

4TH OCTOBER 2023
DR. MIRIAM MULDER



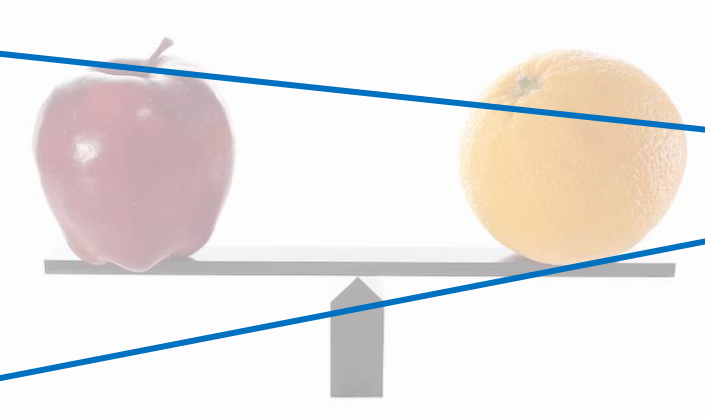
Learning Lab
exploring the future of learning

The issues with media comparison studies

- Virtual and Augmented Reality (VR/AR) enhances learning (e.g., Hamilton et al., 2021; Kavanagh et al., 2017; Pellas et al., 2021; Radianti et al., 2020; Wu et al., 2020)
- media comparison studies are prevalent (e.g., Buchner & Kerres, 2023)



medium A

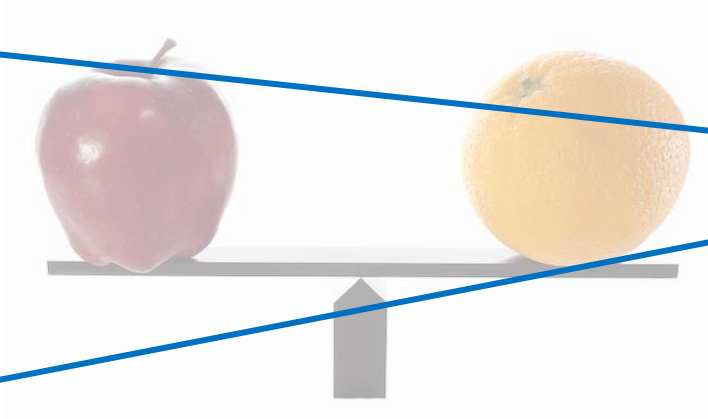


medium B

learning



VR



no VR

learning



The issues with media comparison studies

- focusing on the question **if** learning with VR or AR works and if it is better compared other presentations, and do not examine **when and how** learning with VR and AR works
- “*apples-to-oranges type of comparison*” (Parong & Mayer, 2018 p. 788)
- technology-oriented
- comparability of conditions regarding content, instructional method, etc. not assured (Mayer, 2019)
- discussed critically (Clark, 1983; Hodges et al., 2020; Mayer, 2020; Meyer et al., 2019; Makransky & Petersen, 2021; Reeves & Reeves, 2015)



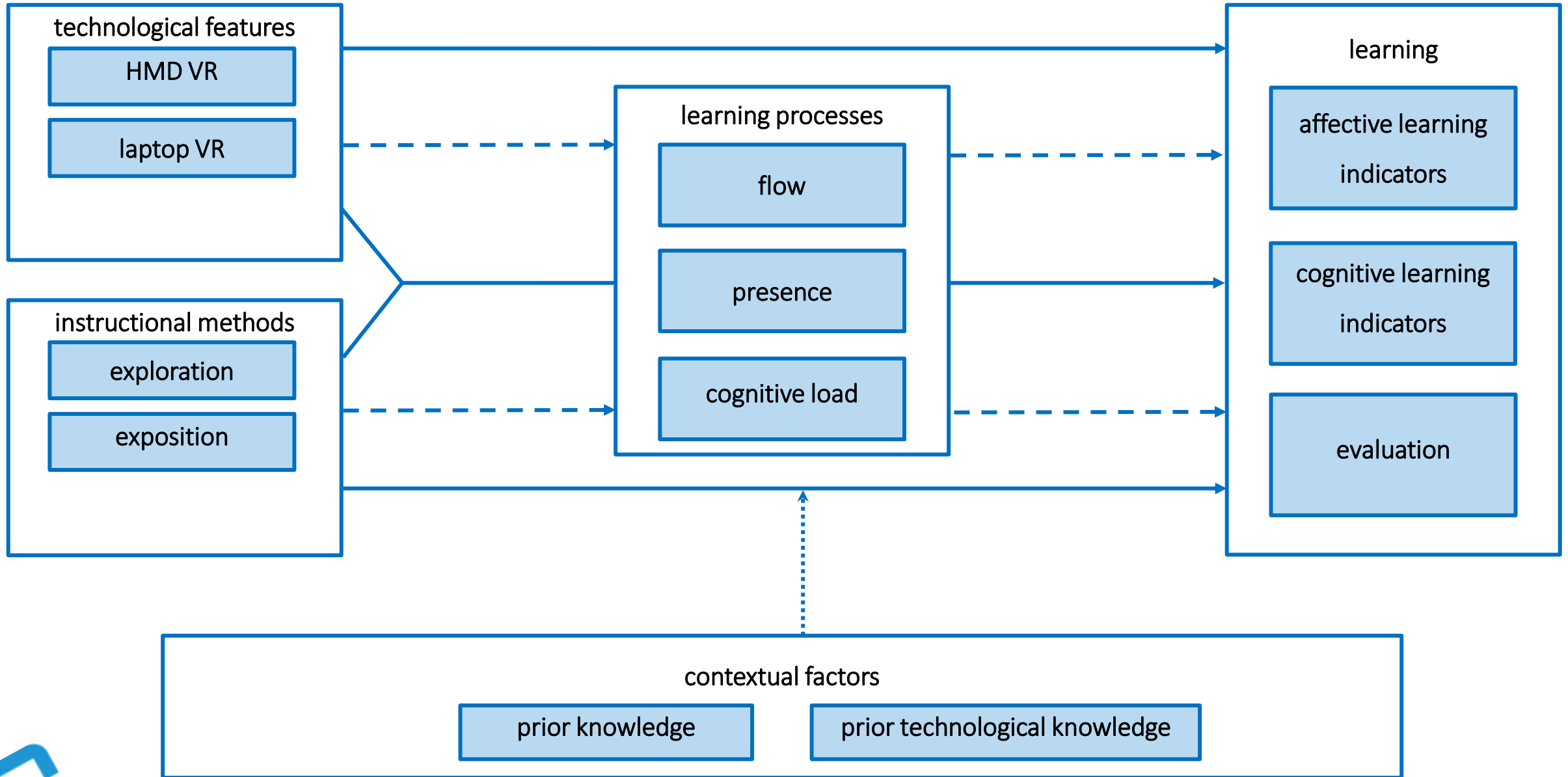


<https://www.annefrank.org/de/anne-frank/das-hinterhaus/>

Anne Frank VR House

- initiated by *Anne Frank Foundation* and designed by *Force Field VR*





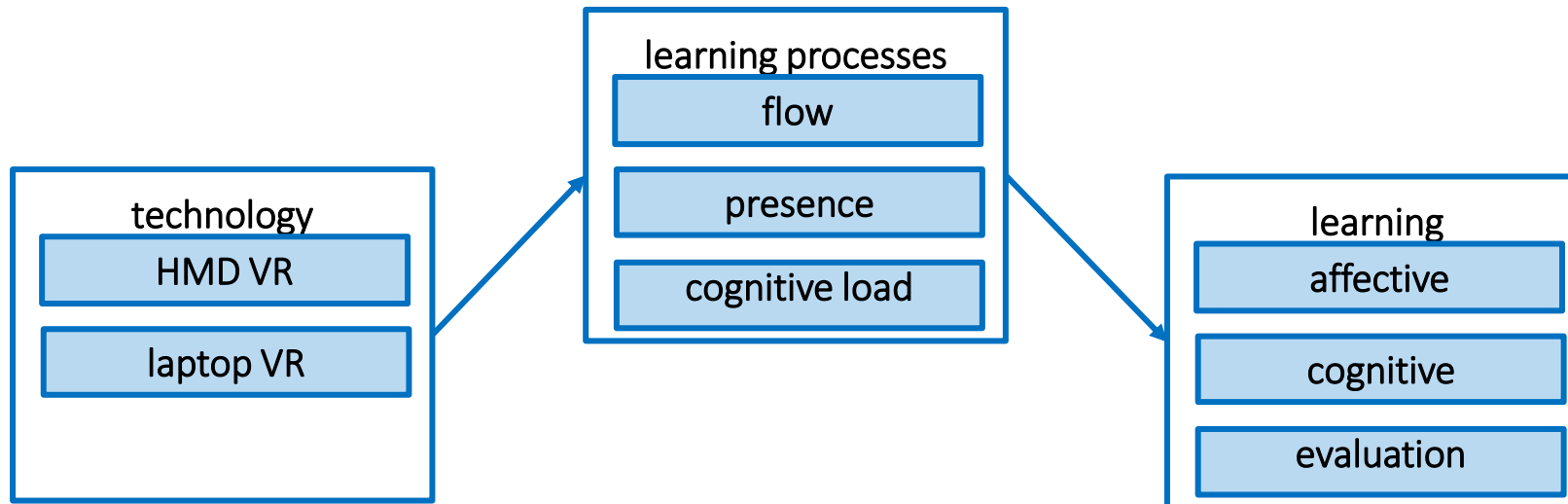
Results

- 2x2 randomized experimental design (HMD vs. laptop, exposition vs. exploration)
- 132 students (65 female, 63 male, 4 non-binary; $M = 13.84$, $SD = .92$)

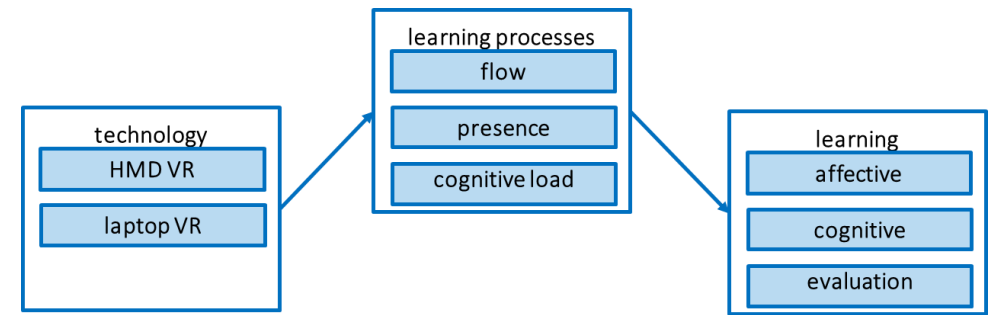
	HMD	laptop
exposition	$N = 37$	$N = 31$
exploration	$N = 37$	$N = 27$



Results



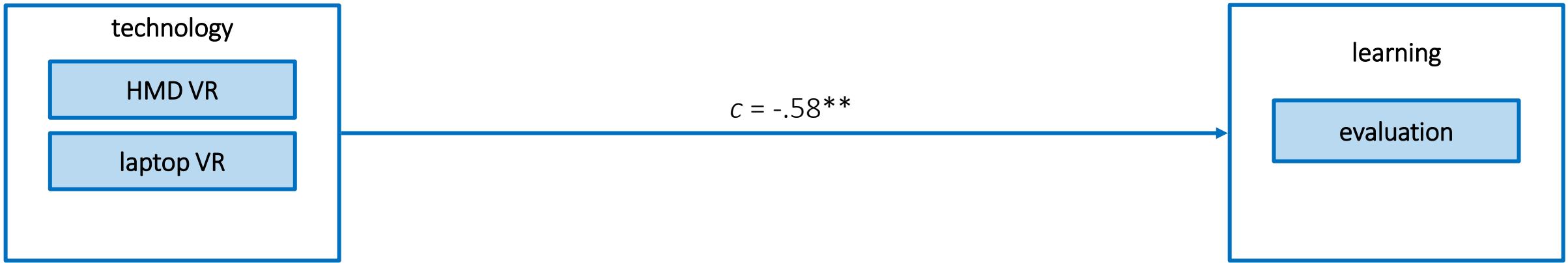
Results

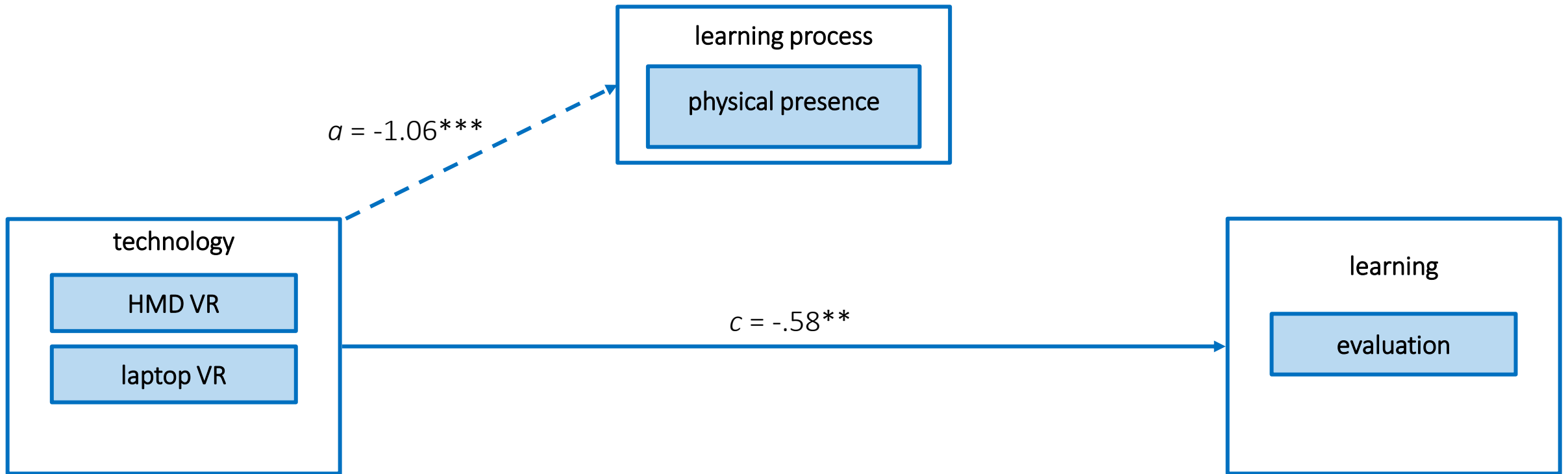


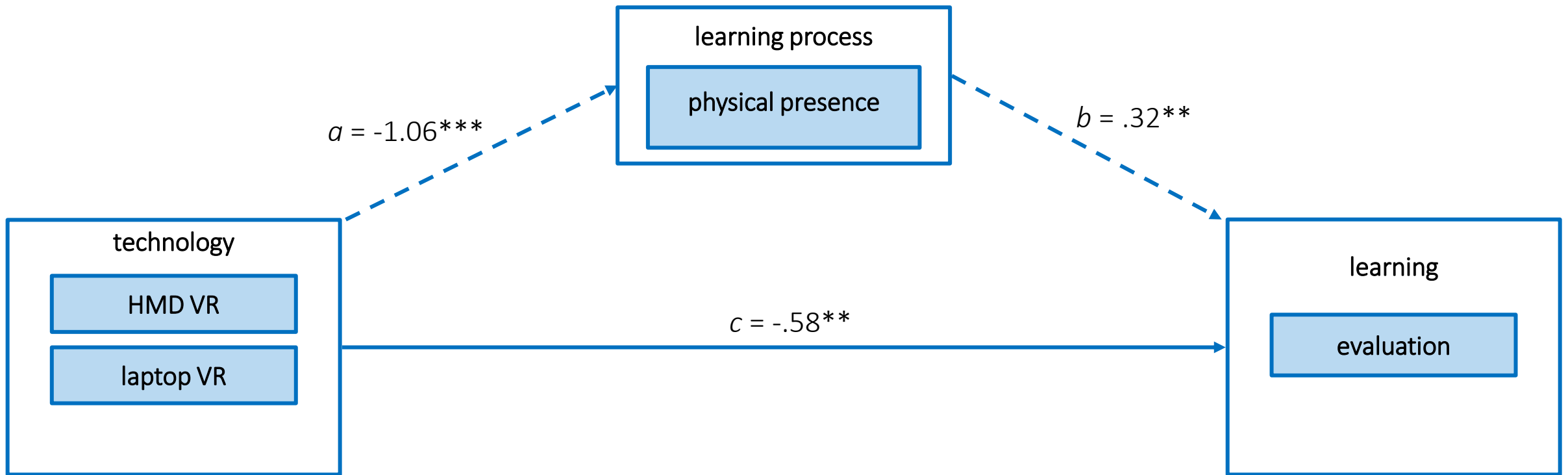
- verification of mediation effects using the SPSS macro PROCESS (Hayes, 2013)
 - 32 mediation tests in total
 - of which 14 were fully or partially significant

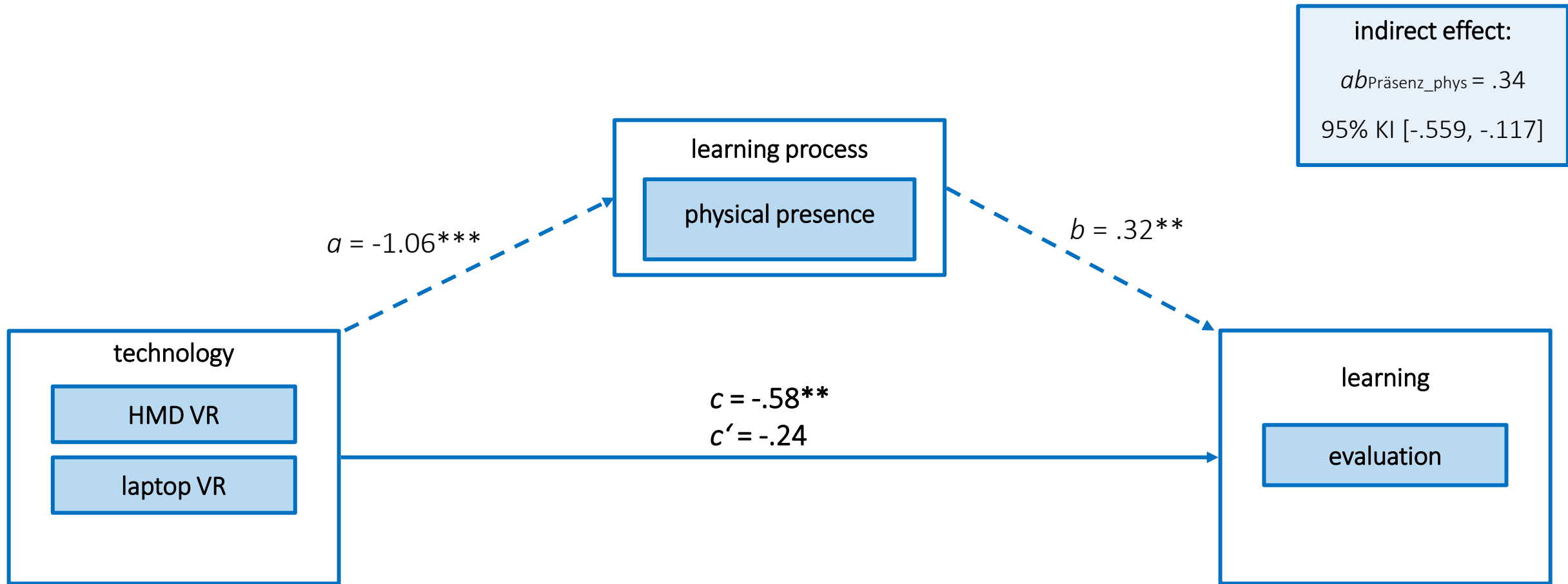




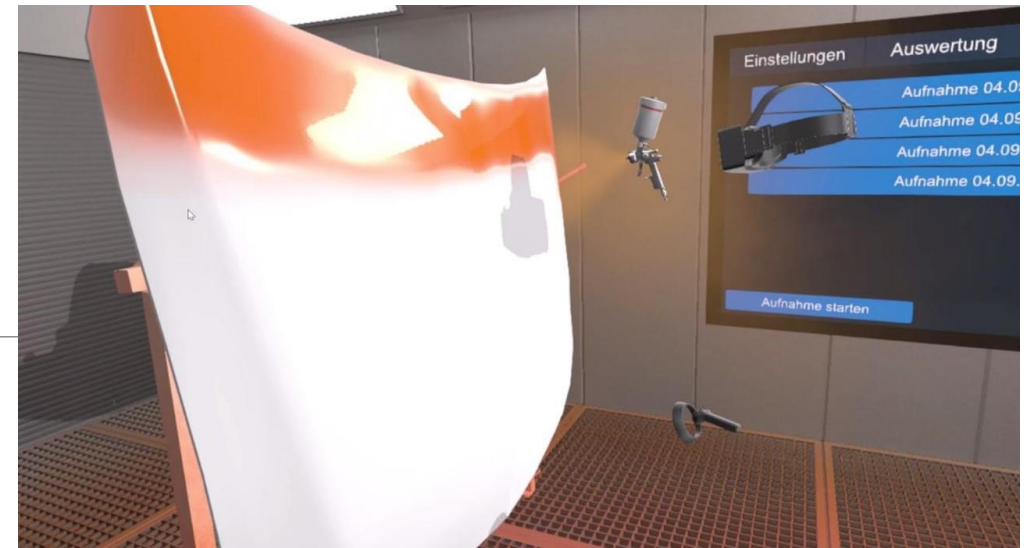








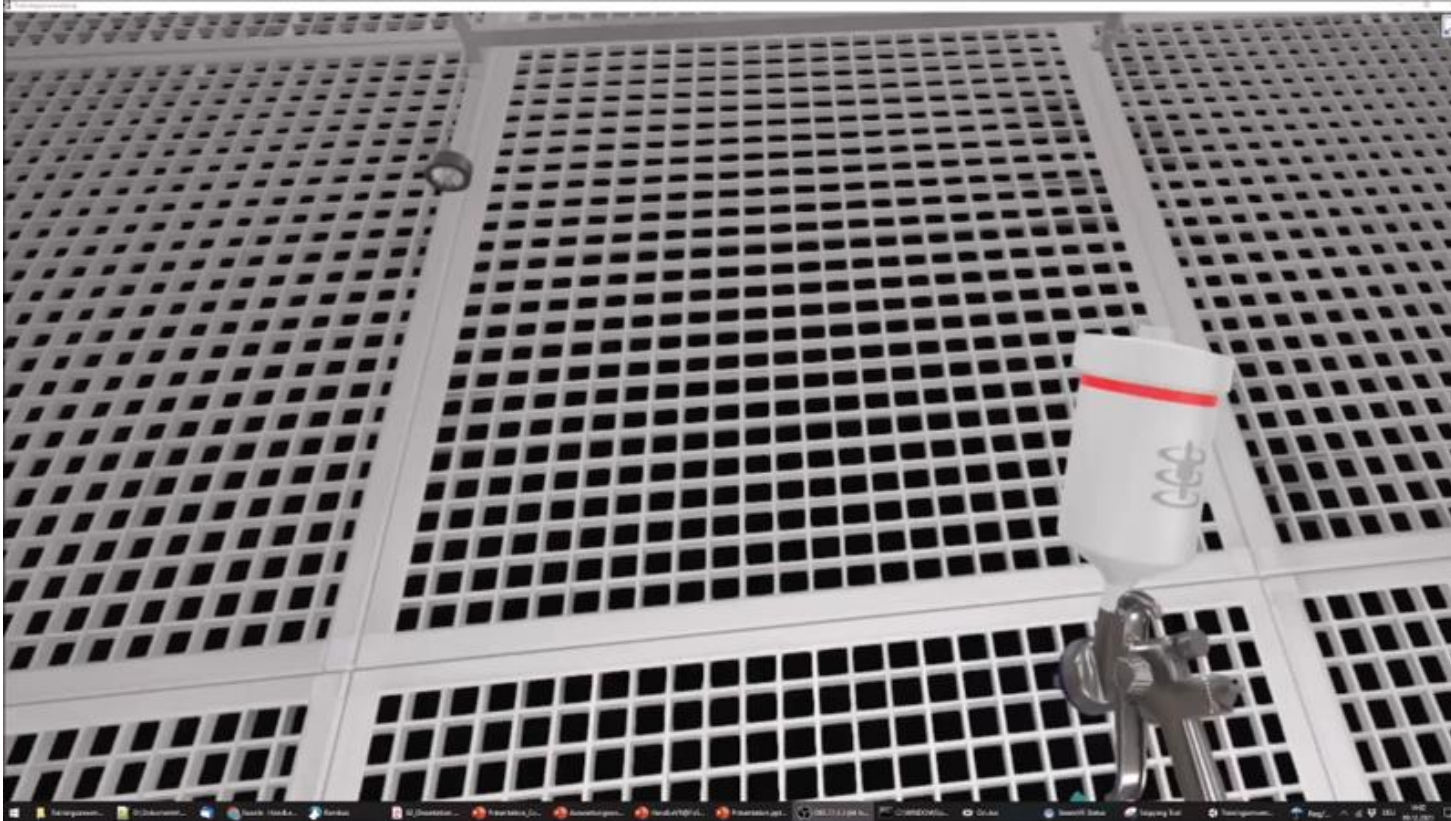
What else?



- VR painting shop
- project (2019-2022) funded by German Federal Ministry of Education and Research
- interdisciplinary team (University of Duisburg-Essen, University of Potsdam, Daimler AG)
- agile software development (i.e., *Scrum*)
- 4C/ID model (van Merriënboer, Jelsma & Paas, 1992)
- OER



What else?



Link to video: https://drive.google.com/file/d/1JCf_Abedk2VhGPYMFPerqXa0afHbwO4/view?usp=sharing



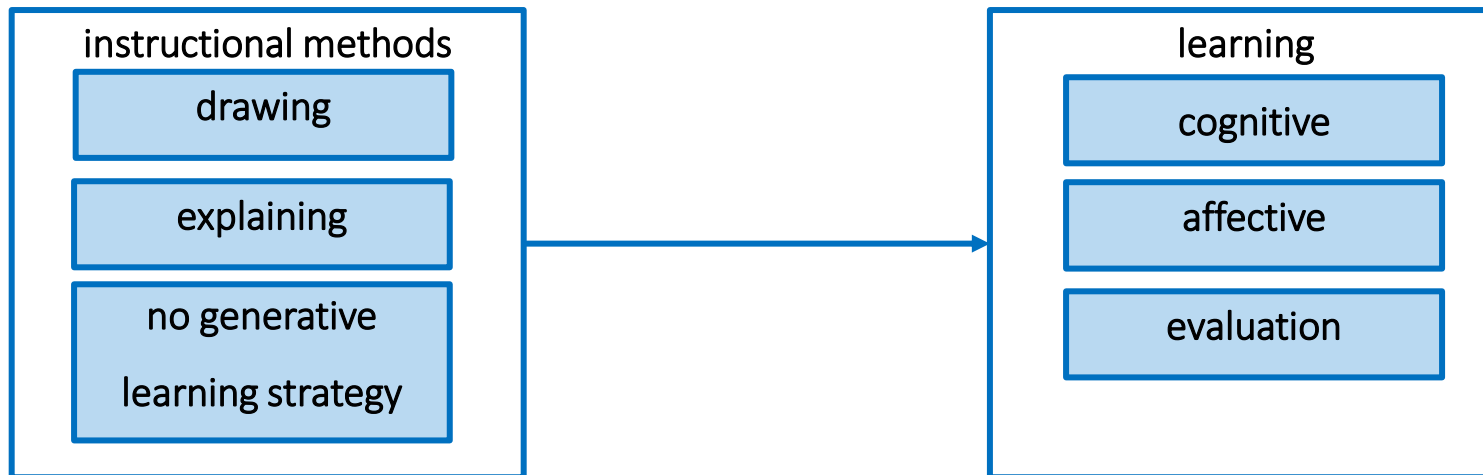
What comes next?

- (1) generative learning activities after exploring the *Anne Frank VR House* (HMDs only)
- (2) developing a multiplayer version of the *Anne Frank VR House* and testing various social scenarios
- (3) *greenpeace* XR environment about biodiversity and Amazon rainforest



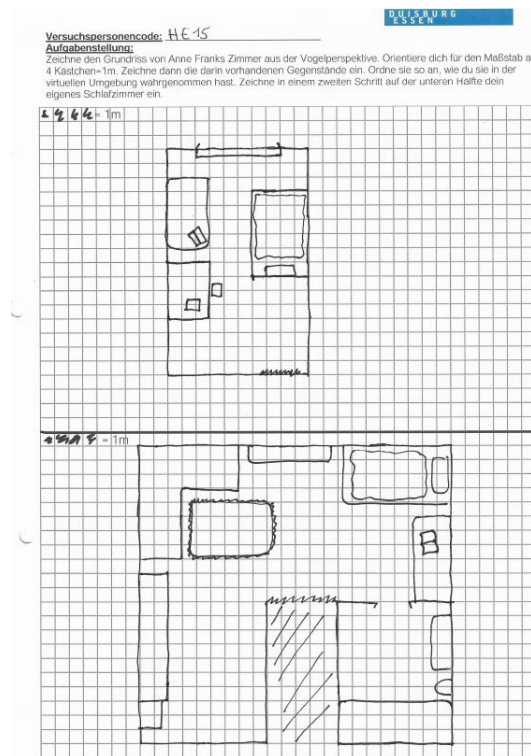
What comes next?

- (1) generative learning activities after exploring the *Anne Frank VR House* (HMDs only)



What comes next?

(1) generative learning activities after exploring the *Anne Frank VR House* (HMDs only)



drawing

Versuchspersonencode: _____

Aufgabenstellung:

Stell dir vor, du müsstest nur eine Woche unter den Bedingungen leben, unter denen Anne gelebt hat: sich versteckt halten, leise sein, nicht rausgehen ...

Wie würde sich das anfühlen? Womit hättest du die größten Probleme und was würde dich am meisten beunruhigen?

➤ _____

➤ _____

explaining

What comes next?

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What comes next?

- (2) developing a multiplayer version of the *Anne Frank VR House* and testing various social scenarios



What comes next?

(2) developing a multiplayer version of the *Anne Frank VR House* and testing various social scenarios

- single player
- novice-novice
- expert-novice



What comes next?

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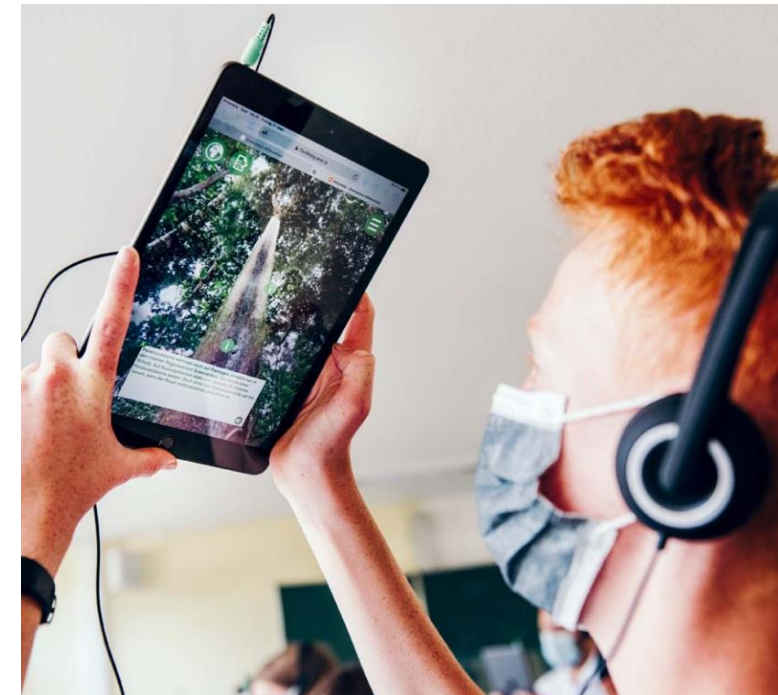




<https://artenvielfalt-auf-der-spur.de/>

What comes next?

(3) *greenpeace* XR environment about biodiversity and Amazon rainforest



What comes next?

(3) *greenpeace* XR environment about biodiversity and Amazon rainforest

- 274 students (108 female, 157 female, 8 diverse; $M = 13.54$; $SD = 1.09$)
- 159 experimental group, 115 control group
- mixed-methods study: online-questionnaire (e.g., MPS: Makransky et al., 2017; Green-Scale: Haws et al., 2014) + focus groups



What comes next?

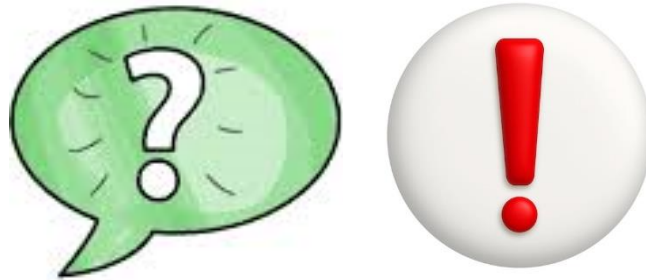
(3) *greenpeace* XR environment about biodiversity and Amazon rainforest

- hardly any significant differences between the groups regarding the dimensions of knowledge, interest, and attitudes
- more variance explained by school type
- significant correlations between presence, flow and the learning dimensions



Thank you for your attention!

I'm looking forward to your questions and feedback.



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