
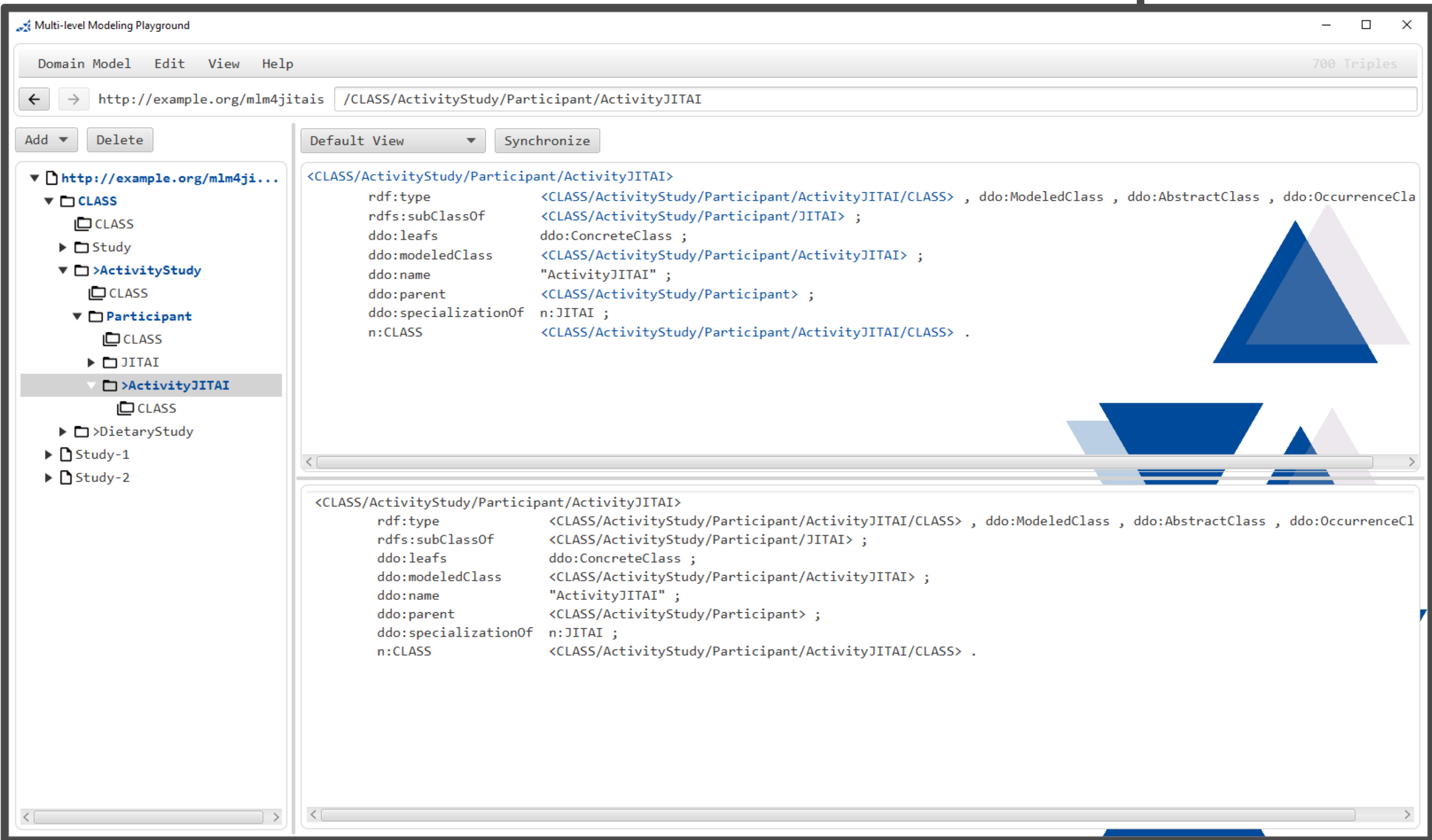


Usability testing of a multi-level modeling framework for just-in-time adaptive interventions (JITAI) in mobile health

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INTRODUCTION

- The JITAI combines real-time data and knowledge to provide personalized interventions using artificial intelligence
- Cross-study analysis of data requires prior data integration
- We designed a framework that combines multi-level modeling, composition hierarchies and specialization hierarchies to eliminate the need for data integration
- However, the complexity of the framework and the size of models created with the framework may be challenging for use
- The aim of this study was to investigate the usability of a proof-of-concept prototype (POC) based on JavaFX and standardized semantic web technologies (RDF, SPARQL, SHACL)
- The POC does not hide the complexity of the framework, but provides means to navigate and work with a model



METHODS

- We conducted two usability tests with students of a lecture course on "Semantic Artificial Intelligence"
- In the 1st usability test, they were given an MLM tutorial and a basic version of the POC and were asked to complete 8 tasks within a week
- In the 2nd usability test, they received a presentation about the framework and the full version of the POC and were asked to complete 10 tasks within 60 minutes
- The students were invited to complete a survey after each usability test



Tasks of the 1st usability test
including the results for each task



Tasks of the 2nd usability test
including the results for each task

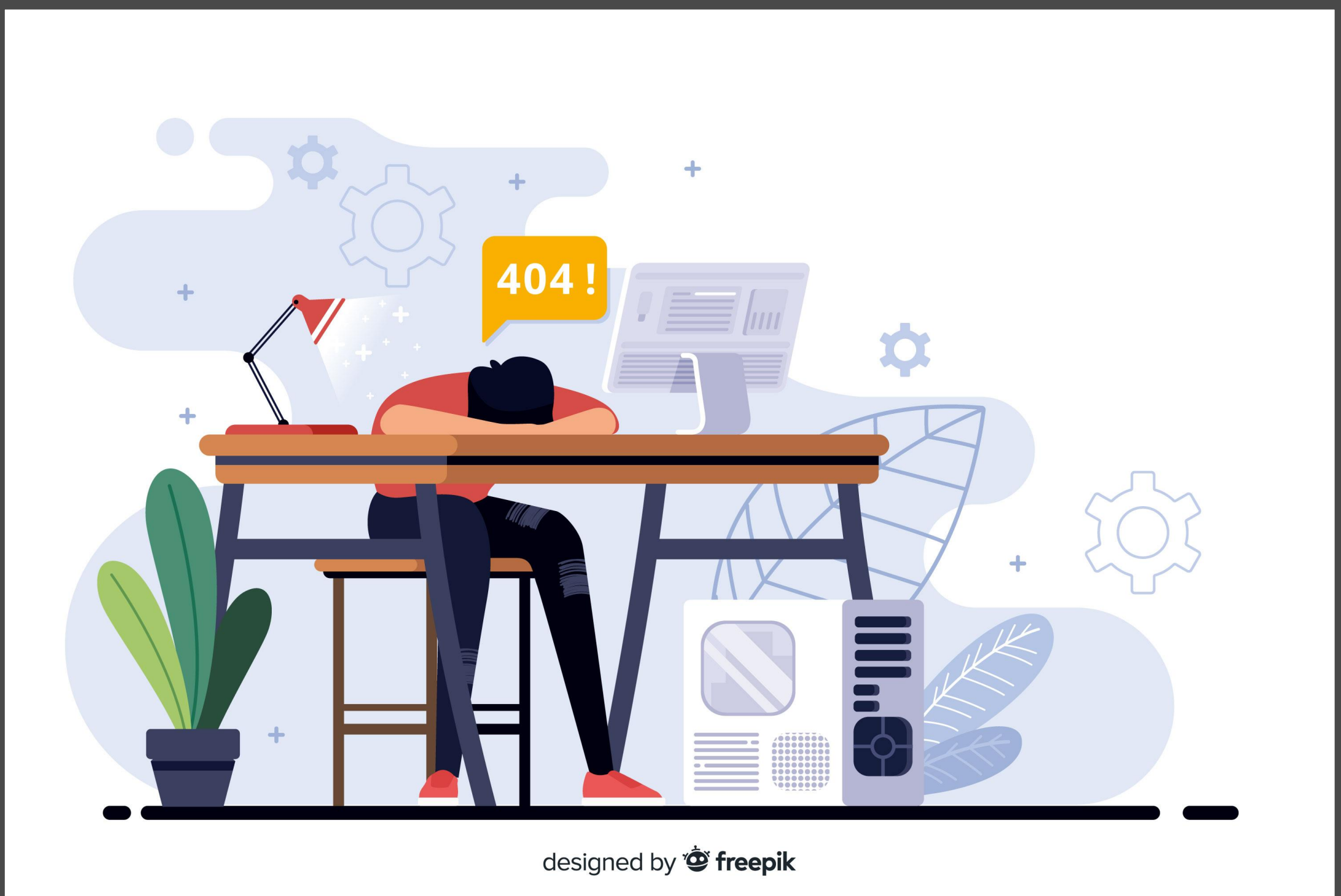
RESULTS

						Tasks					
	N	UMUX ¹ [0, 100]		RTLX ² [0, 20]		completed [%]		not completed [%]		not attempted [%]	
1 st usability test	17	M = 76.0	SD = 19.8	M = 9.6	SD = 3.1	M = 84.6	SD = 22.1	M = 10.3	SD = 11.5	M = 5.1	SD = 14.3
2 nd usability test	11	M = 67.4	SD = 13.9	M = 10.1	SD = 1.1	M = 56.4	SD = 21.0	M = 27.3	SD = 11.4	M = 16.4	SD = 15.5

¹Usability Metric for User Experience, ²Raw NASA Task Load Index, M ... mean, SD ... standard deviation

DISCUSSION

- The 1st usability test only served as a preparation for the 2nd usability test
- However, the students still faced difficulties in the 2nd usability test, possibly due to
 - the inherent complexity of the framework,
 - accidental complexity of the frontend,
 - inadequate instruction on the POC,
 - and/or lack of understanding of the framework
- We will therefore work on
 - hiding the complexity of the framework
 - improving the frontend and the instructions (e.g., developing guidelines)



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