



# Improving Language Learning by an Interact-to-Learn Desktop VR Application: A Case Study with Peinture

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# 01 Background

- ❑ Mastering vocabulary is a daunting task for second language learners.
- ❑ Learner's bodily sensations and actions can enhance comprehension.
- ❑ Well-designed non-immersive desktop VR may be very conducive to learning and training.

## 02 Peinture



Lecturing area

Interactive area

- ❑ Non-immersive desktop VR
- ❑ AI-generated Instructor
- ❑ Interaction via keyboard and mouse

## 03 Experimental conditions

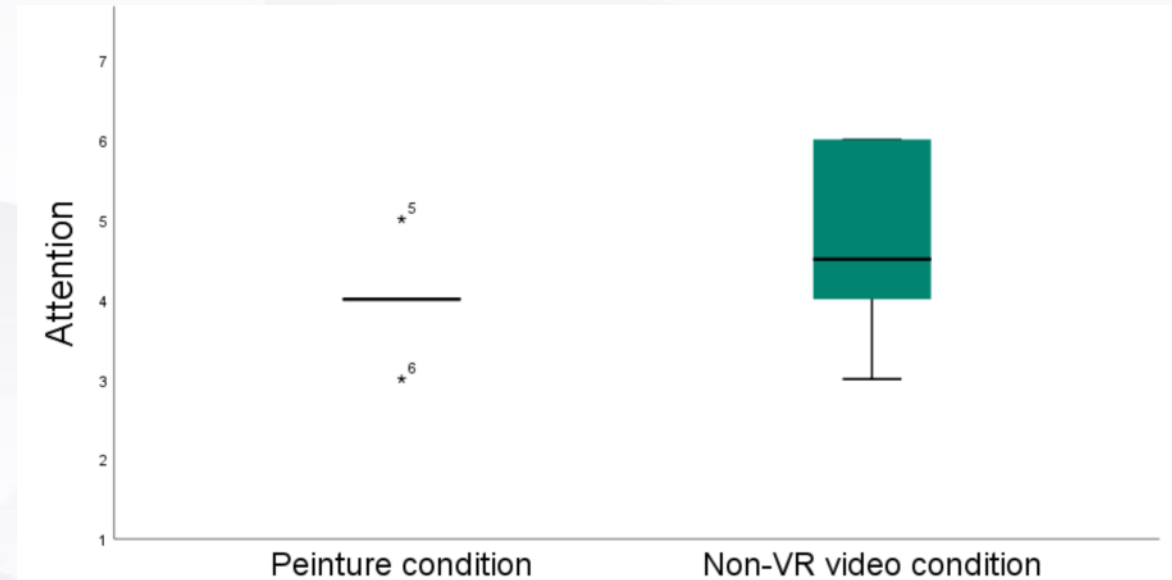
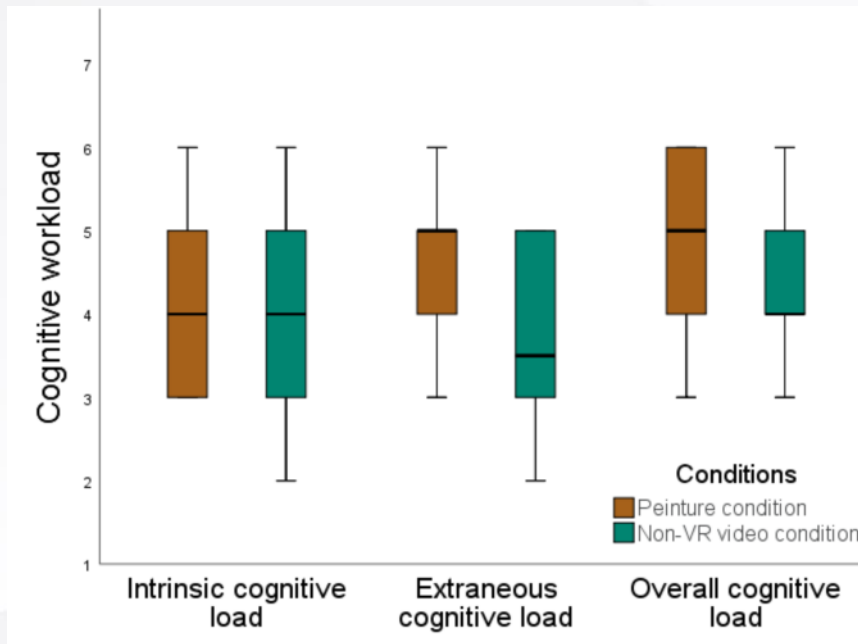
Participants	Experiment design	Procedure	Measures
<ul style="list-style-type: none"><li>❑ Six students</li><li>❑ Age: 22 to 23</li></ul>	<ul style="list-style-type: none"><li>❑ Within-group design</li><li>❑ Two conditions: Peinture and non-VR video conditions.</li><li>❑ Counterbalanced</li></ul>	<ul style="list-style-type: none"><li>❑ Informed consent and basic information.</li><li>❑ Learned with two conditions.</li><li>❑ Performed the tests and scales.</li></ul>	<ul style="list-style-type: none"><li>❑ Learning outcomes</li><li>❑ Cognitive workload</li><li>❑ Attention</li><li>❑ Eye tracking</li><li>❑ Self-reports</li></ul>

## 04 Results and discussion

### ➤ Learning outcomes

The overall performance of tests under Peinture condition ( $M = 11.33$ ,  $SD = 1.82$ ) was slightly higher than that of the non-VR condition ( $M = 11.16$ ,  $SD = 3.37$ ).

### ➤ Cognitive workload & Attention



## 04 Results and discussion

### ➤ Eye tracking data of Peinture

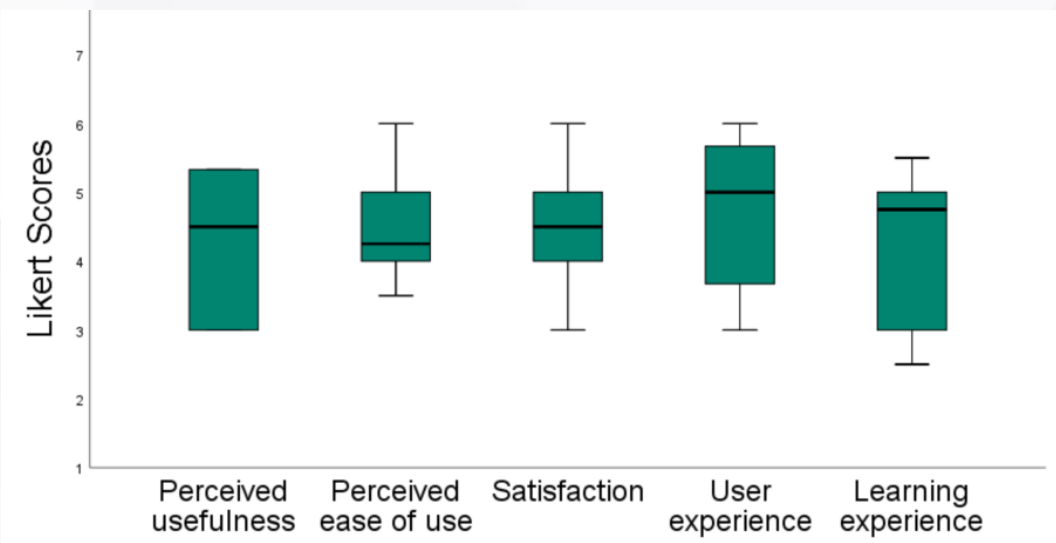
Participants fixated longer and fixated more time in the interactive area compared with the video area. They also revisited the interactive area more.

Table 1: Results of eye tracking measures.

Metrics	Interactive area		Video area	
	M	SD	M	SD
Total fixation duration	103.49	21.25	64.47	38.55
Total fixation count	293.17	104.54	233.50	138.93
Saccade duration	126.43	29.48	81.14	51.20
Saccade count	32.00	7.40	30.33	6.53

### ➤ Self-report of Peinture

Peinture received all median above 4.



## 05 Conclusion, limitations, and future work

- Conclusion: Interact-to-learn activities provided by Peinture were beneficial for second language learning. Providing interaction and instruction simultaneously may split attention and lead to overloading the learner's visual, auditory, and motor channels.
- Limitations: small sample size
- Future work: how to present interaction and instruction spatially and temporally in educational VR environment; how multi-tasking learning style impact learning effect of interact-to-learn activities.

*Thanks!*