

# Conversational norms in faculty communities enable and constrain opportunities to learn

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Across teacher and faculty professional development efforts, there is significant momentum around building professional learning communities. More research however is needed on how the design and emergent norms of such communities enable or constrain particular learning opportunities for educators. In this paper, we share a comparative analysis of the conversations unfolding in two distinct faculty groups (associated with the Next Generation Physical Science and Everyday Thinking Faculty Online Learning Community). We choose to focus on moments in their video conferences when similar issues arise (e.g. concerns about pacing). By comparing these moments, we demonstrate important differences in how the instructional problem is posed, how participants interact with the problem, and how these differences open up and close off opportunities to learn.

## I. INTRODUCTION

The Next Generation Physical Science and Everyday Thinking curriculum (NGPET) is a research-based, guided inquiry curriculum [1] designed to help prospective elementary teachers learn physical science in ways consistent with the Next Generation Science Standards. Shortly after the curriculum was published, the NGPET faculty online learning community (FOLC) (<http://ngpfolc.com>) was established to address some of the challenges associated with long-term implementation of research-based instructional strategies [2, 3]. The NGPET FOLC provides a mechanism for faculty using the curriculum to discuss both specific implementation issues and general issues related to teaching and learning. Currently, the FOLC has 48 members divided into four clusters, each with two or three cluster leaders who have extensive experience with prior versions of the curriculum. In one cluster, faculty use a version of the curriculum designed for lecture-style classrooms [4], and in the other three the faculty use a version designed for studio-style implementations [5, 6]. The clusters meet twice a month via Zoom video conferencing, and also communicate via an online portal system and email.

In this study we compare faculty conversations in two clusters around the topic of pacing. In one cluster, referred to here as the blue group, most faculty teach the lecture-style version or a lecture-studio hybrid. In the other cluster, the green group, all faculty are implementing the studio-style. Issues of pacing are quite different in the lecture and studio style implementations. Lecture-style classes are shorter, involve little or no hands-on experimentation, and are much more faculty directed. In studio-style classes student groups are more independent than in the lecture-style classes, they engage in extensive hands-on experimentation, and participate in more whole class discussions. Consequently, keeping student groups on pace presents different challenges in the two settings. We analyze two examples showing how conversations about pacing can play out. Variations in facilitation and participation lead to either surface level or rich in depth discussions.

## II. CONCEPTUAL FRAMEWORK

The attributes of faculty learning communities are highly variable and a shared curriculum or goal is not the only factor that can influence the trajectory of a conversation [7]. Conversational routines enacted by members of the group in order to solve a problem [7] can open up or close off opportunities to learn (OTLs) [8, 10]. OTLs are moments where educators have the ability to learn something new or change their perception of an idea and can apply that knowledge to future work.

The manner in which the originator of a problem presents their problem, called problem framing, is a conversational move that influences the trajectory of the conversation [11]. The amount of detail provided in the initial posing of the problem gives group members information to move the conversation forward. The problem poser can position their problem with respect to different frames depending on the goal of the problem poser and the group as a whole [9, 12]. This positioning can alter the direction of the conversation as different solutions are proposed, for example student-centric solutions or logistical solutions.

Epistemic claims (ECs) are statements or singular turns of talk that participants in the conversation make about the following dimensions: teaching (T), students (S), and the curriculum/content (C) [8]. ECs can concern one dimension or link multiple ones and often are met with normalizing, which occurs when other participants show solidarity or reassurance about the problem [7, 13]. Participants may briefly remark on the EC and then move on to other topics, called turning away [7]. Conversely, the participants may invite the problem poser to elaborate on their problem or ask clarifying questions about their specific situation, called turning toward [7]. In turning toward, the group is likely to go into more detail about an issue and work out possible solutions and the problem poser has a significant role in defining the problem and interacting with possible solutions. OTLs generally encompass multiple turns of talk, which include specific ECs and periods of turning toward. We have selected for analysis one example

that is more consistent with turning toward (green group) and another with turning away (blue group).

### III. ANALYTICAL APPROACH

We focus on one clip each of conversation from the blue and green groups concerning issues of pacing. To select these clips from hours of conference call videos, the blue and green groups were monitored for major topics of discussion, epistemic claims, normalizing, and examples of turning toward and away. During the initial monitoring phase, clips were brought to research group meetings to refine claims and ensure that interpretations of different constructs were robust [14]. Most notably, multiple collaborative meetings were spent refining the definitions and examples of turning toward and turning away. One of the most important aspects of the construct was the agency the problem poser had over the conversation and the subsequent actions the participants took with respect to the problem posed.

The second stage of analysis consisted of further collaborative discussion of episodes from our monitoring as well as a more fine-grained analysis of the selected clips on pacing. The clips were selected because they seemed to be representative of the patterns of the two groups at the time and they dealt with similar topics. ECs in each clip were identified and tracked throughout the conversation to determine where certain ideas were or were not being taken up. We also considered the expertise level of the group leaders. Though both sets of group leaders were considered experienced, the green group leaders have significantly more experience with previous versions of the curriculum than the blue group leaders. This may impact the conversational moves made in the following clips. Here, we aim to identify what conversational moves open up or close off OTLs.

### IV. ANALYSIS AND FINDINGS

The two episodes provide examples of online synchronous conversations that take widely different trajectories based on the conversational moves by participants. The conversation in the blue group concerns class pacing and the need for a more regimented class structure in order to keep students on task. The green group episode concerns issues with the class moving faster than expected and the underlying factors that contribute to this. The two clips will be compared with respect to how the problem posers present the problem and how the other participants including the group leaders interact with the problem.

*Blue Group* The blue group meeting considered here included group leaders Chester and Corey, group members Leonard and Gwen, and three others who were not involved in the conversation of interest. Leonard presents a pacing problem, "We've become a little less studio as it's gone along, because if we give them too much freedom, they just take forever. So we need to be pretty regimented about, '... we're finishing this and starting this part. Okay, now we're going

to start this part.'" Leonard's EC links teaching and students: with too much freedom, students will take too long. He has tried making the class more structured to fix this problem.

Participants do not explicitly ask for clarification of claims (Table I). Corey normalizes the situation, then gives some quick pacing advice (B1). Corey makes an EC about some groups moving more slowly than others, but this is not picked up by anyone in the group. Chester then makes a new, unrelated EC about the curriculum and teaching, describing the difference between pacing and consensus in the studio and lecture style versions (B2). Corey picks up this claim and adds that the time to consensus also varies by topic (B3). Chester then restates his previous claim (B4). Gwen takes up Corey's EC about pacing by topic, providing specific examples (B5). That EC was not further expanded upon and Chester changes the subject right after.

*Green Group* The green group meeting considered here included group leaders Carter, Clay, and Courtney and group members Yin, Mansour, and Taylor. Yin presents a problem regarding her current class moving much faster than she anticipated based on the speed of her previous class, where she did not use NGPET. She offers up a list of possible reasons for this issue: 1) is the transition from energy to forces better, 2) do the energy and forces units take different amounts of time, or 3) does it have something to do with providing incentives for finishing assignments early or on time?

Courtney asks about Yin's use of incentives in class and gives an example from her own class where incentives worked well with respect to pacing (Table II, G1-3). Yin acknowledges Courtney's contribution to the conversation and reiterates one of her initial ECs about the curriculum by asking if one of the units (forces or energy) takes longer. Taylor and Carter answer her question directly saying that neither unit seems to take longer than the other (not included in Table II). Carter then normalizes Yin's pacing issue, revises her problem, and explains what he does to keep students on track, providing an additional possible factor leading to students moving faster through the curriculum (G4). Taylor gives an example of a similar technique she employs in her non-NGP engineering class (G5). Carter points out an issue with Taylor's suggestion and Taylor justifies her idea further (G6-7). Mansour and Courtney agree with Taylor and Carter's contributions and Courtney provides backing for the technique (G8-9). Yin maintains agency over the conversation here, stating that the solution is useful and she would like to try it. Even after Yin takes up that solution, Carter gives more examples of classroom strategies that may be helpful as well. The conversation persists not only to help Yin, but also to benefit the entire group. Carter winds down the conversation saying, "I know no fixed solution to it, but lots of good ideas to try." Yin closes the conversation on pacing by bringing up one last explanation for the change in pacing regarding the deliberate grouping of students based on their abilities and also that the issue will always exist in some capacity so there may not be a perfect solution.

*Findings* In the initial posing of the problem, Yin (green

TABLE I. Transcript of the blue group segment on pacing.

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- B1 Corey: **In the studio style, pacing is a much bigger issue, and keeping the groups somewhat together, because some groups like, "Oh, we've got this." And some groups take longer. (EC-TS) So helping those along, and give... different little extension questions for the groups that are cruising (EC-T)**, like, "Oh, what if I change this." It's definitely a part of it.
- B2 Chester: I think one of the things that I heard along the way somewhere, at one of these workshops, was that **the idea behind the studio style, and the lecture style is a little bit different in terms of when you would expect students to have reached a consensus. (EC-TC)** So in a lecture setting, where you're trying to guide them all in a relatively uniform way, you would sort of have the consensus attempted at a lesson by lesson frequency, whereas you'd be willing to let that draw out a little longer in the studio as they arrive at their consensus, a little bit closer to the unit order of scale, and **let them maybe carry issues from activity to activity.(EC-T)**
- B3 Corey: I think the place in the lecture that's different, in lecture **for the magnetism unit, you let them go longer, but for the other units, you mostly hit that consensus by the end class typically. (EC-T)**
- B4 Chester: **You might want to let things string out a little bit, but you also don't want to leave so that they're dawdling, and you're going so slow that they lose the story. (EC-T)** So, interesting.
- B5 Gwen: Well the **consensus seemed to be more of an issue in magnetism and static electricity, not so much in interactions and energy. (EC-T)** It's more like we're telling you this is our model rather than informing the model, it seems like.
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TABLE II. Selections from the transcript of the green group segment on pacing.

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- G1 Courtney: So you're giving them incentives to stay focused this time that you didn't last time, is that?
- G2 Yin: Yeah, last time a lot of my students started chatting just random stuff with each other, not about the content related. So this time I say, "Well, if you do finish this particular activity you can take a break..."
- G3 Courtney: **I have found in my classes that that makes a difference. (EC-S)** A couple of years ago I was just having trouble, they were taking the whole time. I have them for a two-hour chunk, and even really short activities seemed to be taking the whole two hours when it had never taken two hours before. And I went home and I was complaining about it, and my kids were like, "Well, mom, did you tell them that you get out early if they finish?" And I said, "Well, no, I thought that was obvious." And they were like, "No, you gotta tell them." And so I told them that. You know, "We're only doing this one activity today, so if you finish early then you get to leave early." Let me tell you, they started working much, much faster... I mean, **they weren't working fast and sloppy, they were working fast and getting their work done and concentrating and paying attention, and it made a big, a huge difference, (EC-S)**
- G4 Carter: I struggle with this same issue. Something I sometimes do is tell them at the beginning of an activity about how long I think it will take... if we start a new activity like a half an hour in, I'll say, you know, "This activity often takes classes about 50 minutes finish. It may take us a little more, a little longer, and it's totally fine. But I am hoping that you will finish your small group work on this by, you know, 1:30, and that will leave us 20 minutes to discuss the activity as a full class before you leave today. So that should be your goal. Try to stay focused, and we'll check in and adjust that schedule as needed." **So that I'm trying to communicate to them that they should work at their own pace in order to make sense of all the ideas, but that also there is some urgency to keep moving forward... (EC-TS)**
- G5 Taylor: I've been finding in my Engineering intro course, I had these activities that would take a really long time, and I found that if I sort of had intermediate points that were goals, and I would like make the whole class either discuss or vote or put something up where like, **"Okay, we should be here at this time," and it would kind of help everybody kind of catch up to that and so it would keep everybody on task. (EC-TS)**
- G6 Carter: I think that's a nice idea. But the Next Gen PET curriculum has these established checkpoints at the end of every activity, so it would require a little bit of...
- G7 Taylor: That's what I used to have, but **it was too big a chunk for them to really manage their time. (EC-SC)** But if there was intermediate result, or some question part way, or like, something that's sort of on a 10-minute scale, not on a 20-minute scale...
- G8 Mansour: **I think breaking the time to smaller pieces would be kind of helpful. (EC-TS)** Because, see, when we have a group that is slow and we read for it like for 30 minutes...
- G9 Courtney: **What I've found is that the slow groups often don't realize that they're slow, (EC-S)** and if you wait until the very end of class then you're like, you know, "Come on, guys, you got to catch up." And they're like, "We didn't know we were behind."
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group) is very clear about what she wants to talk about by outlining three possible explanations along with her problem. Leonard (blue group), on the other hand, is not clear about what kind of feedback he is interested in. Yin more clearly invites others into generating and evaluating possible explanations for her observed pacing differences. After posing the

problem, participants in the green group ask clarifying questions and delve into the problem poser's specific situation, whereas in the blue group the group leaders move quickly to proposing solutions.

In both segments solutions are given, but the extent of the interactions are different. In the blue group, the solutions

stand alone, while in the green group solutions mentioned are generative for further conversation. As well, the solutions in the blue group were group leader generated, while the green group leaders and members provided and discussed solutions. The blue group leaders also moved the conversation along more quickly by offering solutions and changing the topic soon after. Leonard did not wrap up the conversation like Yin. This could have been due to the blue group leader changing the subject or due to the general framing of the conversation. There is a greater precedent (from previous cluster meetings) for elaboration and the taking up of claims in the green group than the blue group, so it made sense for Yin to interact with the other members' claims before moving on. This norm can be seen in not only this clip, but in the majority of the green group online conference calls. In the blue group, leaders seem to intentionally change the subject in order for everyone to be heard and are the main providers of solutions. Overall, the presentation of the problem, the norms of the group and the interactions between group leaders and members influenced the trajectory of the conversation to bring about or suppress OTLs.

## V. CONCLUSIONS

The contrasting cases we present show how conversations around similar topics can unfold differently and that both group leaders and members have a hand in moving the conversation forward by making ECs, turning toward problems of practice and as a result promoting OTLs. The green group conversation could be deemed more successful for the following reasons: a) the group acknowledges that they have made some progress together with clear OTLs, b) the group seems to be turning toward problems of practice, in ways that make us think that they are being exposed to multiple different perspectives on the work of teaching, and c) the group focuses on multidimensional claims often linking students, teaching and the content/curriculum.

Yin and Carter from the green group connected the provided solutions to future work and showed that the group could use the knowledge gained from the conversation in the

classroom. There were no signs of applications for future work from the blue group conversation. The blue group solutions were not explored thoroughly and other members of the group did not ask for more detailed descriptions or clarifications. In the green group meeting, there were multiple perspectives on one solution being proposed. This would more likely result in deeper understandings of the problem and possible solutions. The ECs made about the problem and solutions focused on multiple dimensions rather than on mainly students compliance or whether and how students were doing what they were asked to do in the given amount of time [15]. Leonard in the blue group was concerned about "giving the students too much freedom" and that they end up "taking forever" to finish the assigned work and frames his issue as how to get students to comply and move forward. Yin and the other green group members looked at the problem from a holistic view of how their teaching influences students and how it connects to the nature of the curriculum. This shows that from the beginning the problem posers frame their problems entirely differently. By offering more detail to begin with, Yin makes it clear that she is looking for specific solutions. The Green group aimed to understand the underlying reasons for the issue and how to specifically solve it.

These differences could have implications for moves facilitators and group members could take to dig into the deeper issues around the original problem posed. Facilitators or group members of the group could ask questions that encourage the problem poser to elaborate a more specific claim. Then, specific claims could be attended to in order to expand the scope of the conversation. In turn, the group could solve the issues of the original problem poser with multiple perspectives. In this study we aim to understand how FOLCs can operate and how to garner meaningful discussions that promote OTLs.

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- [1] <https://nextgenpet.activatelearning.com>. Retrieved 7/6/18.
  - [2] C. Henderson, A. Beach, and N. Finkelstein, *J. Res. Sci. Teach.* **48**, 952-984 (2011).
  - [3] C. Henderson, M. Dancy, and M. Niewiadomska-Bugaj, *Phys. Rev. ST Phys. Educ. Res.* **8**, p. 020104 (2012).
  - [4] F. Goldberg, E. Price, S. Robinson, D. Boyd-Harlow, and M. McKean. *Phys. Rev. ST Phys. Educ. Res.* **8**, 010121 (2012).
  - [5] F. Goldberg, S. Robinson, and V. Otero, *Physics and Everyday Thinking*. (Activate Learning, Greenwich CT, 2007).
  - [6] F. Goldberg, V. Otero, and S. Robinson, *Am. J. Phys.* **78**, 1265 (2010).
  - [7] I. S. Horn and J. W. Little, *Am. Educ. Res. J.* **47**, 181-217 (2010).
  - [8] R. P. Hall and I. S. Horn, *Mind. Cult. Act.*, **19**, 240-258 (2012).
  - [9] N. A. Bannister, *J. Learn. Sci.*, **24**, 347-372 (2015).
  - [10] J. G. Greeno and M. S. Gresalfi, in *Assessment, equity, and opportunity to learn*. (Cambridge University Press, Cambridge, England, 2008).
  - [11] E. Goffman, E. *Frame analysis*. (Northeastern University Press, Boston, MA, 1974).
  - [12] I. S. Horn (2007). *J. Learn. Sci.*, **16**, 37-79.
  - [13] J. W. Little, and I. S. Horn, in *Professional learning communities*, (McGraw-Hill, UK, 2007).
  - [14] R. A. Engle, F. R. Conant, and J. G. Greeno, in *Video research in the learning sciences*. (Erlbaum, Mahwah, NJ, 2007).
  - [15] E. M. Baldinger, in *Teacher Noticing*. (Springer, Cham, 2017).