Activity theory: what does it offer elearning research?

Liz Bennett*

Department of Community and International Education, University of Huddersfield, Huddersfield, UK

Activity theory is an analytical tool which offers a particularly useful perspective to those researching in elearning because of its ability to illuminate the contexts of an implementation of an innovation. Activity theory was originally conceived by Leontiev as a model of human psychology, but has been adapted to analyse complex situations involving people and organisational processes (1978). Within elearning and human computer interaction it is popular because it moves the focus of analysis from the technological tool to the way that tool is used by people to achieve a purpose.

This paper compares the conceptions of activity theory proposed by Leontiev with the way that it has been interpreted by Engeström. The paper then focuses on how activity theory has been used to examine the impact that learning technologies have had on teachers' practice through consideration of three case studies. The paper illustrates the methodological pluralism, the flexibility, lack of proscription and range of focus of activity theory in practice.

As elearning seeks to become a well articulated discipline, activity theory offers a particularly useful way of conceptualising and articulating elearning practices because of its focus on a socio-cultural model for understanding the design, adoption and integration of technological tools into learning. The paper argues that Engeström's approach to activity theory is popular despite criticisms of it as rarefied and over simplified because it fits with the characteristics of a good theory identified by Ur (2001). The paper also provides guidance on how to avoid the limitations associated with Engeström's interpretation.

Keywords: Activity theory, online tutoring, theory

---

* Correspondence author. Email: e.bennett@hud.ac.uk

Introduction

Activity theory is not a theory in the conventional sense instead it "consists of a set of basic principles which constitute a general conceptual system which can be used as a foundation for more specific theories" (Bannon 1997, 1). Nardi agrees calling it a "powerful descriptive tool rather than a strongly predictive theory" (1996, 7). Neither is it methodologically precise. It does not offer prescribed tools and techniques for research, instead the concepts of activity theory need to be applied to the specific object under scrutiny (Nardi 1996, 8).

Activity theory has been of particular interest to scholars of human computer interaction (HCI), who have found valuable its perspective in which computers are viewed as tools in a human activity. The focus on activity theory moved HCI research away from laboratory based testing to examine the ways computers are used within social activities (e.g. computer supported collaborative working and computer supported collaborative learning). Thus activity theory has been used to focus on a computer interface as a device that is used to achieve particular types of human activity rather than as a thing on its own.

Activity theory has been popularised by Engeström's work in health care and business organisations, but is also applied to education (2001, 26). Within the sphere of technology enhanced learning, scholars have used activity theory to examine many different perspectives of the learning process. Table 1 provides a summary of a selection of elearning studies which have used activity theory as their analytical framework. The studies have been selected to illustrate the range of topics and rationale for adoption activity theory and to illustrate this breadth rather than as a result of a systematic literature search. The table illustrates the variety of area of interests that activity theory has been used to study related to elearning and the reasons given for the use of activity theory, and thus illustrates the possibilities that activity theory may offer other researchers. It shows the scope, range and diversity of the theory's application.

This paper compares the ways that Leontiev, the scholar who first coined the terms activity theory with the model suggested by Engeström. The paper then focuses on how activity theory has been used to examine the impact that learning technologies have had on teachers' online practice through consideration of three studies. The discussion of these three vignettes illustrates the lack of proscription and methodological pluralism and range of

interpretations of the theory. The discussion highlights the value of activity theory for research in elearning and provides some guidance on how to use activity theory.

Elearning is a rather imprecise term. In terms of this paper it is used to refer to the application of any technological tool to learning. Thus it is used to encompass

- online learning (where a computer and communication system are required to access people and information perhaps via a VLE (virtual learning environment) or any other internet or web 2.0 service),
- classroom based tools and devices (such as interactive white board, classroom response systems) or
- mobile devices used to support learning applications.

Table 1 Summary of some elearning studies which have used activity theory

	Topic /Aims	**Reasons for using activity theory**
Scanlon and Issroff (2005)	To understand students' perspectives on the learning experience To identify and discuss conflicts between the economic setting of education and pedagogical principles To understand evaluation of learning technology	To unpick the ways in which learning settings can be understood It is holistic/multifaceted in that it considers wider context of learning situation e.g. institution and social contexts To highlight the underlying interactions between rules, community and division of labour to make sense of the learning situations
Murphy et al (2006) in Murphy and Rodriguez-Manzanares (2008,450)	To explore the changing work loads that result from online teaching activities	To explore contradictions that arise from changing online working practices
Hardman (2005) in Murphy and Rodriguez-Manzanares (2008, 446)	To explore introduction of a new tool into a teachers' pedagogic practice.	To explore process of change
Mwanza-Simwami (2007)	To inform design of learning	The importance and prominence it gives to social and cultural factors when

		introducing a new tool
Basharina (2007) in Murphy and Rodriguez-Manzanares (2008, 447)	To study cultural misunderstandings in contexts of intercultural telecollaboration	To illuminate the importance of the history of students'/tutors' use of technology
Somekh and Saunders (2007).	To unpick the expectations of ICT usage to bring about improved SATS results in schools	Knowledge of socio-cultural practices is generated by engaging actively in those practices and co-constructing meanings with participants.
Benson, Lawler, & Whitworth (2008)	To compare two online programmes delivered via course management systems.	It reveals the interfaces between e-learning at the macro- (strategy, policy, 'campus-wide' solutions) and the micro-organisational levels (everyday working practice, iterative change, individual adaptation) (2008, 456)
Barab et al. (2002) in Murphy and Rodriguez-Manzanares (2008, 446).	To understand and support the continued innovation of a system	It provides a strong emphasis on "development" and evolution of activities and actions within settings. To gain insight into the dynamics of the activity system of a course, rather than study its components in isolation.

Approaches to Activity Theory

Activity theory has its roots in cultural historical psychology in Russia in 1920s and 1930s. Vygotsky was the originator of cultural historical psychology and Leontiev, who was a colleague of Vygosky, is generally attributed as the founder of activity theory. Activity theory is sometimes referred to as cultural historical activity theory, CHAT, to emphases the links between the two. Cultural historical psychology was a product of post 1917 Russian Revolution which was looking for a new Marxist psychology "to replace the old "bourgeois" one" (Kaptelinin and Nardi 2006, 36). Vygotsky believed that culture and society are not external to the mind, but instead they are part of the way that the mind is formed (Kaptelinin and Nardi 2006, 39). Thus cultural historical psychology proposes the notion that human beings appropriate the meaning and values that exist in the world around us and that from these develop our own meanings and values. This idea of "non straight forward, dialectical cultural determination of mind" (Kaptelinin and Nardi 2006, 39) gave rise to a set of concepts, principles and research methods. In recent years activity theory has been developed from its origins as a theory for understanding human psychology to a tool to understand socially and organisationally orientated problems (Bannon 1997, 1).

The concept of cultural mediation of the mind is thus central to understanding activity theory. It can be illustrated by an experiment carried out by Leontiev. Leontiev used cards to stimulate the recall of different words from people of three different ages. The youngest group did not find the cards helped recall, the middle school children did markedly better with the use of cards, whist the oldest group, university students, did not do significantly better with the cards, although they did achieve the best recall both with and without the cards. The conclusion Leontiev proposed is that the mediating tool, the cards, was internalised by students as a result of their development in a cultural environment. Thus external actions and processes are translated into internal processes. Externalisation is the process by which the internal processes of the mind translate into external action, for instance if an internal action needs to be tested out (Bannon 1997, 2). An example of internalisation/externalisation is in the skill of an experienced pool player who has the ability to predict the trajectory of a ball whereas the novice player is unable to predict the results of hitting a ball at a particular angle and instead needs to actually try out (externalise) the shot in order to be able to see the results. The experienced pool player has internalised the use of the pool cue (tool) and an understanding of the way that the ball, cue and table interact.

These processes of internalisation and externalisation are key tenants of activity theory proposed by Leontiev.

The concept of the activity as the unit of analysis was key to Leontiev's theories of human psychology. Activity is directed towards an object which provides the activity with motive. Hence the object differentiates one activity from another. Kapetelin and Nardi suggest that objects could be practical things such as a target (bull's eye) or they could be ideal objects for instance the desire to become a brain surgeon (2006, 67). The subject is the person or people operating to achieve the object and the focus of activity theory is on the subject-object interaction.

Kapetelin and Nardi provide a diagram to illustrate the hierarchical relationships in an activity. Subordinate to the motive is the goal of an activity. A motive may well be something that we are not conscious of, whereas a goal is more immediate in our consciousness. At the lowest level are operations which are "routine process providing an adjustment of an action to the ongoing situation." (2006, 62). Examples cited by Kapetelin and Nardi are the unconscious way that people move through a crowd without colliding; the goal is to get to a particular place but the operation of weaving is automatic. A conscious action can transform into an unconscious operation, for instance when learning to drive the operation of the pedals becomes automatic with practice.

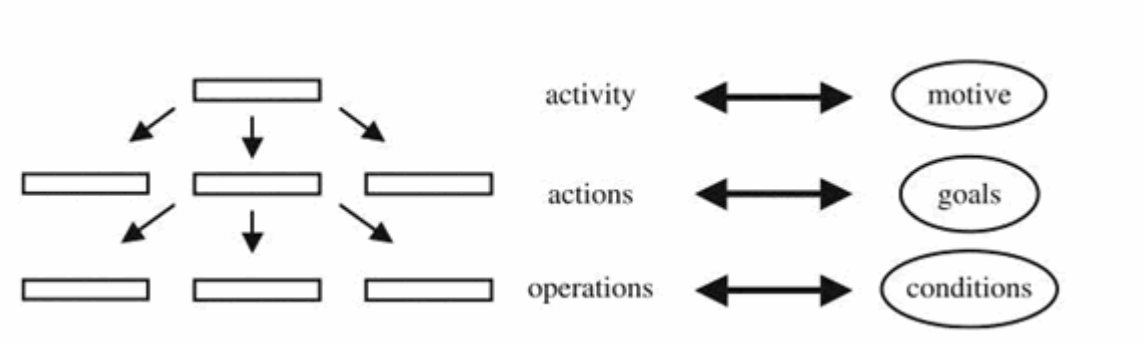

Figure 1 Diagram showing the hierarchical structure of an activity (Source Kaptelinin and Nardi 2006, 64).

From this original conception by Leontiev, activity theory has been adopted and interpreted by a range of academics (Bannon 1997, Kaptelinin and Nardi 2006 Langemeyer and Nissan 2004). However it is the interpretation of activity theory by Engeström that has unarguably been most frequently cited in the academic literature.

The activity theory model formulated by Engeström has been depicted as consisting of six interacting components (Figure 2).

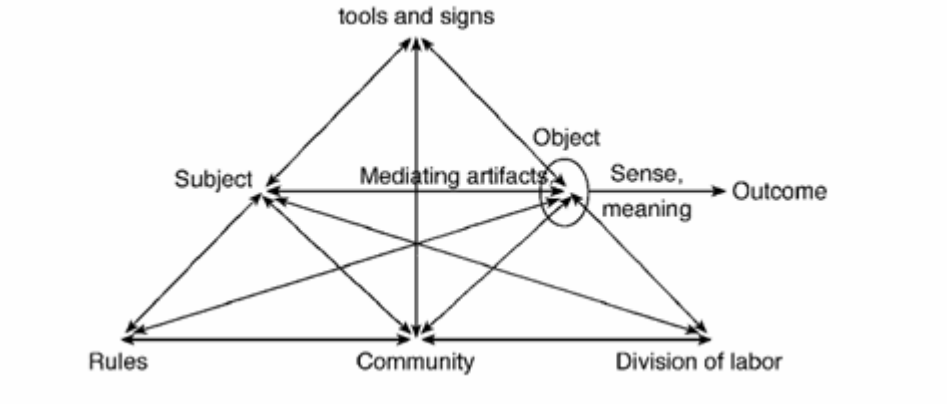

Figure 2. Engeström's structure of a human activity system (Source Engeström 2001,135)

Engeström used activity theory to explore activities in the context of collective processes. His model, depicted in Figure 2 shows the relationship between *subject* and *object* being mediated by *tools,* the relationship between *subject* and *community* being mediated by *rules* and the relationship between *object* and *community* being mediated by the *division of labour*. As Kuutti points out the three mediating groups should be understood broadly so that *tools* can be physical or symbolic or conceptual, *rules* cover both explicit and implicit norms, conventions and social relations with a community and *division of labour* concerns the implicit and explicit way that a community is organised in terms of the relationship between the object transforming into the outcome (Kuutti 1996, 28),

Murphy and Rodriguez-Manzanares (2008, 444) summarised Engeström's five principles of activity theory

> 1. According to the first principle, the main unit of analysis in activity theory is the activity system (Engeström, 2001).
>
> 2. Multi-voicedness refers to multiple perspectives, interests, and traditions, which can be a source of trouble and of transformation in the system, as members of an activity system "carry their own diverse histories" and the system itself "carries multiple layers and strands of history engraved in its artefacts, rules and conventions" (Engeström, 2001, p. 136).
>
> 3. The principle of historicity argues that the history of activity systems helps understand their problems as well as their potentials because "parts of older phases of activities stay often embedded in them as they develop" (Kuutti, 1996, p. 26).

> 4. Contradictions can result in tensions but also transformation in activity systems. In a context of education, for example, a contradiction in teachers' practices might occur when a new technology is introduced into their activity system and clashes with an old element.
>
> 5. Expansive learning relates to the possibility of expansive transformations in activity systems through reconceptualisation of the object and the motive of activity "embrac[ing] a radically wider horizon of possibilities than in the previous mode of the activity" (Engeström, 2001, p. 137).
>
> (Murphy and Rodriguez-Manzanares 2008, 444)

Engeström implemented his approach to activity theory in a series of *Boundary Crossing Workshops*. The problem he was exploring related to the care of children with long term illness and how their care was managed between the children's hospital and the primary care health center services. He organised a series of 3 hour workshops for a range of staff from both settings. The professionals discussed the patients' cases and these were videotaped and analysed using the Engeström's five principles. Engeström's model of activity theory uses the contradictions that exist in systems as the focus for the analytical process. Although a contradiction is inherently a tension in the system it has the potential to bring about change as the system seeks to work through or is engerised by these internal contradictions (2001, 140). Engeström used the triangular model is used to depict the tensions occurring between different parts of the activity system (shown in Engeström's triangles (2001, 145) as a jagged line connecting the two items in tension).

Mwanza's Eight Step Model helps researchers apply the triangle model to studying actual systems in order to gain an understanding of the system;

> 1. *Activity* of interest - What sort of activity am I interested in?
>
> 2. *Object*-ive of activity - Why is this activity taking place?
>
> 3. *Subjects* in this activity - Who is involved in carrying out this activity?
>
> 4. *Tools* mediating the activity - By what means are the subjects performing this activity?
>
> 5. *Rules* and regulations - Are there any cultural norms, rules and regulations governing the
>
> performance of this activity?
>
> 6. *Division of labour* - Who is responsible for what, when carrying out this activity and

how are the roles organised?

7. *Community* - What is the environment in which this activity is carried out?

8. What is the desired *Outcome* from carrying out this activity? (Mwanza 2001,5).

Critiques of Engeström

There have been many critiques of Engeström's formulation of activity theory. Langemeyer and Roth argue that Engleström's interpretation of activity theory "neglects aspects of dialectic thinking" (2006, 21) and in particular the use of the triangle model (figure 2) reifies the elements into separate self reliant parts rather than look at the "relationships, interdependencies, determinations and changes in practice" (2006 30). They critique the epistemological stance in Engeström's work in that there is an unproblematic assumption of a neutral third person perspective (2006, 31). They point out that in the workshops Engeström presents the official discourse within the hospital for the adoption of the workshop but does not explore the view of the families and practitioners. Within the workshop the complexity involved in the range of people's views participating is not discussed, so for instance, the nurse's view is likely to be valued less highly than the doctor's due to the power relationships within the hospital, yet this is not mentioned in the paper. Furthermore they suggest that Engeström's analysis reifies the activity system from the wider societal systems in which they operate and in particular they question Engeström's understanding of exchange and use value (2006, 38).

However the use of Lieontiev's hierarchical analysis of an activity is much less frequently adopted that Engeström's model. It appears that researchers like the apparent simplicity and structure of Engeström's model and find the open-endness of the dialectic questioning advanced by Langemeyer and Nissan (2004) difficult to operationalise. As Bannon commented

> Perhaps one of the reasons the work of the activity theorist Engeström has become popular is because he provides both a clear (though not necessarily coherent) conceptual frame - through his now famous "triangles", and a well-worked out methodological frame (1997, 3).

Case studies of activity theory applied to tutors' practice

In order to examine the value of activity theory and to further exemplify the way that activity theory can be used, three research studies will be discussed. The three studies have been chosen because they all focus on a similar topic that of the adoption of discussion boards and its impact on teachers' practice. As outlined at the start of the paper, activity theory has been used to explore many aspects of elearning and any of these topics would have been offered an interesting perspective on how activity theory has been used.

The three case studies included in this paper illustrate the lack of proscription afforded by activity theory in terms of its methodology and approach and how three different ways of operationalising activity theory are achieved. Firstly Engeström's triangular depiction of activity theory and the principle of contradictions is used by Dippe (2006) whilst Issroff and Scanlon (2002) prefer to apply the language and concepts of activity theory. Finally Price and Oliver (2007) apply Kuuti's (2006) description of activity being constructed of multiple levels of strategy, operation and action to their analysis.

Table 2 shows a summary of these three case studies compared in terms of the way that they use activity theory, the aims and methods of the study being reported, the value that they place on using activity theory as the analytical tool and the insights gained. The table illustrates activity theory's methodological pluralism and the variety of reasons for using activity theory.

Dippe's (2006) study is set in a distance learning Swedish distance education programme. The paper sets out to explore the performance of teachers online. He used the principle of contradictions suggested by Engeström's model of activity theory to frame the aims of the study;

> What practices and contradictions for the students and the teachers emerge due to the design characteristics of the SÄL programme? (Dippe 2006, 2)

Dippe started by modelling the system with two connected activity systems; one with the outcome of becoming a qualified teacher and the other of becoming a better teachers. Figure 3 shows this modelling;

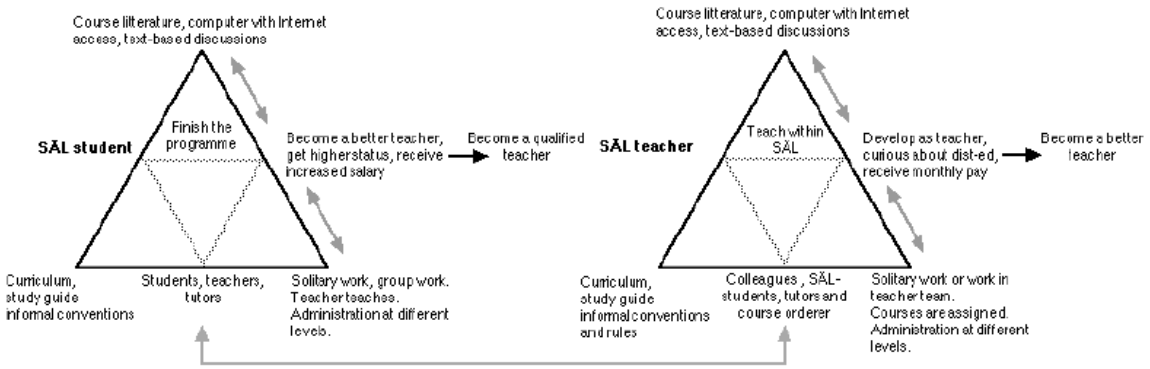

Figure 3 Engeström's expanded activity system model applied to the SÄL programme. (Dippe 2006, 3)

Dippe's data collection took the form of a large scale questionnaire (to over 800 trainee teachers) based on questions formulated from the six steps of the triangle (Figure 3). The discussion of the analytical process that he adopted is limited making it difficult to evaluate the strengths and limitations of Engeström's model to his analysis. However what is clear is that this analytical framework enabled Dippe to explore the nature of the problem of online tutoring within the context of organisation in which it exists. Thus the exploration of why a tutor was seen by students as absent was framed by the lack of embeddedness within the institutional structures in the move to online learning. He identified that the institution put pressure on teachers to teach online but did not acknowledge the differing skills that it involved (for instance there is no policy document about online teaching). Thus activity theory allowed Dippe to articulate and explore the problem framed in terms of contradictions, and drew attention to the situated nature of the practices thus offering insights into the organisational structures that support or inhibit technology enabled learning.

A second example of activity theory's application to online tutoring practice is taken from Issroff and Scanlon (2002). Their paper starts by introducing Engeström's model and the principle of contradictions. They go on to describe two case studies in which technology is adopted to support learning (one uses of discussion boards in an online graduate introduction to science programme, the other a web site to support humanities students). Issroff and Scanlon applied the notion of multiple perspectives of different participants to illuminate way that individual students had a variety of experiences of the technology whist in general the introduction of technology was beneficial to the group as a whole. They also found the principle of contradictions helpful in articulating the conflicts that emerged between

the rhetoric surrounding discussion board adoption, and the reality that students experienced where the tutor's view is privileged.

Issroff and Scanlon clearly valued the language of activity theory including concepts such as contradictions, multiple perspectives and situating practices within the wider context that activity theory provides. They state;

> Activity Theory provides a language for describing and understanding the changes, difficulties and some of the iterations of the development not just of the website, but also of the surrounding practices, of the staff and students on the course (Issroff and Scanlon 2002, 83).

The third example of activity theory's application to online tutoring practice is taken from Price and Oliver (2007). They analysed the impact that adoption of Blackboard's discussion groups into a PGCE course within a higher education university. They found that teachers frequently related their new online practice to their familiar face to face teaching practices but Price and Oliver question the extent to which this is an accurate description of practice. They use the hierarchical analysis of levels of activity in formed by Kuutti (1996) to explain why once the new operations are mastered, they become automatic and indeed invisible. Hence tutors who have reached this level of mastery of the operations involved in tutoring online consider the two forms basically the same and see "no real difference with their teaching face-to-face, because they will become unaware of the majority of the ways in which their practices are different" (2007, 24). This is because the action of tutoring online remains the same at the uppermost of level that of motive but it is very different at level of actions – e.g. looking for signs of non participation is very different online compared to face to face. In addition, at level of the operation, the role of tutor is entirely different online to face to face; online tutors need to monitor the statistics provided by Blackboard to see who is contributing is entirely different to glancing round room to gauge students' attendance and interest.

Activity theory was thus used by Price and Oliver to highlight and understand the nature of the changes to teachers' practice in terms of the motive, action and operations levels. The authors make use of the language of activity theory to comment that further study into the rules that govern behaviour in different settings might be worthwhile.

The value and strength of activity theory is its flexibility and lack of prescription. Although the three examples discussed in this paper have been concerned with broadly the same subject the adoption of online teaching and learning practices, the methods used for data

gathering, the approach taken to applying activity theory illuminated different understandings of the topic are all different.

Table 2 illustrates the variety of ways that action research has been implemented with the case studies summarised in this paper. The variety of methods employed include questionnaires, interviews and case studies. This methodological pluralism is further illustrated by Murphy and Rodriguez-Manzanares (2008) who examined thirty seven studies which used activity theory as the analytical framework to understand various aspects of educational technology and its adoption. The dominant method used in these studies was that of case study including both single case and multiple case studies. The number of participants varied from four teacher participants to a survey of 434 students (Murphy and Rodriguez-Manzanares 2008, 448). The research methods used included individual interviews, group interviews, transcripts from video recordings, chat room conferences, instant messaging session, online journals, observations, field notes, questionnaires, documentary evidence, student assignments, analysis of artefacts and recall analysis. Some studies used a variety of data sources whilst others relied on just one data collection method (Murphy and Rodriguez-Manzanares 2008, 448). Benson et al argue that there is particular value in using activity theory with multiple case studies as a way of illuminating the nuances of each particular setting through cross case comparisons (2008, 458) which they suggest that single-case studies risk obscuring (2008, 459).

The philosophical basis for activity theory clearly informs the particular methods adopted. Some would argue that activity theory involves participant engagement in a prototype activity (Langemeyer and Nissan 2004, 188) although this is not widely assumed as a necessary approach to activity theory. The use of action research as a methodological approach reflects the Marxist roots for activity theory which aims to challenge and reform the underlying power structures within organisations (Langemayer and Nissan 2004, 190).

Table 2 Summary table of three case studies

	Way that AT used	Research aims	Methods	Value of AT
Dippe (2006)	Engeström's model (2001). Triangular representation drawn for two separate activities; becoming a qualified teacher and becoming a better teacher. Focus on contradictions as a driver for development and understanding.	What practices and contradictions for the student and the teachers emerge due to the design characteristics of the programme?	Paper based questionnaire to 743 students on a Swedish distance education teacher educator programme.	Situates the mediating technology in the set of activities in which it was used. Enables a focus on contradictions in this case between the conflicting goals of the individual teachers and of the organisation.
Issroff and Scanlon (2002)	Engeström's model (2001). No triangular representation created for the analysis. Focus on contradictions as a driver for development and understanding.	To explore how Activity Theory can be used to understand how the addition of learning technology into a learning situation changes the practice within that discipline.	Two case studies based on developing a course for graduate students in a large distance education institution in the UK. Questionnaires, assessment material and conference contributions (no significant further details of methods given)	The multi-levelness Integrated framework Dynamic and developmental model Used to explore different participants' perspectives. Provides a language for describing and understanding the changes, difficulties and some of the interactions of the development and the surrounding practices. Highlights problematic features of the setting.
Price and Oliver (2007)	Uses Kuuti (1996) to analyse the activity by its different levels (strategic, operational and actions)	Do teachers' models of teaching and learning influence the way technology is used or does technology enable new models of teaching and learning to develop?	Interviews with four academic staff, with three follow up interviews and with two members of staff with remit for supporting pedagogical use of technology.	Allows for creation of nested accounts of practice that encompass both strategic and 'automatic' acts. Provides a deeper level of analysis; through understanding the similarities of strategy level, yet differences at action and operations levels when tutoring online.

Elearning in search of a theory?

Elearning is an emerging field of academic study. As it seeks to become recognised as respectable and reputable the use of theory is a part of this process. As Tompsett (2007, 175) argues, the elearning field needs a strong theoretical foundation that can integrate a variety of different methodologies, research aims and conflicting interpretations of the same technology;

> Any application of information and communication technology in education (ICTE) sits, at times uncomfortably, at the intersection of three key disciplines: technology, education and sociology(including reflexivity). To confuse matters, any specific study may need to take account of specific knowledge within subdisciplines, such as organisational management and technology transfer, and of knowledge within the domain of application (e.g. nursing, social work, fashion, etc.). Researchers must build a consistent model of knowledge that can integrate disparate methodologies, research goals and even conflicting interpretations of the same terminology. Without this, the ICTE research field will be dominated by what is simply novel, irrespective of the relevance of particular changes to educational practice.

The case studies illustrate how activity theory is a theoretical model which helps to understand the use of ICT in education supported by a range of methodologies, for a variety of research goal, and with differing insights into the ways in which discussion boards are used in learning situations. Tompsett also asserts that researchers need to be aware of the educational and sociological models that they use (2007).

Ur (2001, 5) has argued, based on the work of Popper (1963) Huberman and Miles (1994) Swan (1994) and Ellis (1999) that good theories have five characteristics; plausibility, simplicity and parsimony, explicitness, comprehensiveness and demarcation, explanatory, predictive and generative power. She also adds an additional characteristic for a good theory as having aesthetic appeal. These criteria illustrate why Engeström's model for activity theory has achieved such popularity in the research community; the triangular representation is both simple, explicit, provides demarcation combined with an appealing pictorial presentation.

From the analysis given in this paper in both table 1, and in the three case studies, activity theory enabled elearning researchers to look in a systematic way at the detail of how a new tool is adopted and to understand better the issues that arose through its introduction into

the activity system. It appears that in searching for a theory to help to inform analysis of elearning innovations activity theory has much to offer.

Implementing activity theory

Care needs to be taken to avoid uncritical and mechanistic adoption of Engeström's model in a way that misrepresents activity theory's complexity. Mwanza's Eight Stage Model summarised above appears to over simplify the cultural historical aspects of activity theory. Instead Langemeyer and Nissan propose the dialectic questioning of systems within an action research framework. This involves questioning of societal structures and processes to explore and create models which explain the contradictory moments of development (2004, 188). The questions suggested are;

> How did this quality (this function, dimension, aspect of life, this feature) come to be? What does it presuppose? How does it transform, and how does it differentiate into opposing forms? (2004, 188).

Langemeyer and Nissen argue that "method is the ongoing theoretically informed reflection of the social practices in which research participates" (2004, 22). This approach is supported by Langemeyer and Roth who believe that theory should be based on a deeper level of analysis;

> A critical theory therefore needs to proceed dialectically: first by analyzing how societal structures bring about certain actions and how they impair others, how they are internalized by subjects and embodied in their behavior; and second, by excavating –on a social *and* societal level – action possibilities to intervene and to change those structure that have become problematic for free human development. (2004, 39)

Bannon (1997) and Kaptelinin and Nardi's (2006) identify five basic concepts underlying activity theory and these convey some of the complexity of activity theory in terms of its understanding of its underpinning psychological processes. The five basic conceptions are;

Object –orientedness; objectives give meaning to what people do, but do not in their entirety determine the activity. The subject- object relationship has determining qualities of both subject and object. Objects can be physical things or ideal objects (e.g. wanting to become a brain surgeon).

Hierarchy structure of activity: an activity can be analyzed at different levels: activities, actions and operations.

Internalisation-Externalisation; as explained above internalisation and externalisation are the processes by which external activities affect and shape the mental process and vice versa. These principles emphasise that the mind is not independent from the culture that society.

Mediation; tools shape the way humans interact with reality and shape the external activities which eventually result in shaping the internal ones. In addition the tools have been shaped by the historical and cultural traditions surrounding their design.

Development: this principle requires that human activities are studied in relation to their development because activities develop in response to particular conditions and circumstances. This principle informs research methodology leading to a preference for action research involving active participation and monitoring developmental changes of the study participants. Alternatively ethnographic approaches, which focus on the history and development of practices, are also favoured.

Bannon argues for the systematic application of the five principles of activity theory which involves many layers and levels of analysis and their inter-relation (1997, 3). However Bannon doesn't provide any guidance on how to do this in practice whereas Katetelin and Nardi provide specific guidance in the form of two separate checklists one for design and one for evaluation of the 'target technology'. The check lists are grouped under headings which reflect four of their five concepts of activity theory (hierarchy, object orientedness, internalization/externalization, and development) (Katetelin and Nardi 2006, 271 – 277). The checklists whilst using simple language are not immediately applicable to a research problem or setting and require the researcher to have a background in activity theory principles. So, for instance, one item in the check list is "Components of target action which are to be internalized" (Katetelin and Nardi 2006, 272) requires an understanding of the principle of internalisation. Other questions are more straightforward e.g. "Does the system require a large investment of time and effort in learning how to use it? (Katetelin and Nardi 2006, 276). A more significant limitation of Katetelin and Nardi's principles is that they focus on the design or evaluation of a technology rather than on understanding how a tool is being adopted and used. Thus the use of their checklists is limited to those who work in the field of design and evaluation of computing or artefact design.

Conclusion

Activity theory has its origins in cultural historical psychology articulated in Russia in 1920s and 1930s but has been formulated in essentially two different ways; firstly by Kuuti (1996) who examined activity in terms of levels of an activity with subordinate actions and operations and secondly by Engeström (2001) who depicted it in a simple triangle structure involving six aspects and five principles.

Although the methodological and epistemological approaches to use of activity theory are contested Engeström's triangular representation provides a simplified visualisation of complex problem and this simplicity has proved popular. The approach is criticised for not being sufficiently dialectically informed and too reified to capture the complexity of the situation (Langemeyer and Roth 2006). However its popularity illustrates that researchers value this simplification.

The five principles outlined by Bannon (1997) and Kaptelinin and Nardi (2006) provide a stronger understanding of the dialectical questioning than Engeström's five principles and provide a useful summary of activity theory's dialectic roots which might be used by researchers to inform the adoption of activity theory. However analyses informed by Engeström's principles of contradictions and by Kuutti's (1996) levels of an activity discussed in this paper, illustrate the value of these approaches to activity theory.

This paper has analysed how three papers have used activity theory in different ways to shed light on the topic of adoption of discussion boards by lecturers. The case studies illustrate the lack of proscription and methodological pluralism within activity theory. They also illustrate the value that activity theory has offered elearning scholars to explore and explain the complexity of a social activity and social change mediated by tools.

As elearning seeks to become recognised as a valid discipline researchers need theories to underpin and inform their analysis. Activity theory offers a theory that many elearning researchers have found valuable because of its flexibility, lack of proscription, focus on macro and micro contexts and on practices and systems using technological tools rather than on the tool itself. And as Lewin notably commented "There is nothing so practical as a good theory" (1951, 169).

References

Bannon, L. (1997). Activity Theory. Retrieved 26/10/09, from http://www.irit.fr/ACTIVITES/GRIC/cotcos/pjs/TheoreticalApproaches/Actvity/ActivitypaperBannon.htm

Barab, S., A., Barnett, M., Yamagata-Lynch, L., Squire, K. & Keating, T. (2002). Using activity theory to understand the contradictions characterizing a technology-rich introductory astronomy course. *Mind, Culture, and Activity*, 9(2), 76-107. Cited in Murphy, E., & Rodriguez-Manzanares, M. A. (2008). Using activity theory and its principle of contradictions to guide research in educational technology. *Australasian Journal of Educational Technology, 24*(4), 442-457.

Basharina, O. K. (2007). An activity theory perspective on student-reported contradictions in international telecollaboration. *Language Learning & Technology*, 11(2), 82-103. [viewed 19 July 2007]. http://llt.msu.edu/vol11num2/basharina/default.html. Cited in Murphy, E., & Rodriguez-Manzanares, M. A. (2008). Using activity theory and its principle of contradictions to guide research in educational technology. *Australasian Journal of Educational Technology, 24*(4), 442-457.

Benson, A., Lawler, C., & Whitworth, A. (2008). Rules, roles and tools: Activity theory and the comparative study of e-learning. *British Journal of Educational Technology, 39*(3), 456-467.

Dippe, G. (2006). *The Missing Teacher: Contradictions and Conflicts in the Experience of Online Learners.* Paper presented at the Networked Learning, Lancaster.

Ellis, R. (1997). *SLA Research and Language Teaching*. Oxford: Oxford University Press. Cited in Ur, P. (2001). *Opening Gates to Teacher Education*. Retrieved 27/10/09, from vcisrael.macam.ac.il/site/eng/files/E1A003/files/theoryvc.DOC

Engeström, Y. (2001). Expansive Learning at Work: toward an activity theoretical reconceptualization. *Journal of Education and Work, 14*(1), 133-156.

Hardman, J. (2005). An exploratory case study of computer use in a primary school mathematics classroom: New technology, new pedagogy? *Perspectives in Education*, 23(4), 99-111. Cited in Murphy, E., & Rodriguez-Manzanares, M. A. (2008). Using activity theory and its principle of contradictions to guide research in educational technology. *Australasian Journal of Educational Technology, 24*(4), 442-457.

Huberman, M. & M.B. Miles (1994). *Qualitative Data Analysis*. London: Sage. Cited in Ur, P. (2001). *Opening Gates to Teacher Education*. Retrieved 27/10/09, from vcisrael.macam.ac.il/site/eng/files/E1A003/files/theoryvc.DOC

Issroff, K., & Scanlon, E. (2002). Using technology in Higher Education: an Activity Theory perspective. *Journal of Computer Assisted Learning, 18*, 77-83.

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with Technology Activity Theory and Interaction Design*. London: MIT Press.

Kuutti, K. (1996). Activity Theory as a Potential Framework for Human Computer Interaction. In B. Nardi (Ed.), *Context and Consciousness*. London: MIT Press.

Langemeyer, I., & Nissen, M. (2004). Activity Theory. In C. Lewin & B. Somekh (Eds.), *Research Methods in the Social Sciences* (pp. 188-192). London: Sage.

Langemeyer, I., & Roth, W.-M. (2006). Is Cultural-Historical Activity Theory Threatened to Fall Short of its Own Principles and Possibilities as a Dialectical Social Science? *Outlines, 2*, 20-42.

Lewin, K. (1951). Field theory in social science; selected theoretical papers. In D. Cartwright (Ed.). New York: Harper Rowe.

Leontiev, A. N. (1978). *Activity, Consciousness, and Personality*. Englewood Cliffs: Prentice-Hall.

Murphy, E., & Rodriguez-Manzanares, M. A. (2008). Using activity theory and its principle of contradictions to guide research in educational technology. *Australasian Journal of Educational Technology, 24*(4), 442-457.

Murphy, E., Rodriguez-Manzanares, M. A., Dodd, C., & Kerr, B. (2006). Using third generation activity theory and contradictions to analyse qualitative data. Retrieved 25 January 2007, from http://cider.athabascau.ca/CIDERSessions/sessionarchive/

Mwanza, D. (2001). *Changing Tools, Changing Attitudes: Effects of introducing a CSCL system to promote learning at work.* Paper presented at the Euro-CSCL 2001: 1st European Conference on Computer-Supported Collaborative Learning

Mwanza-Simwami, D. (2007). *Concepts and Methods for investigating learner activities with Mobile Devices: An Activity Theory Perspective*. Paper presented at the Beyond Mobile Learning Workshop.

Nardi, B. A. (Ed.). (1996). *Context and Consciousness*. London: The MIT Press.

Popper, K. 1963. *Conjectures and Refutations: The Growth of Scientific Knowledge*, London: Routledge and Kegan Paul. Cited in Ur, P. (2001). *Opening Gates to Teacher Education*. Retrieved 27/10/09, from vcisrael.macam.ac.il/site/eng/files/E1A003/files/theoryvc.DOC

Price, S., & Oliver, M. (2007). A framework for conceptualising the Impact of Technology on Teaching and Learning. *Educational Technology & Society, 10*(1), 16-27.

Scanlon, E., & Issroff, K. (2005). Activity Theory and Higher Education:evaluating learning technologies. *Journal of Computer Assisted learning 21*, 430-439.

Somekh, B., & Saunders, L. (2007). Developing knowledge through intervention: meaning and definition of 'quality' in research into change. *Research Papers in Education, 22*(2), 183-197.

Swan, M. (1994). Design criteria for pedagogic language rules. In Bygate, M., A. Tonkyn, & E. Williams (eds) *Grammar and the Language Teacher*. Hemel Hempstead: Prentice Hall International. Cited in Ur, P. (2001). *Opening Gates to Teacher Education*. Retrieved 27/10/09, from vcisrael.macam.ac.il/site/eng/files/E1A003/files/theoryvc.DOC

Tompsett, C. (2007) Tipping into the abyss: with more than a virtual parachute? *ALT-J,* 15, (2), pp. 175–180

Ur, P. (2001). *Opening Gates to Teacher Education*. Retrieved 27/10/09, from vcisrael.macam.ac.il/site/eng/files/E1A003/files/theoryvc.DOC