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Delving into the meaning of productive reflection: A study of future teachers' reflections on representations of teaching

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HIGHLIGHTS

- Animations used in teacher education as representations of algebra instruction.
- Multi-phase analysis employed to study future teachers' reflections-for-action.
- Future teachers were able to productively reflect on animations without scaffolds.
- How "productive" reflection is deemed depends on what is valued and studied.
- More transparency and common baseline data needed in reflection research.

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ABSTRACT

This study incorporated multiple methods of analysis to explore the productivity of future teachers' reflections after viewing animations as representations of algebra instruction. Two groups of future teachers posted their reflections on an asynchronous, electronic discussion board with no instructor scaffolding. The productivity of the reflections varied depending on whether their content, connectedness, or complexity was considered. This highlights the need to consider reflection as a multidimensional construct. The role of teacher educators and the benefits of using animations to facilitate productive reflection by future teachers are considered. In addition, the studying and reporting of reflection data are also discussed.

> "In our endeavor to understand and encourage reflective practice, we need to clarify our understanding of reflection. Yet, this must be done without oversimplifying the concept, for in its complexity lies its worth."
>
> Jay & Johnson, 2002, p. 73

1. Introduction

Veteran, novice, and future teachers differ in their abilities to reflect on their own or others' teaching practices (Star & Strickland, 2008; Star, Lynch, & Perova, 2011; van Es & Sherin, 2002). Practicing teachers can learn to reflect effectively (Filby, 1995), but Coombs (2003) noted "teachers need consciously to think about their experiences if they are to learn from them" (p. 63).

Novice teachers have fewer experiences to draw from than veterans, and typically lack skill in drawing conclusions, evaluating, and adapting their teaching (Berliner, 1988). With the practical knowledge that comes from experience, novice teachers can become more flexible and better able to make analytical, adaptive plans that build on this new awareness (Berliner, 1988). Over time they can develop into experts (Hammerness et al., 2005); yet, this requires reflection in order to accomplish the complex combination of noticing, analyzing, and taking action.

One goal of preparing future teachers is to nurture their ability to reflect productively on teaching. Teacher educators must provide relevant experiences that allow for reflection. This way, future teachers can identify, become acquainted with, and gain insight into factors that impact classroom planning and action (Coombs, 2003). For teachers' reflection to be productive what is reflected upon and how that reflection occurs should not be arbitrary. This study considers what productive reflection might mean in teacher education by examining future teachers' reflections on an electronic discussion forum when responding to a series of representations of teaching.

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2. Background for the study

2.1. Reflection

Dewey (1933) described reflection as "[a]ctive, 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" (p. 9). Loughran (1996) called reflection the "purposeful, deliberate act of inquiry into one's thoughts and actions" (p. 21). In teacher education, reflection is used to help improve the teaching practices of veteran and novice as well as future teachers (van Es & Sherin, 2010; García, Sánchez, & Escudero, 2007; Kersting, Givvin, Sotelo, & Stigler, 2010; Moore-Russo & Viglietti, 2011; Reilley Freese, 1999; Sherin & Han, 2004).

Schön (1983) introduced reflection-in-action and reflection-on-action. *Reflection-in-action* refers to the ability to reflect or think about what is occurring while it occurs. Reflection of this nature in teaching involves "deliberative responses" (Griffiths, 2000) that are similar to the on-the-fly decisions made while riding a bicycle in traffic (Eraut, 1995). van Manen (1995) described this as "immediate reflective awareness that characterizes the active and dynamic process of a … routine lesson" (p. 34). In contrast, *reflection-on-action* refers to reflecting or thinking about what has already occurred. It is a purposeful revisiting of the past often to consider critical events (e.g., reviewing actions that led to a specific, possibly unexpected or unconventional, outcome).

A third type of reflection, reflection-for-action, has also been suggested. *Reflection-for-action* is the process of reflecting on past actions and decisions as a means to guide future practices (Killion & Todnem, 1991). Reflection on the past can be a way for teachers to nurture future-oriented reflection (Conway & Clark, 2003; Killion & Todnem, 1991), reflection that can impact instructional planning as well as influence the spontaneous decisions required during the act of teaching. Thompson and Pascal (2012) claim reflection-for-action is the process of planning, by drawing on experience and taking context into account. While one cannot predict what will happen in the future, it is still beneficial to contemplate the various scenarios that might happen (Wilson, 2008). Reflection-for-action, thus, can help prepare future teachers for what might occur including how to respond to various scenarios they may encounter.

2.2. Productive reflection

Although many would agree that reflection should be productive, there is no consensus on what "productive reflection" is. Multiple expressions indicate that the goal for teachers is to reflect at a "higher" or "deeper" level, but there is a real lack of description as to what this means or how to determine if it has occurred. It is not even clear if many conducting research consider that there might be various types of productive reflection.

Regardless of whether the reflection is in the moment, on the past, or about what might occur, at its most basic level, it is descriptive. Reflection has been called productive when it is comparative (i.e., views a crucial incident from a variety of perspectives) or critical (i.e., involves questioning perspectives that lead to new ideas) (Hayden, Moore-Russo, & Marino, 2013). Moreover, it has been found that comparative and critical reflections are more apt to prompt instructional adaptation and action (Jay & Johnson, 2002; Risko, Roskos, & Vukelich, 2005).

Fund (2010) and Davis (2006) agree that productive reflection must go beyond mere description, but their characterizations of what constitutes productive reflection vary. Fund depicted productive reflection as reflections that are "higher level … that extend beyond the immediate situation" (2010, p. 684). Reflection might be deemed productive because it considers what has been noticed in light of other perspectives (Jay & Johnson, 2002) including personal experiences, practical knowledge, educational theory, and professional development (Fund, 2010). Dewey (1933) emphasized the importance of open-mindedness that allows a teacher to take into account alternate possibilities, and others have specifically suggested that reflection on teaching should be open to considering evidence from a variety of sources (Attard & Armour, 2006). However, reflection might also be deemed productive because it involves considerations of the various aspects of teaching that help an individual understand its complex nature. With this emphasis, Davis (2006) asserted productive reflection involves integration, the idea that four aspects of teaching (learners and learning, instruction, assessment, and subject matter knowledge) are noticed, emphasized, and linked together.

2.3. Using representations of teaching to promote reflection

Teacher education programs often use various representations of teaching to nurture reflection-for-action. Narrative cases (Barnett, 1998; Harrington, Quinn-Leering, & Hodson, 1996; Levin, 1995) and, more recently, digital representations of teaching are viable options that can portray the temporal and dynamic nature inherent in classroom interactions.

Video clips of classroom instruction have been deemed beneficial by providing occasion for both practicing (Colestock & Sherin, 2009) and future teachers (Santagata, Zannoni, & Stigler, 2007; Star & Strickland, 2008; Stockero, 2008a; Wang & Hartley, 2003) to notice, reflect upon, and analyze teaching and learning. Video clubs have been implemented with practicing teachers (Sherin & Han, 2004; Sherin & van Es, 2005; van Es & Sherin, 2010); while implementation of video, often involving specific instructional frameworks, has been used in teacher education courses (Alsawaie & Alghazo, 2010; Friel & Carboni, 2000; Santagata & Angelici, 2010). Video offers an efficient means to develop future teachers' reflective skills through vicarious observation, since it is often impossible for all members of a teacher education class to engage simultaneously in an actual classroom observation. While video clips provide the ability to observe and analyze as a group, they may contain distracting events, are often only from a single camera angle, and frequently contain lulls in the action.

Animations are a relatively new medium but provide certain advantages over video. They play out in a linear continuum, often condensing the viewing time so that classroom vignettes are presented without unnecessary distractions or lulls. Animations have been used to study the norms that guide the teaching of algebraic and geometric concepts (Chazan, Sela, & Herbst, 2012; Herbst, Nachlieli, & Chazan, 2011). The animations were found to be effective in eliciting discussion among experienced teachers often compelling them to project themselves into the stories (Chazan & Herbst, 2011; Herbst & Chazan, 2006; Herbst et al., 2011). A study conducted by Moore-Russo and Viglietti (2011) found that future and novice teachers were prompted to discuss pedagogical decisions and student thinking after viewing animations that represented geometry teaching even when no instructional scaffolding was provided.

Some have suggested that future teachers' reflections on video representations of teaching can be unproductive (i.e., not extending past simple description), unless viewers are provided with a particular framework or lens to scaffold their analysis (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Santagata & Angelici, 2010; Santagata et al., 2007; Star & Strickland, 2008). Brunvand and Fishman (2006–2007) felt that scaffolds helped focus attention to a particular scenario, reducing the cognitive load by allowing viewers to concentrate on the exact skill or lesson desired. Rocco (2010) found that future teachers were successful in producing productive reflection with limited scaffolding in an online asynchronous environment.