

Humanizing the Coding of College Algebra Students' Attitudes Toward Math

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Through their coding of survey responses, researchers can create spaces to humanize students' attitudes toward math. To account for complexity in students' attitudes beyond positive or negative, we developed three additional codes: mixed, ambiguous, and detached. In our coding methods, we account for a diversity, rather than a binary, of student attitudes.

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Even before Calculus, College Algebra is a gatekeeping mathematics course, and students' attitudes toward math can impact their persistence in such courses (Bressoud, Carlson, Mesa, & Rasmussen, 2013; Ellis, Fosdick, & Rasmussen, 2016). College Algebra students can express complex attitudes toward math, and we posit that researchers' coding methods should begin to open space to acknowledge the complexities of students' attitudes. Drawing on survey responses as sources of data, researchers have coded students' attitudes toward math as positive, negative, and other/indifferent (Ding, Pepin, & Jones, 2015; Pepin, 2011). In our coding methods, we account for a wider range of students' attitudes, to give more voice to attitudes outside the positive/negative binary. For example, students can express a mixture of positive and negative attitude, ambiguity in their attitude, or a detached attitude toward math.

We administered a fully online attitude survey to College Algebra students at the beginning and end of the Spring and Fall 2018 semesters. We used Pepin's (2011) open-ended question stems, (e.g., "I like/dislike math because..."), because the question stems allowed students to self-narrate a range of attitudes that may not fit into binary categories. Beyond positive and negative, we included three additional codes: mixed, ambiguous, and detached. We coded *mixed* for a response that presented more than one attitude (e.g., positive *and* negative), *ambiguous* for responses that crossed multiple attitudes, and *detached* for a response that separated the person from the mathematics, treating mathematics as something "out there" or not connected to self. Table 1 shows examples of student responses we coded as mixed, ambiguous, or detached.

Table 1. Examples of responses coded as mixed, ambiguous, or detached

<u>Code</u>	<u>Example Student Response</u>
Mixed	I love and enjoy problem solving, but I dislike having to remember a lot of rules.
Ambiguous	I don't care either way.
Detached	Math is the universal language.

Langer-Osuna & Nasir (2016) called for researchers to develop methods that humanize students' experiences. Were we not to have included the additional codes, we would have coded the student responses in Table 1 as "other/indifferent," because they are neither positive nor negative. Yet, the responses presented distinct attitudes, which we valued and wanted to name.

As researchers, our methods are never neutral. In our coding of hundreds of College Algebra students' responses to survey questions, we worked to amplify students' voices to extend possibilities for the kinds of attitudes counted. As a result, we created a richer landscape of possibilities, which requires more than a linear continuum to represent.

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