

Towards an Activity Theoretical Evaluation Method for Web-based Systems

Amanda Quek

School of Computing, Staffordshire University, Beaconside, Stafford,
ST18 0AD, United Kingdom.

a.quek@staffs.ac.uk

Abstract: This paper details an approach towards an activity theoretical evaluation of web based systems. Activity theory provides a framework with which to analyse and understand human behaviour in context. However, there are few methods with which to apply AT directly. We argue that an AT based approach to evaluation can make a positive contribution to web based systems development. To this end, a method for evaluating web-based systems is presented and discussed. The limitations of the method are considered, as well as the problems faced in developing the method itself. The paper concludes with possible ways forward.

Keywords: evaluation, activity, activity theory, method, web

1 Introduction

The aim of this paper is to present efforts towards a method for the evaluation of web-based systems using activity theory (AT). The first section will look at the context for the work, and how an AT-based evaluation method could be of value to the web development process. In the following section, we take a brief look at AT and describe the principles and concepts that the theory is built from. We then describe the process of building an AT-based method for evaluation, the problems faced in trying to build the method, and the method itself. Finally, we discuss the strengths and weaknesses of the method as it stands, and what needs to be done to improve it. Conclusions are then drawn on possible ways forward.

2 Context

Existing evaluation methods are mostly based on the traditional theory of cognitive psychology from the field of human-computer interaction. In cognitive techniques, the behaviour of humans is likened to the behaviour of systems; people's actions are reduced to events of input-processing-output. However, cognitive science based laboratory-oriented psychology has been seen as unable to penetrate the human side of the

interface (Nardi, 1996). We need to examine the user's situation in a richer context in order to account for sociocultural and contextual aspects when evaluating the usability of websites. For this we propose the use of activity theory as a framework with which to analyse and understand human behaviour in context. This paper proposes an effort towards an activity theory-based method for evaluating web-based systems.

3 Activity Theory

Activity theory (AT) is a complex, abstract, theoretical framework that provides concepts and a vocabulary with which to analyse and understand human activity in context. AT stems from the work of Vygotsky and Leont'ev, and was developed further by Engeström. There are six main principles within AT, as detailed in Kaptelinin (1992) – the unity of consciousness and activity, object-orientedness, mediation, internalization, hierarchical structure and development. There are other concepts that also form a part of AT, such as contradiction, and learning. The major implication of AT is that human activity can only be understood if we look at the social, cultural and historical aspects. The usefulness of AT in systems design has been well recognised (Kaptelinin, 1992, Kuutti, 1996, Hasan, 2001) and we believe that

AT has great potential to play a major role in web-based systems development but few methods exist for applying AT in a practical way.

4 Towards an Activity Theoretical Evaluation Method for Web based systems

Here we describe the building of an activity theoretical method for evaluation. We chose the form of a checklist for the evaluation tool, following in the footsteps of Jonassen & Rohrer-Murphy (1999) and Kaptelinin *et al.* (1999). We have produced two slightly different versions of the checklist – one for designers and another for users. The difference is that there are issues specific to designers (such as how the system is maintained) and issues specific to users (such as whether they are informed that the system has been modified).

The checklist was developed mainly using the principles and concepts of AT. There are seven sections in the checklist, each devoted to examining a particular principle or concept. The sections are:

- Contextual Analysis
- Examining the Object
- Support for Internalisation/Externalisation
- Support for Actions and Operations
- Tools and Mediation
- Development and Change
- Support for Learning

Throughout the checklist, we aim to observe contradictions within the activity system, which will help to pinpoint problem areas to be addressed. Due to space constraints, the checklist cannot be published here.

The checklist is not meant to replace the use of usability guidelines and technical evaluation, instead it is an alternative approach to evaluation that focuses on the contextual and sociocultural issues that affect both the development process of the system and the use situations.

There were several difficulties faced when developing the checklist. It was not easy to enforce a consistent level of granularity within the points listed in the checklist. Also, some ideas in AT eg the unity of consciousness and activity were difficult to concretise into clear items for evaluation. The checklist is lengthy, and it is

unlikely that practitioners would be able to internalise all the items. The checklist also does not cater for the different types of web based system available, such as intranets, e-business sites, or e-learning sites.

Future work on the checklist will see it being used to evaluate several different websites. Versions that do not contain AT jargon need to be prepared that can be used by users who have not studied AT. The use of the checklist in practice will also be evaluated using AT.

5 Conclusions

In conclusion, it is not impossible to crystallise AT concepts into practical methods. However, there is a basic contradiction within the effort to make AT applicable in practical development situations, and this is the tension between needing methods that can be generalised for use in different situations, vs. the need for methods that are most suitable for the situation at hand.

This research is funded by the Tracker project at Staffordshire University (EPSRC Grant No. GR/R12183/01).

References

- Hasan, H. (2001) An Overview of Different Techniques for applying Activity Theory to Information Systems, In *Information Systems and Activity Theory: Theory and Practice* (Ed, Hasan, H.) University of Wollongong Press, .
- Jonassen, D. H. and Rohrer-Murphy, L. (1999) Activity Theory as a Framework for Designing Constructivist Learning Environments, *Educational Technology Research and Development*, 47, 61-79.
- Kaptelinin, V. (1992) Activity Theory: Implications for Human-Computer Interaction, In *Context and Consciousness: Activity Theory and Human-Computer Interaction* (Ed, Nardi, B.) .
- Kaptelinin, V., Nardi, B. A. and Macaulay, C. (1999) The Activity Checklist: A Tool For Representing the "Space" of Context, *Interactions*,
- Kuutti, K. (1996) Activity Theory as a Potential Framework for Human-Computer Interaction Research, In *Context and Consciousness: Activity Theory and Human-Computer Interaction* (Ed, Nardi, B.) Massachusetts Institute of Technology, .
- Nardi, B. (1996) Activity Theory and Human-Computer Interaction, In *Context and Consciousness: Activity Theory and Human-Computer Interaction* (Ed, Nardi, B.) Massachusetts Institute of Technology, .