Intermittent signals as prompts for coherence formation and the role of learners’ prior knowledge

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Theoretical Background

- For a successful learning process a learner has to integrate different representations into a coherent mental representation (Mayer, 2014)
- Signals could support the learner during this process, and therefore improve the learning outcomes (Richter, Scheiter, & Eitel, 2016)
- Signals might function as prompts which trigger a deeper learning process (Bannert, 2009)
- A learner needs at least some prior knowledge to handle the signals in a helpful way (Seufert, 2003)

Research Question

Do intermittent signals have a positive effect on learning and which role does prior knowledge thereby play?

Hypotheses

We assume an overall positive effect of intermittent signals

We assume that particularly learners with high prior knowledge can profit from intermittent signals

Method and Design

- N = 102 (\(M_{\text{age}} = 21.32, SD_{\text{age}} = 2.57; 88.5\% \text{ female}\))
- Experimental factors
  - presence of signals (without / intermittent)
    - Intermittent signals of the most relevant words or picture parts on the slides were highlighted intermittently in the first and third quarter of the lecture (12 of 27 slides)
  - learners’ prior knowledge
- Dependent variable: learning outcomes
- Implemented in an online lecture for psychology students

Results

- Signals were not a significant predictor for learning outcomes (\(\beta = -.22, t(101) = -1.04, \text{ ns}\))
- The interaction (signals x prior knowledge) was a significant predictor for learning outcomes (\(\beta = -.39, t(101) = 0.39, p = .05\))

Conclusions

- Effective use of help requires additional resources
- Thus, for designing learning substantiate, resource-related learner characteristics such as prior knowledge, working memory capacity or other cognitive skills should be taken into account
- Further studies should additionally include a group with enduring signals and should analyze cognitive load to support our interpretation

References


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