



**Instructional Design and Technology:
From the lab to the classroom**

HandLeVR –

A vocational training environment based on the 4C/ID model

Miriam Mulders

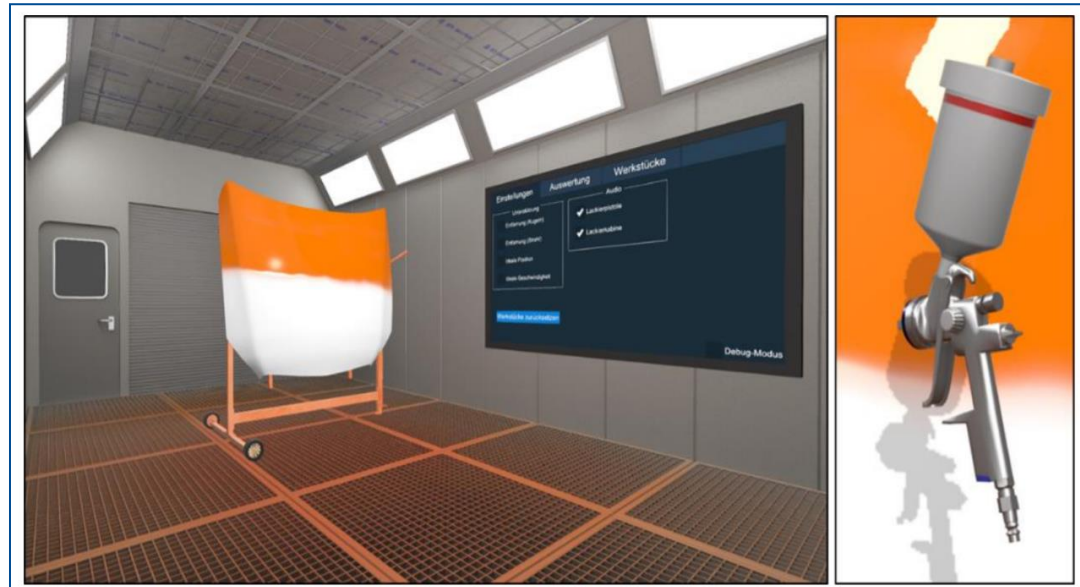
EARLI Sig 6 & 7 Meeting - 24.08.2020

HandLe VR

GEFÖRDERT VOM



Bundesministerium
für Bildung
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Background

Applying 4C/ID model (van Merriënboer & Kirschner, 2018) in VR-Painting Simulator to enable integrative acquisition of competences: knowledge, skills and attitudes (Brockmann et al., 2008)

- instructional design model that contains 4 components: (a) learning tasks, (b) supportive information, (c) just-in-time-information, (d) part-task-practice

Research questions

 Is 4C/ID model applicable to the competence acquisition in the realm of vocational training of vehicle painters?

 VR learning environments seems to be especially useful to train skills (Jensen & Konraden, 2018). Is this true or is it equally possible to acquire knowledge and attitudes?

Procedure

- pilot study
- first prototype of learning tasks

Participants

- $N = 8$ staff members working in local centers of German Chamber of Crafts in the field of vehicle painting
- age: $M = 40.71$ ($SD = 10.19$)
- 7 male, 1 female

Material

- Two paper-and pencil-questionnaires
- 5-point Likert scale: 1 (*do not agree*) to 5 (*totally agree*)
 1. applicability of the 4C/ID model
 2. integrated acquisition of KSA



4C/ID model is sufficiently applicable to the competence acquisition in vehicle painting ($M = 4.00$, $SD = .87$)



Results show **advantages in the training of skills and attitudes when compared to knowledge** (knowledge and attitudes: $t(6) = -2.62$, $p = .04^*$; knowledge and skills: $t(6) = -2.74$, $p = .03^*$; skills and attitudes: $t(6) = .96$, $p = .37$, n.s.).

The study has two major contributions:



First, it shows that the 4C/ID model is suitable for the design of competence-based training in VR in vocational education.



Second, skills are trained significantly better compared to knowledge but not compared to attitudes.

- explanation: motor activities realistically simulated, knowledge elements were represented through text or video

Also, the training is more appropriate for developing attitudes than for acquiring knowledge.

- explanation: motivation by medium

Brockmann, M., Clarke, L., & Winch, C. (2008). Knowledge, skills, competence: European divergences in vocational education and training (VET) - the English, German and Dutch cases. *Oxford Review of Education*, 34 (5), 547–567. <https://doi.org/10.1080/03054980701782098>

Jensen, L., & Konradsen, F. (2018). A review of the use of virtual reality headmounted displays in education and training. *Education and Information Technologies*, 23 (4), 1515–1529. <https://doi.org/10.1007/s10639-017-9676-0>

Van Merriënboer, J. J. G., & Kirschner, P. A. (2018). Ten steps to complex learning: A systematic approach to four-component instructional design (Third edition). Routledge Taylor & Francis Group.