Being Guided or Having Exploratory Freedom: User Preferences of a Virtual Agent's Behavior in a Museum

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Introduction

Background
- Supporting users to guarantee a successful and efficient scene exploration, defined as acquiring knowledge of the unknown scene with additional explanations
- Embedding an embodied conversational agent (ECA) as assistance
  - → Condition 1: ECA as virtual *guide* allowing a structured and complete experience
  - → Condition 2: ECA as knowledgable *companion* accompanying users on their free exploration

Hypothesis H1
- The accompanied exploration of a virtual museum is superior to a classical guided tour in terms of enjoyment and comfort in an educational context.

Conditions of Assistance

	Guide	Companion
Welcome	Introduction to scene and ECA's role	
Scene Traversal	• Walking ahead of user on a pre-defined route • Reengaging distracted user 	• Accompanying user • Walking abreast (HMD-adapted)
At an Exhibit	• Pre-defined ECA locations to maintain proxemics • Alternating gaze between user and exhibit during explanation • Reengaging distracted user → Inviting to listen or guiding back to current exhibit	• Determining user's interest • Pre-defined locations, alternating gaze • Reengaging distracted user or canceling explanation
Farewell	• Goodbye triggered by ECA	• Goodbye triggered by user

VR-based Pilot Study

- Apparatus: HTV Vive with one Vive controller for interaction
- Within-subjects design: randomized & counterbalanced
- 8 participants (7 males, age M=28.875, SD=1.899)
- Excerpt from the questionnaire data
  - "Would recommend to a friend": 4x guide, 4x companion
  - Evaluation of ECA's behavioral conditions

Shortened Statements	C_{guide}			$C_{companion}$		
	M	SD	Mdn	M	SD	Mdn
Kate was easily understandable	1.625	0.484	2	1.875	0.331	2
Kate appeared competent	1.75	0.433	2	1.75	0.433	1.5
Kate was entertaining	0.0	1.225	0.5	0.625	0.857	1
Kate caused discomfort	-1.25	1.09	-2	-1.0	1.5	-2
Kate caused unease	-0.5	1.581	-1	0.375	1.317	0.5
Kate respected PS	1.50	0.707	2	0.75	1.392	-1
Kate positioned logically at exhibit	1.0	1.322	1.5	0.5	1.0	0
Kate behaved weirdly at times	-1.625	0.696	-2	0.5	1.323	0.5
Kate reacted generally appropriately	0.875	0.781	1	1.375	0.484	1
Tour was well paced	0.876	0.927	1	*not applicable*		
Enjoyed being guided	0.625	1.218	1			
Enjoyed free exploration	*not applicable*			1.5	1	2
Walking with Kate felt natural				-0.875	1.053	-1
Kate determined interest correctly				1.25	0.662	1

5-point scale (-2= strongly disagree to 2= strongly agree)

Results
- Guide
  - + Reprimand due to inattentiveness rated appropriately
  - + Tour rated positively in terms of enjoyment
  - − Tour rated negatively due to monotony and limited interactivity
- Companion
  - + Full control of interactive experience rated positively
  - − Abreast walking (HMD-adapted) rated unnatural
  - − Reprimand due to inattentiveness rated negatively

Lessons Learned, Implications & Next Steps
- No clear preference to either condition
  - → H1 cannot be supported
- Interactive and adaptable, however, structured and complete scene exploration preferred
  - → Designing ECA combining guide- and companion-elements with improved abreast formation for walking
  - → VR-based evaluation with a larger sample size

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