Medical Device User Experience: The Device Users' Perspective

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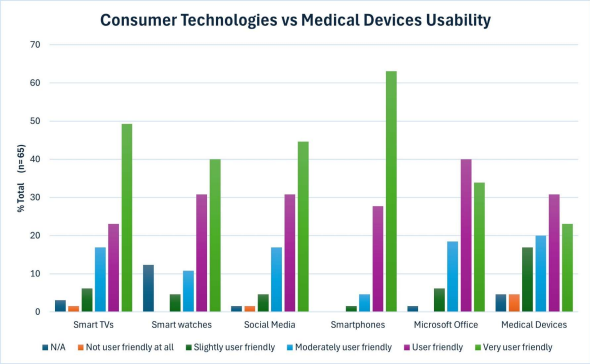

Figure 1: *Medical devices usability compared to common consumer technologies*

> *"What is the point of a device that's designed to help people live their lives with less restriction and discomfort if they don't work?"*

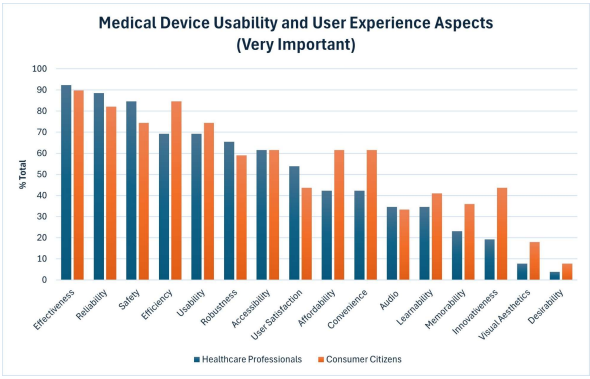

Figure 2: *Important usability and user experience aspects*

Introduction

Human factors in medical device design specify three factors for consideration: the device user, device interface and context of use. These affect the overall performance of a device which may lead to one of two outcomes, correct use (safe and effective) or a use error (unsafe and ineffective). Medical devices that are designed with human factors methods lead to good design which mitigates use error, promotes quality and safety, and improves overall user experience.

The aim of this study was to explore the end users', healthcare professionals and consumer citizens, perception of the user experience and usability of medical devices.

Methodology

A survey research approach, self-administered questionnaires with closed and open questions, was chosen as the best approach to achieve the aim of this study. The questionnaires were designed to facilitate the collection of views on the various aspects of user experience and usability, lived experience of medical device use and participation in usability testing.

The surveys were shared on LinkedIn and via an email broadcast at Ulster University. There was a total of 65 respondents, 26 healthcare professionals and 39 consumer citizens. The preliminary analysis of the survey data was conducted using a mixture of descriptive statistics and graphs using SPSS and MS Excel.

Findings

The most important usability and user experience aspects for healthcare professionals are effectiveness (92%), reliability (88.5%), safety (84.6%), efficiency (69.2%) and usability (69.2%). On the other hand, the consumer citizens' top aspects are effectiveness (89.7%), efficiency (84.6%), reliability (82.1%), safety (74.4%) and usability (74.4%).

On the overall user experience with medical devices the collective results of the two user groups are good (43%), very good (31%), fair (20%), poor (2%) and very poor (5%) consecutively. In comparison to other consumer technologies, medical devices (23%) and Microsoft Office (34%) were the least user-friendly while smartphones (63%) and smart TVs (49%) were the most user-friendly technologies.

The respondents presented varied views on their confidence to use a medical device without training with 12% indicating they would be very confident and 32% being fairly confident. The consumer citizens indicate more confidence with 15% saying they would be very confident.

When asked of their likelihood to take part in a usability study the respondents agreed that they would somewhat likely (46%) and extremely likely (31%) participate. However, out of the 65 respondents, only 8% (5) have participated in a usability study.

Conclusions

The results of this survey indicate that both healthcare professionals and consumer citizens understand the importance of medical device usability and user experience. There is a clear preference for the pragmatic usability aspects over the hedonic ones. The respondents also show an openness to be involved in the human factors' evaluation of medical devices.

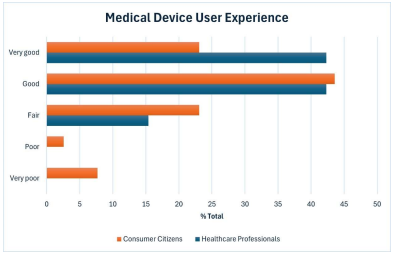

Figure 3: *Respondents overall experience with medical devices*

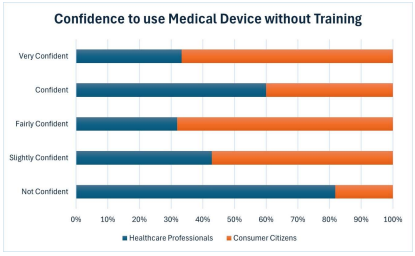

Figure 4: *Confidence to use a medical device without training*

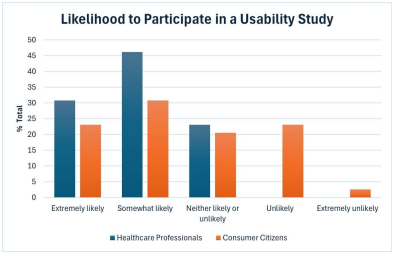

Figure 5: *Comparison of likelihood to participate in usability studies*

Ozelle Kimalel (PhD Researcher) Ulster University kimalel-o@ulster.ac.uk
Kyle Boyd, Ulster University ka.boyd@ulster.ac.uk
Justin Magee, Ulster University jdm.magee@ulster.ac.uk
Raymond Bond, Ulster University rb.bond@ulster.ac.uk