"INSTALLING" A THEOREM IN HIGH SCHOOL GEOMETRY: HOW AND WHEN CAN A TEACHER EXPECT STUDENTS TO USE A THEOREM?

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Efforts to increase students' share of labor in the development of new knowledge require us to understand how new knowledge is customarily developed in classrooms. Like other classroom activities, the introduction of new knowledge in the mathematics class is done jointly (even in the extreme case, when one of the registers of interaction is nonverbal): the teacher does some things in some way, the students do other things in other ways. Furthermore, the introduction of new knowledge is done over time, some actions happen earlier and others later, and all of them take time as well as occupy places in time. Whereas accomplishing this joint work over time is contingent on many factors, what is to be accomplished, the element of mathematical knowledge at stake, somehow preexists that interaction. The claim that a given class has come to know something requires a judgment call over an exchange between work done and what that work could mean for an (mathematically educated) observer. The teacher may not necessarily be responsible to tell, sanction, or produce new knowledge, but she is, by virtue of the title she has, responsible to manage the place where students come to know. To understand whether and how students might take responsibility for developing, recognizing, inscribing, and remembering new knowledge we need to first understand what the customary exchanges leading to the claim that a class knows something, what the customary division of labor and organization of time are like.

In project ThEMaT (1) (Thought Experiments in Mathematics Teaching), we have been studying a case of this phenomenon in the context of the US high school geometry class: how theorems are installed. The expression "installing a theorem" designates the activity whose goal is for the teacher to be able to hold students accountable for knowing a theorem that she could not have held them accountable to know before. We expect that this activity might include actions as apparent as stating a declarative proposition and sanctioning it as theorem, but also subtler things such as translating a statement about concepts into a statement about objects. What are all those actions? How are they done, and by whom? When are those actions done in relation to each other and how long can they take? Our poster shows a model that describes the installation of theorems in geometry classes as a system of norms; where by norm we mean a central tendency around which actions tend to distribute, or a default that is applied whenever nothing ad hoc or special is done in its stead. We have been studying the norms associated with the installation of theorems by way of a novel experimental method that builds on Bourdieu's (1998) notion of practical reason: Confronting groups of practitioners to representations of the installation of a theorem that deviate from norms we hypothesize, and observing whether they say something and what they say to mark the deviation perceived (see also Herbst & Chazan, 2003).

Endnotes

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References

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