Mathematics for Undergraduate Nursing Students: Expansive Framing to Foster Transfer

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Mathematics plays an important role for nurses on the job yet practicing nurses do not view their work as being math-dependent, and nursing students find little value for learning mathematics beyond simple calculations (Hoyles et al., 2001). This may indicate that nursing students are struggling to successfully transfer what they learn in mathematics class into the nursing field. *Transfer* occurs when a student takes content or skills learned in one context and applies it to another. Transfer has been studied extensively but is known to be a construct that is difficult to research (Barnett & Ceci, 2002). Expansive Framing theory (Engle et al., 2006, 2011, 2012) acknowledges the transfer debate but refocuses the lens on context, positing that transfer is fostered by linking contextual elements and creating *intercontextuality*, or connections between contexts.

This research employed a teaching intervention in an online College Algebra course at a nursing school. The students in the course received instruction through a weekly synchronous webinar. Participants were placed in two groups: the first group received typical instruction using primarily bounded framing, and the second group received instruction using expansive framing across time, place, people, and topics (Lam et al., 2014). Participants were interviewed about their perceptions of value and transferability and transcripts were analyzed using reflexive thematic analysis (Braun & Clarke, 2022).

Results showed that forming intercontextuality positively influenced perceptions of value and transferability. While the webinars themselves showed mixed effectiveness, other expansively framed course activities emerged as being highly beneficial for influencing perceptions. Overall, this research indicated that broad framing of context was effective in improving perceptions of mathematics value and transferability for nursing students. Based on these results, I recommend that mathematics instructors in undergraduate programs actively seek opportunities to create intercontextuality through broad framing during instruction, but also by applying EF to classroom activities through curricular integration of content.

The accompanying poster provides examples of expansive and bounded instructional framing, quotes from student interviews, and more detailed results. This research provides a unique contribution to the field of undergraduate mathematics education, and while this research focuses on mathematics in nursing, the findings have important implications about mathematics in a variety of applied fields. Expansive Framing is a theory previously applied in the Learning Sciences field and has not yet been widely accepted in mathematics education, yet this research shows that it has the power to facilitate deeper mathematical connections across contexts through the creation of intercontextuality.

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