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Envisioning the Future of Mathematics Education in Uncertain Times

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MAPPING ERRORS IN PROBLEM-SOLVING TO MATHEMATICAL PRACTICES

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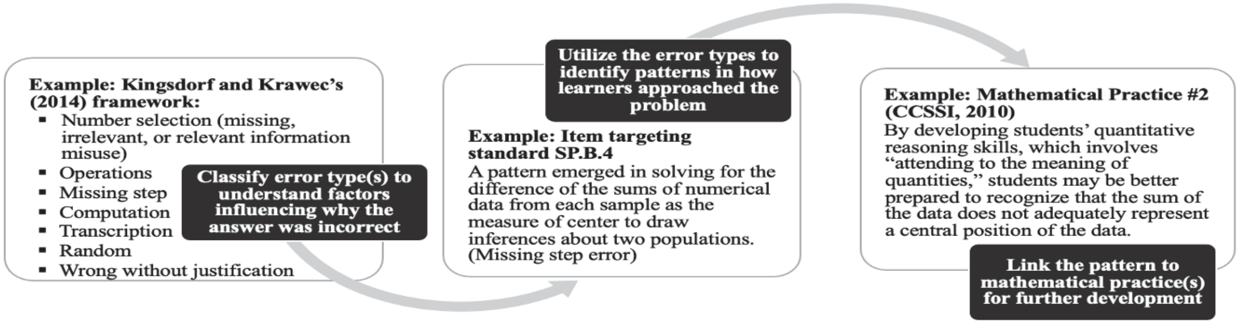
K-12 assessment practices have been identified as needing advancement (Datnow & Hubbard, 2015; Harris et al., 2023). Strategies for using assessment data to inform instruction is a key practice to advance (Wilson, 2018). Careful analysis of students' errors on mathematical assessments in particular has been shown to provide insight into their conceptual understanding (Rakes & Ronau, 2019). In turn, information from incorrect responses is maximized to support teaching and learning (Lannin et al., 2006). Mathematical problem-solving skills are a needed area of study given the continued focus internationally (Mullis et al., 2016) and in the Common Core State Standards - content and practice (CCSSI, 2010). The aim of this poster is to share a process for analyzing incorrect responses to gain insight into targeted areas for development related to mathematical practices. Incorrect written responses (*N*=2,115) on the seventh grade Problem-Solving Measure CAT prototype items were analyzed collaboratively in coder pairs (≥90% inter-coder agreement). The PSM has substantial reliability and validity evidence (Bostic et al., 2015, 2017, 2024). Fifty-nine items were sampled to represent the content standards. A cyclical approach involving expert (*n*=5) and practitioner (*n*=16) feedback through surveying and interviewing informed iterative refinements to the process. Thematic analysis (Braun & Clarke, 2006) of practitioner data revealed the usefulness of describing common errors. Expert data revealed a refinement needed was to re-frame error descriptions to reflect how students approached a problem to adopt a more asset-based lens. This resulted in a three-step process (see Figure). This process contributes to the call for advancements in assessment practices (Harris et al., 2023), namely offering a process for using results to identify targeted areas for learning.

Figure 1: Three-Step Process



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