



Why Did I Ask That? The Questions Graduate Teaching Assistants Ask Their Students

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Abstract

This qualitative study examined three graduate teaching assistants (GTAs) and the types of questions used in their teaching. We considered data consisting of video from two class meetings for each GTA. After the first recorded class meetings, each GTA viewed and discussed a video case of college mathematics instruction concerning the concept of slope that illustrated various questioning techniques. Each GTA was then video recorded a second time. The goal of the study was to explore the potential of the video-case professional development activity on GTAs classroom practice in the context of questioning techniques.

Literature Review

Speer (2001) examined how TAs beliefs about learning impacted their teaching decisions. We chose to extend this research by focusing on how GTAs ask questions in their classrooms. Specifically, can viewing video vignettes positively influence the ways in which GTAs chose to ask questions in their classrooms? The participants viewed a video vignette illustrating different questioning techniques. This video vignette was designed to assist in GTAs professional development (Hauk, Kung, Segalla, & Tsay, in press).

Methods

Each GTA was video recorded once prior to viewing the video vignette and once after viewing the video vignette. The questions asked by each GTA during their classes were transcribed. Using a grounded theory approach (Strauss & Corbin, 1998) these questions were then reviewed and coded for emerging themes. Through open-coding, themes were developed, and then consolidated into categories and subcategories through selective coding (Creswell, 1998; Strauss & Corbin, 1998). To provide validity, researcher triangulation was used to code for the theme searching.

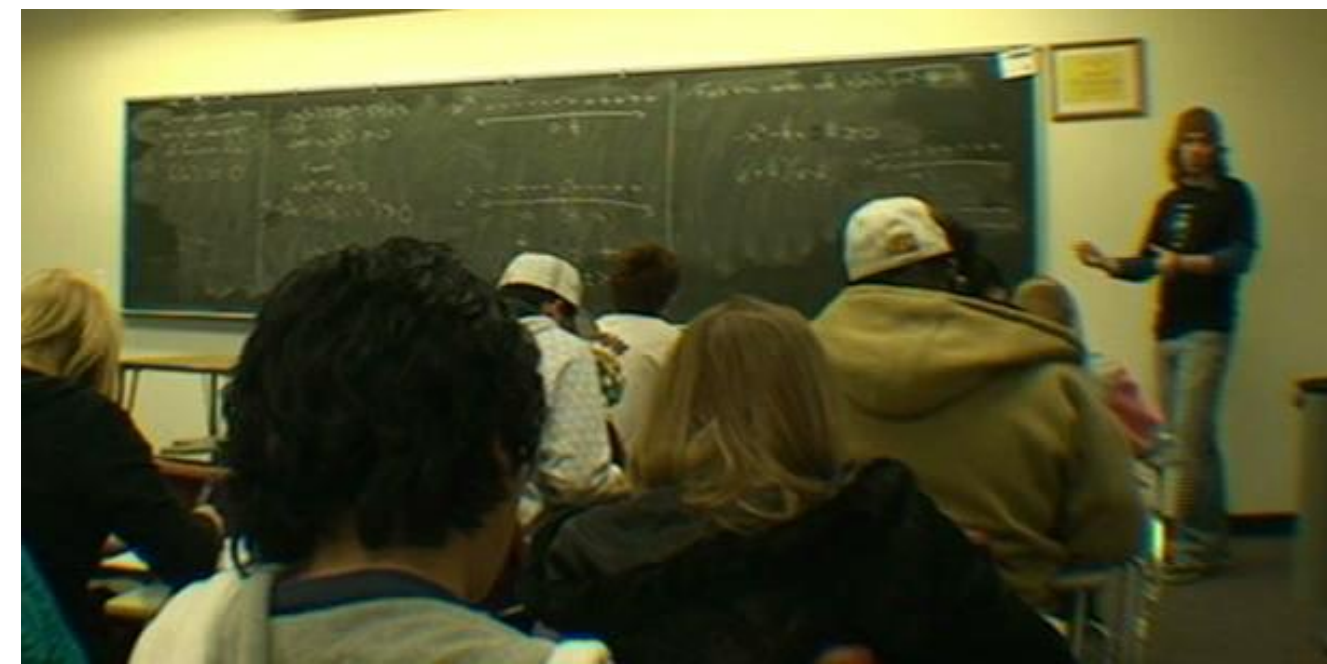
Participant Biographies

Lee: This is currently Lee's third year as a graduate teaching assistant, two years at the University of Kentucky and one year at the University of Northern Colorado. This is his third semester teaching college algebra. Lee believes the questions he asks during his class serve two purposes, 1) to build students' self-confidence and 2) to guide the direction of their learning. Without this direction Lee believes that students may construct connections between mathematical concepts inaccurately or students may learn processes and procedures incorrectly.

Kristin: Kristin has taught at both the high school and undergraduate level for five years; one year at the high school level and four years at the undergraduate level. Kristin believes that students learn best when they generate their own understanding through inquiry or exploration, not lecture. Kristin believes that by questioning students' reasoning she can challenge their misconceptions and help them see relationships and connections between mathematical ideas and concepts.

Aaron: At the time of the study, Aaron was teaching College Algebra for the first time. He is Deaf and used two interpreters to aid him in teaching the course. He believes asking questions in class is very important; they provide students with the opportunity to understand and master the subject. Aaron feels that the most important thing he can do to help his students learn mathematics is to create an environment where the students can freely ask questions, allowing them to become active participants in constructing knowledge of mathematics.

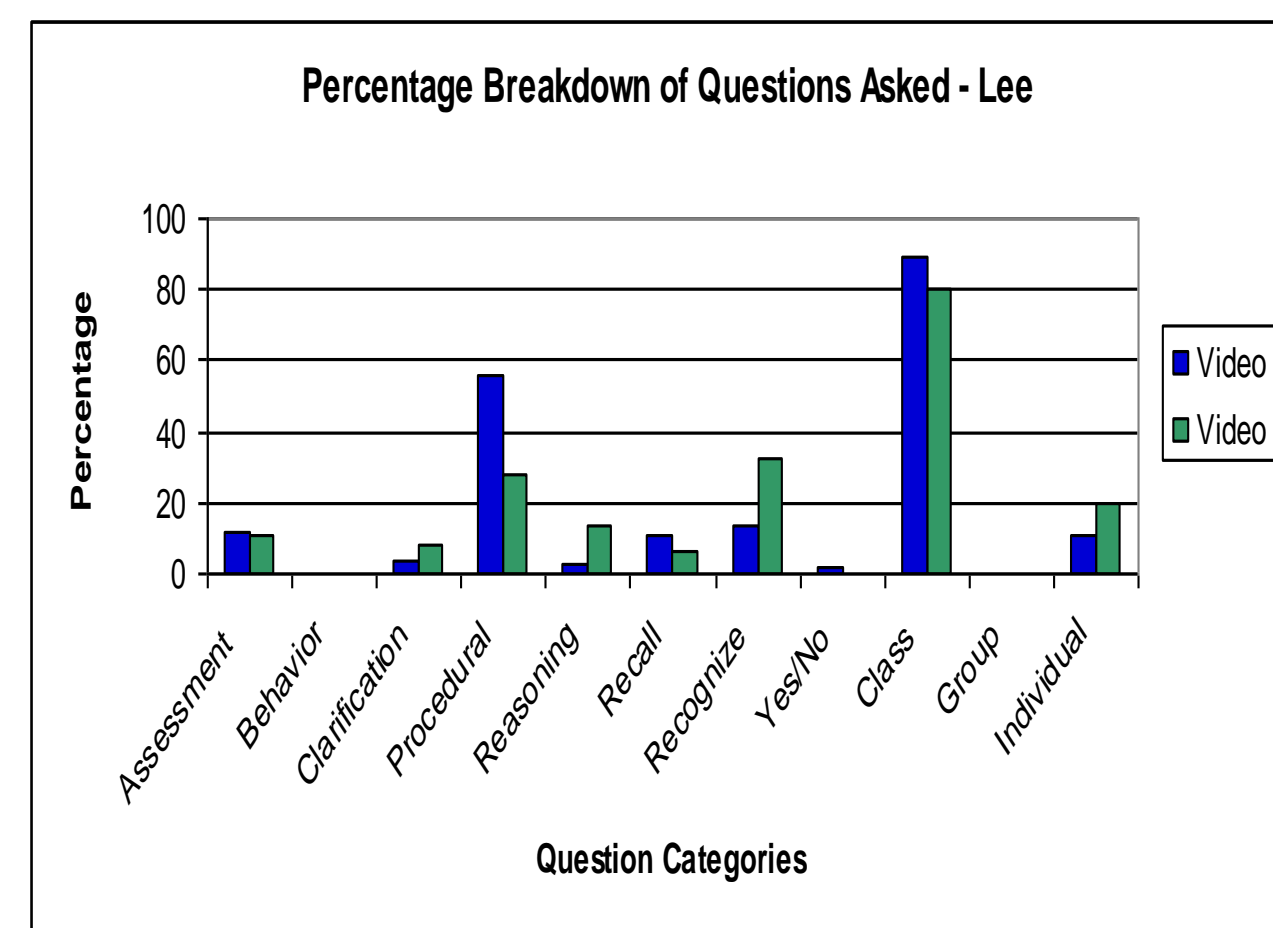
Research Question: What, if any, impact can be seen in GTAs' classroom questions after viewing a video vignette of an experienced college professor while teaching?



Typical Discourse in Lee's Classroom

Context: During Lee's class they were discussing how to factor. The following transcription illustrates a typical, but brief, interaction between Lee and his students during class.

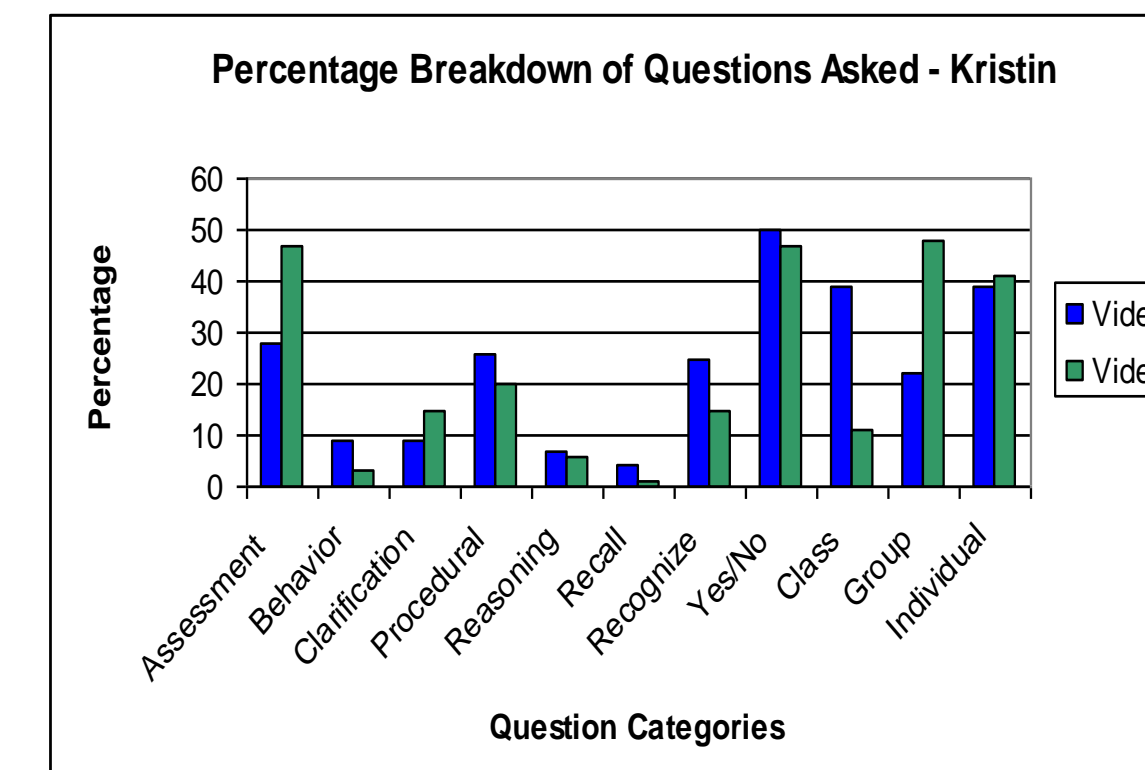
Lee: So what are the factors of three that we have?
 Student: Three and one.
 Lee: And you also get?
 Student: Negative three and negative one.
 Lee: Negative three and negative one, right. So how might we be able to use this to get to negative five, since we either have three and one or negative three and negative one? [pause] First of all, which two do you think you're going to use? [pause] Any ideas?



Typical Discourse in Kristin's Classroom

Context: A student is trying to find the area of a triangle by cutting it up. She calls Kristin over to her group to ask a question.

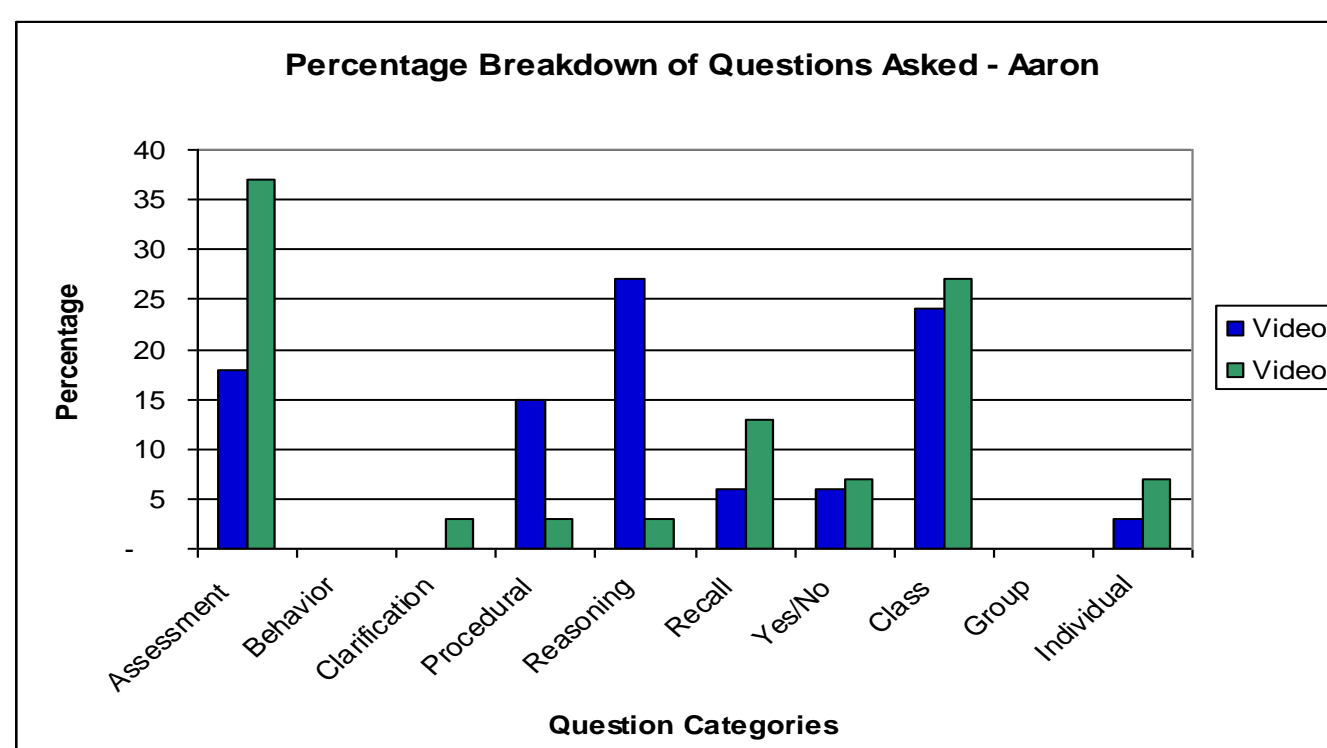
Student: Is this half [of a square unit]?
 Kristin: What do you think?
 Student: No.
 Kristin: Why not?
 Student: Because the middle edge is out.
 Kristin: So, if we were to cut something in half, both parts that you cut it into would have to be equal, right?
 Student: Yeah.
 Kristin: So, is this part equal to that part?
 Student: No.
 Kristin: So you have to think of something else [a different method], right?



Typical Discourse in Aaron's Classroom

Context: Aaron noticed that students struggled with a particular problem, so he brought it up in class.

Aaron: Ok Class. I noticed some problems that you have with number 7. I know it is tough but I will go thru the problem so you can understand it better. As x becomes larger and larger, what is the y -value the line approaches?
 Student: 2.
 Aaron: Right because each line represents 2. Means the graph is scaled to 2. I will write that down for you. It is important to analyze the graph as the asymptote gives you valuable information.



Results: Question Categories

Aspect	Descriptions	Examples
Assessment	These questions help the instructor to quickly assess the students' understanding. Assessment questions could pertain to a student's understanding of the task (direction) or the topic (concept). These questions could also help instructors assess students' progress (general).	"Does everyone know what they should be doing?" "Does that make sense?" "How are you doing?"
Direction Concept General	These questions refer to or request a student behavior.	"Did you share your thoughts with the rest of your group?"
Behavior	With these questions, an instructor clarifies or requests the student to clarify what has been said or done.	"Did you divide by 2?" "What did you say?"
Clarification	With these questions, an instructor asks students to perform, describe, or summarize a mathematical procedure. Procedural questions could initiate a procedure (introduction). They could also implore on students to state or describe the intermediary steps of the procedure (process) or result (conclusion).	"How can we find the area of this triangle?" "What is the next step to solving this equation?" "What is the final answer?"
Procedural Introduction Process Conclusion	These questions require students to consider or explain their reasoning.	"Why do you think this formula works?"
Reasoning	These questions require students to recall facts or information.	"What is the quadratic formula?"
Recall	These questions encourage students to recognize mathematical similarities, relationships, or connections (relationship), or they encourage students to recognize mathematical dissimilarities, discrepancies, or differences (difference).	"Are the areas of these two triangles the same?" "Does anyone have a different method for finding this answer?"
Recognize Relationship Difference	These are questions that elicit either an affirmative or a negative response from the student.	"Is the answer 10 units?"
Yes/No	These questions are directed towards the entire class.	"Has everyone turned in their assignment?"
Class	These questions are directed towards a group of students.	"How is your group work going?"
Group	These questions are directed towards an individual student.	"How did you solve that, Lucy?"
Individual		

Future Research

Future research includes examining the elapsed time of teacher/student interactions, and conducting interviews with the participants to better understand their teaching philosophies and how it relates to their beliefs of student learning. Extending the study to include an entire semester of professional development activities and examining any possible positive influence these activities may have on the GTAs' teaching.

References

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