

**PREREQUISITES FOR UNDERSTANDING STATISTICS ABOUT SOCIETY:
THE INTERPLAY OF CONTEXT KNOWLEDGE,
STATISTICAL THINKING, AND CRITICAL THINKING**

Sebastian Kuntze

Ludwigsburg University of Education, Germany
kuntze@ph-ludwigsburg.de

BACKGROUND: Dealing with statistics about society in the classroom raises questions about instructional goals, such as, for instance “Is using statistics about society (instead of other statistics) in the classroom a goal in itself?” or “Is statistics education around statistics about society thinkable which does not aim at fostering statistical literacy and statistical thinking in some form?”, and it raises questions about the learners’ needs for understanding statistics about society, e.g. “For facilitating the understanding of statistics about society, should we foster statistical literacy, critical thinking, and context knowledge?”. This points not only to a need of avoiding a too narrow focus in statistics education, but also to a need of knowing more about the interplay of these three variables when learners make sense of statistics about society. The poster presents a corresponding relationship model which suggests that the statistical thinking necessary for understanding statistics about society is supported by critical thinking and knowledge/views about the context. However, evidence about the interplay of the three factors in the model is scarce. In particular, when being confronted with representations of data about society and having to make sense of it, does critical thinking and context knowledge always play a supporting role or can they on the contrary even impede statistical thinking?

METHOD: In two empirical studies, this question has been investigated empirically in a mixed-method approach. Both qualitative and quantitative methods have been used, details of the methodology are presented elsewhere (Kuntze, 2016).

FINDINGS: In the first study, case studies show that critical thinking can be supportive, but it can also play a negative role for statistical thinking processes needed for the understanding of statistics about society (Aizikovitsh-Udi & Kuntze, 2014) – according to the evidence this can happen when critical thinking gets predominant over statistical thinking processes. As the qualitative and quantitative evidence of the second study shows, also individual views and knowledge about the context may be detrimental for the statistical interpretation of data about society: For instance, learners happen to rely more on what they recall from their knowledge about the corresponding social context instead of analysing statistically the given data. This phenomenon was observable in more than 8% of the answers collected from more than 500 secondary students (Kuntze, 2016).

CONCLUSIONS: Beyond just foregrounding specific types of statistics in the classroom, the needs of the learners should be in the focus: For analysing and fostering prerequisites for the understanding of statistics about society, the relationship between statistical literacy, critical thinking and context knowledge should be investigated in depth. Learning environments and their empirical evaluation should be aware of such interactions.

References:

- Aizikovitsh-Udi, E. & Kuntze, S. (2014). Critical Thinking as an Impact Factor on Statistical Literacy. In K. Makar, B. de Sousa, & R. Gould (Eds.), *Sustainability in statistics education. Proceedings of ICOTS9*. Voorburg, NL: ISI.
- Kuntze, S. (2016). *Understanding statistics about society between statistical thinking and critical thinking – The role of individual context knowledge*. www.ph-ludwigsburg.de/wp/kuntze/kuntze-statisticsaboutsociety.pdf
- Watson, J., & Callingham, R. (2003). Statistical literacy: A complex hierarchical construct. *Statistics Education Research Journal*, 2(2), 3-46