Chapter 9

# The Role of Experiments in the Study of Virtual Groups

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## ABSTRACT

*In this chapter, the authors discuss the use of experimental methods in the study of virtual groups. For some time, experimentalists have hoped, as noted in Bainbridge (2007), that virtual worlds would provide a locale for research. The authors discuss practical techniques for doing so, and provide a detailed example of one such experiment as a platform for discussing opportunities and potential pitfalls for conducting research on virtual work groups. For convenience, they divide the steps in creating and conducting an experiment into several stages: design of the experiment, pre-testing, and statistical power of the data it produces. Each stage in any experiment presents challenges and requires decisions on the part of the experimenters; experiments conducted with virtual groups are certainly no exception.*

## INTRODUCTION

As noted in a recent issue of *Science* (Falk & Heckman, 2009), experiments are a major source of knowledge in the social sciences. Despite some reluctance among social scientists, experiments are gaining prominence. Thye (2007) notes that experiments provide advantages for developing social scientific theory that are unmistakable, such as identifying key processes in theories. Webster and Sell (2007) add that the range of usefulness of experiments in social scientific research has been traditionally understated. Finally, Falk and Heckman (2009) advocate that experiments are an important method to develop causal knowledge.

## BACKGROUND

When it comes to virtual work, the role of experiments is both less developed but also potentially more promising than in many other areas of social scientific work. Bainbridge (2007) makes this case strongly, urging researchers to consider a variety of virtual settings for their experimental research, including virtual worlds such as Second Life, observational ethnographies online, and analysis of social networks. He views virtual settings as spaces where "people can work and interact in a somewhat realistic setting," which "have great potential as sites for research in the social, behavioral, and economic sciences" (Bainbridge, 2007, p. 317). Even *World of Warcraft*, a very popular massive multiple online role playing game, provides a viable location for examining virtual teams; players of this game cannot advance in any meaningful way without joining with others who have different skills and perspectives. While some online games consist of teams of friends who know each other in "real life," *World of Warcraft* teams are often composed of strangers who do not know each other offline (e.g., Miller, 2007). They can, therefore, provide rich environments for examining distributed teams whose primary mode of interaction is online.

We will leave it to others to explore this variety of virtual settings. Our objectives in this chapter are to describe the role formal experiments can play in the study of virtual work groups and provide some practical advice about conducting such experiments. We include an in-depth description of one such experiment as a case study for lessons learned.

## CONDUCTING VIRTUAL GROUP EXPERIMENTS

### Design of the Experiment

Experiments, at their best, are about theory-testing and causal knowledge. A researcher designing any experiment, including those conducted in the virtual worlds, should have a prediction about the results, derived from the abstract concepts of a theory (or from several theories). These abstract concepts must be rendered concrete and observable.

Primary among the decisions a researchers must make are: what variables—independent and dependent—will we measure? What will our situation be? What are our conditions and manipulations? There can be a tendency in virtual experiments to be limited to what others have already done (i.e., what others have programmed) without relying on the theoretical constructs to tell us what the most useful questions and answers will be.

### Variables and Conditions

It is crucial that researchers are clear from the beginning of the design process just what the variables of interest are and how they will be measured or identified. Clear hypotheses identifying the independent and dependent variables and the exact relationship expected between them will go a long way toward creating a useful experiment.

Hypotheses can be, and often are, stated as "if… then" statements. To be most useful, hypotheses take the form of, "Given situation Z, if X, then Y." Here Z represents the setting or initial conditions under which the cause-effect relationship is expected to hold. X represents the independent variable. X will be introduced in some conditions but not others (or at varying levels across conditions). Y represents the dependent variable which the researcher will measure to compare against predictions derived from the theory.

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