FW-HTF-P: Supporting the Future Industrial Operators Workforce in Warehouse & Distribution Centers within Material Handling Industry and Logistics

Data Management Plan

Overview

The project implemented by the University of North Texas will generate physiological as well as psychological data of the industrial operators working in material handling industry. Specifically, the project will explore data and information that influence the behavior of the forklift operators at a WDC and identifying possible reasons for being distracted.

Roles and Responsibilities

Data will be collected by the qualified Key Personnel and trained Research Assistants through biosensors such as eye-tracking, GSR, EEG, surveys, archival research, literature review, and interviews and in accordance with the methodology described in the Project Description supported by methods described in (Charmaz, 2006; Glaser, 1992; Glaser & Strauss, 1967; Holland, 1992; Randall & Mello, 2012; Randall, Pohlen, & Hanna, 2010). The Key Personnel will also assume ownership and responsibility for ensuring the integrity and quality of the data for the duration of the project. Day-to-day management of data will be the responsibility of the PI [Suman Niranjan]. In the absence of the PI, Co-PI [Brian Sauser and/or Arunachalam Narayanan] will be designated by the Director of Sponsored Research at the University of North Texas to assume the role of day-to-day management.

Expected Data

Outside of publically available information, the project will use three primary methods for data collection: field studies, secondary data from telematics, and interview data. Data will be collected via biosensors attached to the operators that records signals of the operator, surveys completed at various stages of their driving the equipment, interviews, videos of operator driving the equipment and simulated equipment. In general, all data will be used at the aggregate level, and will have no identifying information about specific participants. *The research team already has an approved IRB 20-508 for the proposed planning project.* The data will be in the form of numbers, text and videos. By their nature, field experiments allow for observance of behavior only. That is, with the exception of some instances in which we may be able to record individuals' gender or approximated age, there will be no data about the participants that will identify them individually. We might, in some cases, interview a subset of the participants in order to verify data. The Key Personnel have past experience in the methods and dissemination of such data.

Period of Data Retention

Data will be stored in a locked room with a password protected hard drive at all points of time. While data is being collected at the location/field (WDC) care will be taken to transfer the collected data immediately to an external hard drive. Once the transfer of data happens to a hard drive it can only be accessed via a password. Due to enormous size of field data (video, audio etc.) collected (several terabits of data) None of the data will be available on cloud or on server. Once the data moves from field to campus, the hard disks will stay in PI's office, and will only be accessed by project personal. The survey data and secondary data obtained from industrial operators will also be in the digital format and will be stored on a locked computer in PI's office. Hardcopies of survey data will have their identification information redacted, and the hardcopies of the surveys will be stored for at least 5 years duration. The digital data will be retained by the PI with access to key project personnel indefinitely or until no longer valid.

Data Format and Dissemination

Data will be stored as text, video, and audio files. We do not foresee any issues in this area. Although we are recording data from individuals, there is no need to record any personal information regarding these people. We will not identify users and any sensitive data will be deleted. The data is open for use to all

involved with the research and access will be granted by the PI [Suman Niranjan, 940-565-3673, suman.niranjan@unt.edu]. Data will not be disseminated directly but used in the aggregate in publications and teaching materials. The aggregate data will be made available starting in the sixth month of the second year of the project. Data dissemination will predominately be via publically available training materials resulting from this project and disseminated through the venues specified in the proposal.

Data Storage and Preservation of Access
Research data saved on the external hard disk, and a back up hard disk for each hard drive. All the hard drives will be password protected. Eventually all the data from hard drive will be transferred into university network, which will be stored on production "machine room" servers, with offsite data backup systems, all supported 24 hours a day, 7 days a week. Connected to the UNT Consortium Co-Investigator's office network by a Gigabit backbone, this backup also provides a redundant, multi-terabyte storage with highly available power and disks and replacement hardware onsite.

The data acquired and preserved in the context of this proposal will be further governed by the University of North Texas' policies pertaining to intellectual property, record retention, and data management.

Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks, CA: Sage Publications, Inc.
Glaser, B. G. (1992). *Basics of Grounded Theory Analysis*. Mill Valley, CA: Sociology Press.
Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory*. Chicago, IL: Aldine Transaction.
Holland, J. H. (1992). *Adaptation in Natural and Artificial System*. Cambridge, MA: MIT Press.
Randall, W. S., & Mello, J. E. (2012). QUALITATIVE RESEARCH SPECIAL ISSUE- GROUNDED THEORY: AN INDUCTIVE METHOD FOR SUPPLY CHAIN RESEARCH. *International Journal of Physical Distribution & Logistics Management, Forthcoming*.
Randall, W. S., Pohlen, T. L., & Hanna, J. B. (2010). Evolving a Theory of Performance Based Logistics Using Insights from Service Dominant Logic. *Journal of Business Logistics, 31*(2), 35-62.