"Engagement" and the Concept of Task in Activity Theory

Some comments on the article "Engagement: Understanding the Instantiation of Activities" to appear in Interacting with Computers.

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1. Introduction: Activity Theory and HCI

Activity theory (AT) is a psychological framework or meta-theory founded in the former Soviet Union during the first decades of the Twentieth Century. Over the course of around 60 years of continuous development, AT became established as a fundamental approach within Soviet theoretical and applied psychology encompassing many different strands of development and competing schools of thought (Bedny, Seglin, & Meister, 2000), and, since the fall of Communism in 1991, has continued to develop, diversify and find applications around the world. AT was introduced into HCI in the mid-1980s amid a general "move to the contextual" which saw the conceptual framework of the discipline expand to include models of users as autonomous, motivated agents acting, learning, and developing within specific cultures and sociotechnical work arrangements (Bertelsen & Harris, 2005). For Scandinavian researchers evolving a "tool perspective" through their work on the participatory design of workplace technologies (see e.g. Bødker, Ehn, Kammersgaard, Kyng, & Sundblad, 1987; Ehn, 1988), AT provided a potentially useful alternative to the then dominant cognitivist paradigm in HCI and IS. Following pioneering work by Danish computer scientist Susanne Bødker and her collaborators (e.g. Bødker, 1989; Bannon & Bødker, 1991; Bødker, 1991), the mid-1990s saw a number of optimistic pronouncements concerning the potential of AT to provide a unifying conceptual framework for IS and HCI (e.g. Kuutti, 1991; Kaptelinin, 1996; Kuutti, 1996; Nardi, 1996).

However, with a just a few notable exceptions (e.g. Bødker, 1996; Kaptelinin, Nardi, & Macaulay, 1999), the following decade saw a large number of very general, descriptive

AT-based IS studies, but little progress toward developing practical HCI design and analysis techniques able to get "close to technology"(Bertelsen & Bødker, 2000, p. 7). Indeed, as the authors of the article under review here point out, over the last decade many researchers in activity-theoretical HCI (henceforth, AT-HCI) have seemed to be "struggling to define concepts", often – as a review of the principal sources cited in the AT-HCI literature reveals – on the basis of the very brief summaries given in articles by post-Soviet interpreters of AT such as (Kuutti, 1996) and (Engeström, 1999). It is possible to discern a number of factors influencing this situation. The development of AT took place under conditions of extreme ideological pressure on science (Kozulin, 1984; Joravsky, 1989; Lethbridge, 1992). Consequently, the influence, access to funding, publication and translation of different individuals, research groups, and institutions did not always accurately reflect their scientific contribution. This is reflected in the limited range of materials currently available to English-language researchers.[1] Furthermore, once AT became established as a fundamental approach in Soviet psychology the majority of publications were addressed to a scientific audience assumed to be already familiar with its basic concepts and epistemological and ontological orientation, making the translation of increasingly specialized discussions a challenging task.

2. "Engagement" and the Concept of Task in Activity Theory

In light of the developments in AT-HCI outlined above, any attempt to clarify the fundamental concepts and principles of activity theory and show how they may be further developed and applied in HCI is welcome. We very much appreciate the present authors' intention in this regard, and - given the formidable complexity of the topics under discussion – admire the direct and simple manner in which they present their argument. They begin by clearly identifying an important and persistent problem in the field, namely that: "The need for an intermediate concept has been particularly clear in studies

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[1] For example, in the dearth of English-language translations of the work of S. L. Rubinshtein (1889-1960), generally acknowledged as the founder of one of the two principal schools within AT - the other being that of Leont'ev, which is currently often mistakenly taken (as in the article under review) as representing the entirety of AT.

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exploring the instantiation of activities within disciplines such as HCI and CSCW" (p.2).[2] This is very much in accordance with the position taken in some of our recent work (Bedny, Chebykin, & Karwowski, 2005; Harris, 2005) and thus we find ourselves in broad agreement with the authors' characterization of the difficulties involved in attempting to understand the complex and dynamic structure of activity using only the notions of activity and action, an argument which they support here with some useful examples from their empirical investigations.

However, it is clear that any research which aims to introduce a major new concept into such a longstanding and highly developed theoretical framework as activity theory, [3] and which – as here - claims to "close a conceptual gulf not adequately addressed" (p. 1) by previous work within the field, must proceed with caution. A basic requirement for the making and acceptance of such strong claims is that it should be convincingly demonstrated that previous attempts to formulate and address the problems under discussion have either not taken place, have been mistaken, or have proved inadequate. Such a demonstration must then by followed by arguments showing that the new concept proposed builds on, and integrate with, established and well-validated knowledge in the field. We must state plainly that in our opinion the paper under review fails to adequately address either of these requirements. Rather, its arguments in favor of "engagement" as a "new level in the hierarchy between the activity and action" (p. 1) reveal a deeply flawed and – perhaps ironically, given AT's emphasis on historical and developmental analysis - essentially ahistorical understanding of the concepts and principles of activity theory.

As we have seen, the interpretation and adaptation of AT terminology presents considerable challenges to Western scientists. However, we must point out that even a cursory review of the Russian-language literature[4] not only demonstrates that the "intermediate concept" the authors seek already exists, but shows that it has in fact long

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[2] Page numbers refer to the draft circulated for comments.

[3] Note that it is a contribution to AT, rather than simply HCI, that the authors appear to claim in their abstract and introduction.

[4] There are of course also relevant methodological discussions available in English translation, such as (Tikhomirov & Klochko, 1976/1981; Zinchenko, 1981; Tikhomirov, 1988), including some within AT-HCI such as (Raeithel & Velichkovsky, 1996).

been an object of intense study within AT. This concept is *the task*. Both of the great founders and theoreticians of activity theory, A. N. Leont'ev and S. L. Rubinshtein, used the notion of task to deal with the obvious presence of hierarchies of goal-orientation within activity. Over the decades a great many Soviet texts have presented the task, task-goal, and hierarchies and sequences of goals as fundamental concepts within activity theory. We can cite, for example, such authors as (Matyushkin, 1972; Kudryavtcev, 1975; Zavalishina, 1985; Tikhomirov, 1988; Petrovsky, Yarochevsky, & Korenko, 1995). An interested reader can find English-language summaries, examples and analyses of much of this work in (Bedny & Meister, 1997; and Bedny, Seglin, & Meister, 2000).

Even if, adopting the approach of the article under discussion we confine our attention to a very narrow selection of primary sources - those of Leont'ev's works available in English translation - we find it clearly argued that "any kind of well-developed activity presupposes the attainment of a <u>series</u> of concrete goals, some of which are rigidly ordered. In other words, an activity is usually carried out by some aggregate of actions subordinated to <u>partial goals</u>, which can be distinguished from the <u>overall goal</u>" and that "…apart from its intentional aspect (<u>what</u> must be done), the action has its operational aspect (<u>how</u> it can be done), which is defined not by the goal itself, but by the objective circumstances under which it is carried out. In other words, the <u>performed</u> action is in response to *a task*" (Leont'ev, 1981, pp.62- 63, underlining in original, our italics). Leont'ev immediately goes on to define the task as "the goal given under certain conditions" (Leont'ev, *ibid*.).

3. "Engagement" and "Purpose" vs. Task and Goal

Thus, within AT, the "flow of activity" has long been considered as a system of organized tasks, where a task is defined as a logically organized sequence of goal-oriented actions directed toward achieving the (supervening) goal of the task. According to the article under review (p. 11), "engagement" involves "a particular collaborative orientation, and thematically connects chains of actions oriented toward the achievement of purposes that transcend the goals of individual actions" (p.11). The similarities

between these definitions are immediately apparent, although it should be noted that the concept of task encompasses multiple levels of goal-orientation and situations where actions are not only sequentially but simultaneously performed, and in which actions are abbreviated, omitted, the order changed, etc. Therefore, the authors' Fig. 3 ("A modified hierarchy of human activity") appears to us to be both incorrect and misleading. In our understanding, motivated activity is always directed toward the achievement of a hierarchically organized system of task goals; tasks are directed toward the achievement of task-goals; and actions toward the achievement of a specific goal of action – that is, a subject explores or transforms a real or ideal objective according to an accepted or formulated goal, which is a more-or-less precise conscious cognitive representation of the desired future result of activity. Operations do not have conscious goals and are dependent upon work conditions. Fig. 1 summarizes this view of the hierarchy of human activity.

Activities	$\rightarrow$	System of Task-Goals
Tasks	$\rightarrow$	Task-Goal
Actions	$\rightarrow$	Goal
Operations	$\rightarrow$	Conditions

Figure 1: A hierarchy of human activity.

The activity-theoretical concept of task and the notion of "engagement" also differ in other important respects, not least in their use of such basic concepts as *action*, *goal-orientation*, and *purpose*. In a recently published paper on the application of AT to the study of human work (Bedny & Harris, 2005) we dealt with some definitional issues which we see as being vital to resolve if the HCI community is to make further progress in applying activity theory to the analysis and design of interactive technologies. We find a number of the problems discussed in that paper apparent in the article under review. It will suffice here to briefly note the authors' conflation of the activity-theoretical concepts of *object* and *goal* - a possibly useful move for macro-analytical studies such as those in which the famous "Engeström Triangle" (Engeström, 1987) was developed, but which

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we have argued is almost entirely unhelpful within the domain of HCI; the difficulties in clearly defining an action consequent upon this conflation; and the way in which they make extensive use of the concepts "purpose" and "purposeful" in framing their definition of "engagement".

In this latter instance we directly confront the translation issues alluded to above, which compound the difficulties that attend all attempts to adapt ideas from general psychology to the study of human work. No exact equivalent of the English word "purpose" exists in the Russian language, and the concepts of *purpose* and *goal* carry clearly differentiated meanings within activity-theoretical psychology, a point noted, if not addressed, by the authors on page 16. The word *tcel'* can be translated as *goal* and namerenie as *intention* or *purpose*. Soviet activity theorists expended great effort clarifying the differences and similarities between these ideas, and in particular distinguishing tcelesoobraznost' - *purposefulness*, purposeful behavior[5] - from *tcelenapravlennost'*, "the intention to reach the conscious goal." As a detailed analysis (in English) of the different meanings of these concepts can be found in (Tikhomirov, 1988) we will not deal with it further here, except to note that the discussion undertaken on pages 15-17 of the article under review, which highlights many valid and important issues, is limited both by its conceptual imprecision and by its reliance on texts which provide only the most general outline of the topics under discussion. As a consequence of these various considerations, we consider the concept of "purpose" as open to misinterpretation, and thus cannot endorse its use as a basic concept within AT-HCI.

At this point it is perhaps appropriate to note that the scholarly books by A. N. Leont'ev which the authors use as their primary sources are predominantly summary works of great generality, in which Leont'ev presents a broad theoretical overview and is not concerned to explore the application of AT to design. AT utilizes diverse, dynamic functional units of analysis, the most fundamental of which is the concept of *goal-directed* or *goal-oriented action* (Wertsch, 1981, 1995). Although Leont'ev introduced

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[5] A concept which Russian psychologists particularly associate with the behavioral psychology of E. C. Tolman (Tolman, 1932)

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the idea of mental and behavioral actions to AT, his work did not develop analytical techniques for the extraction of discrete actions from the flow of activity, nor did he develop methods of action classification. This work was left to others in the former USSR for whom the concept of action, and in particular the micro-structure of cognitive and behavioral actions, became an intense area of study in applied psychology, including ergonomics and the design of the man-machine interface. Major contributions in this area were made by G. M. Zarakovsky (Zarakovsky & Pavlov, 1987), V. P. Zinchenko (Zinchenko, 1978; Zinchenko & Gordon, 1981), N. D. Gordeeva (Gordeeva, Devishvily, & Zinchenko, 1975; Gordeeva & Zinchenko, 1982), A. V. Zaporozhets (Zaporozhets & Zinchenko, 1982) and many others. Again, extended reviews of this research can be found in (Bedny & Meister, 1997), while a basic definition of the concept of action and methods for action extraction, classification and analysis can be found in (Bedny & Harris, 2005).

4. Conclusion: "Engagement", Activity-Theoretical Task Analysis and HCI

One of our principal aims in recent work (e.g. Bedny & Karwowski, 2003; Harris, 2004) has been to reinstate the (activity-theoretical) notion of the task as an important object of study for AT-HCI. Reviewing the article under discussion here has strengthened our conviction that this is essential for progress in the field. We are of course aware of the many critiques of task-analysis methods developed within the framework of human information-processing psychology, which typically point out that such "additive models" as GOMS (John, 2003) embody simplistic and mechanistic assumptions which tend to ignore the context within which interaction is embedded (e.g. Ehn & Kyng 1984; Draper, 1993; Bertelsen 1994). We concur with these criticisms, and thus understand why – as here - they have led some researchers attempting to use activity theory in HCI and IS to reject the notion of task as almost entirely unhelpful (e.g. Holland & Reeves, 1996; Nardi, 1996b).

Yet, as we have demonstrated, within the tradition of applied AT, concepts of the goal-oriented task, hierarchies of goals, task-solving processes, and task analysis have always

been central (Bedny & Meister, 1997, pp. 18-25). The practical usefulness of the task (that is, activity during task performance) as an object of study is the way in which it a) delimits the scope of activity analysis and b) (re)focuses attention on the hierarchical and differentiated nature of goals and motivations in activity. We began this commentary by agreeing with the authors that without some clear conceptual differentiation between the hierarchically nested goals and sub-goals present in work activity, and their correspondingly differing levels of motivation, detailed and consistent analysis of human-computer interaction is extremely difficult. We then set out some reasons for rejecting the formulation of "engagement" put forward in their article as a viable solution to this problem, suggesting that the detailed and nuanced understandings of task, action and goal-orientation established by previous work in activity theory are more than adequate to underpin further methodological developments in AT-HCI.

This view of course implies that those of us working within activity-theoretical HCI must fully engage with the body of existing knowledge within AT in order to meet the emerging needs of our discipline, and that the very general and somewhat programmatic expositions of that knowledge which currently provide the primary theoretical resources for many working in this field are no longer adequate to its requirements. In this sense, we see the article under review as marking an important watershed in the development of AT-HCI, and believe that the debate it (and commentaries such as this upon it) will undoubtedly provoke will make a valuable contribution to further developments in this exciting area of research.

5. References