

## PRESERVICE ELEMENTARY TEACHERS' CONCEPTIONS OF DISTRIBUTION

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This poster presents on the first phase of a research project examining the development of preservice elementary teachers' (PSTs') conceptions of distribution. Distribution is a unifying theme in the study of statistics, an "organizing structure or conceptual entity" (Bakker, 2004, p. 149) for looking at data. We focus in particular on the ways in which using (or not using) the lens of distribution when looking at data impacts the way PSTs view different measures of center, the relationships and distinctions between different measures and how they make choices between measures. This knowledge will inform mathematics and statistics educators so they can create tasks building on the PSTs currently held conceptions with a consideration to how those conceptions develop. The notion of building on currently held conceptions grows out of a rich cognitive-science paradigm focused upon children's prior knowledge in learning situations, a consideration that is equally important in work with adults (Bransford, Brown, & Cocking, 1999).

The importance of including statistical literacy in the elementary and middle school curricula has been recognized by national organizations such as the National Council for Teachers of Mathematics (NCTM, 2000) and the American Statistical Association (Aliaga, Cobb, Cuff, Garfield, Gould, Lock, et al., 2007). These organizations recognize the important role of statistics education in preparing students to navigate our current society (e.g., reading newspapers, understanding political implications, etc.), and the important role of teachers in supporting students' statistical development.

In this poster we present results of the analysis of 25 individual interviews conducted with PSTs. Guided by the fusion of two frameworks: SOLO (Biggs & Collis, 1982) and the constructs of conceptual/procedural knowledge (Hiebert & Lefevre, 1986), data analysis focused on identifying PSTs' conceptions.

### REFERENCES

- Aliaga, M., Cobb, G., Cuff, C., Garfield, J., Gould, R., Lock, R., et al. (2007). *Guidelines for assessment and instruction in statistics education college report*. Alexandria: American Statistical Association.
- Bakker, A., & Gravemeijer, K. P. E. (2004). Learning to reason about distribution. In D. J. B.-Z. Garfield (Ed.), *The challenge of developing statistical literacy, reasoning and thinking* (pp. 147-168). Dordrecht, The Netherlands: Kluwer.
- Biggs, J. B., & Collis, K. F. (1982). *Evaluating the quality of learning: The SOLO taxonomy*. New York: Academic Press.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (1999). *How People Learn*. Washington, D. C.: National Academy Press.
- Groth, R. E., & Bergner, J. A. (2006). Preservice Elementary Teachers' Conceptual and Procedural Knowledge of Mean, Median, and Mode. *Mathematical Thinking & Learning: An International Journal*, 8(1), 37-63.
- Hiebert, J., & Lefevre, P. (1986). Conceptual and procedural knowledge in mathematics: An Introductory Analysis. In J. Hiebert (Ed.), *Conceptual and procedural knowledge: The case of mathematics* (pp. 1 - 27). Hillsdale, NJ: Erlbaum.
- Jaccobe, T. (under review). Elementary school teachers' understanding of the mean and median - Implications for teacher preparation programs. *Journal of Mathematics Teacher Education*.
- Leavy, A., & O'Loughlin, N. (2006). Preservice Teachers Understanding of the Mean: Moving beyond the Arithmetic Average. *Journal of Mathematics Teacher Education*, 9(1), 53-90.
- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston Virginia: Author.
- Shaughnessy, J. M. (2007). Research on statistics learning and reasoning. In F. K. Lester (Ed.), *Second Handbook of Research on Mathematics Teaching and Learning* (pp. 957-1009). Charlotte: National Council of Teachers of Mathematics.