

## Towards a framework for context selection in statistics instruction

V.N. Vimal Rao  
University of Minnesota  
rao00013@umn.edu

How many contexts should be used in teaching a first course in statistics? This seemingly innocuous question has no obvious answer.

The role of context is integral to the practice of statistics (Rao, 1975). Expert practice requires constantly interacting with both context and statistics (Wild & Pfannkuch, 1999). Furthermore, the development of statistical literacy (Gal, 2002; Wallman, 1993) requires a deep and meaningful interaction with context (Watson, 2006; Weiland, 2017). As instruction of statistical literacy gains traction in classrooms (Rumsey, 2002), so too does the importance of the role of context in learning statistics (Pfannkuch, 2011).

Recent recommendations ask instructors to utilize and integrate a variety of contexts throughout a course to ensure student interest, buy-in, and engagement (GAISE, 2016; Neumann, Hood & Neumann, 2013; Newfeld, 2016). However, statistics instructors may be introducing too many contexts and concepts at once (Beckman, delMas, & Garfield, 2017; Wild, Pfannkuch, Regan, & Horton, 2011). Such an over-saturation of context may incite heavy cognitive load for students, as students' unfamiliarity with varied contexts compounds (Sweller, 1988). This may in turn inhibit the development of students' conceptual understanding of statistics (Kirschner, Sweller, & Clark, 2006; Paas, Renkl, & Sweller, 2003).

While calls have been made for the thoughtful implementation of contexts in statistics instruction, no clear framework for decision making has been developed to achieve *complexity reduction* (Wild et al., 2011). Generally speaking, theories of abstraction espouse the marginal benefits of introducing a new context, while theories of cognitive load highlight the marginal costs. A simultaneous consideration of both can facilitate the identification of an equilibrium in terms of the number of contexts utilized.

In this paper I introduce the development of an integrated strategic framework to guide context selection in statistics instruction. After a review of relevant literature, I discuss key barriers in developing a robust solution, provide recommendations based on current work, and showcase how such a framework may be applied to two example syllabi in conjunction with a method for selecting and sequencing contexts for an entire course.

This work contributes towards general recommendations for context selection in statistics and can benefit instructors and course designers.

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