LIfBi *Lectures*

January 21, 2020:

Prof. Dr. Johannes Naumann

University of Wuppertal, Institute of Educational Research

Processes and products in reading digital text: Prospects and challenges in defining, analyzing, and interpreting log-data based process-measures

In this talk, I will firstly outline a framework connecting outcomes (learning or eventual performance on assessment tasks) with input variables such as persons' skills and tasks' demands through task engagement process variables. This framework suggests that task engagement processes mediate effects of person and task variables on task performance. Most importantly, the association of task variables and task engagement is moderated by person variables, and the association of person variables with task engagement is moderated by task variables. Also, task engagement predicts task performance conditionally on both person and task variables. Secondly, I elaborate how especially the interaction terms included in this model can help to conceptually disambiguate otherwise ambiguous process measures, like time-on-task, which can be indicative of both cognitive (in-) efficiency and scrutiny or engagement, or page visits in hypertext reading, which might be indicative of either curiosity or disorientation. All analyses presented will use reading digital text and the related domain of complex problem solving as examples.

Related literature

Eichmann, B., Goldhammer, F., Greiff, S., Brandhuber, L., & Naumann, J. (in press). Using process data to explain group differences in complex problem solving. *Journal of Educational Psychology*. https://dx.doi.org/10.1037/edu0000446

Naumann, J. (2019). The skilled, the knowledgeable, and the motivated: Investigating the strategic allocation of time on task in a computer-based assessment. *Frontiers in Psychology, 10*, 1429. https://dx.doi.org/10.3389/fpsyg.2019.01429

Hahnel, C., Goldhammer, F., Kröhne, U., & Naumann, J. (2017). Reading digital text involves working memory updating based on task characteristics and reader behavior. *Learning and Individual Differences, 59*, 149-157. https://doi.org/10.1016/j.lindif.2017.09.001

Naumann, J. & Goldhammer, F. (2017). Time-on-task effects in digital reading are non-linear and moderated by persons' skills and tasks' demands. *Learning and Individual Differences, 53*, 1-16. https://doi.org/10.1016/j.lindif.2016.10.002

Naumann, J. & Salmerón. L. (2016). Does navigation always predict performance? Effects of navigation on digital reading are moderated by comprehension skills. *The International Review of Research in Open and Distributed Learning, 17*(1), 42-59. https://dx.doi.org/10.19173/irrodl.v17i1.2113

Goldhammer, F., Naumann, J. & Greiff, S. (2015). More is not always better: The relation between item responses and item response times in Raven's matrices. *Journal of Intelligence, 3*, 21-40. https://dx.doi.org/10.3390/jintelligence3010021

Naumann, J. (2015). A model of online reading engagement: Linking engagement, navigation, and performance in digital reading. *Computers in Human Behavior, 53,* 263-277. https://doi.org/10.1016/j.chb.2015.06.051

Goldhammer, F., Naumann, J., Stelter, A., Rölke, H., Tóth, K., & Klieme, E. (2014). The time-on-task effect in reading and problem solving is moderated by item difficulty and ability: Insights from computer-based large-scale assessment. *Journal of Educational Psychology, 106*, 608-626. https://doi.org/10.1037/a0034716

Naumann, J., Goldhammer, F., Rölke, H. & Stelter, A. (2014). Erfolgreiches Problemlösen in technologiebasierten Umgebungen: Wechselwirkungen zwischen Interaktionsschritten und Aufgabenanforderungen. *Zeitschrift für Pädagogische Psychologie, 28*, 193-203. https://doi.org/10.1024/1010-0652/a000134