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On your watch: field studies of bridge work and maritime technology

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Objective

There is a rapid development of technology and automation of maritime navigation technology, and an increasing number of accidents due to or exacerbated by this technology. This study has the twin motives of studying the effects of technology on bridge work including the knowledge needs of the mariners, and finding data collection and analysis techniques that will support manufacturers' incorporation of such findings into their equipment.

Method

A 4-year qualitative study of maritime navigation technology and navigation practice on Swedish merchant ships is planned, from 2001 to 2004. To date, 190 hours of observations supplemented with interviews have been performed on 10 passenger and cargo ships, resulting in several hours of videotape, 100s of photographs and 100s of pages of field notes and transcribed interviews. More specifically, the data collection methods are participant observation, semistructured and unstructured interviews, and accident analyses from archival material. In addition 5 technology manufacturers have been interviewed.

Preliminary results

The data collection and the analysis are ethnographically informed, and preliminary results show that maritime bridge officers integrate and accommodate a large number of entities, cues and strategies into their practice. Further, they have to act as the integrating component between various instruments in spite of so-called integrated bridge equipment, and perform transformations on or comparisons of analogue and digital data. Complex navigation situations are exacerbated by the mismatch between new technology and in some cases obsolete navigation regulations. There are also issues of deskilling and reskilling, particularly among the more experienced mariners. In addition to this, the manufacturer interviews show that they are inadequately equipped to collect, analyse and integrate user data into technology functionality and interfaces. This is an issue of which they are aware and explicitly wish to resolve.

Discussion

There are implications for several areas such as education and training, rules and regulations, and of course technology manufacturers. The results suggest that learning of certain skills should be situated and that critical and relevant cues should be included in simulator training. Furthermore, curricula should include training for handling malfunctions of technology in addition to use under normal circumstances. Major revisions may be necessary for anti-collision regulations as well as other rules to allow for the changing navigation practices and the possibilities available with technology and automation, in order to remove ambiguous interpretation possibilities, but also to incorporate flexibility as several studies show the risk of regulating in too great detail. As mentioned, technology manufacturers need a structured method for collection and analysis of user data and needs, and the preliminary results of this study indicate that focused ethnography gives critical insights as well as the possibility of transforming user data into design guidelines.