

Promoting proximal formative assessment with relational discourse

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Abstract. The practice of proximal formative assessment – the continual, responsive attention to students’ developing understanding as it is expressed in real time – depends on students’ sharing their ideas with instructors and on teachers’ attending to them. Rogerian psychology presents an account of the conditions under which proximal formative assessment may be promoted or inhibited: (1) Normal classroom conditions, characterized by evaluation and attention to learning targets, may present threats to students’ sense of their own competence and value, causing them to conceal their ideas and reducing the potential for proximal formative assessment. (2) In contrast, discourse patterns characterized by positive anticipation and attention to learner ideas increase the potential for proximal formative assessment and promote self-directed learning. We present an analysis methodology based on these principles and demonstrate its utility for understanding episodes of university physics instruction.

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INTRODUCTION

National standards emphasize formative assessment as among the most valuable tools for enriching student understanding in science [1], consistent with research demonstrating that learning gains from systematic attention to formative assessment are larger than most of those found for any other educational interventions [2]. Classically, the goal of formative assessment is to create structured classroom activities that engage and display student ideas for the purpose of responsive lesson planning. An instructor thinking in terms of classical formative assessment might reflect, “My students’ written work doesn’t show whether they are conserving energy; tomorrow I will have them use a different representation so I can see their model of energy in more detail.” “Proximal” formative assessment, in contrast, takes place moment-to-moment; it is the continual, responsive attention to students’ developing understanding as it is expressed in real time, for the purpose of responsive interpersonal interactions [3]. An instructor thinking in terms of proximal formative assessment might say to herself, “I don’t know what this student meant just now by the term ‘perpetual motion’; I’m going to ask her if this rolling ball is an example of that.”

Either type of formative assessment depends on students’ willingness to share their ideas with instructors. In what follows, we describe a theoretical framework that identifies conditions in which learners are more likely to explore their ideas, and apply the framework to two different episodes of classroom activity. We observe that in the cases presented, positive anticipation and attention to learner ideas increase the potential for proximal formative assessment, while evaluation and attention to learning targets cause students to conceal their ideas, depleting the classroom of information that could be valuable for instruction.

ROGERIAN DISCOURSE THEORY

The American psychologist Carl Rogers pioneered the ideas that people are resourceful and self-improving; that self-examination requires courage; and that helping professionals (such as therapists or teachers) can help by being *genuine*, *acceptant*, and *empathetic* [4]. In Rogers’ day, these principles contrasted strongly with the prevailing Freudian psychology, which posited that people are helpless and self-destructive; that successful therapy fosters anxiety to motivate people to accept difficult truths perceived by the analyst; and that professional therapy succeeds best when the analyst is remote (a blank field for

transference), interpretive (offering insight the client lacks), and confrontational (distressing the patient into seeking change) [5].

Relational Discourse

We term discourse that is aligned with Rogers' ideals *relational discourse* to emphasize its focus on a direct and engaged interaction between human persons. Rogers identifies participants engaging in relational discourse as being *genuine*, *acceptant*, and *empathetic*. To be *genuine*, according to Rogers, is to have qualities of transparency, immediacy, and openness, conveying that the speaker is fully present in the moment and has nothing to hide. The quality of being *acceptant* may precede any actual interaction: it is a mindset of positive anticipation, an approach in which interactants show an expectation that what they may hear will likely be worth hearing. Rogers used "warmth" and "prizing" as synonyms for this quality, and famously termed it "unconditional positive regard" [4]. To be *empathetic* is to see a situation as through another person's eyes, understanding their specific experience while retaining a separate sense of self.

The discourse properties described above are described in Rogerian theory as having educational effects as well as the therapeutic ones that were Rogers' primary interest. When instructors are *genuine*, for example, students know where they stand, and as a result feel secure. When students detect positive interest (because the instructor is *acceptant*), they feel their ideas have potential worth. When students hear instructors represent their ideas *empathetically*, they feel understood. The implications for the classroom are to promote proximal formative assessment: Learners are more likely to have the courage to explore their ideas, and find in the process that it is safe and productive to share their developing understanding with instructors and peers. The result is to foster learning that is original, self-directed, and integrated. As a result of such experiences, learners are predicted to become more creative, adaptive, and autonomous [4].

Ideological Discourse

In *ideological discourse*, the primary interaction is less between people as they are in the present moment, and more between *ideas about* people or things. This form of discourse is roughly complementary (or opposed) to the relational discourse described above. Rogers understood ideological discourse to be the normal, everyday form of human interaction [4].

Rogers does not offer single terms to characterize participants who are engaging in discourse that runs counter to his ideals. We formulate the opposite of genuine as *presentational*, to capture the sense that the speaker is putting on a front for the purposes of favorable appearance, while intentionally hiding less desirable aspects of the self. Presentational discourse is characterized by mixed messages and a sense that the speaker is remote or playing a role. An alternative to being acceptant is to be *vigilant*, that is, to have an approach in which interactants show an expectation of trouble or unpleasantness. Rogers was particularly concerned with the negative effects of *evaluation*, which he saw as being both pervasive and incompatible with empathy in that it involves measurement against an outside standard.

In Rogerian theory, instructors who are *presentational* provoke anxiety in students, who (like all humans) are very concerned to know where others stand. In this perspective, an instructor who maintains a "poker face" in the interests of shielding students from his own reactions to their thinking may in fact be disturbing students more than if he had revealed his thinking. Similarly, when students detect negative expectations (*vigilance*), they feel apprehensive. Finally, when instructors are primarily *evaluative*, the instructor-student discourse may be directed by attention to errors, and students may experience their unique ideas as irrelevant to the learning activity. The implications for proximal formative assessment are that learners may feel threatened and conceal their ideas, depleting the classroom of information useful for instruction. The intention of such instruction, though, is not to cause harm; rather it is intended to promote learning that reproduces established results. The goal for learners is to efficiently acquire expert knowledge and skills.

ROGERIAN ANALYSIS OF TUTORIAL EPISODES

Rogers was highly concerned with the empirical evaluation of therapeutic methods. He defined his approach in operational terms, developed reliable measurement procedures, and was among the first to record psychotherapy sessions for the purpose of research [4,5]. In what follows, we extend his analytic effort to observe the effects of relational and ideological discourse on proximal formative assessment in university-level physics instruction.

The episodes we analyze took place as part of a two-semester algebra-based introductory physics course at the University of Maryland (UM). One hour per week of this course was spent on worksheet-based group-learning activities ("tutorials") produced at UM.

The tutorials were constructed to emphasize the reconciliation of everyday, intuitive thinking and experience with formal scientific thinking [6].

Any form of discourse is an interactional achievement among all the participants. However, Rogers emphasized the special responsibility of the helping professional (instructor or therapist) for setting the tone in an interaction. In the brief analyses that follow, the analytic focus is on the instructor, though student contributions are considered as well.

Relational discourse promotes proximal formative assessment

In this first episode, as part of a tutorial on hydrostatic pressure, three students (“Sarah,” “Dev,” and “Gina”) consider whether water will squirt out more strongly from a hole in the side of a wide beaker or a narrow one (the holes are at the same depth). The purpose of the exercise is for students to consider whether the strength of the squirting is determined by the depth of the hole or by the weight of the water above the hole. While the students are discussing the question, the teaching assistant (TA), “Joel,” enters the scene without speaking and smoothly lowers himself onto an empty stool. Joel leans in toward the joint space of the table as he pulls his sleeves over his hands and places his covered hands in front of his mouth. He remains in this approximate position for 20 seconds, moving his gaze to each student as he or she speaks, or to their shared workspace on the table when that is the focus of the students’ attention. The students’ conversation during this time is continuous, on-task, and directed at one another, not Joel. The interaction with Joel begins with a direct question from Dev:

Dev: I have a question, I know depth is height, but the way he explained it in lecture is, he was using height until he mentioned surface pressure, and then after that he started using the word depth. So is depth, does that include the surface pressure plus the height?

Joel: Well usually, I’m not sure what happened in lecture, usually the word depth refers to sort of your distance from the surface.

The students continue debating the question of which beaker will produce the stronger stream for about 30 seconds before Joel speaks further. At that point his contribution is to begin to characterize two sides of an argument that he seems to see taking shape:

Dev: I think it’ll shoot out the same, it’ll just shoot out less,

Sarah: It’ll shoot out the same...with less force?

Dev: Like it won’t shoot out as far.

Joel: OK, so you say, so you’re saying it won’t shoot out as far, so this will do something different than the little

Sarah: It’ll be like weaker, the acceleration of the water leaving the hole won’t be as fast.

Dev: Actually, no it won’t.

Joel: OK, won’t be as

Sarah: Because there’s more area to contend with so

Joel: Good, so here you’re saying there’s more area here, so there’s more area to contend with because it’s wider [Sarah: mmm-hmm], so it should shoot out less fast than the narrow one, that’s your stand [Sarah: yeah] or your claim.

Gina: Okay.

Joel [to Dev and Gina]: Good, do you all agree or disagree? It sounds like you want to disagree.

In the above interaction, Joel shows *genuineness* partly with his tone, which feels relaxed and open; there is a feeling that he’s “all here.” The students appear to take him at face value, rather than giving an appearance of needing to figure out what he’s really saying; they are continuously engaged in their discussion, rather than watching for his responses to them. When Joel has an interpretation to offer, he is transparent with it (“It sounds like you disagree”). Joel displays an *acceptant* attitude in showing a modest curiosity about the students’ ideas: he leans in to listen. His quiet arrival at the table, as if slipping into a theater, suggests respect for what might be transpiring there. In this episode Joel’s *empathetic* stance is displayed particularly strongly. His main interaction with the students is to describe their ideas clearly. He visibly supports each one (“Good”) without appropriating it (“that’s your stand, or your claim”).

The key outcome of this interaction is that the students continue to discuss their ideas productively. Joel continues to learn more about what they are thinking in the moment and respond to them based on what he learns about their ideas. In other words, proximal formative assessment is promoted.

Ideological discourse inhibits proximal formative assessment

The second episode we will analyze is from a tutorial on kinematics in which students are trying to graph velocity vs. time for a cart that rolls freely up and then down a ramp. The correct answer in this case is a straight diagonal line downward from a positive value through zero to a negative value. The students’ answer is a curved line that descends steeply at first, levels out to horizontal as it reaches zero, and then curves downward again as the velocity becomes more

negative. The TA, “Tim,” approaches the table while the students are writing quietly on their individual worksheets and stands at the end of the table. As he enters the camera frame, “Theresa” looks up at him and opens an exchange:

Theresa: Yeah we figured it out.

Ryan: We fixed it.

Theresa: You tried to fool us.

Tim: What does it look like? Hm.

Ryan: Cause it’s going the opposite direction, so thus it would have a negative velocity.

Tim: I see.

Ryan: We’re guessing.

Tim: Do you guys agree that it’s curved like that?

Theresa: Hhh [drops face into both hands (see figure)]



Ryan: Ummm

Theresa: We did.

Julie: We used to agree with that.
[6 sec pause]

Tim: I’ll let you guys discuss. [Tim backs away from table, leaving the frame.] That’s uh, an interesting question to consider.

Theresa: [glancing in the direction Tim went, then downward to the space between her and Ryan:] Torture. This is torture.

Ryan: I know.

Julie: [drops face into both hands, then looks up and around the room] Where’s that other guy?

The fourth student, “Lynn,” restarts the discussion with “Wait, let’s just think about this,” and discussion continues without Tim present.

The primary effect of Tim’s interaction with these students is for them to learn from him that their graph is not correct. However, Tim’s explicit speech is an inquiry regarding consensus. In this sense, Tim is relatively *presentational*, speaking in such a way as to conceal the socially difficult fact that he is judging them negatively. In another mixed message, Tim says he will “let them discuss” as if they were trying to do so, when in fact they were silently regarding him or their worksheets at that time. As Tim says, “That’s an interesting question to consider,” he backs away from the table, giving a sense that he has “one foot out the door.” There is a sense that Tim may be wondering what he is supposed to do in this situation, perhaps making an effort to role-play proper TA behavior.

Tim’s behavior is *vigilant* in the sense that he seems apprehensive about seeing their answer; he remains standing with his hands behind his back and rocks from side to side as he peers downward at their worksheet. Though Tim’s face is not visible on screen, the students’ faces suggest apprehension about how he will respond to what he sees.

Finally, the substance of Tim’s interaction with the students is *evaluative*. His expressed concern is with the incorrect features of the graph. He does not describe possible student thinking that might have gone into creating the graph.

The key outcome of this interaction is that the students do not discuss their ideas with Tim further. Though the students continue their discussion among themselves, Tim does not have the opportunity to learn more about what they are thinking in the moment. Even if he were to return to the table, he would have little basis with which to engage with them about their ideas. There is even a concern that they might purposely conceal their ideas from him, even avoid interacting with him (by seeking another TA), in order to avoid further “torture.” In other words, proximal formative assessment is inhibited.

SUMMARY

Rogers’ central hypothesis may be stated as: to the extent that a teacher is more genuine, acceptant, and empathetic, the learners will be more functional, self-directed, original, understand themselves and others better, use more of what they already know, and cope better with problems [4]. We see this hypothesis modestly borne out in the episodes analyzed here.

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