

Summary

Designing an intuitive object for hand rehabilitation at home

This Bachelor Assignment regards the design of a, intuitive, (smart) object for hand rehabilitation, due to stroke, for a particular daily activity at home. Through identifying current hand rehabilitation methods, products and experiences as well investigating the personal situation and daily circumstances of the primary and secondary users as it was possible to create a requirement specification which supported the development and evaluation of this (smart) object.

The aim of this assignment was to answering the main research question: *“How can we design smart objects for hand rehabilitation after a stroke that promote intuitive interaction by their form for a particular daily activity?”*. The key component for this assignment has been the intuitiveness of the product. Current hand rehabilitation methods are often time consuming and not worth the effort according to the conducted interviews. This highlights that for a hand rehabilitation (smart) object to be accepted and used by patients, the (smart) object should be intuitively implementable in the daily life of the patient.

Such seamless integration can be obtained through using obtained knowledge of designing for a meaningful experience. This overarches flow and engagement theory, which strongly supports the establishment of motivation, an important aspect for intuitive designs. The characteristics that support the aspects of meaningful experiences are therefore kept in mind when designing the (smart) object.

However, the intrinsic motivation to maintain a regular hand rehabilitation practice is often difficult in an at home setting. Therefore not only the creation, but also the setting of the (smart) object is of importance. Therefore an investigation is done which elaborates on daily situations and the experience of these by patients. The findings of this are supported by evidence of interviews with a physiotherapist and an occupational therapist. While considering all abovementioned knowledge of hand rehabilitation gained during research, a decision is made on which daily activity would suit best for the development of an intuitive (smart) object. The chosen activity was cooking, as this is done on a daily basis, there is a possibility for a variety of tasks and the design opportunities are broad.

After deciding on this daily activity, a set of requirements was created. These requirements were based on the conclusions drawn from each research section and highlighted the core of the design of the (smart) object.

Using these requirements as a basis, the design process was started. An explorative ideation session resulted in three different concepts. These concepts were evaluated based on effectiveness and eventually one of the concept was chosen to be developed into an initial concept. The chosen concept was an add-on for kitchen utensils that measured the accuracy of three different grasps as well as point collection to support a sense of achievement. The reason that this concept was still an initial version finds itself in the multiple prototypes that were made. The initial concept fulfilled most requirements but only after a prototype was made, improvement points were identified. These points of improvement were investigated and implemented in a new, final prototype.

This final prototype was adjusted mostly with regards to the main shape. This prototype had a smaller grip, personalized finger positions for each grasp, a better affordance for regularly used grasps in a kitchen environment and was more easily identifiable for either left or right hand usage. This improved prototype resulted in a final concept design of the Gr!pp.

This final design was then evaluated based on intuitiveness, fulfilment of requirements and product value creation. As some requirements were not sufficiently met and value creation was difficult to determine through the unavailability of primary users, this evaluation led to multiple recommendations for future improvements.

To conclude, through carefully analysing the user situation and potential daily activities one can create a (smart) object that promotes hand rehabilitation in an at home setting. During designing, the elements that are needed for creating a meaningful experience, an intuitive design and user value need to be considered throughout the whole process: from ideation to end product and prototype. This end product needs to be evaluated based on the proposed requirements for the creation of hand rehabilitation products for a particular daily activity. This way user demands will be satisfied and an effective (smart) object for hand rehabilitation after stroke that promotes intuitive interaction by their form for a particular daily activity can be developed.

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