

VALIDATING A MEASURE OF MATHEMATICAL KNOWLEDGE FOR TEACHING COLLEGE ALGEBRA

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We report on one aspect of the validation process of our mathematical knowledge for teaching college algebra at community colleges MKT-CCA instrument (Mesa et al., 2024). Using cognitive interviews (Bostic et al., 2021) with a representative sample of 26 community college instructors who recently completed the MKT-CCA instrument, we aimed to confirm whether and how a representative set of the MKT-CCA items captured teacher knowledge as intended. The participants each answered the same five items which varied across content (linear, exponential, rational functions) and tasks of teaching (choosing problems, understanding student work). During Zoom interviews, participants were asked to read the items and express their reasoning out loud and to show their work through annotations on the Zoom screen. We also asked participants to share the mathematical ideas they thought were elicited by each item, misconceptions students might have when working on similar tasks, and whether the scenario in the item was familiar. Our research question is: Do participants use the hypothesized mathematical knowledge for teaching college algebra when working on the items? Our analytic process consisted of: establishing a reliable coding framework that connected participants' responses to the knowledge and mathematical reasoning that we hypothesized they would use, individual researchers coding participants' answers, and confirming reliability of coding both by pairing researchers on multiple responses and having the entire research team code a subset of the responses. For each of the items, we have found participants: (1) answering correctly and incorrectly, (2) using the hypothesized knowledge and also other types of heuristics to answer the items, (3) a preponderance of statements about mistakes students make rather than misconceptions they may have, and (4) familiarity with the content but not with the presentation of the items as participants noted that the items looked novel.

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References

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