Activity Theory and HCI: Research and Practice

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ABSTRACT The tutorial introduces attendees to Activity Theory, providing an overview of the theory as it applies to HCI and relating it to the use of information systems in organisations. An Activity Theory approach takes the whole activity as the core point of departure for any kind of human endeavour. The strengths of Activity Theory for HCI are its concept of tool mediation and its emphasis on activity in a social context.

KEY WORDS Activity Theory, Russian Psychology, Psychological Theory, Human-Computer Interaction

1. INTRODUCTION

In the development of the discipline of HCI, cognitive psychology has been a major influence on our current understanding of the characteristics and requirements of the human user of computer technology. This approach has led to rapid improvements in the usability of the technology by individuals but does not provide an appropriate conceptual basis for computer use in its wider social and organisational context. When cognitive psychology is applied, the HCI system is seen as being composed of two information processing units, the human being and the computer, so that the output of one unit is the input to the other. In this light, the role of the computer is seen as automating basic work practices by "replacing" the human. Many dynamic, interactive systems, such as decision support or management information systems, are not design to replace humans but rather as tools to support the higher-level decision making tasks which are not suitable for automation by existing technology. Such systems highlight the severe limitations of cognitive science as a theoretical basis to

explain the interaction of people with the computer. A more holistic approach such as that provided by Activity Theory (AT) may be more helpful.

Activity Theory is a psychological theory developed by the Russian psychologists Vygotsky (1978), Leontjev (1981) and others during the first half of this century. The original foundation, as laid down by Vygotsky in the period 1920-30, revolves around the basic idea that human activity is mediated by cultural signs: words and tools, which cause changes in that activity, and thus its internal mental reflection. Vygotsky's work was continued by Leontjev who developed a conceptual framework for the theory of Activity.

An AT approach means that Activity is the core point of departure for any kind of human endeavour. AT is able to conceptualise humans in their context and positions tools, such as computerised information systems, as mediating work activities. An activity involves a **subject**, which can be a person or group, and an **object**, with a meaning beyond simple physical objects, but which includes social and cultural properties, more in the sense of the "object of the exercise". Activities are distinguished from each other

according to their object, which motivates the activity transforming the object into its outcome. The strengths of AT are its concept of tool mediation and its emphasis on activity in social context. The holistic, centralised approach of AT to the use of technology is in stark contrast to that of cognitive science which, by virtue of its basic premise of the human as an information processor, has been forced into a piecemeal approach.

2. OBJECTIVES

The tutorial introduces attendees to AT, providing an overview of the theory as it applies to HCI and presenting a framework that relates to the use of information systems in organisations. We specifically show some examples of how this framework can provide a fresh perspective on certain extant problems in the fields of HCI. Participants should also become more aware of the nature and complexity of current controversies concerning the role of theory in HCI. As well as providing an introduction to the basic concepts of the theory, participants are given examples and a practical exercise illustrating how this general framework can be utilised in more specific settings. By the end of the tutorial, participants should be able to understand the basic principles of AT, and be able to describe their work activities in terms of this framework.

3. BACKGROUND

English translations of the original works of Vygotski (1978) and Leontjev 1981) are widely quoted by researchers in many fields. These are suggested reading for anyone wishing to come to terms with AT. However excellent companions to this tutorial would be the books by Bonnie Nardi (1996) and Susanne Boedker (1991), as well as publications of the presenters in this area .

4. CONTENT

The following topics are covered in the tutorial:

- Limitations of the cognitive science model of people as Information Processors
- The basic principles of AT
 - Activities as the objects of study
 - Object-orientedness
 - The Hierarchy of Activities

- Internalisation / externalisation
- Technical and Psychological Tools
- Tool Mediation
- The Dynamic Nature of Activity
- The Russian and Finnish Models of Activity
- Novice/expert differences and AT Hierarchies

5. PRESENTATION

As much of the information concerning AT may be new to participants the tutorial begins with an hour of substantial explanation and demonstration by the presenters. Following this the tutorial resembles more of a workshop format where participants are actively involved in applying AT concepts to real world problems. This leads to a discussion of the practical implications of what AT has to offer HCI.

The presenters have a background in Information Systems and Human-Computer Interaction. They were introduced to AT through the several East-West HCI conference held each year in Russia since 1991 and have formed cooperative research links with proponents of AT throughout the world.

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