

DIGITAL APPENDIX TO:

**MAY I SPEAK TO THE DRIVER? EXPLORING DESIGN
PRINCIPLES FOR A VIRTUAL IN-VEHICLE ASSISTANCE
SYSTEM APPLIED IN ROAD-BASED AUTONOMOUS
PUBLIC TRANSPORT**

File Description

This file contains the digital appendix to the study, entitled "May I Speak to the Driver? Exploring Design Principles for a Virtual In-Vehicle Assistance System Applied in Road-Based Autonomous Public Transport."

Keywords: Public Transport, Autonomous Mobility, In-vehicle Assistance, Design Principles.

Appendix

Workshop Insights					
Information	What information do users need in an emergency?	What information do users need at the end of the journey?	How should the information be?	What information do users need before travelling?	What information do users need during the journey?
	Special exit (problem solution) Emergency assistance (fall detection, conflict detection, etc.)	Hints: Don't forget your umbrella Weather information City map Destination guidance after exit Local tips: nearest pub, nearest supermarket	Trustworthy Intensität / Menge Consistent Multilingual	Onboarding: 'Are you [name]?' 'Please secure your bike as follows' 'Please fasten your seatbelt'	Travel information Route information Location (Where am I?)/ GPS Journey time (traffic jam, delay) What time will I be there? Passengers (detours, how many passengers) Connection information/ Changeover time Disruption info: why, when will it continue
Communication / Interface	What should the contact form be?	What should the form of communication be?	What level of individualised support do the users need?	How should communication be presented?	
	Communication triggers ('Hey Google', button, 'Hello Siri') Make the contact room recognisable (push button/ screen) Contact (several options) Connection for headphones Accessible interface Avatar necessary for communication?	Multilingual Facial expressions, gestures, non-verbal communication General loudspeaker for announcements (defensive) Customised user support	Personalised user support Selectable supervision intensities Subscription model (extra service)	Text-based passenger information Main display App (smartphone) Individual display Bus stop - display with departure times Customised avatar and subtitles	
Safety / Well-being	How are problems detected in the vehicle?	How do the VIVA react to problems in the vehicle?	What requirements must the system fulfil during interaction?	How can barrier-free communication with the vehicle be achieved?	What environmental factors can be influenced by the autonomous driver that could lead to greater passenger well-being?
	Diagnostics Perception of interpersonal tensions Monitoring vs. data protection Clarify the threat situation	Emergency assistance interface Emergency reaction Emergency assistance Automatic emergency call Fastening and securing the seat belt	Recognise special needs Personalised support from AI Gaining trust vs. loss of control	Simulating empathy Dialogue with the avatar Recognition of the language Clear feedback Possibility of communication from outside the vehicle Use of hearing aids	Customised room climate Voice Cancelling Climate control Olfactory: room fragrance

Figure A.1. Workshop insights.

Literature Reviewed	
[Number]	Short reference
1	Hollebeek et al. 2024
2	Boffi 2020
3	Lawson-Guidigbe et al. 2020
5	Lang et al. 2024
6	Riedl 2022
7	Clark et al. 2024
9	Kaufman et al. 2024
11	Burggraf et al. 2022
13	Lugano 2017
14	Tenhundfeld et al. 2022
15	Liu et al. 2024
17	Gao et al. 2023
18	Macrae 2022
21	Large, Harrington, et al. 2019
22	Knutzen et al. 2019
23	Wang et al. 2021
24	Detjen et al. 2020
26	Flohr et al. 2021
27	Wang et al. 2022
28	Detjen & Schneegass 2022
29	Cunningham 2023
30	Wallner et al. 2022
31	Premstaller et al. 2023
34	Kaplan et al. 2023
37	Yue und Li 2023
38	Lawson-Guidigbe et al. 2023
41	Kong et al. 2021
43	Kuberkar & Singhal 2020
46	Bawack & Desveaud 2022
51	Renner et al. 2021
55	Heinbach et al. 2021
58	Seeger et al. 2018
59	Voinescu et al. 2018
60	Uzan et al. 2023
63	Williams & Breazeal 2013
64	Koo et al. 2015
65	Large et al. 2017
66	Waytz et al. 2014
68	Du et al. 2019
70	Antrobus et al. 2019
73	Forster et al. 2017
75	Ekman et al. 2018

77	Cramer et al. 2008
78	Eyssel et al. 2012
79	Hock et al. 2016
80	Kraus et al. 2016
81	Tanaka et al. 2017
82	Frison et al. 2019
85	Large, Clark, et al. 2019
86	Large, Burnett, et al. 2019
88	Verberne et al. 2015
89	Dong et al. 2020
90	Ruijten et al. 2018
91	Antrobus et al. 2018

Table A.1. Literature Reviewed including consecutive numbers.

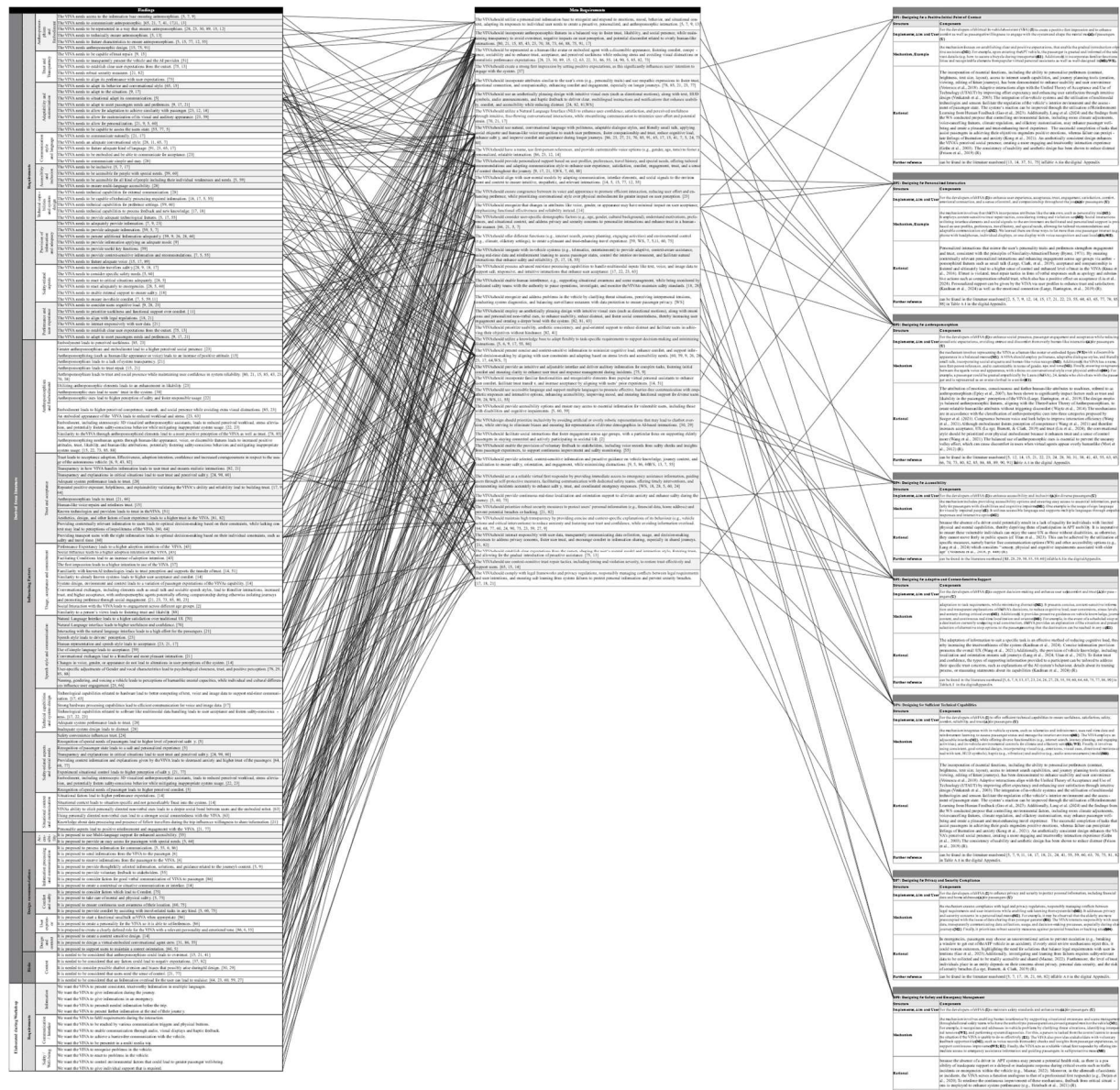


Figure A.1. Visualisation of the derivation process.

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