Visualizing Business Process Models on Virtual Reality Screens

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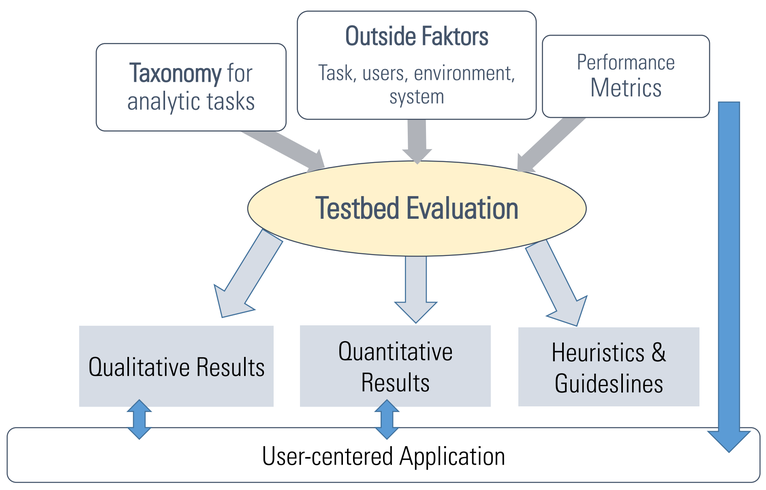
How to use new VR devices like Oculus Rift for Business Applications?

Abstract
Virtual reality (VR) is widely regarded as technology with huge potential in many application domains beyond entertainment. The visualization capabilities of VR headsets hold potential in displaying business relevant information. In this paper we address utilization of VR technology for visualizing business process models. We developed prototypes of a virtual screen that is tailored to display large models. The evaluation includes detailed usability tests that deepen the understanding of how to use VR for process model visualization.

Methodology and Experimental Setup

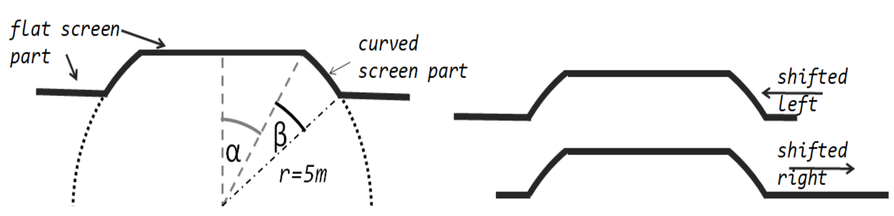
Adapted version of the testbed evaluation approach (Bowman and Hodges 1999) for studying process model analysis in VR:



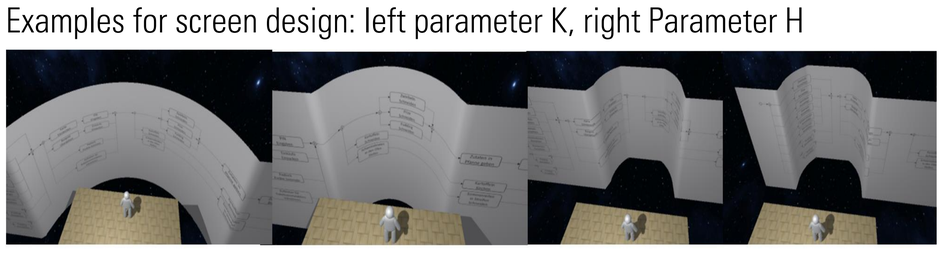
We use also qualitative interviews with experts in business process analysis.

Screen Design

Concept for shaping the screen in VR:



Examples for screen design: left parameter K, right Parameter H



Curved screen shape	Parameter set G	Parameter set H	Parameter set J	Parameter set K	Parameter set L
Central angle	25 °	15 °	0 °	0 °	35 °
Peripheral angle	90 °	45 °	75 °	90 °	90 °

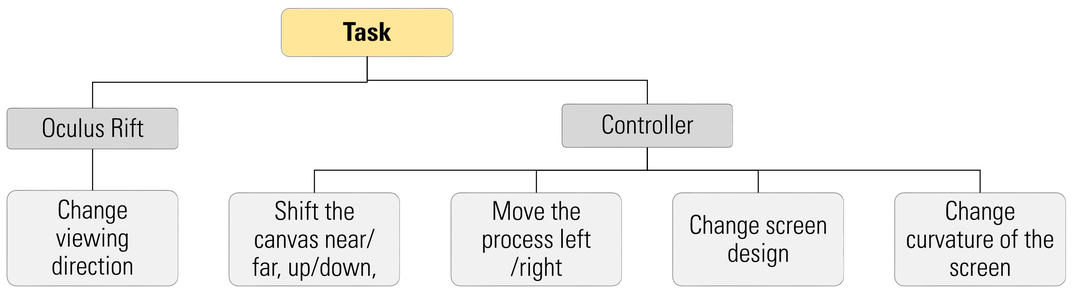
References:
Bowman, D., and Hodges, L. 1999. "Formalizing the design, evaluation and application of interaction techniques for immersive virtual environments," in The Journal of Visual Languages and Computing, pp. 37–53..

Experiments and Evaluation

Test-User: 21 student participants
Application: Process cooking a meal

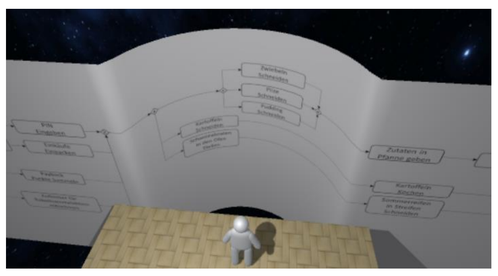
Task 1: find the best screen design compared to flat screen
Task 2: get an overview of the process
Task 3 : find two specific activities in the process

Taxonomy of the interactions for curved screen design:



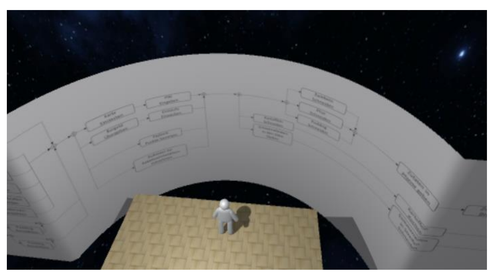
Findings and Observations

Initial default screen



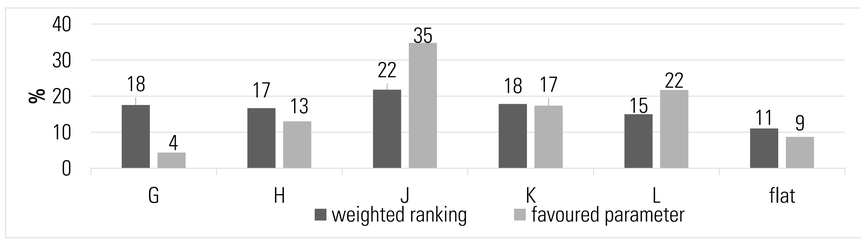
J = (0°, 75°), r = 5

Favoured screen



J = (0°, 75°),r = 9

Prefered parameters orderd by weighted ranking and favored parameter:



Conclusions

We present a screen design that overcomes the constraints of ordinary computer monitors.
Our design improves the display of large model information in VR and

- We validate its advantages
- We identified peripheral vision and head movement as key factors how VR helps to view processes
- We provide insights into user preferences regarding periphery for screen control