

An Activity System Perspective of eLearning and the Reframing of Knowledge

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Abstract— Activity theory offers a way of synthesizing and developing relevant notions. The approach has its origins in Russian psychology which endeavoured to avoid the dichotomies between thought and action and between individuals and society which have characterized Western theory. Activity theory examines the nature of practical activities, their social origins, and the nature of the 'activity systems' within which people collaborate. Modifications to Engestrom's contemporary presentation of the approach are suggested, and a theory of eLearning as activity systems is offered. The theory reframes eLearning by modelling the recurrent and embedded nature of human activities, by revealing the tentative nature of knowledge and its action orientation, and by highlighting the opportunities for individual and collective development. The article concludes by reviewing implications for knowledge work and eLearning.

Keywords— activity system, eLearning, knowledge

I. INTRODUCTION

In recent years major reviews have occurred of the nature of truth and knowledge, the relationship between rationality and action, and the links between individual thought and collective beliefs. Contributions have been made from a variety of sources, including the sociology of knowledge, discourse analysis, studies of the social impact of advanced technologies, theories of learning and philosophy.

Using Ryle's (1949) terminology, collectively such work has contributed to a series of developments in both the theory of 'knowing that' and the theory of 'knowing how'. It has been suggested that knowledge is:

- socially constructed (Berger and Luckmann, 1966)
- often tacit (Polanyi, 1967)
- a function of the play of other meanings (Derrida, 1978)
- enacted (Weick, 1979)
- distributed (Hutchins, 1983)
- situated (Suchman, 1987)
- material, as well as mental and social (Latour, 1987)
- resilient, but provisional and developing (Unger, 1987)
- public and rhetorical (Vattimo, 1988), and
- acquired through participation within communities of practice (Lave and Wenger, 1991).

Different writers emphasize different aspects of them. Nonetheless, overall, the implications are clear; the conventional rational-cognitive approach to understanding is breaking down. This is a highly significant development in a culture where abstract, rational, and analytic thinking has been highly prized. The common assumption has been that people possess objective knowledge and thought is a personal matter which takes place within individuals' heads. Yet, the distinctions between the psychological and social, between thought and action and between theory and practice are becoming blurred.

The following framework defines activity as a social phenomenon, and reinterprets the concepts of individual knowledge, action and skill within a broader theory of knowledge, competency, and collective development. The theory reframes matters of central concern to eLearning, such as co-operation, technology, planning and learning.

II. ACTIVITY THEORY

The analysis presented here is derived from activity theory, an approach developed in Russian psychology. The central concerns of activity theory are the relationships between material action, mind and society; the approach explores links between thought, behaviour, individual actions and collective practices.

The foundations of the activity theory approach were laid by the Russian Lev Vygotsky, who worked in the years immediately following the Bolshevik revolution.

Marx's conception of human nature had provided Vygotsky with his starting point. Marx believed it makes no sense to say that human nature is fixed. Rather, he suggested, people continually make themselves through their productive activity. 'As individuals express their life, so they are'. Marx's notion of productive activity was, of course, very wide; it included both material products and mental ideas. Vygotsky and his followers developed this approach, exploring the emergence of psychological processes, and developing the suggestion that higher mental processes have their origin in social processes. Of particular interest are the opportunities that the Russians recognized in the concept of *activity*. As developed in activity theory, 'activity' is a more general concept than either 'operation' or 'action' and is more specific than either 'society' or 'culture', yet it implies all of these. For the Russian theorists, interested as they were in the relationship between mind and culture, activity promised the smallest unit of

analysis possible which preserves both the link between mind and society and the coherence of different actions and movements. The concept draws attention to relationships between motives and the contexts of action, and invites enquiry into the processes through which people enact the activities in which they participate. The link this general approach promises with contemporary social constructionism is clear: the settings for different activities are not determined by objective, physical features but are provided by those who engage in them. 'Work', 'play', 'war', 'parenting' or 'study', for example, are socio-cultural concepts imposed on different situations by the participants themselves.

A. Engestrom 's Analysis of Activity Systems

In the Vygotsky tradition, Engestrom emphasizes how analysis of human activity must develop from the study of material actions and communication processes. 'Activity systems' is the term he uses to describe the context of actions. Engestrom's model displays the essentials of such contexts, locating human agents, their objectives, and the tools and language they use, within their broader social and structural settings. Engestrom contrasts the general structure of animal activity (Figure 1) with human activity (Figure 2). Human activity systems are distinguished by the emergence of tools and concepts which mediate the interactions between the individual and his or her context; by the appearance of traditions, rituals and rules which mediate the relationship between the individual and her community; and by a simultaneous emergence of a division of labour that mediates the relationship between the community and the actions of its members.

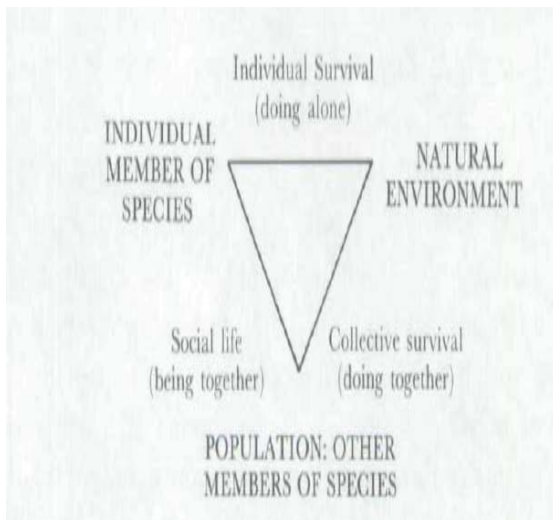


Fig. 1 Engestrom's model of the structure of the animal form of activity (Adapted from Engestrom, 1987)

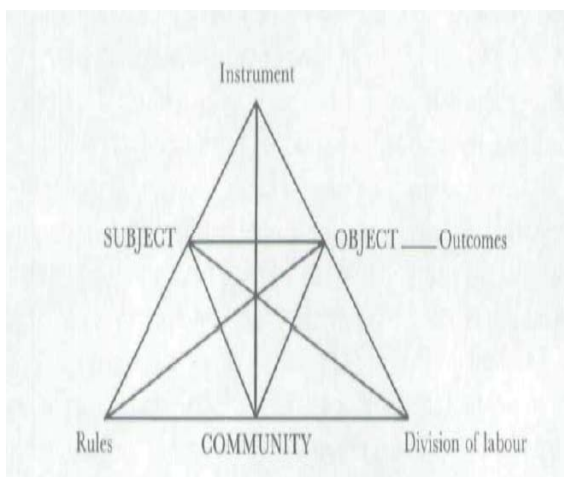


Fig. 2 Engestrom's model of the structure of human activity (Adapted from Engestrom, 1987)

The notion of mediation is central to Engestrom's theory. Marx had pointed the way through his emphasis on 'man the tool-maker': man creates tools which he interposes between himself and his labour. Vygotsky adopted this formulation and extended it to the phenomenon of language: man creates a sign system which, in the first place, he uses to co-ordinate his actions with those of others and which, later, he uses to regulate himself. In Engestrom's model of activity, the three processes of mediation of tools between subject and object, of rules between community and subject, and of the

division of labour between community and object, are presented as transforming the nature of the contexts within which people act.

Also central to activity theory is its conception of social learning. The approach suggests that the ambiguities, uncertainties, and contradictions that are such a characteristic of the human condition can provide key opportunities for individual and collective development. Engestrom distinguishes between gradual individual learning, rapid individual learning and the shared or collective learning of a community. Important occasions for such processes arise, he argues, from the ambiguities and conflicts that can be found within and between activity systems themselves.

Furthermore, *within* each of the elements depicted in Engestrom's model there is a potential dialectic:

(a) Contrasting conceptions ('ideal types') of different activities and activity systems can be identified. For example, the traditional conception of research as an intellectual activity is different from the research as it might be practiced by people encouraged to compete within a commercial environment: the former assumes a loose, informal network of researchers in open communication and debate who are principally concerned with developments in theory and method; the latter suggests formal, closed, competitive groups, working under time pressures and concerned with bounded problems and marketable solutions.

(b) Contrasting conceptions of activity will coexist within the same activity system. For example, co-operating occupational groups are likely to hold different views of their work (Engestrom, 1990a, illustrates such differences by comparing the varying conceptions of theatre held by directors, dramatists, actors and drama teachers). Especially important however is the point that, with the passage of time, new or revised conceptions of activity are likely to emerge

within any activity system, yet traces of earlier outlooks can be expected to remain.

Adopting Vygotsky's terminology, Engestrom (1987) suggests that the incoherencies, dilemmas and double-binds which he maintains can be identified in an activity system mark out its 'zone of proximal development', that is, they both provide the motive for and indicate the capacity present within the system for collective learning. Engestrom maintains that collective learning about activities will follow an expansive course: from attention to the internal contradictions in a particular activity system to a broader concern with the implications of change for other systems. (First, he suggests, it is necessary to recognize the contradictions that exist within the separate elements of an activity system; second, to become aware of inconsistencies between such elements; third, to search for revised objects for activity; fourth, to address conflicts between the old system and the demands of the new; finally, to consider emerging conflicts between the new activity system and neighbouring system.)

III. eLEARNING AS ACTIVITY SYSTEMS AND THE REFRAMING OF LEARNING

Activity theory offers a powerful package of ideas that serves to integrate social constructionist developments in the theory of knowledge. To summarize, key aspects are:

(1) *The concept of activity*: People do not just think, they act on the world and they do this collectively. 'Activity' is a highly appropriate concept for learning theory. It draws attention to the social origins of learning motives and helps to explain the overall coherency of different actions.

(2) *The nature of activity systems*: Mediating mechanisms, such as tools, language, social rules and the division of labour, transform the relationships between individuals, communities and shared

endeavour. Such factors are interwoven in a complex web of mutual interactions.

(3) *Active participation*: Novices learn by participating in activities and activity systems. This is a creative, interpretative, process. Such learning is likely to be tacit rather than explicit. Collective learning occurs when communities construct new conceptions of their activities and develop new activity systems.

These points are compatible both with developments in social constructionist approaches to knowledge and with many of the concerns of eLearning systems. As already noted, the concept of activity serves a similar function to concepts such as 'frame', 'script', 'social world' or 'habitus' that emerged in the social sciences in the 1970s. This model suggests that practical actions are located in a process which is recurrent, systemic and self organizing, rooted in history and reaching out to the future. Moreover, Engestrom's approach (1989) provides a perspective on the complexity of relationships in which activities are embedded, located as they are not only in forms of discourse but also in material action, technologies, rules and social structures.

A. Definition of eLearning

Before developing a model of eLearning as activity systems it is useful to provide an overview of the main theories of eLearning.

To begin with, there are many terms for eLearning. Some of them are: virtual education, Internet-based education, web-based education, and education via computer-mediated communication.

My definition of eLearning is developed from the definition of Keegan (1996):

"eLearning is a form of education characterized by:

- the use of computers and computer networks to unite teacher and learners and carry the content of the course;

- the provision of two-way communication via computer networks so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education);

Throughout this paper, eLearning will be defined as interactive learning in which the learning content is available online and provides automatic feedback to the learning activities. Online communication with real people may or may not be included, but the focus of eLearning is usually more on the learning content than on communication between learners and tutors.

B. Underpinning Theories of eLearning

Keegan (1996) categorizes distance education theories into three groupings:

1. Theories of autonomy and independence
2. Theory of industrialization
3. Theories of interaction and communication

It should be noted that until the 90's the theories of interaction and communication mainly treated communication between the tutor/helping organisation and the individual student, while recently theories involving collaborative learning, group interaction and social constructivism emphasising learning as a process and result of a collective experience of the learning group have received much attention.

Michael Moore is specifically known for his development and refinement of the theory of distance education as independent learning. The main dimensions are 'transactional distance' and 'learner autonomy'. It is clear that in his earlier writings Moore put more emphasis on autonomy – as distance teaching programmes by their nature require more autonomous behaviour by the learner. To succeed in such programmes, the learner must be able to act independently and autonomously.

According to Moore (1991, p. 2-3):

“ It is the physical separation that leads to a psychological and communication gap, a space of potential misunderstanding between the inputs of instructor and those of the learner and this is transactional distance.”

Transactional distance is not the same as physical distance but built up of the two qualitative and continuous variables labelled 'dialogue' and 'structure'. The dialogue describes the transactions between teacher and learner, but is not used synonymously with interactions, as dialogue is described as interactions having positive qualities (Moore, 1991). Structure describes to which degree the programme is able to be responsive to individual student's needs. According to Moore the transactional distance of a programme increases when level and quality of dialogue decrease and structure increases. Programmes with low transactional distance have high dialogue and low structure.

In analysing distance education in light of the post-industrial society, Peters draw the following conclusions:

“In a postindustrial society the traditional industrial model of distance teaching will no longer satisfy the new needs of new types of students with their particular expectations and values which, seemingly, not only differ from those of the students in the industrial society but are in many cases even the exact opposites of them.

This situation calls for the design of new models of distance education. They will probably be combinations of intensified and sustained group work – highly sophisticated ways of acquiring the necessary information of self-study and increased telecommunications between participants. They will have different sets of goals and objectives. And they will have to rely on self-directing and self-controlling – that is, on students becoming autonomous.

This means that the shift from industrial to postindustrial distance education will be a

Copernican. Slight and superficial alterations will certainly not do.” (Peters, 1993, p. 57.)

C. Modelling eLearning as Settings of Activity

In developing a model of eLearning as activity systems I have chosen, therefore, to acknowledge the variety of conceptions of activities that may exist within them and that in addition to physical and mental factors, interpersonal, socio-structural and technological factors are intertwined within them. Learning is located in its broader socio-historical context, and online learning environments are represented as mediated systems, involving active agents engaged in collective activities. Such a model pictures the dynamics of the learning environment as participants act practically, and communicate, interpret, improvise, negotiate, enact, re-enact, and learn.

This conceptions of eLearning is connected to the monitoring of online actions performed by people involved in online courses. When we refer to actions, we consider the human activity, in which activity is seen as always collective and sustained by some social motive or necessity (Engestrom, 1987). Each human activity is constituted by individual actions, achieved by individual or groups and directed to specific goals (Engestrom, 1987). Each action consists of operations, i.e. automatic acts without a voluntary control performed by the individual in the execution of some action (e.g., the mouse control performed by an expert user). Since actions could be performed by a single person (e.g., the student’s utilization of the resources proposed by the teacher in web platform), but also by a group (e.g., the discussions in a web forum), we can consider actions as individual (a student interacts with web artefacts for downloading/reading/learning contents, e.g., a web platform,) or as collective (a student interacts with other students through web artefacts, e.g., a web forum).

Just as activity theory offers a synthesis of recent developments in the theory of knowledge, the theory of eLearning as activity systems is useful for exploring the nature of digital knowledge and learning. What the theory of eLearning as activity systems does is bring a unifying and distinctive framework to a range of issues that would otherwise appear only loosely related.

At the level of individual learner (e-learner) rational-cognitivism would encourage an objectivist interpretation of the nature of knowledge. This would include expectations (Engestrom, 1989) that the knowledge is objective and universal or that professional status is acquired by learning established bodies of knowledge and copying established masters of the art. Activity theory, on the other hand, highlights:

- The origins of different forms of knowledge lie in different cultures and histories, changing technologies, and the developing conceptions of the knowledge.
- The component tasks the learner engages in are situated and context based. E-learners respond to particular contingencies, using the online resources provided by their activity system. In other words, Learning is made convenient for the student in the student's own environment
- Becoming an e-learner is a creative process as people 'do more than they yet know how to do'. By mixing and combining media and methods, eLearning offers the opportunity for each subject or unit within a subject to be taught in the best way known.

At the level of the online learning environment, rational-cognitivism suggests: (a) eLearning is (or should be) rationally designed, the structures and procedures should approximate to what any reasonable teacher would decide to do. On the other hand, the theory of eLearning as activity systems suggests:

- Online learning environments provide a socially constructed context for actions. As learners 'act practically' they interpret and negotiate such contexts. In the early days of online courses, just putting course syllabi on the Web is worthy of attracting some attention. Nowadays many online courses are offered using a combination of asynchronous and synchronous computer conferencing, slide presentation on the Web, and file transfer systems. Although course delivery is an important component of eLearning, it is not the only component. In order to create a successful online learning environment, various support services to students and faculty members have to be included in the plan as integral part of the whole system.

- Online learning environments also comprise a unique combination of social and institutional factors. As they become 'blackboxed', using Latour's (1987) term, such routines become relatively entrenched. For instance, an online learning environment can be broken down to four major components: administrative services, student services, resource services, and institutional services. Each component has a different purpose and provides students with different services to support the student's learning. The student and his or her relationship to each of these four areas; the transmission systems with which the services can be accessed by students; and applications and tools to be used in offering the service elements all can be negotiated depending on the requirements of the course.

To conclude, it is appropriate therefore to summarize implications concerning eLearning. eLearning occurs with engagement. This is a creative process which occurs at both the individual and the collective levels. New mediating devices may precipitate eLearning. Analysing online learning environments as activity systems encourages learners to stand back from their learning routines and to perceive the overall pattern that such routines fall into. It encourages exploration of the origins of these patterns, of what presently sustains

them, of the imagery used in descriptions of them, of the inconsistencies and conflicts that they embrace, and of the stimulation that new challenges may provide. Routines do become entrenched, but people are also capable of debating, reworking and rethinking the contexts within which they participate.

IV. CONCLUSIONS

A modified version of Engestrom's theory of activity is proposed in this paper as an account of the hermeneutic foundations of eLearning. The approach highlights the significance for learning theory of the social origins of motives, the nature and significance of mediating mechanisms in the enactment of online learning activities and the active nature of participation.

Analysing online learning environments as activity systems avoids the conception of knowledge as independent from actors, as an objective resource like any other; nor is knowledge conceived independently from action, a product of discourse and interpersonal communication alone. Rather, the approach emphasizes the interplay of actions, technologies and social structures. In this regard, the approach offers an analysis of the direct and indirect relationships which link individuals and the eLearning systems of which they are a part.

Finally, for teachers, the theory of eLearning as activity systems offers an antidote to simplistic interpretations of the nature of individual knowledge. At its best, the approach reframes learning; it models the recurrent and embedded nature of human activities, reveals the tentative nature of knowledge and its action orientation, and points to the opportunities for development promised by engagement.

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