

# Understanding Teacher Learning in a Virtual Learning Community: A Mixed-Methods Approach

Shereen Oca Beilstein<sup>a</sup>, Genevieve Marie Henricks<sup>a</sup>, Victoria Jay<sup>a</sup>, Michelle Perry<sup>a</sup>, Meg Bates<sup>b</sup>, Cheryl Moran<sup>b</sup>, & Joseph R. Cimpian<sup>c</sup>

a. University of Illinois at Urbana-Champaign, b. University of Chicago, c. New York University



## Abstract

This study aims to understand how elementary school teachers learn from classroom videos posted to the *Everyday Mathematics* Virtual Learning Community (VLC) by comparing quantitative web analytics with qualitative interview data from 41 VLC members. Results suggest that despite the relatively sparse and often surface-level commentary that surrounds VLC videos, which might indicate lack of engagement with the content, **the members we interviewed gave us clear evidence that they felt they learned from watching the videos.** These members also identified several key factors that prevented them from sharing what they learned by posting public responses to the site. We are using these results to develop actionable ideas for increasing active participation and analysis on the VLC.

## Introduction & Theoretical Framework

### The Affordances of Video in Traditional PD Settings

- Analysis of classroom video has become an integral component of teacher professional development (Ball & Cohen, 1999; Brophy, 2004; Seago, 2004) for both pre-service (Chval et al., 2009; Santagata & Angelici, 2010; Sun & van Es, 2015) and in-service educators (Borko et al., 2008; Santagata, 2009; Sherin & van Es, 2009).

- Teachers’ analysis of video has been positively associated with effective instructional practices (Sherin & van Es, 2009; Sun & van Es, 2015) and student learning (Kersting et al., 2010, 2012) in mathematics.

### The Promise of Video in Online PD Settings

- The reach of video extends across school districts and state lines through online teacher professional development (OTPD) sites (e.g., *Inside Mathematics*, *Teaching Channel*, and the VLC).
- But, similar to traditional PD, simply providing teachers with access to video online does not guarantee learning and improved practice. In fact, researchers have stressed the need for more empirical work that examines the complexities of how teacher learning occurs online (Borko et al., 2009; Moon et al., 2014; Dede et al., 2009).

### Video-based Learning on the VLC: The Current Study

- The VLC is a National Science Foundation-funded site, with approximately 50,000 members. Previous studies have indicated that little evidence of analysis exists *online*, as measured by VLC member comments posted in response to video (e.g., Bates et al., 2016).
- When asked to produce comments *offline*, however, pre-service teachers’ responses can reach deeper levels of analysis than that which exist online (Beilstein et al., 2017). Thus, this study seeks to understand why such analysis may or may not translate to the online space by comparing quantitative web analytics to qualitative interview data from individual VLC members.

## Research Questions

- When participants mention that they learn from watching VLC videos, what do they report having learned? (See Table 2.)
- Do the web analytics match up with teachers’ own assessments of how they use the VLC? If not, what could account for this discrepancy? (See Figure 1.)
- When participants do not provide comments on the VLC videos, what reasons do they nominate as barriers to their active participation? (See Table 3.)

## Methods

- We employed a mixed-methods approach (Greene, 2007; Teddlie & Tashakkori, 2010) to study the phenomenon of how teachers use and learn from the VLC by comparing quantitative web analytics on usage patterns to qualitative interview data from 41 VLC members.

## Data Sources: Part 1

### Web Analytics

- We collected data on video usage (e.g., total number of videos each member watched, and when, and whether the member commented on a video) and created categories based on usage patterns.

**Table 1.** User categories derived from web analytics on video resources, and participants’ distribution across them.

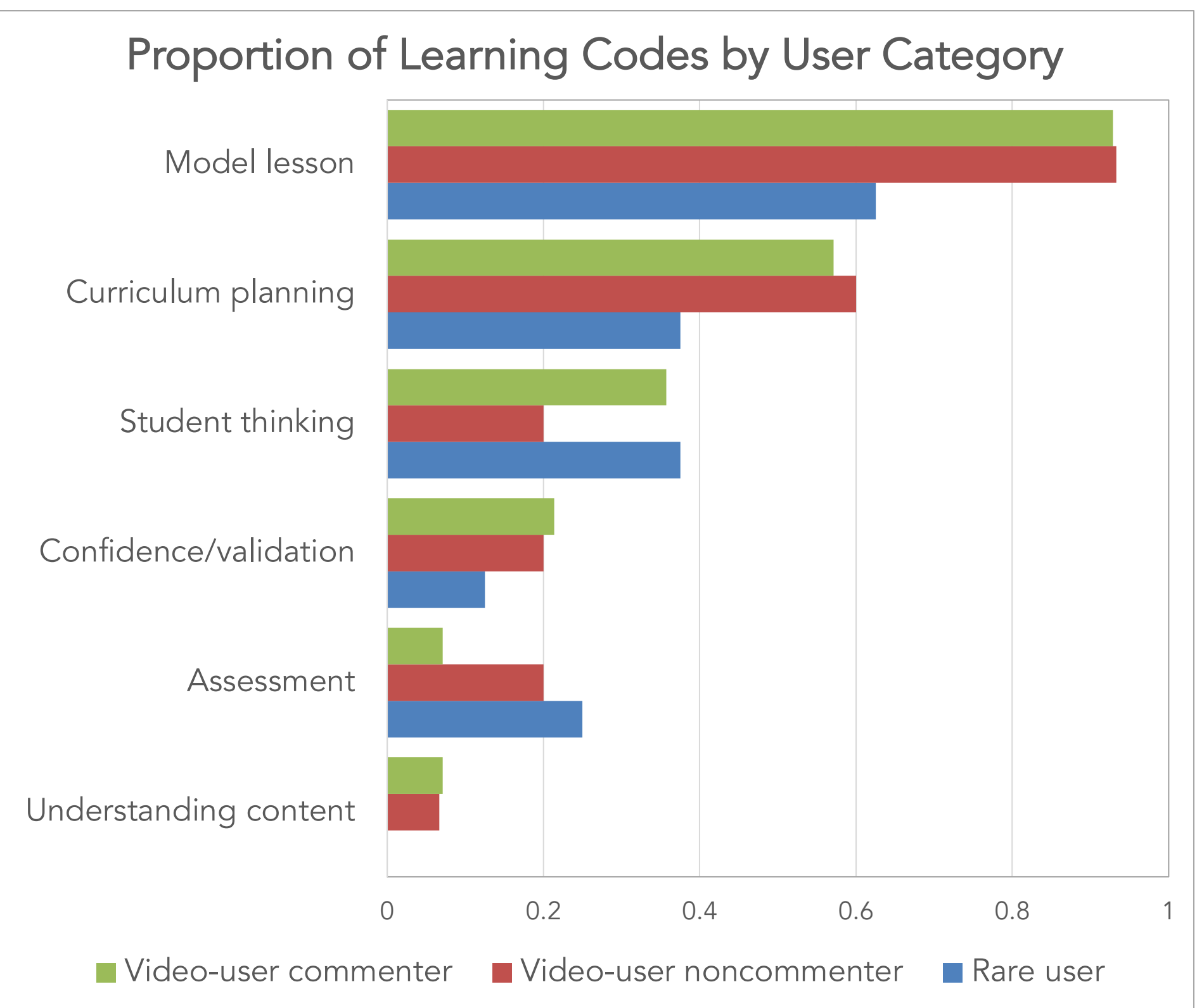
User category	Description	Number (%) of participants
Rare video users	Participants had logged onto the site repeatedly, but never watched a video.	8 (19.5%)
Video-user noncommenters	Participants had viewed a video, but never commented on one.	19 (46.3%)
Video-user commenters	Participants had viewed a video and also commented on one.	14 (34.2%)

## Results

**Table 2.** Frequency of the different types of learning participants reported in their interviews.

Learning code	Description	Number of participants	Percentage of participants
Model lesson	Teachers watched specific videos to view exemplar lessons or to learn pedagogical techniques.	36	87.8
Curriculum planning	Teachers watched a series of videos to get an overview of a sequence of lessons, a unit, or grade-level curriculum.	20	48.8
Student thinking	Teachers reported that the videos gave them a better understanding of students’ content background or mathematical talk.	14	34.1
Confidence/validation	Teachers reported that the videos made them feel more confident or validated in their teaching.	8	19.5
Assessment	Teachers reported that they watched videos to gain a better understanding of how to carry out assessment practices.	6	14.6
Understanding content	Teachers watched videos to learn the mathematical content itself.	2	4.9
Mentioned any learning code		37	90.2

**Figure 1.** Relation between web analytics-based user categories and participants’ reported types of learning.



**Table 3.** Proportion of barriers to commenting by user category.

Barriers	Rare users	Video-user non-commenters	Video-user commenters
Too busy	0.143	0.158	0.143
Commenting section does not feel like a discussion	0.286	0.263	0.214
Didn’t know to comment	0.286	0.158	0.071
Personality (i.e., ‘I’m not someone who comments on internet sites.’)	0	0.158	0
Nothing to unique to say	0	0.211	0.071
Fear of being misinterpreted or offending someone	0.286	0.158	0.143
Mentioned any barrier	0.857	0.895	0.571

## Data Sources: Part 2

### Interview Protocol and Coding

- We used a semi-structured interview protocol to understand participants’ perceptions of learning from the site. Two of the authors conducted the interviews. Most interviews lasted less than 45 min.
- We analyzed interview responses and generated themes using grounded-theory procedures (Corbin & Strauss, 2008).
- We created codes along the following two dimensions: VLC members’ reported (1) **learning** from—and (2) **barriers to posting comments** about—the videos. We achieved sufficient interrater reliability between two coders for both dimensions (Cohen’s kappa for learning = .74 and for barriers = .79).

## Conclusions and Discussion

- Findings reveal that beneath the sparse and often surface-level comments left in response to VLC videos (e.g., Schleppenbach & Beer, 2012), the participants provided clear evidence that they felt they learned from this resource. Often, when reporting what they learned, participants did so in great detail—indicating substantive engagement.
- Nearly all participants (90.2%) mentioned that they learned from VLC videos, and the vast majority (87.8%) claimed that they learn about delivering specific lessons. Further, noncommenters showed almost the same learning profile as the commenters. This suggests that learning likely occurs, even when viewers do not publicly post analytical commentary.
- Most viewers do not leave comments. We probed participants to determine what they saw as barriers to posting comments. Barriers ranged from those that may be difficult to overcome (e.g., lack of time, personality, and wariness of offending others) to others that can be used to develop changes that increase active participation and analysis on the VLC (e.g., didn’t know there was a commenting section or felt the section lacked discursive features).
- In sum, web analytics can provide developers of OTPD sites with a wealth of data on user behaviors and preferences. We hope that these findings open a window onto the underlying motivations that guide user behavior and preferences as well as the barriers that keep OTPD members from actively participating online. This brings us closer to understanding what factors might lead to OTPDs wherein robust, lively, and reflective discussion occur around teaching and learning mathematics.

This work was supported by the National Science Foundation, Grant No. 1621253.

