Engineering Design Methology

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|  | |  |  | | --- | --- | | Andreas Fröderberg | 880730-7577 | | Hanna Hellman |  | | Aron Gyulai |  | | Thomas Carlsson |  | | Jennifer Tannfelt Wu |  | |
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# Theory of Science

When performing research, a researcher makes different assumptions about how and what they will learn during their studies [1]. These assumptions might also be called paradigms, or worldviews, which Creswell defines as “a general orientation about the world and the nature of research that a researcher holds” [2]. One such worldview is postpositivism, a quantitative research approach often represented in traditional research [3]. Postpositivists believe that there is no absolute truth and that knowledge is shaped from data and rational consideration [3]. According to Kuhn, an acceptable theory in within postpositivism is simple, provides accurate predictions and shows compatibility with other contemporary theories [4]. On the other hand, proponents of social constructivism believe that knowledge is created from individuals interaction with the environment [5]. As such, truth is not asbsolute and generalizable since phenomena all happen within a certain time and context [6]. Lincoln and Guba claims that a theory should aim to be if it is more informed and elaborates on earlier theories [7].

Examining a cross section of researcher Mats Magnussons work, one can infer that he uses the mixed methods research (MMR) methology. An MMR researcher exhibits methodical eclectisism [8], ie uses methods from both qualitative and quantitative approaches. Magnusson uses a wide range of methods such as Case Studies [9] and semi-structured interviews [10], which are methods of the qualitative domain. In [11], Magnusson uses statistical analysis which is a quantitative method. Focusing on the problem at hand and choosing the methods that work are typical characteristics of a pragmatic worldview [12] [13] which is why Magnusson is believed to subscribe to this worldview.

Examining Magnussons research from a social constructivist perspective, one might criticize the lack of background perspective of the test subjects. Etnicity and cultural background are important to the results [14] and should be taken into account when drawing conclusions. In [15], interview subjects job position is presented, which is good, but their social setting is ignored.

# Quantitative methods

One quantitative research design is survey design. In this design the researcher uses questioneers on a sample of the population to collect numbered data. The data are then analyzed statistically to test research questions and hypothesis and to find trends [16]. One might also use the experimental research design. One uses this when one wants to examine whether or not an action or a procedure has effect on the outcome, or the dependet variable. The outcome is then compared to a reference group which did not experience the action or procedure [17].

When conducting quantitative research, researchers employ a variety of instruments, or methods. One of these is *observational and behavioral checklists* [18], where the researcher observes a group and records behavior by checking points on a scale [19].