Facilitating the tasks of observers and observees

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THE WORK IN CONTEXT

Human factors professionals and researchers have a wide variety of methods at their disposal to collect data to further our understanding of human factors issues encountered in work settings. Among the most labour-intensive methods, and less frequently used, are workplace and worker observations. However, because observations can provide a truly in-depth understanding of a worker's tasks and factors impacting on these tasks, it is important to find ways to reduce the effort required to collect data via observations and to improve the quality of such data. In this paper, we present a software tool that supports task observers in recording their observations quickly and easily, that eliminates the need for a separate data coding step and that stores the data in a format ready for statistical analysis. The tool was originally developed to record and code team communication and was restructured to enable task observation recordings. This restructuring came about when a mining organisation operating in a remote area of Australia approached us with concerns they had about the workload and work pressures faced by their frontline supervisors. Both human factors and work design research has shown that heavy workloads and work pressure can negatively impact wellbeing, and general and safety performance. The mining organisation wanted to better understand a typical supervisor's workday, and an observation-based approach seemed most appropriate. The goal of the observations was to gain insight into the various tasks performed, time dedicated to each task, how many and which tasks are juggled on an hour-by-hour basis, when peaks in workload occur, and which potential improvement areas exist to make work life easier for the supervisors and to better support them.

KEYWORDS

Workplace observation, open-source software, task switching

A brief outline of the work carried out

A group of nine mining operations supervisors were shadowed, one at a time, for an entire day shift by one of the researchers. With input from the supervisors, an inventory was made of regular tasks that were grouped into four main categories: interactions with others, interactions with systems, transport, and a rest category: other tasks. For interactions with others, distinctions were made regarding whom the interactions were with (for example team members, superintendents), how they were done (for example face-to-face, phone, radio), the purpose, and which leadership style was used. For interactions with systems, distinctions were made regarding which system (for example work planning, e-mail, bookings), and for what purpose. For transport, different transport modes and purposes were distinguished. The four categories and further distinctions were used for recording and coding every single task the observed supervisors performed as part of their workday, along with the tasks' start and finish times.

Findings/solutions (the outcome)

The observation data provided insights into the amounts of time spent on various types of tasks, and into when the peak periods were for either workload in general, or for particular types of tasks, or for frequent task switching. Peak workload and high frequency of task switching was found to occur at the start, middle, and at the end of the shift. Time spent on administrative tasks was higher than anticipated, and even though supervisors spent about half of their time interacting with others, only a quarter of their time overall was interacting with their own team members, much lower than the amount considered ideal for their job role. A substantial proportion of the task switching was between relatively complex tasks that often also were quite unrelated, which compromised task performance.

The software tool wasn't ready in time for the supervisor shadowing project, but has been tested on data from this project, and is now fully functional. The tool allows the observer to code on-the-spot using a touch-screen interface, where applicable categories and further details can be selected by touching them on screen. The start of a different task, triggered by touching the category to which the task belongs, automatically enters an end time for the previous task too. The tool records all entries and their timing, and automatically generates a data file for analysis, eliminating the need for data entry and coding later. Using examples from data collected from the supervisors, we will demonstrate how this tool can be used to record and code this data.

Impact

The supervisor shadowing project was received very positively by the supervisors and their leadership team. Combination of the insights from the observations with insights from relevant literature led to recommendations regarding how the supervisors' jobs could be improved and better supported through the use of technology, administrative support, and task redistribution. Most of those recommendations have since been implemented.

The software tool has now been used in a different task observations context, where it provided savings in time and effort required from the researchers and increased the levels of detail and accuracy of the observations. This in turn benefits the workplace where the findings from the analysis of the observation data are of use.