Embrace the Chaos, It’s Not Noise: Lessons Learned from Non-Traditional Environments

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ABSTRACT

The lessons learned from seven years of the testing of a behavioral monitoring system—the Everyday Living Monitoring System (ELMS) — outside the laboratory in the real world are discussed. Initially, the real world was perceived as messy and filled with noise that just delayed and complicated the testing and development of the system. However, over time, it became clear that without embracing the chaos of the world and listening very carefully to its noise, the monitoring system could not be successfully moved from the laboratory to the real world. Specific lessons learned at each stage of development and testing are discussed, as well as the challenges that are associated with the actual commercialization of the system. [Article copies are available for purchase from InfoSci-on-Demand.com]

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INTRODUCTION

Although it is possible to test whether a piece of equipment works in a laboratory, it’s not possible to test whether a technology works within a confined laboratory environment. This is because a technology is not equipment alone, but instead a technology is the equipment plus its application: that is, what it does in the real world. However, the problem with the real world is that it is
messy; it is inhabited with people who have real needs and real problems and who want a technology that meets these needs and solves their problems in a way that makes sense to them and at a cost in time and money that they can afford. Therefore, it is not surprising that developers of new technology are often reluctant to take the technology into this real world where they lose control and a sense of security and where the chaos of real life rears its head and confounds test protocols, schedules and projected costs. “Why can’t people behave the way they are supposed to and use the technology the way it was intended”, is a phrase often heard when technology is taken from the lab to the real world. Thus, developers spend inordinate amounts of time trying to eliminate the noise of real life, rather than accepting that the noise is the key to making the technology work.

We have spent the last seven years dealing with this noise as we moved a new behavioral monitoring technology from the laboratory to the real world. Initially, we viewed this noise as a hindrance to this successful transition, but over time we became convinced that without embracing the chaos and listening very carefully to the noise, our monitoring system could not be successfully moved from the laboratory to the real world. This process has been painful at times, but we believe that the lessons we have learned can benefit other developers and perhaps, help them embrace the chaos also. For have no doubt experienced chaos first hand in field testing various forms of behavioral monitoring (Alwan et al., 2006; Alwan et al., 2007; Blackburn, Brownsell & Hawley, 2006; Celler, Lovell & Brasilakis, 2003; Cleland, Louis, Rigby, Janssens & Balk, 2005).

STAGES OF REAL WORLD TESTING

Over six years of laboratory research and development on behavioral monitoring technology resulted in the first real world ready iteration of the Everyday Living Monitoring System (ELMS) which became QuietCare® when the system was commercialized by Living Independently Group. The ELMS was comprised of five motion sensors and a base station connected, via the Internet, to a website that processes the sensor data and converts them to information that is then displayed with graphics and text for caregivers. The PIN secure website provides a daily summary for each person being monitored for six activities: waking time; bathroom falls; the taking of medication; meal preparation; overall level of activity; and nighttime bathroom use, as well as ambient temperature. In addition, the ELMS provides emergency alerts for bathroom falls, non-wake-up, and high or low temperature and has the ability to produce monthly summary charts for all monitored activities. See Figure 1 for an example of a QuietCare daily summary page.
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