



Sustainable e-learning, activity theory and professional development

Ian Robertson

RMIT University, Melbourne

Sustainable e-learning can be defined as e-learning that has become normative in meeting the needs of the present and future. This exploratory paper proposes that activity theory is a theoretical framework that provides the potential to contribute to change management towards sustainable e-learning. Using organisational, technological and pedagogic perspectives, the paper demonstrates that activity theory provides a common language for discussion across the three activity systems. Activity theory provides an opportunity for the assumptions, values and beliefs that underpin each system to be made more explicit. With debate, discussion and critique, expansionist learning becomes possible. That is, learning beyond what would have been possible if actors from each perspective were to remain insulated. The power dynamics that occur at the interface of the organisational, technological and pedagogic activity systems are considered to conclude that any change management towards sustainable e-learning must address this issue. The role of professional development for teachers in establishing sustainable e-learning emerges as a central issue. It is concluded that professional development that does not address teacher's beliefs about what constitutes good teaching practice is likely to be unsuccessful.

Introduction

Nichols (2007) uses the term 'sustainable embedding' to describe a process where e-learning is characterised as proactive, scalable and self-perpetuating. Jochems, van Merriënboer and Koper (2004) propose that the optimum integration of e-learning needs to address organisational, technological and pedagogic perspectives. A proposition that is not unproblematic in terms of implementation or outcome. Where there is incongruence between these perspectives a less than optimum outcome will occur.

This paper builds on previous work (Robertson, 2007) that looked at the potential of activity theory and Basil Bernstein's pedagogic device to examine the dynamics that shape teaching practice. The current paper is different from the earlier in that the focus is on sustainable e-learning. That is, e-learning that has become normative practice and which has the capacity to meet the needs of the present and the future. It proposes that activity theory (Engeström, 1999; Engeström, Miettinen, & Punamäki, 1999) provides a useful framework for negotiating the form that sustainable e-learning might take, describes how activity theory might be used and draws conclusions related to the professional development of staff in educational organisations.

Activity theory

First generation activity theory (AT) represents activity at an individual level (Figure 1). It is based on the assumption that tools (artifacts) mediate between the subject and the object. These tools (artifacts) such as physical tools, language and symbols are created and/or transformed in the course of an activity.

Second generation activity theory (Figure 2) represents activity at a collective level. Rules may be explicit or implicit. Division of labour refers to the explicit and implicit organisation of the community involved in the activity. Based on the elements of generation two activity theory (see Figure 3), Mwanza and Engeström (2003) list eight questions that need to be addressed when investigating a system and which provide an opportunity to identify tensions and contradictions within a single activity system.

Third generation activity theory represents networked activity and incorporates the idea of boundary objects as depicted in Figure 3. That is, objects that operate at the interface of many contexts (Edwards, 2005). Where two (or more) activity systems come into contact there may be contradictions and tensions. Activity theory provides the opportunity to make explicit, and hence to better understand what happens when activity systems come into contact. There is potential for expansionist learning where 'the object or

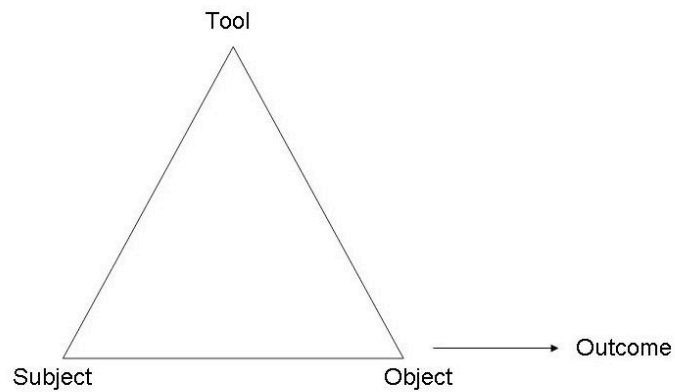


Figure 1: First generation activity theory

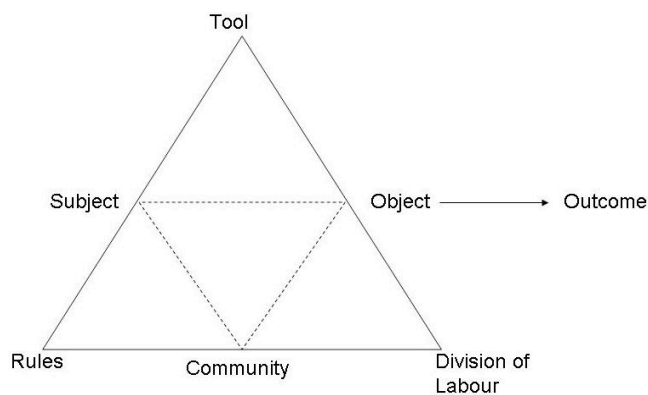


Figure 2: Second generation activity theory

Table 1: Source Mwanza & Engestrom, 2003

Activity	What sort of activity am I interested in?
Object(ive)	Why is the activity taking place?
Subjects	Who is involved in carrying out the activity?
Tools	By what means are the subjects performing the activity?
Rules and regulations	Are there any cultural norms, rules or regulations governing the performance of the activity?
Division of labour	Who are responsible for what, when carrying out activity and how are those roles organised?
Community	What is the environment in which this activity is being carried out?
Outcomes	What is the desired outcome from carrying out this activity?

the motive of the activity are reconceptualised to embrace a radically wider horizon of possibilities than in the previous mode of activity' (Engestrom, 2001, p.7). The usefulness of this approach has been demonstrated by the *Center for Activity Theory and Developmental Work Research* at Helsinki University (<http://www.edu.helsinki.fi/activity/> accessed 15 March 2007) in a range of settings. Others have used activity theory as a means to examine human-computer-interaction (Kaptelinin, 1996; McMichael, 1999; Nardi, 1996; Verenkina & Gould, 1997). Most recently, Demiraslan and Usleul (2008) have used activity theory to examine the integration of technology into Turkish schools, Murphy and Rodriguez-Manzanares (2008) propose activity theory as useful in examining contradictions in the research of educational technology.

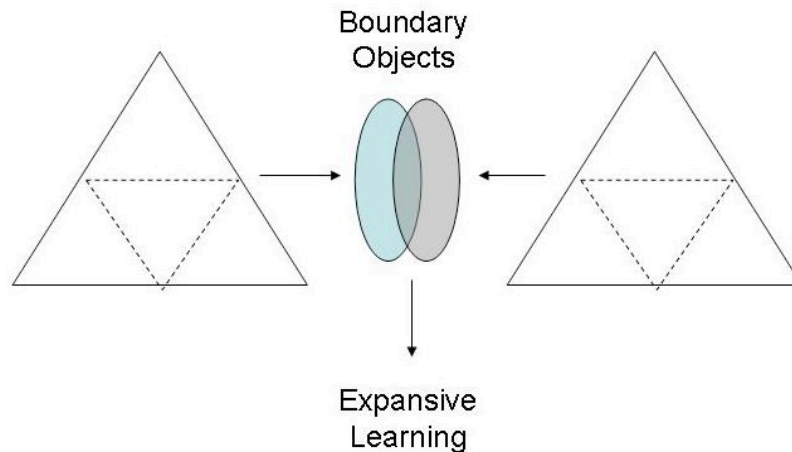


Figure 3: Third generation activity theory

Activity theory provides a common lexicon to describe the organisational, technological and pedagogic perspectives proposed by Jochems et al (2004) in terms of subjects, tools, object and outcome, rules, community and division of labour. Figures 4, 5, 6 provide a graphic representation of these perspectives. There is potential for expansionist learning when the objects of the three activity systems come into contact.

If we assume that the object of each activity system is an increase in e-learning the outcome of the object will vary between the systems. The organisational activity system – largely represented by management – has primary responsibility for the physical, financial and human resources of the organisation. The desired outcome of the organisational activity system is organisational sustainability. The technological activity system – largely represented by information technology specialists – whose primary responsibility is for the health of the organisations information technology systems (both administrative and teaching) will desire technological sustainability. The pedagogic activity system – represented by those with primary responsibility for teaching and learning - will desire a rigorous and sustainable pedagogy.

Organisational activity system

Within the organisational activity system which aims to increase e-learning (the object), the desired outcome is to achieve organisational sustainability which is defined as the capacity to meet present and future demands in respect to political, legal and social obligations. Indicators may relate to financial sustainability, availability of facilities and resources (physical, virtual, intellectual and human). From a financial perspective organisational sustainability might be achieved through decreased costs, increased income, increased return on investment, increased surplus etc. From a branding perspective this might be measured by the level of customer recognition and acceptance. From a political perspective, improvement in relationships with those who control public funding. In educational systems this is often represented by the ability to meet the present and future educational needs of particular groups or individuals as measured by quantum of provision, quality of provision and measurement of outcomes against performance indicators.

In education, most organisations are subject to political, legal and social obligations (rules) represented in laws, policies and regulations that are frequently under the control of government agencies. In a typical large educational organisation the activity system's community includes board members (and possibly shareholders), chief executive officer, senior management, middle and other managers, administrative support staff, and learning support staff (eg library). In large organisations there is typically a strong division of labour both vertically and horizontally. Vertically, Government agencies and shareholders determine strategic direction, the CEO and senior managers develop strategy that is implement by middle and departmental level managers, all are assisted by administrative support staff. Horizontally, the organisation is likely to have a departmental style structure representing the interests of finance, human resource development, facilities, information technology, teaching and teaching support. The organisational activity system typically has, at its disposal a range of political, physical, financial and human resources that can be allocated in ways that meet obligations and desires. Further, under usual

circumstances, through control over the distribution of resources, this activity system has a strong level of influence over the technological and pedagogic activity systems.

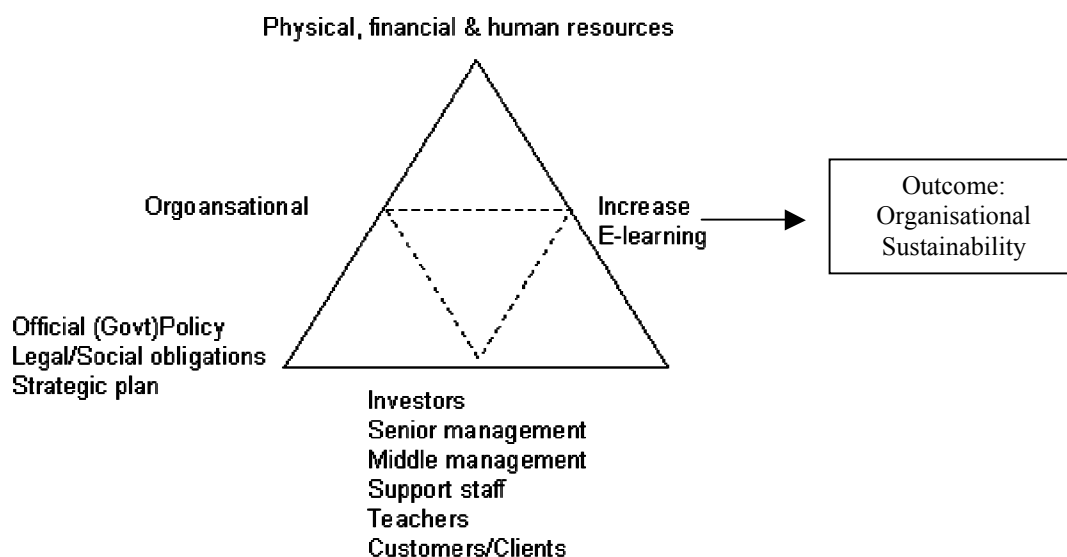


Figure 4: Organisational activity system

Technological activity system

Within the technological activity system which aims to increase e-learning (the object), the desired outcome is to achieve technological sustainability. This might be defined as a system of financial, physical, virtual and intellectual resources that are capable of meeting present and future demands of technological needs. Tools available within the technological activity system relate to hardware and software, systems and procedures that ensure the security, reliability and scalability of the system. An important factor is the level of influence over those who control the funds necessary to maintain these capabilities. The technological activity system works within standards related to coding and interoperability, learning content (e.g. SCORM standards) and accessibility (e.g. W3C standards).

The community includes programmers, developers, designers, hardware and software specialists. The division of labour, both vertically and horizontally, within this community varies depending on the nature and size of the organisation. As one moves from an operational to a systems perspective it is not atypical to find that hardware, software and knowledge management sections become more insulated with their own hierarchical arrangements.

Pedagogic activity system

Tools at the disposal of the pedagogic activity system include curriculum, learning/teaching resources, political influence, human and intellectual resources. These are influenced by official and tacit rules. Official rules include the need to achieve curriculum outcomes within the available resources. Tacit rules relate to normative behaviours and beliefs of teachers, vocational disciplines and learners. Teacher's disposition towards the use of technology in teaching is fundamental to decisions about adoption. Despite the limitations of variations in terminology, there is a strong body of literature to support the contention that teacher's deep-seated notions of what constitutes good teaching are critical in shaping teacher's practice. Terms include values, beliefs (Borko & Putnam, 1995; Errington, 2004; Pajares, 1992; Schoenfeld, 1998) and personal practical theories (Marland, 1997, 1998). Teachers' beliefs and assumptions about the nature of knowledge, disciplinary norms, and how students learn affect the choice and use of technology for teaching and learning (Gibbs & Gosper, 2006).

The community involved in this activity system includes teachers, learners and support staff such as librarians and counselors. Whilst the division of labour varies depending on the pedagogic model adopted, it is not unusual for there to be insulation between the roles and the responsibilities of the major groups.

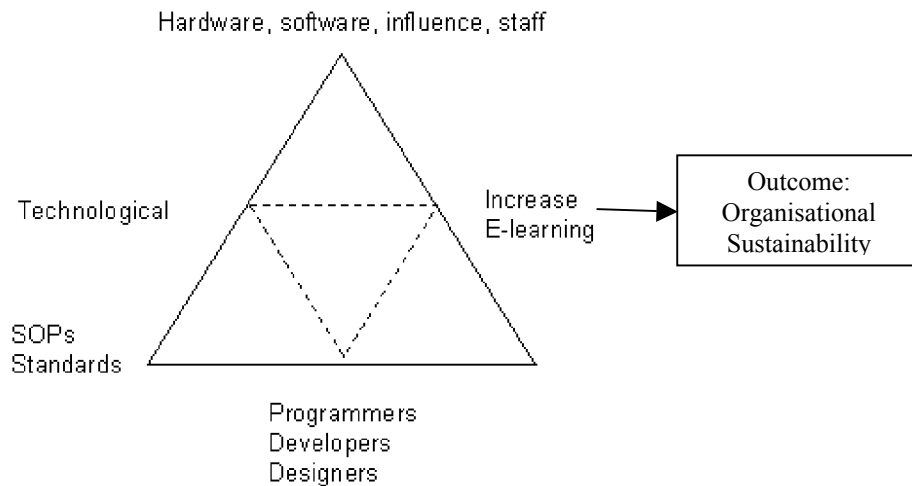


Figure 5: Technological activity system

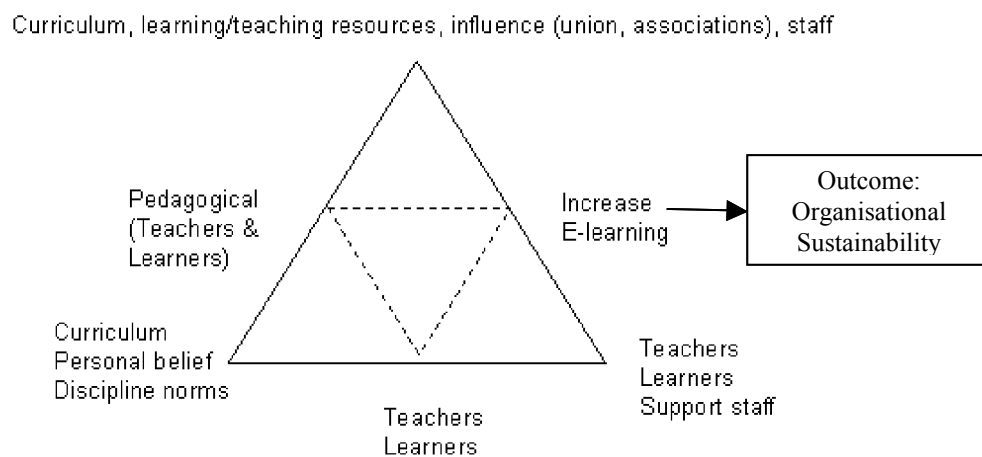


Figure 6: Pedagogical activity system

Power relations between activity systems

It would be naive to ignore the role of power relations that are active at the interface between activity systems. The influence that each perspective brings to this engagement is not always equal. Gibbs and Gosper (2006) propose that technological and marketplace concerns have overpowered educational concerns in the design of e-learning and that this inequity needs to be addressed.

We need to find ways of developing e-learning technologies and systems to meet global standards, be interoperable with other systems, and encourages the pedagogical richness which reflects a full range of philosophical and epistemological perspectives. Fundamental to achieving this is a continuing dialogue between teachers and developers. (Gibbs & Gosper, 2006, p.52)

In general, the organisational activity system has power over the distribution of resources throughout the organisation and is able to set performance outcomes for various sections. Whilst it is common for people with teaching experience to be represented within this activity system, and it would be unrealistic to suggest that these people do not hope to achieve what they perceive to be high quality educational outcomes, their primary concern, as determined by the nature of their position is organisational welfare. Through control over financial, physical and other resources, the organisational activity system adopts a powerful position in determining that fate of e-learning within an organisation.

In many, if not most cases, sections responsible for information technology report directly to management. Given the central importance of technology to support business processes as well as

teaching and learning, the technological activity system might be seen as a functionary of the organisational activity system being privileged in respect to influencing the distribution of resources.

The pedagogic activity system is dominated by those directly involved in teaching and learning. In most educational organisations, the pedagogic activity system is divided into departments on the basis of factors such as discipline, or age range of learners. Through departmental managers, actors in the pedagogic activity system have links to the organisational and technological activity systems. Influenced by discipline norms, and individual values and beliefs, when organisational pedagogic discourse reaches this level it is further recontextualised at the discipline level and/or the individual level.

Change management and sustainable e-learning

There is a large body of literature on the generic topic of change management. Much of this takes an instrumental perspective providing 'how-to advice'. For example, Kotter (1995) describes an eight-step model of change management that includes establishing urgency, building a guiding team, getting the vision right, communicating, empowering action, creating short-term-wins, persistence and embedding the changes. Whilst the role of people in the change process is acknowledged, the premise of such models is that if the steps are carried out correctly then change will be successful. A premise that smacks of technological determinism, that fails to acknowledge the complexity and impact of human behaviour dynamics that can be captured through a socio-cultural consideration. That is, change seen as meaning making.

Some suggest that the general nature of change should vary depending on the size of the organisation and scope of change required. For example, Salmon (2005) describes two approaches to implementation of e-learning as large-scale centralised change and incremental change. Another commentator suggests that larger institutions are more likely to succeed if diffusion is decentralised, small organisations if it is centralised (Nichols, 2007). One study at Oxford Brooks University found that a decentralised approach that 'allowed schools to set their plans for their own developments within their own contexts' (Sharpe, Benfield, & Francis, 2006, p.146) was the most influential lever for change. This allowed schools to 'contextualise their plans for change, the facilitation of communities of key staff and creating opportunities for staff to voice and challenge their beliefs about e-learning' (Sharpe et al., 2006, p.135) as particularly important levels in facilitating the sustainable embedding of e-learning. This approach enabled a focus on educational before technical concerns facilitated through targeted professional development.

Such publications also make recommendations about communication and professional development. For example, Nichols (2007) notes the importance of professional development and reducing ignorance, Salmon (2005) emphasises the need to make organisational values explicit, to determine and make explicit the purpose of pedagogical innovation and the objectives of e-learning. At a practical level, a recent review of teacher professional development finds that activities that aim to change practice should use content that is relevant to the participants, provide examples of new pedagogy in action, provide support and time for changes in teacher's understanding and commitment to new practices, recognise the influence of established expectations and norms, and establish an environment where participants feel safe to share ideas and examples of work (Harlen & Doubler, 2007). These ideas bring the issues of values and culture into focus. They might be seen as reinforcing the existing requirements of the organisation or as transformational depending on the perspective and approach adopted.

In the case of educational organisations, gatekeepers for change are frequently the teachers and many educational change projects have floundered at the level of the teacher-learner interaction due to a lack of consideration for teacher's beliefs and values about teaching and learning. If teacher's practice is to change in a fundamental way there is a need for professional development to move beyond simply providing technical level skills in the use of e-technology to address teacher's beliefs about what constitutes good teaching practice (Errington, 2001, 2004; Marland, 1997, 1998; Pratt, 1998). Such an approach to professional development requires practitioners to engage 'in dialogue about personal practical theories of learning and teaching' (Errington, 2004, p.43) in order to 'subject their theories to review and revision' (Marland, 1998, p.18) so that sustainable changes to teaching practice can occur.

Within the pedagogic activity system, activity theory has the potential to make otherwise tacit and possibly contradictory understandings amongst teachers explicit through the use of a common language to articulate the object of the activity, tools available, rules, community, and division of labour. Between the organisational, technological and pedagogic activity systems, activity theory provides a means to make explicit the assumptions underpinning and any contradictions between the systems. With reflection,

discussion and debate the potential of expansionist learning such that e-learning is more likely to be sustainable if increased.

Conclusion

This paper shows that activity theory provides the opportunity to make the assumptions, values and beliefs that underpin organisational, technical and pedagogic perspectives of e-learning more explicit. Through the identification of tensions and contradictions both within and between activity systems expansionist learning becomes possible such that sustainable e-learning can be facilitated. Major conclusions of this paper are that any change management towards sustainable e-learning must address the power dynamics that occur at the interface of the activity systems and that professional development for teachers must address teacher's beliefs about what constitutes good teaching practice.

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Author: Dr Ian Robertson, Senior Lecturer, School of Education, RMIT University, GPO Box 2476V, Melbourne VIC 3001. Phone: 61 3 99252613. Ian is a senior lecturer in education at RMIT University, Melbourne, Australia. He has a particular interest in approaches to teaching and learning such as flexible learning, e-learning, blended learning and workplace learning.
Email: ian.robertson@rmit.edu.au

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