Using WarpPLS in E-Collaboration Studies:
What if I Have Only One Group and One Condition?

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ABSTRACT

What if a researcher obtains empirical data by asking questions to gauge the effect of an e-collaboration technology on task performance, but does not obtain data on the extent to which the e-collaboration technology is used? This characterizes what is referred to here as a scenario with one group and one condition, where the researcher is essentially left with only one column of data to be analyzed. When this happens, often researchers do not know how to analyze the data, or analyze the data making incorrect assumptions and using unsuitable techniques. Some of WarpPLS's features make it particularly useful in this type of scenario, such as its support for small samples and the use of data that does not meet parametric assumptions. The main goal of this paper is to help e-collaboration researchers use WarpPLS to analyze data in this type of scenario, where only one group and one condition are available. Two other scenarios are also discussed – a typical scenario, and a scenario with one group and two before-after technology introduction conditions. While the focus here is on e-collaboration, the recommendations apply to many other fields.

Keywords: *Action Research, Electronic Collaboration, Field Research, Multivariate Statistics, Partial Least Squares, Structural Equation Modeling, WarpPLS*

INTRODUCTION

Occasionally a researcher will obtain empirical data by asking questions that attempt to gauge the effect of an e-collaboration technology on task performance. However, the researcher will not obtain data on the extent to which the e-collaboration technology is used.

While this scenario may look like the result of bad research design, it is a relatively common scenario in investigations where the researcher gains access to the participants by offering a service to them, as is frequently the case in action research investigations (Kock, 2005; 2010b).

When this happens, frequently the researcher does not know how to analyze the data, or analyzes the data using unsuitable techniques. Some of WarpPLS's features make it particularly useful in this type of scenario, such as its support for small samples and the use of data that does not meet parametric assumptions.

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The main goal of this paper is to help e-collaboration researchers use WarpPLS to analyze data in this type of scenario, where only one group and one condition are available. Two other scenarios are also discussed. These two scenarios are discussed to set the stage for the discussion of the one group and one condition scenario.

The first is a typical e-collaboration study scenario in which the researcher measures the degree to which the e-collaboration technology is used, or the degree to which specific features of the e-collaboration technology are used, as well as team performance and/or related variables expected to be influenced by e-collaboration technology use. This is a cross-sectional data collection scenario, and is one of the most common scenarios in e-collaboration research.

In the second scenario the researcher does not have data on the extent to which the e-collaboration technology is used, but has data related to team performance and/or other variables expected to be influenced by e-collaboration technology use before and after the technology is introduced. This is a longitudinal data collection scenario, and is a relatively common scenario in e-collaboration research.

The focus of this paper is on e-collaboration research, but the techniques discussed apply to a wide variety of fields. In fact, they arguably apply to any field in which attitudinal and/or behavioral responses are studied in connection with change, where change may result from the use of a new technology, from the introduction of a new management technique, from the use of a new drug for treatment of a disease, or even from a change in weather.

A TYPICAL E-COLLABORATION STUDY SCENARIO

Let us assume that a researcher introduced an e-collaboration technology into an organization with the goal of facilitating the work of business process improvement teams (Kock, 2005). These are teams that carry out business process redesign projects – they select, analyze and redesign business processes (Kock, 2006).

All teams studied by the researcher use the e-collaboration technology. No controls on how much the teams use the technology are applied by the researcher, characterizing the investigation as a field study with quasi-experimental elements (Shadish et al., 2002). The researcher is interested in the possible effect that the use of the e-collaboration technology has on team performance measures, such as the return on investment of a business process redesign project.

In this scenario, the researcher can measure the degree to which the e-collaboration technology is used, or the degree to which specific features of the e-collaboration technology are used. Either way, the researcher will have one or more variables for which there will be different values for different teams. These values will reflect different degrees of use of the e-collaboration technology as a whole, or of specific features of the technology.

The researcher can next collect team performance measures and build one or more models to be analyzed with WarpPLS (Kock, 2010; 2011; 2011b). A simple model would have two latent variables, one measuring e-collaboration technology use and the other measuring team performance, with e-collaboration technology use pointing at team performance.

Figure 1 shows an example dataset with data collected from 20 business process improvement teams. "ECU" measures the degree to which a team used an e-collaboration technology, on an 11-point scale from 0 to 10. "Perf" measures each team's performance in the business process improvement task, also on an 11-point scale from 0 to 10.

Figure 2 shows a simple two-variable model, with results, implemented with WarpPLS using a linear analysis algorithm. In this model "ECU" is the predictor and "Perf" the

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