

Development of a Triangular Evaluation Protocol in a Multidisciplinary Design Process of an Ergometric Step

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Abstract : Prototypes are a critical feature in the product development process, as they help the project team visualize early concept flaws, communicate ideas and introduce an initial product testing. Involving stakeholders, such as consumers and users, in prototype tests allows the gathering of valuable feedback, contributing for a better product and making the design process more participatory. Even though recent studies have shown that user evaluation of prototypes is valuable, few articles provide a method or protocol on how designers should conduct it. This multidisciplinary study (involving the areas of physiotherapy, engineering and computer science) aims to develop an evaluation protocol, using an ergometric step prototype as the product prototype to be assessed. The protocol consisted of performing two tests (the 2 Minute Step Test and the Portability Test) to allow users (patients) and consumers (physiotherapists) to have an experience with the prototype. Furthermore, the protocol contained four Likert-Scale questionnaires (one for users and three for consumers), that inquired participants about how they perceived the design characteristics of the product (performance, safety, materials, maintenance, portability, usability and ergonomics), in their use of the prototype. Additionally, the protocol indicated the need to conduct interviews with the product designers, in order to link their feedback to the ones from the consumers and users. Both tests and interviews were recorded for further analysis. The participation criteria for the study was gender and age for patients, gender and experience with 2 Minute Step Test for physiotherapists and involvement level in the product development project for designers. The questionnaire's reliability was validated using Cronbach's Alpha and the quantitative data of the questionnaires were analyzed using non-parametric hypothesis tests with a significance level of 0.05 ($p < 0.05$) and descriptive statistics. As a result, this study provides a concise evaluation protocol which can assist designers in their development process, collecting quantitative feedback from consumer and users, and qualitative feedback from designers.

Keywords : Product Design, Product Evaluation, Prototypes, Step

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