

# Call for Participation

## OzCHI 2009 Tutorial: Experimental design for HCI research

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### ABSTRACT

This tutorial will introduce the basic concepts and pitfalls of running experiments with human participants, based primarily on the instructor's experience. It is particularly intended for researchers from a computer science background who are planning to conduct formal experiments.

### INTRODUCTION

In recent years it has become more essential for computer science research (and in particular HCI or Information Visualisation research) to be effectively evaluated through user studies. It is no longer acceptable to, for example, submit a PhD thesis or a research paper which describes a new interactive technology or a new visualisation method (however impressive) without some evidence that this technology or method has been evaluated with human participants.

Current PhD students are expected to design and conduct empirical studies, even though their supervisors may not have had such empirical research as part of their own training. While such methods may be well known by psychologists, computer science students have rarely been instructed in empirical design methods before they have to design and run their own research studies.

This tutorial aims to assist in bridging this gap, by discussing the issues associated with designing and conducting a valid experiment, and in analysing the data. Particularly intended for PhD students from a Computer Science background working in HCI or Information Visualisation, this tutorial will also be of interest to any researcher wishing to perform empirical studies.

The information presented in this tutorial is based primarily on the authors' experience of running a wide range of empirical studies over many years: it is not textbook material, and has not been published elsewhere.

### AIMS AND OUTCOMES

The tutorial will follow the process from 'wanting to evaluate HCI research' to an experimental design, and from there to publishable results.

The specific aims of the tutorial are:

1. Introduce the basic concepts of formal empirical studies.

2. Illustrate these concepts with a broad range of examples, highlighting important principles of empirical design.
3. Illustrate why these principles are important by demonstrating the problems that occur when they are not followed.
4. Discuss the various options for the experimental process, the experimental materials, and the data collected.
5. Outline simple statistical tests that can be used to analyse the data.

By the end of the tutorial, participants will:

1. Know what key decisions need to be made when designing a formal experiment.
2. Be able to formalise a typical research question in terms of an empirical study.
3. Be aware of some of the pitfalls of running an empirical study.
4. Be confident in the appropriate types of data analysis method to use.

### OVERVIEW

The tutorial will address the following issues in designing and conducting an empirical study:

1. What is the research question?
2. What kind of benchmarking is needed?
3. What are the variables in the experiment?
4. How can these variables be manipulated to address the research question?
5. What tasks will the participants perform?
6. How will participants be selected, grouped?
7. How can the results be made as generalisable as possible?
8. What data can be collected; what is its form?
9. What materials are needed?
10. How can the data be analysed so as to answer the research question?

### DELIVERY AND PARTICIPANT INVOLVEMENT

The examples presented will primarily be from the area of Information Visualisation (as this is the author's area of expertise), although other HCI examples will also be mentioned.

It is expected that the tutorial participants may themselves have some experience of alternative empirical methods or other research areas, and that broader discussion of other experimental examples will take place.