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End-User Segments in Healthcare Data-Work

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Abstract
Recently, it has been demonstrated that end-users' assessment of Business Intelligence (BI) systems' success related as much to their evaluation of the system in question and tasks as to their occupation, gender, and educational background [4]. In this paper, we argue that these findings can be transferred to collaborative healthcare data-work, and that end-user segments should be considered in the development, implementation, and maintenance of collaborative decision-making systems in the health domain.

Author Keywords
End-user segments; business intelligence systems; data-work; computer supported collaborative work.

ACM Classification Keywords
H.0 [information systems], J3.Life and Medical Sciences: Health, Medical Information Systems.

Introduction
The field of computer-supported cooperative work (CSCW) concerns the manner in which people collaborate by means of technology [9]. To illustrate, different models have emphasized the core role of users in the field by placing them on pivotal places in models. For instance, Grudin models the field of CSCW as departing from small groups comprising individuals

with the user perspective being implicit [8, p. 21]. In a more recent paper, the field is being presented as departing from solely collaboration involving people and subsequently moving into technology requirements, investigation, development, deployment, and finally adoption [9].

Despite CSCW generally considering users as a whole, several recent studies have made a distinction between different user groups. For instance, Bowser et al. [1] investigated both nature and gamer participants in their study of a gamified mobile app. Xu et al. [14] concludes that Twitter is likely to have many types of sub-groups, but do not characterize them. Liao & Shi [11] identify a number of user groups in their study of rumors in a microblogging community. On this basis, they are able to identify differences between the user groups in the manner in which they take different roles in the rumor process. However, none of these example studies focus either on workplaces or the health domain.

In information systems, Ghobadi & Mathiassen [7] add to the discussion that differences between users can inform how sub-groups of users may differ in their work interaction. They studied what project managers, developers, testers, and user representatives considered to be barriers in effective knowledge sharing in software teams. The differences identified in the study point out how the concerns of the different roles must be considered if the aim is to bridge communication gaps and support shared understandings in teams.

In this position paper, we will use a case from the Danish public hospital sector to illustrate how it is possible to detect unobserved heterogeneity among health employees in their use of a BI system. Such systems are not per definition aimed to support group work. However, in the current case, the systems under investigation have a common task dimension [2]. For instance, it is used to pass on information to support own or colleagues' decision-making, leading to a distinction between information users and system users [6]. The systems are also used to improve group procedures in health work [3]. The case is being used to illustrate how differences among employees can be applied for a more precise understanding of system use in new forms of healthcare data work.

Segments in health BI

In this study, we analysed 746 BI users in Danish public hospitals [see full presentation in 4]. The users responded to a survey questionnaire measuring their assessment of BI success. By means of a survey questionnaire reflecting BI success factors as presented by Petter, DeLone & McLean [5, 13] and finite mixture partial least squares (FIMIX-PLS) [10, 12], the study aimed to detect unobserved heterogeneity in BI system use and assessment of BI quality among hospital employees.

This research identified three user segments in the responses on the basis of the FIMIX-PLS analysis. The segments did not differ in terms of task specificity or age. However, on all other variables, differences could be detected in the responses. The users in segment 1 were females with a vocational education, no managerial responsibilities, and limited BI experience. The users in segment 2 were also women, but with a professional bachelor's degree, no management and little BI experience. In segment 3, the users mainly

comprised men with master's degrees, managerial responsibilities, and some experience with BI. The study found more similarities between segments 1 and 2, but all segments differed in terms of their assessment of use, various task dimensions (compatibility, interdependence, significance, difficulty, and specificity), and information and system quality.

Implications for data work in health

The findings of the case study hold several implications for data work in health. The most important implication is that user groups may not solely be identified on the basis of formal characteristics such as age, gender, educational background, or position. User segments are also formed by users' understanding, use, and assessment of the system at hand. That means that in determining how to measure and understand the success of systems to support new forms of healthcare data work, perspectives and variables beyond formal characteristics should be considered.

Another implication is that identifying end-user segments on the basis of their assessment of system success could provide valuable inputs for both system development and implementation. Thus, if for instance a segment experiences increased task significance along with reduced information or system quality, actions could be taken to specifically address this challenge in revisions of the system. Similarly, in implementation, knowledge of end-user segments and their specific challenges can enable tailored initiatives to support a more successful implementation.

In this first analysis of the exemplary case, we have focused on BI systems in Danish public health. Future studies should consider other system types supporting data work, amongst others electronic health records. Also, other national contexts along with health contexts should be studied.

Conclusion

When designing and implementing systems for new forms of data work, and understanding the use and assessment of existing systems, considering and understanding users as segments, and not as one unified whole may provide a more complete picture. In addition, user segments are not necessarily merely composed of their position, gender, and educational background. Segments may also be formed by differences in understanding information and system quality, use, and the characteristics of their tasks in relation to the system. Taking this perspective into consideration will enable a richer picture of end-users that can add to successful implementation of systems for new forms of healthcare data work.

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