



Abstract

The ever-growing interest in the market for VR applications, not only motivated the relevance of the purpose and concept behind the application, but also generated the need for more user-centred development techniques. This project has been developed as a Virtual Supermarket Simulator in collaboration with AAU Integrated Food Studies as a customizable tool model for studying consumer behaviour, choice and decision-making. With a strong focus on pre-existing methods of 3D interaction and user interfaces[1], we have developed and evaluated a VR-system serving the overall purpose. The system was tested using relevant usability-characteristics with the overall purpose of testing the efficiency, effectiveness and utility of the application as well as including screen recordings and post-test questionnaires. The test gave us circumstantial evidence towards answering the overall problem formulation, and gave us valuable results that can help improve the proposed solution for future prospects.

Introduction

Our project is part of the development of the Virtual Foodscape Simulator (VFS) system, which is aimed to teach and help users develop proper habits when buying perishables. Fotions also involves a tool for food outlet designers to understand and study consumers behaviour in regards to the placement of products on shelves. We explore the possibility of enhancing real-life experiments with a virtual substitute. The notion of a customizable tool model for studying consumer behavior, choice, and decision-making, in a virtual emulated environment, that can greatly improve the feasibility and affordability of preexisting real-life methods.

List of Requirements:

- Dynamic reconfiguration of groceries and inventory
- Novel VR interaction
- A customizable tool for researcher and designers of food outlets

Objective

The aim of the research was to create a theoretical framework for understanding concepts of usability with unconventional methods of 3D interaction, and evaluate the affordances of the system according to predetermined usability-characteristics[2][3]:

Learnability: How easy/hard are the tasks to initially accomplish for novice users.

Effectiveness: Accuracy of task performance, amount of errors.

Efficiency: Once users are familiar with the system, how fast and accurate can the user complete tasks.

Errors: The amount of errors the user make, how serious are these errors, and how easily can the user overcome and recover from the errors.

Satisfaction: How pleasant is it to use the interface.

Virtual Environment



Results

The tool was evaluated according to previous mentioned usability-characteristics with hierarchical task analysis and measured with time-completion and post-test questionnaire. Responses were evaluated using content analysis and validated using inter-coder reliability testing[4]. In total there were 17 participants (15 male and 2 female), all of them students or PhD students between 23-41 (Mean = 28.76, SD = 5.83).

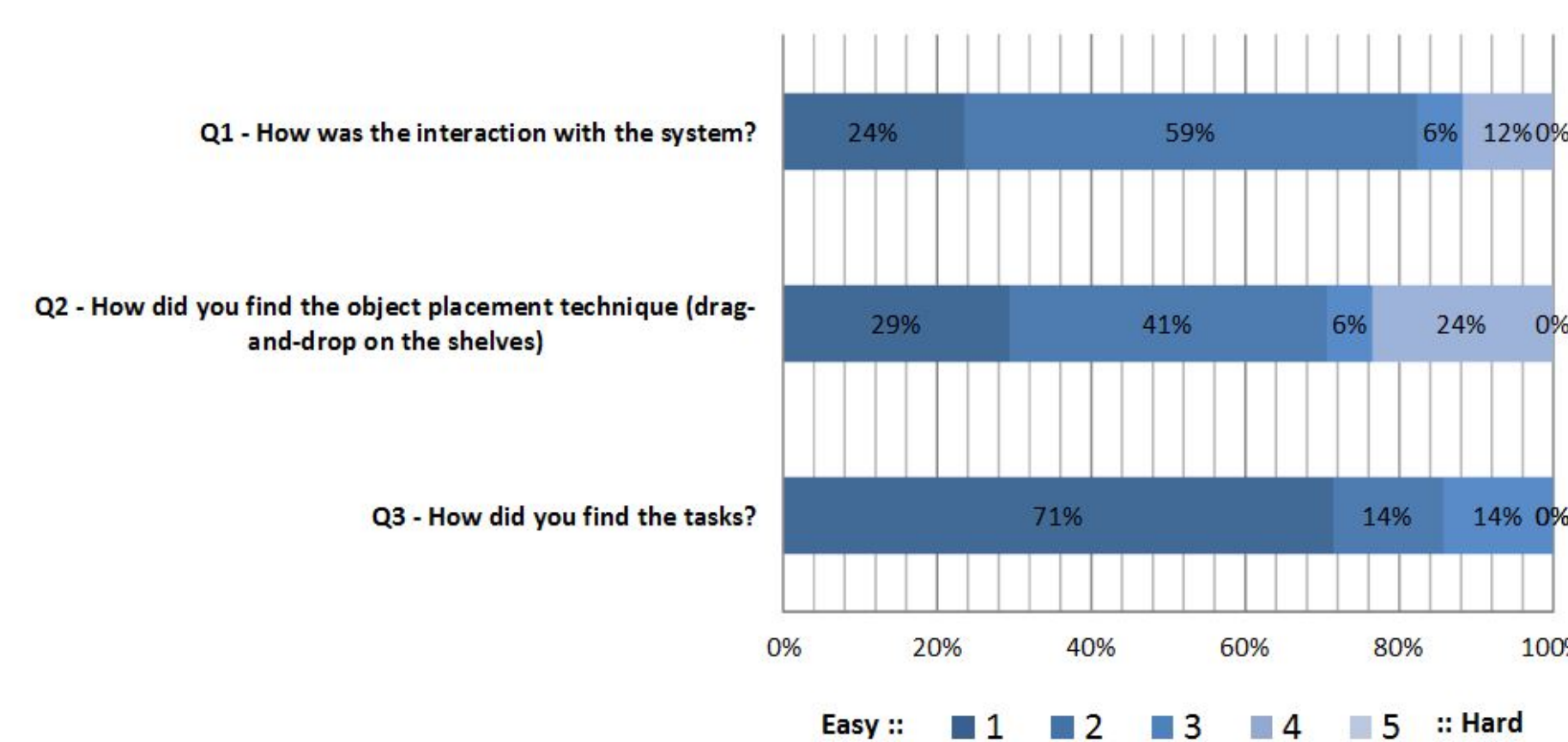


Fig. 1: Closed-ended responses

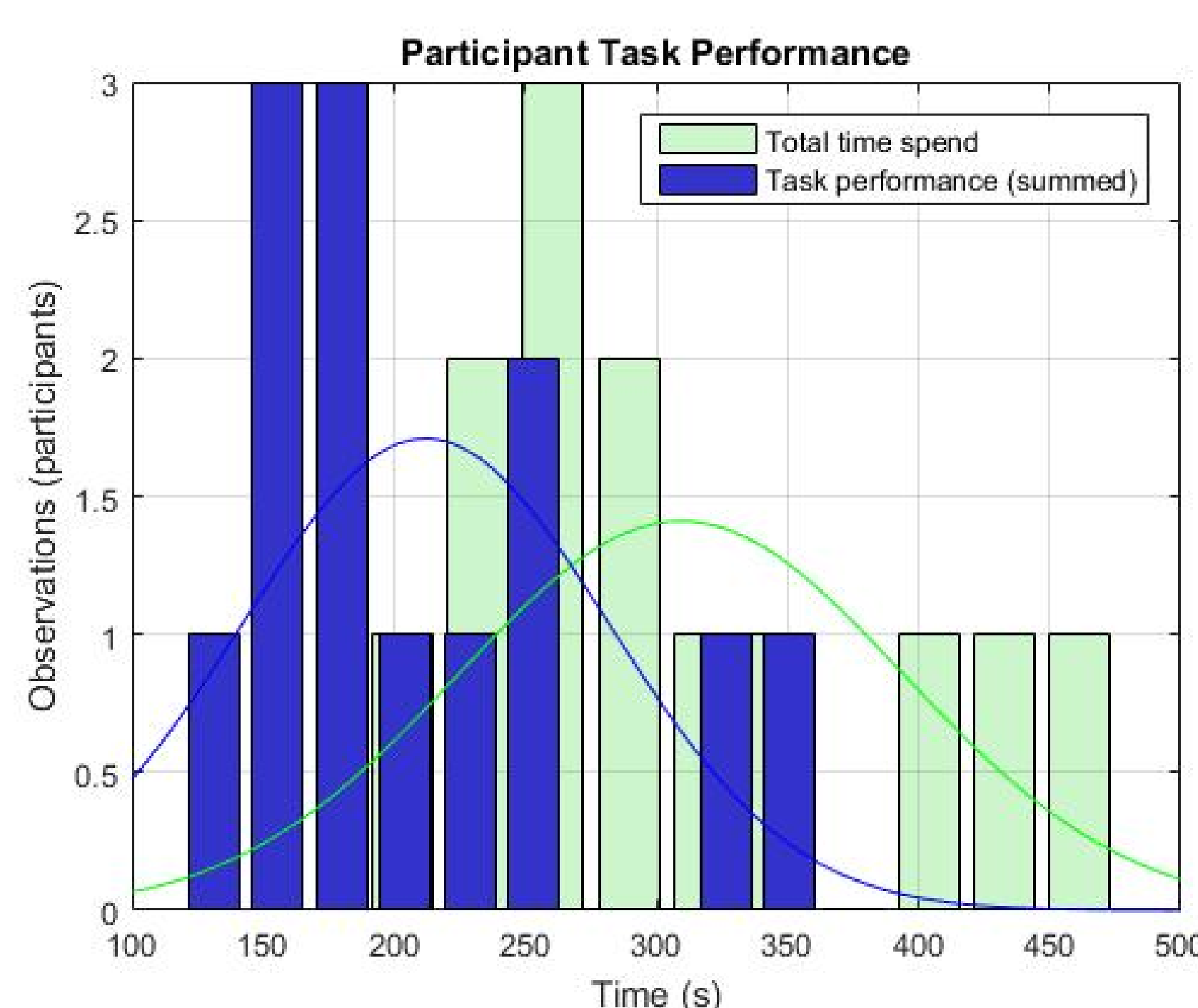


Fig. 2: Total time spend (reading and completing tasks, and task performance alone.

Conclusion

The tool was developed for designers and costumers respectively, but were tested on the same sample group since the initial usability and functionality needed to be assessed. The tests mainly showed that participants felt limited by the low amount of functionalities that the system included, and they suggested a series of tweaks and improvements that would positively affect the experience. On the other hand, results showed that we laid rather solid basis in order to build a stronger and effective system. In addition to this, changes such as an improved GUI, higher resolution textures, and an overall refurbished interaction techniques are needed in order to bring the system one step closer to the final goal of having it a commercially viable solution.

References

- [1] Doug E. Bowman et al: *3D user interfaces: theory and practice*, Addison-Wesley, 2004
- [2] Jakob Nielsen: *Usability 101: Introduction to usability*, 2003
- [3] Yvonne Rogers et al: *Interaction Design: Beyond Human - Computer Interaction*, Wiley, 2011
- [4] Thomas Bjørner: *Qualitative Methods for Consumer Research*, Hans Reitzel, 2015,