

Connecting Online Learners at a Distance: The Promise and Challenge of Using Metaphors as Reference Points

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Abstract: This experimental study probed the effectiveness of three kinds of objects (videos, theories, metaphors) as common reference points for conversations between online learners. Outcome measures were learners' levels of tacit-knowledge (TK) of specific concepts related to their practice (teaching). Learners' level of detail-focus was examined as a mediating variable. Results showed a positive effect of detail-focus within Metaphor condition for two of three TK indicators examined. Implications for online conversation design are discussed.

Introduction

We argue that a lack of shared practice between online learners is a major factor in the shortcomings of attempts to create valuable online learning conversations. Wenger, McDermott, & Snyder (2002) describe shared practice as "a common repertoire of experiences, stories, tools, and ways of addressing recurring problems," (p115) and consider it a critical foundation through which people can negotiate meaning. This importance can be understood through Polanyi's (1966) theory of knowledge as a tacit-explicit duality: in conversation, we express explicit dimensions of our knowledge, but their meaning is rooted in the unspeakable tacit dimensions. Without a shared practice as a reference point for understanding what others mean by their words, online conversations will remain at a superficial level, or result in miscommunication (Carroll et al., 2003).

One way to address the problem of a lack of shared practice is to give online conversants an example of practice to refer to. This "common reference point" can create a bridge between individuals' tacit understandings and the explicit comments made in conversation. Thus an effective common reference point will serve two functions: one, it will be a tool that conversants can use to help construct meaning from one another's statements; two, it will help them make statements that most usefully reflect their underlying tacit understandings. We suggest that to serve these purposes, an effective common reference point should have two distinguishing features: (1) it must be a rich representation of practice so that participants can easily relate to it, and (2) it must be conceptually framed so that it will be understood similarly by everyone involved. Importantly, these two characteristics do not vary independently. A rich representation of practice (e.g. a video) inherently contains many details and participants may focus on different ones, thus interpreting the meaning of the video differently. In contrast, an object with a strong conceptual framing (e.g. a theoretical description of a practice) may be more abstract and thus difficult to connect with the feel of experience (Kessels & Korthagen, 1996).

What might a balance of these characteristics look like? Metaphors are a kind of object frequently used to provide a reference point for understanding new information. Nonaka (1991) discusses the power of metaphors as "a way for individuals grounded in different contexts and with different experiences to understand something intuitively through the use of imagination and symbols" (p. 100). They allow us to understand one domain in terms of another (Clark & Cunningham, 2006) and support abstract thought by allowing us to project from well-structured concrete domains to less-structured ones (Lakoff & Johnson, 1980). In this sense, metaphors can be thought of as providing a balance between rich representation and conceptual framing.

In the current study we used an experimental design to investigate the effectiveness of videos, theories and metaphors as reference points for online conversations where participants discuss their local practices. Context was support for student-teachers in "translating" learning theory to teaching practice. The primary research question was if the type of reference point used would affect student-teachers' tacit-knowledge of the learning theories. Learners' level of detail-focus (Cohen & Weaver, 2005) was examined as a mediating variable. We hypothesized that the metaphor would be the most effective reference point but that a high level of detail-focus would reduce this effect since learners could get distracted by the details of the metaphor and not attend to the overarching conceptual framing.

Method

Participants

58 of 81 (72%) secondary-level pre-service student-teachers at a large Midwestern university.

Treatment and Conditions

Participants were randomly assigned to one of six discussion groups. Two groups were assigned to each type of reference point. The three conditions were each given two 2-week long discussion tasks related to a model of

learning (inquiry then transmission); differing only in how the model was depicted (Table 1). Thus each group received two reference points (transmission and inquiry) in the same format (video, theory, or metaphor).

Table 1. Study Condition Reference Points

	Video Condition	Theory Condition	Metaphor Condition
Transmission Reference Point	2:39 minute video of a teacher giving a presentation...	One way to characterize teaching thinks about learning as the transfer of expertise...	One way to think about a classroom is like a restaurant where the teacher serves...
Inquiry Reference Point	3:03 min video of a teacher asking a small group of students probing questions...	Another way to characterize teaching thinks about learning as a process of making sense of one's world...	Another way to think about a classroom is like a garden where the teacher's job is to nurture support growth of their "plants"...

The Detail-Focus Mediating Variable

The Detail-Focus scale was created based on an adaptation of Cohen et al.'s (2001) Learning Style Survey. Three 4-point Likert-style items asked student teachers to rate how often each of a set of statements characterized them to assess the degree to which they focused on particular elements of a situation. A mark of 4 indicated a high degree of attention to detail. Internal consistency as measured by Cronbach's α was .624.

Tacit Knowledge (TK) Indicators

Participants were asked to respond to a set of five reflection questions based on a video prompt adapted from Beck and Marshall (2002). Reflections were scored with respect to the following TK indicators.

Quality of Interpretation

Four 7-point Likert items assessed the degree of interpretation exhibited by the reflection, the quality of this interpretation, the degree to which learning theory was used to interpret classroom events and the quality of the learning theory use. A mark of 7 indicated a high quality of interpretation. Inter-rater reliability between two raters with one-point deviation allowed was 75%. All differences were reconciled. Cronbach's α was .880.

Focus on Deep Learning Structure

This was indexed in two ways. First each reflection was scored on Overall Focus on Teaching / Learning using a 7-point scale where 1 indicated a focus solely on classroom management and 7 indicated a focus solely on teaching and learning. Second, each reflection was broken into idea units which were scored for whether or not they referred to either learning theory. This was used to calculate the Percentage of Idea Units Using Theory. Inter-rater reliability between two raters was 75% for the first scale with a one-point deviation allowed, and 85% for the second scale. All differences were reconciled.

Procedure

An e-mail was sent to all secondary student teachers enrolled in the online seminar to solicit participation. It was explained that the seminar had been redesigned and that a study was being conducted to understand how to most effectively support student teachers online. Student teachers were asked to permit the researchers to access their coursework submitted as part of their normal participation in the seminar. In the first week of the seminar, student teachers completed the Detail-Focus measure. In weeks 2 through 5, the groups participated in two 2-week discussions of their classroom experiences through the lens of first a transmission and then an inquiry view of learning. They were asked to discuss how these approaches were and were not being used in their classrooms and ways they recognized the conceptual approaches in their classroom practice. In week 6, learners were asked to reflect individually on a classroom video for the tacit knowledge measure.

Analysis Approach

The goal of the study was to investigate the effects and interaction of reference point type (Condition) and participants' level of Detail-Focus with respect to the Tacit Knowledge Indicators. It was also necessary to take into account the potential effect of differences between groups within each Condition. A Hierarchical Linear Modeling analysis was carried out with SAS statistical software version 9.1 using the Proc Mixed procedure. Analysis of covariance was used to test for mean differences in the outcome variables between Condition adjusting for level of Detail-Focus. Condition was a three level fixed effect factor, Detail-Focus was a continuous covariate, and Group nested within Condition was a random factor. Interaction effect of Condition by Detail-Focus was included in the models. Multiple comparison tests were carried out using a Tukey-Kramer adjustment to ensure overall type I error for all pairwise comparisons in mean outcomes was less than / equal to 0.05. If the overall effect was not significant ($p > 0.05$), no pairwise comparisons were considered.

Results

Models satisfying convergence criteria were found for each TK indicator. For all, there was a negligible effect of Group within Condition, thus interpretations focus on the fixed effect factors and interactions. The interaction of Condition and Detail-Focus was significant for Quality of Interpretation ($F(2,45)=4.4$, $p=.02$) and borderline significant for the Deep Learning Structure indicator of Overall Focus on Teaching / Learning ($F(2,43.7)=3.16$, $p=.05$). No significant effects were found for the Deep Learning Structure indicator of % of Idea Units Using Theory. For the outcome measures in which an interaction effects was found, the slope of the line relating Detail-Focus to the TK indicator was estimated separately for each condition. A significant or borderline significant positive slope was found within the Metaphor condition for both Quality of Interpretation (slope=1.35, $t(45)=3.47$, $p=.00$) and Focus on Teaching / Learning (slope=.74, $t(43.9)=2.05$, $p=.05$). Pairwise differences in mean outcomes between conditions were calculated for each outcome measure at low (25th percentile), medium (50th percentile) and high (75th percentile) levels of Detail-Focus. For Quality of Interpretation, differences were found at low levels of Detail-Focus between the Metaphor and Video condition (difference=.88, $t(45)=2.61$, $p=.03$) and Metaphor and Theory conditions (difference=1.05, $t(45)=2.70$, $p=.03$). No significant differences were found for Focus on Teaching / Learning. Put together, these results show a positive effect of Detail-Focus on Quality of Interpretation within the Metaphor condition with individuals at a low level of Detail-Focus performing significantly worse than their Low-Detail counterparts in the other two conditions (Figure 1). A similar, though less dramatic pattern was seen for Focus on Teaching / Learning.

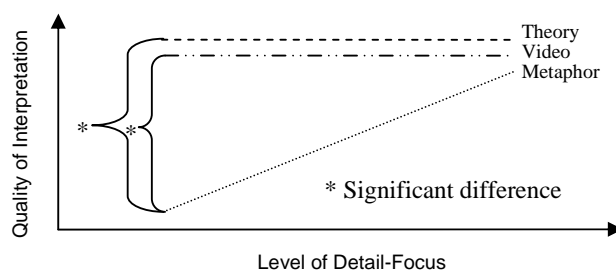


Figure 1. Quality of Interpretation versus Level of Detail-Focus by Condition

Discussion

While we had hypothesized that the metaphor would be the most effective reference point with the effect reduced for learners with high level of detail-focus, our results indicated the opposite conclusion. It seems that high detail-focus learners work well with all three kind of reference points, but learners with a low level of detail-focus have difficulties using metaphors as common reference points. A follow-up qualitative analysis of learner's comments indicates that this may be because low-detail learners (re)interpreted the metaphors in ways other than intended, adding and interpreting details based on their own experiences with cooking or gardening rather than those provided. It is suggested that adding a pre-conversation phase in which the meaning of the reference point object is explicitly negotiated may address this issue. Future work will examine different ways to structure the conversation around the reference point object to better promote common interpretation and use.

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