

Mapping the Design Space for Teacher Learning through Reflection

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Abstract: Reflection has long been considered a core practice of teaching and the continuous professional learning of teachers (Dewey, 1910; Schön, 1983). It is often one of the central features of pre-service and in-service teacher development, and considered the everyday practice of teaching. While reflection is considered a good rule of thumb for teacher learning, there have been few empirical studies that seek to connect the process of reflection to changes in teachers' knowledge, beliefs, and practices. We report on preliminary findings of a systematic review of the literature on teachers' video reflection. We use these findings to map the design space for learning through reflection and learning technologies that can support this process.

Introduction

Reflection has long been conceptualized as part of the toolkit of teaching (Dewey 1910; Schön, 1983). It can be practiced as self-mentation, in collaboration with peers and experts, and with the aid of technology. Reflection is both core curriculum in pre-service teacher education programs and a key component of teacher assessment and licensure exams in the U.S. (SCALE, 2015). It is considered the everyday work of in-service teaching (Shulman, 1987). While there is no debate on the importance of reflection for teaching, there is less consensus on how to structure reflection in order to support professional growth.

In this paper, we report preliminary findings of a systematic review of empirical research on the process of teacher reflection. We examine the affordances of features of the reflective process, and protocols for reflection on practice, on teachers' professional growth. We use these findings to map the design space for teacher reflection, in order to design scaffolds for teacher reflection that are productive for professional growth.

Defining reflection

Reflection is a deliberative thinking process. Through this synthesis, we ask the question of whether simply thinking about practice is an adequate condition to support teachers' professional growth in practice? What features of reflection and reflective thinking—as a learning process—need to be intentionally designed for in order to support teacher learning?

Dewey defines reflective thinking as “active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it, and the further conclusions to which it tends” (Dewey, 1910, p. 5). It is characterized by a (a) state of perplexity or doubt and (b) subsequent inquiry that seeks to gather evidence to test inferences in order to reconcile, refute or revise conjectures that emerge from this state of doubt (Dewey 1910; Schön, 1983). Schön argues, that without doubt, or perplexity, further rumination is not necessitated. A practitioner would simply intuit or classify an instance (e.g., a student question) as that which is known. It is this feature of reflective thinking - doubt and the problem solving that emerges from it - that is argued to be conducive to changes in knowledge, skill, and practice.

There is a growing body of research in the learning sciences that examines teacher reasoning, thinking and development (e.g., Sherin & van Es, 2009; Ghouseini, 2017). This research has provided insight into the contexts, technologies, social processes and practices wherein reflective thinking is situated and can develop. Technologies like video afford a means to look back on practice, what Schön refers to as reflection-on-action, given the natural limitations of recollection and the fast-paced nature of instruction (Schön, 1983). In this systematic review of the literature, we synthesize research on teacher reflection using video as a representation of practice in order to examine the relationship between design features for reflection—as a learning process—that are associated with teachers' professional growth.

Methods

In the Spring of 2019 we conducted a database search for empirical research on teacher reflection in ERIC, a prominent database for education research. We performed the search using the following search terms (and permutations of these terms): “teacher” AND “video” AND “reflection” OR “professional development”. We added “reflection” OR “professional development” when we noticed that the scholarship on “noticing” did not initially appear the results, which we recognized as a close cousin of reflection. We limited our scope for reflection

on video-based PD as we sought to examine how representations of practice, with video being one such representation, were facilitative of the reflective process. This search yielded 173 results.

We applied the following inclusion criteria: 1) article reported on a PD intervention, 2) representation of practice (i.e., video) was used to support teachers' reflection, 3) results reported outcomes for teacher learning. Next, we narrowed this list further, utilizing theory on reflection and standards of research rigor. Articles were coded dichotomously: 4) Does the article conceive of reflection as a learning process (as opposed to reflection as only an outcome measure of learning), 5) If a trigger for reflection is used, was it used intentionally to mediate teacher learning and is that mediation included in the discussion, and 6) Does the article report research questions, show the working of analysis, and includes measure of error (e.g. interrater reliability). With respect to rigor, the article needed to meet all three conditions to be included. Interrater reliability of 86% was achieved on one article, differences were discussed and resolved, and then each researcher annotated roughly 10 articles.

The exclusion criteria resulted in 33 articles to be included in this review (2). These articles were annotated along the following dimensions: structure of reflection, stimuli of reflection, reflective task, modality of reflection, dosage of PD, modality of reflection, individual or collaborative reflection, how the outcome of reflection was measured, and what outcomes of reflection were reported.

Findings

We summarize the findings in terms of three reported outcomes of reflection: changes in beliefs, in reflection itself, and practice.

Changes in beliefs

Among the studies reviewed, four reported changes in teachers' beliefs associated with engaging in the reflective process. The concept of beliefs was used at different levels, to refer to broad beliefs about the nature of learning, and others more specifically beliefs about the effectiveness of certain pedagogical moves. This is congruent with current research on teachers' beliefs (e.g., Ashton, P., 2014).

Specifically, studies reported changes in teachers' beliefs about their pedagogical theories through the process of reflective discussion with peers, written reflections, and by having written reflections read by peers (Meijer et al., 2017). Video-based reflection also shifted teachers' beliefs about their self-efficacy, adopting a learner-centered perspective, and recognizing the potential effect of their teaching in students learning (Osipova et al., 2012). By turning their professional vision towards students' learning, teachers revised their beliefs about the students' conceptions and misconceptions, and the use of error in classrooms (Santagata & Bray, 2015).

Studies reported that changes in participants' beliefs were always associated with reflecting on videos of the teachers' own practice, and several studies examined the impact of reflection with peers' videos. All studies reported scaffolded reflection activities and that the most common format was a combination of collaborative and individual reflection. Of the studies that reported shifts in beliefs through the reflection process, reflection was primarily face-to-face, with one study introducing the use of researcher-teacher interacting over the phone (Osipova et al., 2012). Finally, most of these studies engaged teachers in reflection for less than 10 hours.

Changes in reflection

Most of the scholarship included in this review provides evidence that using video for reflection on practice supports changes in the teachers' reflective thinking. Much of this work is located conceptually within the scholarship on *noticing* (e.g., van Es & Sherin, 2006). Overall, 15 articles report changes in teacher reflection that was associated with the use of video of their own or peers, and an opportunity to talk or write about them. Refined skills in reflection were visible through shifts in teachers' perspectives, e.g. observations shifting from classroom climate to learners' experience, shifts from describing practice towards interpreting practice (Meijer et al, 2017), refined connections between theory and practice (Tömen, 2017), and participating in deeper and more sustained conversations about practice (Santagata & Bray, 2016). In cases where teachers were observing videos about their own PD sessions or coaching, metacognitive skills were developed as they listened to themselves sharing their thinking and decision-making processes (Charteris & Smardon, 2013).

Some key features of PD through reflection identified in the literature are: the facilitator's role (van Es, 2009; Kim et al, 2018), teachers' prior knowledge (Calandra et al, 2014; Calandra et al, 2006), access to transcripts (van Es & Sherin, 2006), and the level to which pedagogical or disciplinary content was part of the reflective session (van Es & Sherin, 2006).

Additionally, except for one study (Kim et al, 2018), the reflective processes were scaffolded. This included oral or written prompts such as: "What do you notice? or What are the negative and positive experiences I had with...?" Reflection was mainly conducted collaboratively (n=20), with approximately half of the studies using a combination of individual and collaborative reflection, and primarily face-to-face. Finally, studies reported

changes in teachers' reflection more often with interventions with less than 10 hours in total (n=12), and with extended interventions of more than 30 hours across several weeks or months.

Changes in practice

One major finding of this review was the evidence that reflection *on* action resulted in a better reflection *in* action. This has been documented by changes in teachers' practice. Of the articles included in this review, nine reported changes in teacher practices as a result of their engagement with reflective tasks. One metric of change were coding schemes, which allowed change to be observed between pre-reflection observations post-reflection observations along a set of dimensions of teaching practice (Pianta et al., 2008; Zan & Donegan-Ritter, 2013; Brown & Kennedy, 2011). Other studies reported changes that were evident in self-reports about reflection activities (Warwick et al., 2016) e.g. that collaborative discussion gave participants the confidence to make changes that were discussed in these sessions.

Many of the studies that reported changes in practice were structured as individual reflective activities (e.g., Pianta et al, 2008; Brown & Kennedy, 2011; Ho & Tan, 2013). Of these articles, one made use of expert videos (Kennedy et al., 2017), two had participants viewing only videos of themselves (Ho & Tan, 2013; Zan & Donegan-Ritter, 2013), and the remainder made use of a combination of self and peer (e.g. Borko et al., 2017). All of the studies that supported changes in practice including scaffolding of reflective thinking. Scaffolding ranged from a noticing prompt (Brown & Kennedy, 2011) to structured probing questions based on selected video excerpts (Pianta et al., 2008). The majority (n=7) of these reflective tasks were face-to-face, but not always collaborative. Finally, of the studies that explicitly reported the dosage of reflective sessions (n=6), all but one reported change in practice from less than 10 hours of reflective sessions.

Discussion: Mapping the design space for teacher learning through reflection

Theory suggests that reflective thinking needs both felt perplexity and systematic inquiry in order to support change and learning. The preliminary findings of this review point to several implications for the design of teacher reflection that can support teacher learning.

First, overwhelmingly, studies suggest establishing collaborative contexts for reflection. However, designs for reflection should be intentional about the use of collaboration for individual and collaborative reflection. Several studies suggest that collaborative discussion around reflection seems to provide a plurality of interpretations that aid problem-solving processes.

Second, while collaborative learning may be productive for problem-solving and strategy development, the literature suggests that in order support changes in teachers' practice, teachers need opportunities for self-reflection, individually. Few studies in our review provided evidence of belief change as a consequence of reflection, however the studies that do suggest that a combination of reflecting on one's own and peer videos seems to be productive for shifts in beliefs, reflection and practice. This may mean that perplexity that can shift beliefs necessitates that a teacher to both examine their own practice as well as instantiations of others.

Third, the findings point to the need to design intentionally to scaffold different elements of reflection, such as prompts, the facilitator's role, the reflective device used (journals, video, transcripts, data visualization) in order to instigate perplexity and aid problem solving that emerges from it. Although most of the interventions were carried out in a face-to-face modality, there are some promising examples of blended approaches, where online asynchronous discussion might contribute to reflection. It is promising that the review suggests as little as 10 hours of reflection can support changes in teachers' beliefs, reflection, and practices.

The findings of this review raise questions about how best to design teacher reflection to support all three outcomes (i.e., beliefs, reflection and practice). We posit that it may be possible to design for all three outcomes by first scaffolding shifts in reflective thinking and practice. We posit that shifting teachers' attention through the development of their reflective thinking and then their practices may, over time, contribute to shifts in their beliefs.

Finally, there are some factors that have implications for the inferences that can be made from this review e.g., teachers agency in deciding to participate in research or PD, and the added sense of accountability for teachers using video and with the presence of an external researcher. These factors should be considered additional features of the design space for reflection.

Endnotes

(1) Authors contributed equally.

(2) Due to space constraints, please find the full list of References here: <http://www.shericeclarke.com/publications>.

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