

## Investigating Teacher Data Needs In Terms of Teacher Immediacy and Nonverbal Behaviors

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**Abstract:** Teachers play a crucial role in students' learning. Therefore, it is important to support teachers in their teaching practice. In particular, it is important to support teacher immediacy which is essential to improving learning and creating a positive classroom environment. We describe an exploratory study aimed at understanding teachers' immediacy data needs. Teachers showed interest in such data about themselves and their students. We discuss how teacher immediacy data can help teachers in their practice.

### Introduction

Teachers are crucial in supporting students' learning, making it essential to support teachers in their practice and help them improve their teaching. Professional development (PD) is a typical way to provide such training. PD is highly effective (i.e., Avalos, 2011) but can often be repetitive, not personalized, not scalable and infrequent (Hill, 2009). PD also often overlooks teacher immediacy, an important aspect of teachers' classroom skills. Teacher immediacy involves the nonverbal behaviors that reduce physical and/or psychological distance between teachers and students and increase their interpersonal closeness, with the ultimate goal of enhancing student learning (Andersen & Andersen, 2008). Examples of nonverbal behaviors include location, movement, eye gaze, smiles, nods, posture, gestures, etc. Prior work has shown that teacher immediacy and nonverbal behaviors have a positive impact on teaching, learning and on creating a positive and inclusive classroom environment (i.e., Andersen & Andersen, 2008; Witt et al., 2004). It has been extremely challenging to collect data on such features (i.e., teacher gaze during class or students' gaze over the semester) to use in PD, even with professional observers. Recent advances in instrumented classrooms (i.e., Ahuja et al., 2019) enable opportunities to easily collect a variety of nonverbal immediacy data and provide teachers with personalized and scalable feedback. Literature shows that when teachers view classroom data, it helps their practice and they significantly change their teaching practices (i.e., Xhakaj et al., 2017 a; b). Here, we report on an exploratory study to investigate teacher data needs in nonverbal immediacy behaviors as a step towards supporting teachers' classroom practice.

### Methods

We recruited 8 instructors and collected video data for 3-9 classes per instructor using the EduSense instrumented classroom (Ahuja et al., 2019) during the Summer 2019 semester at an American university. We then scheduled a 1-hour semi-structured interview with instructors; they were compensated \$15/h. We paired the interviews with PD modules on immediacy, and visualizations (Figure 1) that presented teachers with a subset of data collected from their course with EduSense. The visualizations aimed to start a conversation with instructors and engage them in a discussion around immediacy, nonverbal behaviors, and data they could envision wanting or needing. We transcribed the interviews and conducted a thematic analysis.



Figure 1. Examples of the visualizations shown to teachers.

### Findings

All teachers expressed interest in various immediacy and nonverbal behavior data. Teachers expressed strong interest in their own data. They wanted to know location and movement data including what activity they were conducting at the front of the class, i.e., were they writing on the board, lecturing in front of the projector, etc. (1). Teachers also wanted to know their distance from the board (1), were they sitting or standing (1), their proximity

to students (1), and how students were distributed in class, to determine where they need to spend more time (2). Half of the teachers (4) were interested in their eye contact and gaze. For example, one teacher was interested in how often they face their class, while another was interested in having egalitarian eye contact with students. Teachers were also interested in posture data such as were they standing straight and showing enthusiasm (1), how their body language differed based on the activity (1), and whether they had egalitarian physical engagement with students (1). One teacher was interested in how much they smile, and another was interested in gesticulation synchronized with speech. Lastly, two teachers were interested in metadata such as gender or age: how this plays a factor on whether they stood behind the podium or in front of the class (1), and the other, on how this differentiated the kind of interactions they have with students or indicated any biases in those interactions.

Further, all teachers were interested in student data. Specifically, they were interested in different aspects of student engagement, attentiveness, and focus during class. For example, 3 teachers were interested in students' engagement in relation to devices, such as phones or laptops. Teachers thought these devices sucked students' attention from class. Another teacher was interested in the "back and forth" they had with their students, while two teachers were interested in student eye contact data. Two teachers wanted to know about students' body position, as a proxy for engagement. Specifically, they wanted to know if students were slouching or if they were leaning forward on their computers, if they were writing and how much they were taking notes, especially when it was unprompted by the instructor. One teacher wanted to see student leg positions as a way to tell if any of the students were completely closed off in their physical interactions.

In addition to student data, teachers were interested in "student reaction data", namely how students react to teacher actions in class. Teachers thought that this kind of feedback could help them gauge how effective their own practices were. For example, if they stood at a certain location or if they used certain gestures, would that help them reach their goal of increasing student engagement? Two teachers were interested in how student attentiveness, engagement and gaze is relative to where the teacher is standing in class, and how students' body positions change when the teacher moves around in class. Another teacher was interested in how the imbalance in their position in class affected their students, in particular if that caused them to be less focused and inattentive. Similarly, another teacher was interested in the effects of smiling on student attentiveness. Lastly, one teacher was interested in knowing how different students react differently to their actions

## Discussion and Conclusion

In this paper, we describe an exploratory study to investigate teacher data needs regarding immediacy and nonverbal behaviors, and to better understand how such data can support teachers in their practice. Findings showed that teachers valued immediacy and nonverbal behaviors and were interested in data to support their instruction and improve on their practices in these areas. Teachers were interested in data about themselves, their students and how their actions affect their students in class. In particular, teachers wanted to use this data to keep and increase student engagement and to create a more equitable classroom environment, by sharing their time and attention equally among all students. These results show that there is value in providing teachers with data and feedback on both teacher and student classroom behaviors. In our future work, we aim to design technologies that will help teachers reflect on their immediacy and nonverbal behavior data to support their classroom practice.

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