In What Contexts Do Teachers Experience Changing Their Science Teaching as Satisfying?

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Abstract: Using mixed methods, this study explores a potential lever for facilitating change of teaching practice: teacher satisfaction. 87 teachers reported feeling satisfied by practices they saw as having a positive impact on relationships with students and the classroom community. We suggest potential to build confidence between teachers and facilitators through this framing.

Introduction

Project-based learning (PBL) pedagogies require shifts in pedagogy and in teaching practices. Such shifts are seen as barriers to scale (Coburn, 2003) because they require intensive changes in teaching practices, involving changes in roles and epistemologies, for teachers and students (Krajcik & Czerniak, 2018). Research shows that as curricular systems scale, the depth of change (i.e., the degree to which implementations of pedagogical innovations are consistent with the theories driving those innovations and promote consequential change) is sacrificed. However, this depth is both required for the pedagogical shifts necessary for PBL and NGSS and potentially associated with sustaining that change (Penuel, 2015). This study explores a potential lever for facilitating depth of change at scale: The satisfaction that accompanies working through challenging endeavors.

Theoretical framing

While an area of intense focus, and while there has been success with supporting teachers in transforming their practice individually, the educational research and curriculum development communities continue to struggle with supporting this transformation at scale. Moreover, this literature base frames change in external factors of pedagogical discontent (Koskal & Southerland, 2018). We offer a novel approach to understanding the perceived challenges: teacher satisfaction derived from transforming their practice. We explore teacher satisfaction in PBL contexts because people preserve in tasks that are satisfying. This literature has broadly shown that manageable challenges, intentionality and fulfillment of purpose are factors that lead to a sense of satisfaction (Angner, et., al. 2011; Csikszentmihalya, 1989; Kristof-Brown, & Guay, 2011).

Methods

To explore teacher satisfaction as they take-up novel PBL practices, we surveyed 100 teachers (from 45 districts across 2 midwestern states) that were enacting the Multiple Literacies in Project-Based Learning curriculum (ML-PBL). ML-PBL includes curricular materials developed through a design-based research project (Krajcik, et., al. 2015). The teachers in this study were in the third month of the school year at the time of the survey and ranged from having one (57 respondents) two (22 respondents) or three (10 respondents) years of experience with the curriculum. The teachers were surveyed anonymously and selected randomly across districts according to proportion. 87 teachers responded to the survey. The survey recruitment occurred via email and the survey was administered via a password protected Qualtrics software.

Survey design

We did not define the word 'satisfying' in the survey, but instead began the survey with the following prompt:

> Teaching elementary can be really satisfying. We think of those times when a lesson just feels really satisfying, even though it may not have gone perfectly.

We then asked teachers to identify each PBL feature (selected from a drop-down menu) that was satisfying to them, and each one that was not. They were allowed to select "none." For these two questions we used the following script:

> Every ML-PBL lesson includes all of the features of PBL practices. We want to know which features of PBL practices you **most (or least)** associate with the feeling of satisfaction. Select those feature(s) below.

For each PBL feature the teacher selected, we gave them an opportunity to provide an anecdote or example of that practice and how it was or wasn't satisfying. We concluded the survey asking teachers: "If the decision was yours, would you choose to teach ML-PBL again next year?" The drop-down answers for this question included; yes, no, and not sure. The PBL features used in the survey are based on the design of ML-PBL and the PBL literature more broadly. They are: Driving Question; Working with students to use science practices; Supporting students in figuring out a science idea; Supporting collaboration among students; Using technology or other scaffolding to support learning; Using formative assessment; and Creating an artifact that demonstrates learning.

Analytic methods

74% of the teachers wrote comments or anecdotes about the most satisfying feature. 68% wrote an anecdote about the feature that was least satisfying. To make sense of these examples we used open and axial coding related to teacher satisfaction building on the ideas found in the literature on satisfaction that is described above. Our first stage of analysis was to identify and code themes in the short answer responses, through an iterative process. At the conclusion of this process the first author had identified 13 themes, ranging from ideas such as "curriculum matches what I know as an expert" to "student enjoyment".

While these themes were identified by looking across all of the comments and anecdotes, the next stage of analysis focused exclusively on those comments explicitly describing the PBL features that the teacher identified as satisfying. In this, we related the satisfaction-themes to the PBL features, looking for patterns between what the teachers experience as satisfying when enacting PBL and the PBL features themselves.

Findings

Looking first at the numerical data, we see that the teachers generally reported feeling satisfaction with enacting the new practices in the ML-PBL. Moreover, 68% (59) indicated that they would like to continue if the decision was theirs, 29% (25) we not sure and only 2% (3) expressed that they would not choose to continue.

The three features of PBL that have the highest rates of association with feelings of satisfaction are: Supporting collaboration among students; Creating an artifact that demonstrates student learning and; Working with students to use science practices to make sense of phenomena.

Discussion and implications

In this work, we introduce "satisfaction" to understand one possible condition for enabling teacher's "depth of change" (Coburn, 2013) in teaching practices. We suggest that teachers persist in changes of practice that are satisfying to them as professionals. The teachers that participated in this study reported feeling satisfied by (and hence possibly motivated to pursue and sustain) changes to their practices that they saw as having positive impacts on their relationships with students, strengthen the classroom community, and that affirm students are learning. We suggest a need to reframe discourse around shifts in teacher practice. That is, what if we framed the challenges associated with these features of PBL as opportunities to experience student learning, and to impact the relationships in the classroom—and as places where challenges were expected and warranted. This reframing help teachers see their struggles as the sort of "manageable challenges" that the satisfaction literature highlights.

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