



VIRTUAL LABORATORY

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Summary

Actively involving students in psychological research is a major challenge for distance education psychology departments. To meet this challenge, the Open University of the Netherlands' Psychology Department developed Virtual Laboratory. VL is a series of interdependent applications enabling students to participate in studies developed by the department's staff, via the internet. Study presentation and data save are fully automatic, enabling students to participate at a time and place of their convenience. To make building studies easy, researchers combine preprogrammed modules (e.g., to present a particular item type or to assess reaction times). Only if some functionality is unavailable, is a new module programmed, which then becomes available for all users. Studies include experimental as well as (longitudinal) survey studies in the fields of social, organizational, work and clinical psychology. In the two years during which VL is operational, 652 students participated. Further, a number of Master and PhD students use VL for their research. VL has thus been a major help in stimulating research participation of psychology students and also enables the staff to gather high quality data. Future developments involve further integration of VL in the psychology

Introduction

Actively involving students in psychological research is a major challenge for distance education psychology departments. To meet this challenge, the Psychology Department of the Open University of the Netherlands developed Virtual Laboratory (VL). VL is a software package consisting of several interdependent applications (web-based and windows applications). It enables psychology students to participate in research of their teachers and their fellow students at a time and place of their convenience, via the internet. Building on distance teaching ideas, the Psychology Department has thus introduced distance *research* by developing and implementing VL.

VL in research and education

VL is just as important for the department's research as it is for its educational activities. From a research perspective, VL makes it possible that first year students, like most first year psychology students in Dutch universities, participate in psychological

research of the department's staff. From an educational perspective, VL is important for psychology students to train their skills in designing and develop their own research. Mirroring the psychology curriculum, this training becomes increasingly complex as students move to more advanced years of their psychology education. In the early phases, students act mostly as a participant (test person), in order to learn the workings of psychological research from the inside. In order to stimulate learning, participating students receive a clear and elaborate explanation concerning the aim and the contexts of the study and of this type of research after participation. In later phases of their education, students develop their own research in VL, supervised by the department's staff. For the bachelor thesis, this can entail relatively small variations on studies of the supervising teachers. For the master thesis, more input from students is required.

VL is not the first software package that facilitates internet based research. It is, however, the first package that combines development and adaptation of studies by researchers with user friendly participation and participant administration. Students register themselves on the VL-website and download the software. The website takes care of registration and controls user registration rights (i.e., only first-year psychology students are allowed to register as standard participant). After the installation they can immediately participate in a study of their choice. They receive detailed information on all available studies and can choose with which specific study they want to start. When finished, the data is synchronised via the web and stored in a central database. The administrative aspects of participation are processed automatically: By keeping track of students and their participation, VL allows for automatic registration of who has met his/her participation obligation. VL then forwards this information to the student administration section. To prevent possible problems, the built in e-mail server sends a confirmation e-mail after participants have finished a particular study.

Building on user feedback on previous versions, the latest version of VL is structured following a modular approach, in order to make developing studies easy for the researchers (including senior students) of the department. Researchers combine pre-programmed VL modules in a simple manner to build a study. Modules are, for example available to assess specific item types, such as open ended questions, Yes/No questions, and Likert type item formats, but other modules can also measure response latencies. Furthermore, researchers can include experimental conditions in their study by using a module that chooses at random to which type of information a participant is exposed. Researchers combine these modules simply by dragging them on a time line which reflects the course of the study procedure in the time. Only if certain functionality is lacking in VL is a new module programmed, which offers this functionality. This module then becomes available for all researchers of the Department of Psychology.

An example of one of the first VL studies is a social-psychological experiment examining whether authority power moderates the effect of authority's decision-fairness on attitudes toward these authorities. In this study, participants believed they cooperated with a fellow participant in the course of a decision-making task. The interaction partner's power and fairness were manipulated orthogonally. In fact, participants did not actually interact with a real fellow student. All communication from their interaction partner (e-mail messages) was pre-programmed. This study showed that, as expected, procedural fairness is indeed particularly effective in influencing attitudes towards authorities when authorities have high power. Currently, a revision is being written for a top tier work psychology journal of a paper that contains this experiment as well as several field studies.

An example of VL research that is still running is a health psychology study that makes creative use of the adaptive testing module of VL. Adaptive testing generally refers to procedures in which the items that are presented to participants are contingent on their responses to previous items. In this specific study, participants receive feedback concerning their health related behaviours and instructions concerning how they can improve these behaviours. This feedback is tailored to their own health situation (as measured by a previously administered questionnaire). The aim of this study is to assess the effectiveness of tailored health information interventions in stimulating health related behavior.

A final example, also of a study which has recently become available via VL, is a longitudinal study with two measurement points in which participants are asked for all kinds of characteristics and outcomes of their daily work- and private situation, such as their perceived autonomy and work satisfaction. VL automatically generates and sends a reminder e-mail to participants when it is time for the second measurement. A longitudinal design allows for some certainty concerning how the constructs of interest causally relate to one another. Because many Open University students have a day job, they form a particularly interesting sample to study how work interferes with or relates to educational activities.

Conclusions.

Involving students in research was until recently a difficult challenge for the Psychology Department of the Open University of the Netherlands. Arranging studies and having students participate cost large expenditures in terms of time and money. Following the introduction of VL, these objections have virtually ceased to exist. VL is operational for about two years. During this period, approximately 700 first year students have participated in at least three studies via VL. Further, in addition to the faculty's staff, 10 master students and two PhD students have successfully used VL for their research.

It is expected that use of VL for PhD, master, and bachelor students will continue to grow in the future. A development that was started recently concerns further incorporation of

VL in the psychology curriculum, such as by letting students participate in studies that are illustrative of topics in a specific course. The participants get feedback and more general explanations about the aims and context of this type of research in this particular course topic. Another important development, which is intended to support further integration of VL in the psychology curriculum, is to develop VL's capability to communicate with existing software packages that are used in the psychological laboratory and/or for the development of interactive course work, such as Adobe Macromedia. VL will thus continue to ensure that the department's staff can collect high quality data and it will remain an important factor in stimulating research activity for distance Psychology students.