

# Evaluating the Usability of a Mobile Clinical Computing Device

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## Abstract

Observational ethnography of qualitative impressions and quantitative measurement of user reactions were employed in a sample of experienced nurses to measure the usability of the Motion C5 Mobile Clinical Assistant (C5) in a simulated clinical environment. Semi-structured interviews, surveys, and quantitative analysis of observations suggest a positive level of usability and satisfaction with the C5.

## Introduction

Medical error is a known and highly publicized downside to healthcare in the United States. Healthcare Information Technology (HIT) has been proclaimed as a potential solution to reduce the rate of medical error in America<sup>1</sup>. Current studies however are revealing that HIT, when implemented without a strong understanding of the information needs and workflow of users and attention towards human-centered design are actually increasing medical error instead of reducing it as planned<sup>2,3</sup>.

It is important that clinicians and system developers work in concert to assure that new technologies are designed to support workflow and do not encourage technology “workarounds” which, in of themselves, may increase the chance of medical error. This study is the result of such a collaborative effort between Johns Hopkins University, Motion Computing, and Intel.

## Evaluating the Usability

An empirical qualitative study to evaluate the usability, manageability, and satisfaction of the C5 was undertaken in a simulated clinical environment by a sample of experienced registered nurses. The C5 is a lightweight, hand-carried, point of care computing device designed to facilitate the use of HIT directly at the point of need.

Subjects were asked to perform a series of normal clinical tasks while using the C5. Tasks included medication administration using the C5 built-in barcode scanner, documentation during the process of a bedside patient assessment, and wound assessment documentation using the C5 built-in digital camera. The underlying software for the electronic medical record functionality was Eclipsys SCM 4.5.

To measure usability and user satisfaction with the C5 device interaction, in-depth analyses with techniques common to Human Computer Interaction (HCI) were

employed. User and environmental characteristics were assessed via comprehensive user analysis. Heuristic and cognitive walk-through analyses were completed to gain greater understanding of user characteristics and to determine high-level usability measures of the C5 system. Ethnographic observations using “talk-aloud” methodology of subjects operating within the C5 physical interface and a post-test survey yielded the data necessary to better understand how nurses actually utilize the device, usability issues, and overall satisfaction with the C5. Subject sampling continued until saturation was achieved.

## Conclusion

Overall, the results of the study suggest a positive level of usability, and several areas where the form factor of the device could be improved to better support the workflow of nurse users.

Studies of this type are needed to more fully understand how users interact with systems in the clinical environment and how the usability of such systems can impact actual use. Insights gained from the results of the study will be used to further inform system development and to design further naturalistic studies of the impact of the C5 device in live clinical environments.

## References

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