

Effectiveness of a Virtual Reality car workshop for the learning of automotive mechatronics

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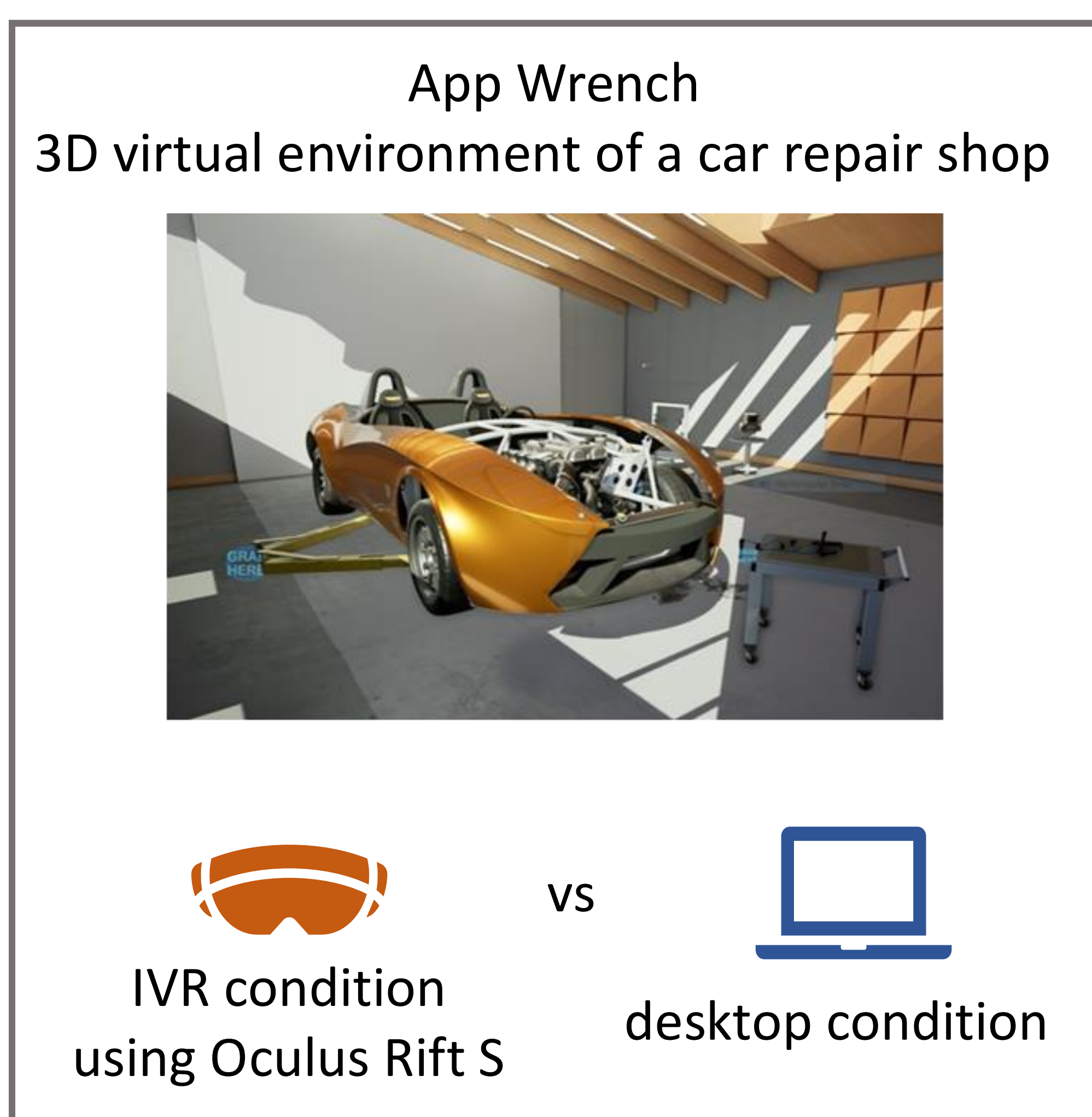
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Introduction

The use of immersive technologies can be most promising in Vocational Education and Training (VET) programmes. The benefits of using Virtual Reality (VR) and Mixed Reality (MR) could result in fewer unresolved errors, in less training time and in a more positive perception of the training experience compared to traditional training of car maintenance service operators (Borsci et al., 2015).. However, the effectiveness of immersive VR in the professional training of automotive mechatronics contrasting desktop and immersive conditions is poorly explored. The objective of this study is to investigate if there was a difference between an Immersive Virtual Reality (IVR) system and a desktop-based VR system, when using them to train apprentices in automotive mechatronics.

Materials & Methods

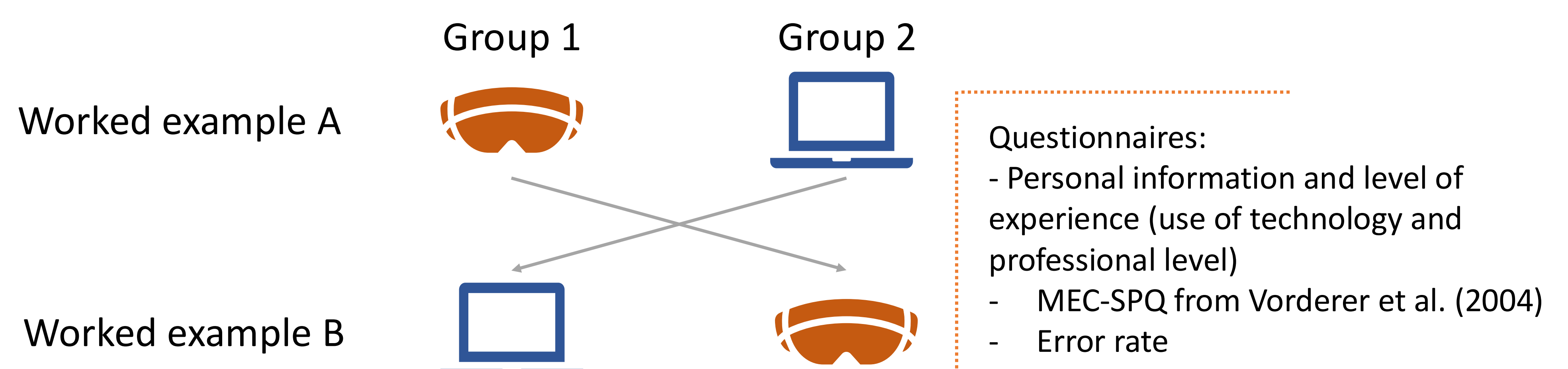


Sample size: 10 male participants (in line with the a priori power analysis)

Average age: 18.9 years (SD= 2.1)

Experimental procedure (crossover design)

Two experimental days with a one-month delay



Results

Error scores. Wilcoxon signed-ranks test

Mean number of errors in:

IVR condition **<** desktop condition
(M = 4.6, SD = 1.50) (M = 7.10, SD = 1.59)

Z = -2.417, **p = .016**

Sense of presence. Wilcoxon signed-ranks test

Mean spatial presence scores in:

IVR condition **>** desktop condition
(M = 7.6, SD = 2.16) (M = 5.11, SD = 3.13)

Aggregate items (Z = 1.478, p = .139)

Single item "I felt part of the environment" (Z = 1.970, **p = .049**)

Conclusion

The results show that using the VR system resulted in fewer errors in the execution of simulated mechatronic work and in a greater sense of presence in terms of feeling part of the IVE. This was probably facilitated by taking a first-person perspective in the immersive environment. These findings are promising for the use of IVR in training programs of automotive mechatronics.

References

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