual captures the degree of understanding and emotional the degree of commitment. We treat belief alignment between teacher and PD as an (intellectual) indicator of buy-in, and seeing a need for change as an (emotional) indicator of buy-in.

Teacher Beliefs and Classroom Practice

To address belief alignment, we both identified teacher beliefs from their discussion contributions in PD sessions and explored related factors of their classroom practice. In this context, our focus is on beliefs about mathematics, teaching, and learning. The principles underlying the PD focus on mathematics as a sense-making activity where are all students are capable of deep engagement in meaning-making via justifying and generalizing. To explore belief relationships and their classroom practice we used cognitive demand and patterns of discourse. Henningsen and Stein

Galindo, E., & Newton, J., (Eds.). (2017). *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education.* Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

(1997) defined cognitive demand as, "The kind of thinking processes entailed in solving the task as announced by the teacher and the thinking processes in which students engage" (p. 529). When teachers engage students in high cognitive demand tasks, it is an implicit reflection of a belief that students can do highly demanding mathematics and that mathematics is richly connected (Wilhelm, 2014). A second way beliefs may manifest in observable classroom actions can be seen in patterns of discourse. We leverage Scott, Mortimer, and Aguiar's (2005) interaction and authority framework to address the balance of student and teacher engagement in doing mathematics. In this report, we focus on the authority dimension where discourse is classified as *authoritative* or *dialogic.* An authoritative classroom has only one acceptable solution path and correct answer versus a dialogic classroom allows for multiple solution paths.

Critical Components and Measuring Fidelity of PD Implementation

We also examined teacher's classrooms for explicit implementation of the PD measured as *degree of implementation* to capture "the extent of change that has occurred at some particular time toward full, appropriate use of the target innovation" (Scheirer & Rezmovic, 1983, p. 601). We analyzed the *critical components* (O'Donnell, 2008) of our PD and developed a classroom observation tool, *The Mathematically Productive Habits and Routines* (MPHR) to measure the implementation of the PD components in classrooms (see Melhuish & Thanheiser, 2017).

Methods

Data for this project was taken from a large-scale study aimed at discerning the efficacy of a 3-year PD program in an urban school district in the Northwestern United States. Our data consist of classroom video recordings (two lessons before PD and two lessons after PD), as well as video recordings and detailed field notes from five PD sessions across the year at two schools.

Identifying Teacher Buy-In

Researchers observed and video-recorded all PD sessions taking detailed field notes which were analyzed using thematic analysis (Braun & Clarke, 2006). The themes were informed by the need to identify important factors that relate to the efficacy of the PD program. We identified four case study teachers to further analyze. They were selected based upon their variations in terms of belief alignment and perceived need to grow.

Analyzing Classroom Change

Each year, two lessons were recorded for all participating teachers. For our case study teachers, we focus on their baseline videos (prior to any PD) and their year 1 videos (after a year of PD). To facilitate in the process of scoring and coding, each video was segmented into episodes; each episode representing a portion of the lesson where the curricular goal/aim was consistent throughout. Each episode was then scored and coded according to the frameworks for the discourse analysis and cognitive demand analysis (i.e. 1-memorization, 2-procedures w/out connections, 3-procedures w/ connections, 4-doing math). Each lesson was given an overall degree of PD implementation score based on the MPHR.

Results & Discussion

In this section, we provide an overview of our four case study teachers and focus more extensively on our most extreme cases: Cora and John. The buy-in level was based on two factors: perceived need to grow in teaching practice and belief alignment with the PD. A summary of the four cases in terms of: (1) 2 factor buy-in, (2) belief and classroom practice alignment, and (3) PD Implementation can be found in table 1. For a more nuanced discussion of their buy-in see Fasteen, Melhuish, and Thanheiser (2015).

Table 1: Degree of Implementation Growth and PD Buy-In for Case Study Teachers

Case Teacher	John (Low)	Nina (Mid)	Kim (Mid)	Cora (High)
Belief Alignment with PD	No	No	Yes	Yes
Need to Grow in Practice	No	Yes	No	Yes
Beliefs Aligned with Classroom Practice	Yes	Yes	Inconsistent	No
PD Implementation	No	Yes	No	Yes

Case 1 & 4: John (Low-level buy-in) & Cora (High Buy-In)

Cora and John were at opposite end of their careers. John was preparing to retire while Cora was in her second year of teaching. During the PD, Cora displayed indicators of high-level emotional and intellectual buy-in while John displayed low levels of both.

Baseline lessons. Prior to involvement with our PD, Cora's classes had a high number of student contributions, but the tasks were often low-demand (see Table 2). Her lessons tended to include majority authoritative discussions. In John's baseline lessons, his class had minimal student interaction with most interaction consisting of pro forma call and response leaning heavily authoritative. The task demand was low with heavy focus on procedures (see Table 2). John's traditional beliefs aligned with his classroom practice. In contrast, Cora's beliefs that students are capable and that mathematics is a rich subject was reflected only in her students having opportunities to contribute while the mathematics remained procedural.

Table 2: Cora & John's Lessons in Terms of Cognitive Demand and Discourse

Lesson / Teacher	Cognitive Demand (% of time High)		Authority (% of time Dialogic)	
	Cora	John	Cora	John
Baseline 1	Varied (40%)	Low (0%)	Authoritative (32%)	Authoritative (0%)
Baseline 2	Low (12%)	Low (12%)	Authoritative (31%)	Authoritative (32%)
Post-PD 1	Varied (40%)	Low (0%)	Dialogic (72%)	Authoritative (12%)
Post-PD 2	High (85%)	Low (13%)	Dialogic (85%)	Authoritative (31%)

After one year of PD. After involvement with the PD, Cora's classroom came into closer alignment with her beliefs. The level of cognitive demand increased. The discourse moved from authoritative to largely dialogic reflecting the acceptance and discussion of multiple strategies and viewpoints. The nature of John's class changed little after the PD. His lessons remained predominately low cognitive demand and authoritative in nature (see Table 2). Cora's implementation of the PD rose after a year of sustained support. This growth reflects her students engaging in mathematical habits of mind and interaction and her use of teaching habits and teaching routines. The tools provided through the PD may have allowed Cora's beliefs and classroom actions to more closely align. As John had low buy-in for the PD, and had beliefs that may limit growth both in terms of his own need to grow, student capabilities, and the nature of mathematics, his degree of implementation score did not rise despite a year of PD.

Conclusion

A teacher's beliefs and disposition towards the subject area, learning, and their own practice play an important factor promoting teacher change through PD. We use the buy-in construct to explore alignment or misalignment of these beliefs and the PD's principles. The literature has established that teacher beliefs and classroom actions are related, but the relationship is often complex. Our cases illustrate some of the complexities. Cora's case is particularly compelling as she has aligned beliefs (and subsequently high buy-in to the PD), but prior to the PD intervention, the beliefs alone were insufficient to promote high level reasoning in her mathematics classroom. When provided with the

tools, Cora's classroom became more in-line with her beliefs. John, who did not perceive a need to grow, implemented little work from the PD into his teaching. Cora and John each represent very different types of teachers that may participate in PD. As providers of development and researchers on innovation, attending to beliefs and belief-alignment in classroom actions, may provide a starting ground for addressing the variance in individual PD participants.

Acknowledgements

This material is based upon work supported by the National Science Foundation under Grant No. DRL-1223074.

References

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

Darling-Hammond, L., Wei, R. C., Andree, A., Richardson, N., & Orphanos, S. (2009). Professional learning in the learning profession. Washington, DC: National Staff Development Council.

Foreman, L. C. (2013). Best Practices in Teaching Mathematics: How Math Teaching Matters. West Linn, OR: Teachers Development Group. In Bartell, T.G., Bieda, K. N., Putnam, R. T., Bradfield, K., & Dominguez, H. (Eds.). (2015). *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. East Lansing, MI: Michigan State University.

Fasteen, J., Thanheiser, E., & Melhuish, K. (2015). "Teacher Buy-In for Profession Development: 4 Distinct Profiles." Proceedings of 37th Conference of the Psychology of Mathematics Education-North America (PME-NA). East Lansing, MI.

Henningsen, M., & Stein, M. K. (1997). Mathematical tasks and student cognition: Classroom-based factors that support and inhibit high-level mathematical thinking and reasoning. *Journal for Research in Mathematics Education*, 524-549.

Melhuish, K., & Thanheiser, E. (2017). Using Formative Evaluation to Support Teachers in Increasing Student Reasoning In M. Boston (Ed.) *Annual Perspectives in Mathematics Education (APME) 2017: Reflective and Collaborative Processes for Improving Mathematics Teaching and Learning*. Reston, VA: National Council of Teachers of Mathematics.

O'Donnell, C. L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K–12 curriculum intervention research. *Review of Educational Research*, 78(1), 33-84.

Scheirer, M. A., & Rezmovic, E. L. (1983). Measuring the Degree of Program Implementation A Methodological Review. *Evaluation review*, 7(5), 599-633.

Scott, P. H., Mortimer, E. F., & Aguiar, O. G. (2006). The tension between authoritative and dialogic discourse: A fundamental characteristic of meaning making interactions in high school science lessons. *Science Education*, 90(4), 605-631.

Thomson, K., De Chernatony, L., Arganbright, L., & Khan, S. (1999). The buy-in benchmark: How staff understanding and commitment impact brand and business performance. *Journal of Marketing Management*, 15(8), 819-835.

Wilhelm, A. G. (2014). Mathematics teachers' enactment of cognitively demanding tasks: Investigating links to teachers' knowledge and conceptions. *Journal for Research in Mathematics Education*, 45(5), 636-674.

Woodbury, S., & Gess-Newsome, J. (2002). Overcoming the paradox of change without difference: A model of change in the arena of fundamental school reform. *Educational Policy*, 16(5), 763-782.