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Kontakt / Contact:

peDOCS
DIPF | Leibniz-Institut für Bildungsforschung und Bildungsinformation
Informationszentrum (IZ) Bildung
E-Mail: pedocs@dipf.de
Internet: www.pedocs.de

Richard Andrews

Does e-learning require a new theory of learning? Some initial thoughts¹

Abstract

There is a growing number of texts about e-learning, but most of them address only the problem of how to teach ('e-teaching'). Few address the social implications of e-learning; its transformative effects; or the social, multimodal and technical interplay that affords and directs e-learning, and which is currently reshaping educational practices. In the light of such developments, the research question that needs to be asked is 'does e-learning require a new theory of learning?'

This theoretical review sits within the field of education, particularly technology-enhanced learning. But the notion of 'technology-enhanced learning' implies that learning exists, and is somehow 'enhanced' by technology. The line taken in the present article suggests otherwise: that learning and technology are reciprocal and co-evolutionary. In a previous work, in the Handbook of E-Learning Research (2007), Caroline Haythornthwaite and I identified the gap in theoretical perspectives on e-learning: "what has been lacking in the literature is a work that emphasizes key theoretical frameworks that underpin the field, addresses the complex interplay of technical, social, and organizational aspects of e-learning endeavors, and the relationship between research, theory, practice and policy." Such gaps in the field have provided the starting point for the present article, with its particular emphasis on whether e-learning requires a new theory of learning; or whether it requires merely an extension and 'application' of contemporary learning theories.

Keywords

E-learning; Learning theory; Models of e-learning

Prof. Dr. Richard Andrews, Institute of Education, University of London, 20 Bedford Way, London WC1H 0AL, United Kingdom
e-mail: r.andrews@ioe.ac.uk

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Erfordert E-Learning eine neue Theorie des Lernens? Einige erste Überlegungen

Zusammenfassung

Es gibt eine wachsende Anzahl an Texten über E-Learning, die meisten jedoch beschäftigen sich nur mit den Problemen der Lehre (E-Teaching). Nur wenige Texte behandeln die sozialen Implikationen des E-Learnings; seinen transformierenden Effekt; oder das soziale, multimodale und technische Zusammenspiel, welches E-Learning hervorbringt und steuert und welches gegenwärtig die Bildungspraktiken umformt. Angesichts solcher Entwicklungen lautet die Forschungsfrage, die man sich stellen muss: „Erfordert E-Learning eine neue Theorie des Lernens?“

Dieses Review von Forschungstheorien ist auf dem Gebiet der Erziehungswissenschaften zu verorten, insbesondere im Bereich des technologiegestützten Lernens. Die Erwähnung von „technologiegestütztem Lernen“ impliziert, dass ein Lernprozess existiert, der durch technische Methoden verbessert wird. Die in diesem Beitrag verfolgte Argumentation schlägt jedoch etwas anderes vor: Lernen und Technologie bedingen und entwickeln einander gegen- und wechselseitig. Im Handbook of E-Learning Research (2007) haben Caroline Haythornthwaite und ich folgende Lücke in der theoretischen Sicht auf das E-Learning identifiziert: „Was in der Literatur fehlt, ist eine Arbeit, die sich schwerpunktmäßig mit den entscheidenden theoretischen Konzeptionen beschäftigt, die dem Forschungsfeld zugrunde liegen, und die sich mit dem komplexen Zusammenspiel von technischen, sozialen und organisationalen Aspekten bei dem Unternehmen ‚E-Learning‘ auseinandersetzt ebenso wie mit den diesbezüglichen Beziehungen zwischen Forschung, Theorie, Praxis und Politik.“ Solche Lücken im Forschungsfeld bilden den Ausgangspunkt des vorliegenden Artikels, der insbesondere die Frage betont, ob E-Learning eine neue Theorie des Lernens erfordert oder nur eine Erweiterung und ‚Anwendung‘ heutiger Lerntheorien.

Schlagworte

E-learning; Lerntheorie; Modelle für E-Learning

1. Introduction

E-learning theory, if we can characterize e-learning as open to theory, is in need of development. In the English language at least, there is a new wealth of material on learning theory (e.g. Illeris, 2007; Illeris, 2009); and a parallel strand of material on e-learning (e.g. Garrison & Anderson, 2003; Danaher, Moriarty, & Danaher, 2009 on mobile learning communities; Latchem & Jung, 2009 on distance and blended learning in Asia; Dirckinck-Holmfeld, Jones, & Lindström, 2009; Steeples, Jones, & Spector, 2002; Conole & Oliver, 2007 on networked learning; see also the chapters in Andrews & Haythornthwaite, 2007). But these very different sources of material do not come together to help us think about the *theoretical* nature of e-learning. The emphasis in e-learning studies, to date, has been on strategies, social contexts, design and/or pedagogies. Methodologically, most of the studies

published, and most papers given at conferences, are ethnographic and/or descriptive studies. It might be said that most of the literature is pragmatic. While these studies are important in themselves, and are also important for working from the ground upwards towards theory, they do not in themselves constitute a theoretical contribution. Without such overarching theory or theories, the field will be unable to chart and gauge its progress; nor will it reach a degree of coherence that allows further discussion of complex tensions and complementarities in the field.

There are exceptions, from different points of view: Keegan (1993) explores theoretical principles of *distance* education, with the student at the centre of considerations (and thus has a focus on learning rather than teaching) and Moore (1997) articulates a theory of transactional distance; from another angle, Holmes and Gardner (2006) work toward a theory of ‘communal constructivism’² that underpins their approach to e-learning and Jewitt (2008) considers learning as being informed multimodally. These different approaches to a theory of e-learning require further discussion. In this article, I will focus on Moore and Jewitt’s conceptions, as they seem to me to be the more fundamental in each case.

Moore (1997) articulated a theory of transactional distance, developing a notion first mooted in the 1970s that distance education was not just a matter of geographical separation, but a pedagogical concept. The notion of transactional distance is a relative one, and involves a set of three variables that operate in relation to the degree of transactional distance between the teachers and learners: dialogue, program structure and learner autonomy. In particular, there was reference to the (then) newly available practice of ‘teleconferencing’, enabling learners to converse with each other as well as with the teacher. The potential increase in the number of lines of communication in such an e-learning situation, compared to those in a conventional face-to-face learning situation, is considerable, where co-presence is compensated by more extensive and busier electronic networking. These connections can be defined in terms of strong or weak ties with different values being placed on the different strengths of connection in social networks. Haythornthwaite (2009) suggests that participatory learning entails instructors ceding leadership and control of learning, giving it over to participants, and encouraging a new form of co-learning pedagogy. Part of this new responsibility for learners is the need for *choice* as to how research is conducted, what sources are used, what degree of cross-checking is employed, and so on. Such a wealth of choice can be disorienting for a student who is not used to such freedom, or is wedded to the conventional face-to-face teaching situation where the student tends to defer to the teacher/lecturer. It is likely that neither students nor institutions are sufficiently prepared for the choices that present themselves in an e-learning context. ‘Learner autonomy’, mentioned as one of the key variables in Moore’s theory of transactional distance, is one that requires more attention from all concerned.

2 Holmes and Gardner (2006) in a brief chapter on e-learning theory, see a development from behaviorism through cognitive constructivism and socio-constructivism to communal constructivism (p. 88). In communal constructivism, the individual contributes to and benefits from a community which provides a living repository of learning.

In a different approach, Jewitt (2008) sets out “a framework for re-thinking learning from a multimodal perspective in order to explore what real difference the use of new technology can make for learning” (p. 2). That framework also includes activity theory (Engeström, 1987), itself derived from Vygotskian thinking about transfers from the social plane to the internal plane. Both these perspectives allow an insight into learning ‘from the outside in’. In other words, they chart the resources, the social semiotics and the social constituents (and conditions) of learning. Learning is seen as “internalising the representational and communicative means of the subject discourse” (p. 25). Jewitt draws on Volosinov (1973) to suggest that the mind is nurtured on signs and that it makes sense of the world and of its own consciousness through such mediation. She suggests that most theories of the internalisation of social relations are based on [verbal] language, but that “from a multimodal perspective *all* modes contribute to learning” (p. 27). Jewitt thus points us in the direction of (a) a multimodal conception of the semiotic resources and relationships that are internalised as thought and transformable into learning, (b) a multimodal and kinaesthetic approach to what the psychologists and those whose theories derive from psychology call ‘input’, (c) seeing students’ ‘output’ as one form of evidence of their learning and (d) a question regarding the relationships of new technologies and computer interfaces to multimodality, i.e. largely in the multimodal nature of the computer screen interface. The social dimension of e-learning is not touched upon other than through the lens of social semiotics which informs and creates signs. It is important to distinguish between multimodality on the one hand and the affordances of digitally encoded communication or of new technologies on the other: there is plenty of overlap, but it is helpful not to blur the distinction between the two. They are not synonymous.

2. Definitional issues

The principal question considered in the present paper is whether the practices of e-learning require a new theory of learning, or whether existing theories of learning are adequate to account for what happens, and what is possible in e-learning.

‘E-learning’ itself is a term that is complex, and that attracts a degree of controversy and disagreement. In *The Handbook of E-learning Research*, Caroline Haythornthwaite and I (2007) charted what we took to be the boundaries and identity of e-learning, a term we prefer to ‘technology-enhanced learning’. The latter term seems unacceptable to us, because we do not see ‘learning’ as a process or state of being/mind which is necessarily ‘enhanced’ by or separate from technology. The phrase ‘technology-enhanced learning’ seems unduly technicist and unrealistically positive. There are many scenarios we can envisage in which learning is enhanced by technology, but equally there are others where technology can interfere with learning. The conception that learning is the *status quo* and technology is the intervention is one we associate with experimental design and application. We

do not think it is an appropriate approach for thinking about the relationship between learning and technology.

Rather, the term 'e-learning' is helpful because it is a hybrid, compound term. It suggests that there is something distinctive about e-learning, and that it is different from 'learning'. In *The Handbook of E-learning Research*, we proposed a conception of the relationship between new technologies and learning that saw them as *reciprocally co-evolutionary*. That is to say, they each develop independently and alongside each other; but they are also related, and contribute to each other's development. As one changes, so does the other. This is not the same as a symbiotic relationship because symbiosis exists to maintain a status quo. E-learning, on the other hand, is dynamic, changing and adapting itself to new social situations, new politics, new technologies and new forms of learning. We can be criticized for drawing boundaries around an area of social practice that cannot always be distinguished from learning itself, and for attempting to build theory on a site that is already well provided for theoretically. But part of our motivation is that existing theories of learning do *not* account fully for what happens in e-learning.

Finally, in these introductory sections, it is important to note that e-learning includes online and offline learning via electronic means. Indeed, the relationship between online and offline engagement is an important consideration in thinking about e-learning. Equally, the distinction between synchronous and asynchronous learning is an important one to consider; but this particular distinction is also important in conventional, face-to-face learning. These issues of online and offline, synchronous and asynchronous engagement are a different matter from the degree of 'blend' or 'mix' in teaching programmes that combine e-learning with face-to-face or other kinds of non-electronic learning. Such programmes are outside the scope of the present article, where the focus is purely on learning mediated by electronic means.

3. Learning theory

The work of Illeris as a writer and thinker about the nature of learning, and also as an editor of a recent book on contemporary learning theories, is central to our discussion. But there are two lacunae in Illeris (2007) regarding e-learning, and they are related. The first concerns e-learning "or net-based learning" (p. 215), and the second concerns learning as a transformational personal and social/political act (a conception I share with Jewitt, Kress and others). Illeris sees e-learning as a site for learning, a 'virtual' space. So he first conceives of the notion of learning as a psycho-social activity, and then assigns it 'different learning spaces' in which to operate. The notion of socially-situated learning, for Illeris, is about *sites* for learning; he does not see the social situations in which learning takes place as integral to the nature of that learning. As a result, he plays down the idea of 'learning as an effect of community' (Rogoff, 1992) and the transformative power of community for ef-

fecting learning, as well as the fact that learning is mediated through social semiotic and multimodal communication.

As far as ‘net-based learning’ is concerned (the term ‘e-learning’ is quickly dropped), there is scant recognition of the transformations possible through electronic communication. The two pages devoted to net-based learning do acknowledge the practical usefulness of learning at distance (best combined, he suggests, with some face-to-face interaction, as in blended or hybrid learning) but see it very much as merely another *site* for learning. A telling statement appears on p. 233:

Net-based learning or e-learning can constitute an appropriate supplement [to learning] in many contexts, but it presupposes that the relevant multi-aspect programs are available and – to an even greater extent than other learning – that the participants have considerable motivation.

It is not clear why e-learning should require more motivation than other forms of learning (everyday, school-based, work-based or voluntary-driven); or why, in an age in which electronic access to texting, voicemail, email, the net, virtual learning environments etc. is prevalent in the developed world, that e-learning is seen as so peripheral and ‘supplementary’.

Illeris’ own lacunae are compensated by the inclusion in his edited collection (2009) of two chapters on transformative learning, by Mezirow (2009) and Kegan (2009). Mezirow traces the origins of transformative learning theory to adult (specifically, women’s) learning communities in the USA in the 1970s, and founds the theory on the work of, amongst others, Habermas and his notions of having “a test of validity until new perspectives, evidence or arguments are encountered and validated through discourse as yielding a better judgement” (p. 92) when engaging in communicative as opposed to instrumental learning (though transformative learning may also occur in instrumental learning). Such mindsets, suggests Mezirow, are the results of cognitive, emotional and value-based frameworks and specific frames that are brought to bear on perception and experience. When these frames are changed, learning takes place. Such changes in the shape of interpretive frames are brought about by “critical assessment of the sources, nature and consequences of our habits of mind” and by “participating fully and freely in dialectical discourse to validate a best reflective judgement” (p. 94).

Kegan (*ibid.*), in developing Mezirow’s definition of transformative learning, notes that precision is necessary. He suggests that “transformational kinds of learning need to be more clearly distinguished from informational kinds of learning”; that “the *form* that is undergoing *transformation* needs to be better understood”; and that, if framing means that learning is always epistemological as well as behavioral, then transformational learning must recognize that dimension (p. 41). Kegan’s limiting of transformational to describe frame-changing learning, as opposed to more information-based learning within existing frames, is understandable (it is not helpful to have the term ‘transformation’ apply to any form of learning, and thus become synonymous with it). But it negates the meaning of

transformation which can apply to small-scale transformations (e.g. the acquisition of a new fact) as well as to large-scale ones (the adoption of a different framework for solving a problem, e.g. discovery of a new strategy for NATO involvement in Afghanistan, or a new approach to the problem of teaching writing to school-age students). Such limiting of the use of the term 'transformational' as applied to learning is helpful in the sense that it increases clarity; but is less helpful in contributing to the understanding of learning theory and its application or development in relation to e-learning.

Indeed, neither Mezirow nor Kegan mention e-learning. Nor do any of the other theorists in the 2009 edited collection by Illeris, *Contemporary Theories of Learning*. Nevertheless, Mezirow and Kegan provide the beginnings of a foundation on which a theory of e-learning can be built, through their emphasis on *transformation* as a key characteristic of learning.

4. Towards e-learning theory

Let us start with the building blocks that we have identified, add some more, and then consider what kind of theory might be constructed to assist us in understanding the nature and possibilities of e-learning.

First, Vygotsky-inspired thinking by Rogoff (1992), leading to the notion that *learning is an effect of community*, can be developed further to a more accurate conception of learning as an effect of *communities*. What does 'learning is an effect of community' mean? It suggests that learning is not a psychometrically measurable entity that individuals register irrespective of their connection to other people; rather, that it *happens as a result of* close connection in cohesive social groupings or communities. These communities vary in size and longevity, from small communities like families or extended families (or families that break up or are attenuated) to communities that are short-lived and large-scale, e.g. a gathering at a concert, political speech or football match. E-communities operate in a different way. They include gatherings such as social networking sites; virtual learning environments; simple email groups which come together for learning purposes; and researchers using the internet. All these constitute learning communities. These are different from real world communities in that they operate irrespective of place. As communities, they operate alongside and in combination with real world communities. It is not appropriate to call these mere sites for the application of learning; they prove the very fabric of learning which is 'read off' from involvement with the communities in question, through dialogic exchange, input and 'passive' peripheral participation. In combination with such theoretical ballast as that provided by Vygotsky, Rogoff, Lave and Wenger is the strand identified above: that of transformational learning, deriving from the communication-as-social-action theories of Habermas, and finding specific articulation in Mezirow and Kegan (both 2009).

Second, what are e-learning practices? Activities that are distinctly different from real world learning practices include, in addition to those mentioned in the previous paragraph under e-learning communities, the following: special interest e-groups; subscription and access to e-journals; access to databases of information on research; digital archiving and access to those archives; access to institutional repositories; email exchanges with supervisors and fellow students; bulletin board access; online browsing and searching (e.g. via Google Scholar etc.); 'live' and asynchronous blogging and other forms of online discussion; conference calling, with and without video-link; formal access to resources, reading lists etc. and completion of assignments using a virtual learning environment; and anytime/anywhere (given suitable broadband provision) access to information and exchange.

Third, learning is never an entirely passive activity in the real world or via e-learning. Even the most instrumental of learning activities requires some accommodation of existing learning patterns and configurations to new learning. In e-learning, because the learner is often isolated physically from other learners in the network, he or she has to make an extra effort to contribute to the e-learning community. In contrast to what was suggested in the first of these three paragraphs about the building blocks for e-learning, learning is never a simple 'read-off' from the tissue of connections made by others; it requires some engagement and contribution. Albeit that some e-learners may contribute little, and simply feed off the contributions of others; but it still takes some awareness and engagement to benefit, even from such a seemingly parasitical position. Illeris suggested that net-based learning required 'considerable motivation' (2009, p. 233), as quoted above, but the degree of motivation depends partly on the nature of the community of learners, and partly on the learner him- or herself. The point is that the learner must be self-motivated as he/she is in a relatively isolated position.

With three different perspectives, what theory or theories are possible to inform further our understanding of e-learning? These include social informatics, communication (multimodal) theory, digital media theory and conventional learning theory.

4.1 Social informatics

Here I recite the outline of social informatics given in Andrews and Haythornthwaite (2007, pp. 27–31) and update that account in the light of recent developments. Essentially, social informatics is an interdisciplinary body of theory that includes consideration of the design, uses and affordances of information and communication technologies, particularly in social, institutional and cultural contexts (Kling, Rosenbaum, & Sawyer, 2005). It is interested in the ways in which new information and communication technologies (resulting in combinations of modes as well as new forms of media) change the patterns and potentialities of social interaction. Borrowing from sociology, social interaction is conceived in terms of strong and weak ties and their initiation, maintenance and development. Information

and communication technologies, and the online and offline communities that are made possible as a result, are seen to enable the maintenance of weaker ties and the possible strengthening of strong ties, partly through the increase in communication that takes place. This increase to a new dimension of social interaction makes for “more than just a re-purposed version of offline learning” (Andrews & Haythornthwaite, 2007, p. 29): it creates a larger, more complex space for interaction, with multiple modes of communication, greater distances of potential interaction, and compressed/enhanced synchronous and asynchronous means of communication.

Sawyer and Eschenfelder (2005) suggest that social informatics “is neither a theory nor a single domain” (p. 428) but a field of research focusing on the relationship between ICTs and the larger social context in which they exist. As such it is a field of enquiry that has overlaps with e-learning practices, but does not provide a theoretical perspective on the problem of whether e-learning requires a new theory of learning. Social informatics itself is undergoing transformation, being subsumed under the broader category of socio-technical systems theory. Its drift toward (or reversion to) that larger (technical) field suggests that it will be of decreasing usefulness in developing theory about e-learning. It is *sociology* rather than social informatics or its own proposed informing discipline, ‘social theory’, that would seem to provide the best theoretical perspective for an understanding of e-learning.

4.2 Communication (multimodal) theory

The communication theory most relevant to the question of the development of a theory for e-learning is the development, over the last fifteen years, of multimodal perspectives on communication. It is highly relevant because most e-learning communication is via computer interface; and these computer interfaces are multimodal in nature. This body of theory has already been touched on earlier in the discussion of Jewitt’s contribution to the connection between new technologies, multimodality and learning.

Kress (2003) explores the connection between multimodality and learning (but not e-learning specifically), suggesting that *transformation* is a key concept in a theory of meaning, concerning how users re-shape meaning according to the available resources; *transduction* is the more specific term to denote the modal shift from one set of resources to another. Transformation is also central to a theory of learning (which Kress, on p. 40, calls “the process of inward meaning-making and the resultant change to the state of an inner semiotic resource”) because learning transforms a person’s state of mind or knowledge. If we make the jump from learning to e-learning, we can see that transduction takes place in the re-casting of meaning from one mode to another; and transformation takes place where the transduction has the effect of changing a state of mind or a person’s knowledge. Transformation (without transduction) takes place in *reading* multimodal texts in

that connections have to be made between the different modal elements of the text, though it could be argued that transduction is taking place too (e.g. from the printed text into ‘thought’ or the impression upon the reader). Not all e-learning is obviously or primarily multimodal, however. Many e-learning courses privilege the verbal over other modes, which are subjugated or are subliminally present.

Kress’ recent *Multimodality: a social semiotic approach to contemporary communication* (2010) is the most recent contribution to a long list of publications in the field and takes the argument further. Establishing multimodality within a social semiotic approach, Kress argues that learning takes the form of augmentation of life experience and thus affects identity. A multimodal social semiotic approach to learning would see it as “the result of the transformative engagement with an aspect of the world which is the focus of attention by an individual ... leading to a transformation of the individual’s semiotic/conceptual resources” (p. 182). What is interesting about the focus on media as well as on modes in this book is that the internalization and transformations of identifiable semiotic resources in the external world, via smartphones and other devices as well as multimodal interfaces, is mirrored in the realignment in internal semiotic resources, which in turn can be manifested again in the *productions* of learners (which change, in however small a way, the social semiotic landscape). How else, we could argue, is it possible to *see* evidence of learning? This approach seems a much more productive line than brain science or purely psychological theories of cognitive development which do not account fully for the semiotic basis of identifiable ‘input’ and ‘output’ – such input and output might be identified as evidence of, or *traces* of learning. In an e-learning context, these traces are often available as publicly shared archives of interaction.

4.3 Digital media theory

This particular body of theory tends to accentuate the visual, concentrating on still and moving images. As such, it focuses on only one mode of communication, but in doing so draws attention to the power of that mode in contemporary communication. Its relevance to understanding e-learning and to the building of e-learning theory is mainly in its exploration of the variety of media that are available for learning, from hand-held devices to desk-top computers and their screens, and from interactive television to portable radio and recording devices. As such, it takes multimodality for granted, preferring to concentrate on the variety of media via which messages can be communicated. Its focus therefore, is on the ubiquity of learning, and on questions of access and accessibility, rather than on the nature of the message itself. As the web pages at the University of Sussex’s Centre for Visual Fields have it, “scholars in this field re-assess forms of practice and forms of thinking about new media technologies as visual digital cultures. They work the visual, material and symbolic properties, the affective or sense perceptive regimes, and the

political economies that are invoked under the banner of digital media, particularly in visual forms” (<http://www.sussex.ac.uk/cvf>).

4.4 Conventional learning theory

What can conventional learning theory contribute to the development of e-learning theory? In the section above on learning theory, points were made about the lacunae in transformational learning theory and in more general synopses of conventional learning theory, thus opening the way for the development of a new theory of e-learning. But such new theory has much in common with conventional learning theory. Conventional learning theory and e-learning theory are best conceived as overlapping circles in a Venn diagram: they have their own spheres of application, but they also have much in common. These commonalities include: an understanding that learning is a psycho-social process; motivation to learn (intrinsic and/or extrinsic); and a distinction between ‘development’ and ‘learning’ in which development is seen as naturally occurring and integrative, whereas learning is more specifically geared to shorter and medium-term changes in states of mind and knowledge. Both are distinguished from teaching, which is an external pedagogical act that may or may not induce learning.

The movements toward e-learning theory in the present section, which have identified five perspectives on learning that need to be taken into account (that of Illeris, Jewitt, Kegan, Mezirow and Moore), and four bodies of theory that are helpful in beginning to define what e-learning theory could be (social informatics, multimodality, digital media theory and conventional learning theory), now need to be built upon further. The next stage of theory-building needs to answer some difficult challenges.

5. E-learning theory

E-learning “is a re-conceptualization of learning that makes use of not only instructor-led pedagogy but all the flexibility that asynchronous, multi-party contribution can bring” (Andrews & Haythornthwaite, 2007, p. 19). It is also continuously emergent, enjoying the dynamic that the co-evolution of learning and technology provides. That dynamic is mediated by and experienced by people. Just as the emergence of a new technology changes the way people interact, access information and use it; so, too, these changing social patterns change the possibilities of how we learn and how we use new technologies as part of that learning. E-learning, then, is an inextricably *social* act; and it is more than a socio-technical activity.

However, in the Introduction to *The Handbook of E-learning Research*, while charting some of the constituent elements and factors in building a theory of e-learning, we backed off the idea of a ‘grand theory’ of e-learning because we felt

that the field was not in a sufficiently mature state for such theorizing. That challenge is now taken up, albeit in more modest theory building.

The distillation of rhetorical and social informatics approaches in relation to knowledge creation and transformation means simply this: that e-learning is generated/made possible when the available resources for learning (existing knowledge, the communities in which we operate) are transformed by the learner (resulting in personal, social and/or political change) with the added dimension of peer as well as teacher discussion (in space, over a geographically much larger domain than in conventional learning) and asynchronously as well as synchronously (i.e. in relation to time). Available and existing texts may be transduced (Kress & van Leeuwen, 2001) in the process of learning; that is to say, they may change their modal or multimodal composition, and the very change may embody the learning that takes place (e.g. in the transduction of a printed text into an image, or vice-versa); but transduction is only part of the overall process of transformation that is at the heart of learning.

Such e-learning is distinctively different from conventional face-to-face learning, or solitary learning by an individual in a library or a monastic cell, in four main ways: the digitization of text makes for easier and more rapid transduction; the availability of an extended community of learners, with the teacher taking his/her place alongside learners, extends the possibilities of learning as an effect of that community (and as an effect of its connection with other communities); within that community, the learner has more agency and more resources at his/her disposal; and the affordance of asynchronicity makes for a potentially more dynamic relationship between the individual learner and his/her interaction with the wider group/community.

This last point is taken up by Castells (2001) who suggests that the internet has enabled a new system of social relationships based on the individual. In short, the individual is able both to define and be defined by the social networks he/she plays a part in. When applied to e-learning, the freedom of the individual is clear. Within (and beyond) the confines of the course or program and its requirements, the individual learner has the freedom to define his or her network of learning. Because the learner moves in and out of the electronic environment of learning, even in so-called '100% online' learning programs, he or she builds a web of discourses and patterns for learning that becomes distinctive. E-learning, then, transforms the nature of learning for the contemporary learner; it does more than 'enhance' an existing state of affairs, and much more than provide a re-situated version of conventional learning. It creates a web of networked communities that in themselves are generative of learning, but in combination and association, provide a richer, more extensive opportunity for learning.

How far has the argument for a theory of e-learning been taken in the present paper, and to what extent have questions been answered that were set at the end of the theoretical section of the Introduction to *The Handbook of E-learning Research* (2007, p. 32)? The questions posed in that Introduction have been quoted and re-formatted here. I have italicized the questions that seem to be particular-

ly relevant to the concerns of the present paper, viz. does e-learning require a new theory of learning, and if so, what would it look like?

The questions that we suggested for future work in 2007 included:

- What do we mean by a community of enquiry?
- *How do e-communities relate to situated, real-world communities?*
- What kinds of community experience are best suited to high-quality learning?
- Where and what are the boundaries between being, and acting in the world, and learning?
- What could an ecology of learning mean, and, once defined, how would e-learning fit into it?

A central theme emerging from such questions is the relationship between the social control of learning and individual agency in learning. From the identification of such a theme – one that is not confined to e-learning, but which applies to learning more generally – further questions arise:

- *When engaged in e-learning, what are you learning?*
- Whose model of learning and whose selection of knowledge are you adopting?
- *What are the unexpected consequences of the drive for e-learning initiatives, such as the continued exclusion of non-ICT users?*
- What is the digital divide in terms of access to and use of ICT in learning?³

6. Three questions answered

I will take the three italicized questions in a different order: first, when engaged in e-learning, what are you learning? Second, how do e-communities relate to situated, real-world communities? And third, what are the unexpected consequences of the drive for e-learning initiatives, such as the continued exclusion of non-ICT users? The sequence is therefore what, how and what are the implications of e-learning.

When engaged in e-learning, what are you learning?

This question brings us back to epistemological concerns, which earlier we had tried to side-step in a focus on the act of e-learning. I would suggest that engagement in e-learning makes for a different kind of learning. In conventional learning and scholarship, there is an authoritative, hierarchical power system at work. The teacher acts as mediator for the student between the body of knowledge, as enshrined in books, journals and other forms of print. ‘Knowledge’ is seen to exist, to be ‘added to’ by research, and to be guarded by editors of journals who, among

3 The non-italicized questions (i.e. the ones that are *not* addressed in the present article) are pursued in Haythornthwaite and Andrews (2011).

others, protect and preserve the discourses of induction into that community. The student voice is always subservient to the authoritative power unless, through debate and discussion, a critical stand is taken and then committed to print. By engaging with print, the authoritative voice of knowledge is taken *on in its own terms* (e.g. in book reviews, in replies to journal articles, in letters, in books that provide a counter-argument). No amount of talk or blogging will dent what appears to be a hegemonic view of knowledge that is reified in print.

In e-learning, however, the canonical texts are themselves committed to digital format and thus become at once more malleable, and more open to critique that has the same status as the original text. A digital electronic text can more easily be broken up, annotated, re-aligned, and incorporated as part of a dialectic or at least dialogical exchange. The ‘voice(s)’ of the original author can be placed alongside the student voice or voices. The learning process becomes more like speech, is more democratic, and is less hierarchical than one based conventionally on print.

So, to focus again on the question, when engaged in e-learning, what are you learning? The answer must be: first, the content can remain the same in either a conventional learning or an e-learning context. But the means by which the learning takes place changes the position of the learner in relation to the content/existing knowledge. As an e-learner, you are learning that knowledge is provisional, that what is enshrined in print is only the transduction of what was said or thought in speech, and that you have a part to play in the acceptance and/or critique of that presented knowledge. ‘Knowledge’, as conceived from an e-learning perspective, can be conceived conventionally as an existing and authoritative *body of knowledge*; but it can also be seen as a continually moving, fluid set of relationships between propositions on the one hand, and supporting or contrary evidence on the other. Knowledge, from this e-learning perspective, is the result of argued social and rhetorical practice and is perpetually in development. One could say that print-based cultures had given the false impression that learning was static, once ‘enshrined in print’.

How do e-communities relate to situated, real-world communities?

Haythornthwaite and Kazmer (2002) argue that the strong and weak ties – cf. social network theory – change in time, the weaker ties faster than the stronger ones (the weaker often being e-learning based ties); and that simplistic assumptions about the detrimental or positive effects of e-learning on learner well-being need to be replaced by more complex depictions of the relationship between on- and off-line learning. Part of that complexity is that the texture of relations between e-learning and conventional learning is rich: the two types of learning inter-penetrate each other’s domains.

Nevertheless, it is possible to identify e-communities that we belong to as learners, as opposed to ‘real-world’ communities that we might belong to. On the one hand, the e-communities would include social network groups where the links were primarily electronic and with cases where the participants had not met, physical-

ly, face-to-face; discussion groups online; video and audio conferences, including conference calls; learning groups in 100% online modules; web 2.0 environments where collective contributions can change a common text; etc. On the other hand, 'real-world' groups include family; groups with which we learn together; informal gatherings, on the street or in clubs and societies; and other joint social activities. The definition of 'community' in the real world is more easily seen through tangible frames, like that of a society in general in a particular nation; the education system within society; individual schools within that education system; individual classrooms within the school; and individual teachers and students within that class.

If learning is an effect of community, there are two further questions to ask: what is the nature of learning in each of these two types of community? And how are they inter-connected? It is again the case, as with the nature of knowledge and learning in the two types of community discussed above, that the real-world contexts tend to be more hierarchical. It can only be speculation as to whether such a context determines the nature of learning (e.g. in making hierarchies of concepts more acceptable) but such an effect is unlikely. Rather, a more likely effect is that learning itself is more fully *embedded* in social and political contexts. In e-learning contexts, on the other hand, learning is apparently less embedded (even though the computer interface is heavily framed as a social and political construct) because the individual user has more control of the format in (through transductive possibilities) and pace at which he or she encounters and processes the material on offer. He or she also has more scope in searching out material. Learning, for an e-learner, is thus less embedded in contexts, more 'parcelled' and re-workable in different shapes and formats, and more open to re-configuration.

What are the unexpected consequences of the drive for e-learning initiatives, such as the continued exclusion of non-ICT users?

The final question takes us further away from the core focus of the present paper and towards *implications* for a new theory of learning. The digital spectrum of access and use (rather than a simplistic 'digital divide') is evident not only internationally, but also within societies. 'Access' is distinguished from 'use' in that it is one thing to have access to a networked computer, and another to use that privilege to good and full effect. But we know that many people in society do not have access to a computer, and if they do may not have access to fast broadband connectivity. There is thus a spectrum of access which means that some learners will be relatively disadvantaged. Such disadvantage may not affect the quality of learning, but it will most certainly affect the type of learning and the range of resources that are available. Access is an issue of systemic economic inequality.

Use is more a matter of individual engagement with the possibilities and affordances of new software and connectivity, and tends to manifest itself generationally rather than socio-economically. See Haythornthwaite (2007) and Haythornthwaite and Andrews (2011) for a fuller discussion of the 'digital divide' and e-learning.

As far as the development of e-learning theory goes, those of us who generalize about e-learning practices must continue to bear in mind that there is a wide (and possibly widening) spectrum both of access and use.

7. Conclusion

In summary, what is the answer to the overall question which this paper addresses: does e-learning require a new theory of learning? I have attempted to argue that e-learning changes the nature of learning in a number of significant ways. First, if we accept the premise that learning is socially situated, and that e-communities are different from conventional learning communities in classrooms in schools and universities, then it follows that e-learning is different from conventional learning. Crucially, e-learning extends the horizons of learning in space, resource and time. The notion of transactional distance is important to understanding how e-learning is different from conventional face-to-face learning. Such extension requires more from the learner in that he/she has to make selections from the possible available resources, as well as decide how and when to engage in the e-learning community. Second, the nature of knowledge itself (and therefore the learning of that knowledge) is affected by digital technology, particularly in the leveling out of the relationship between existing knowledge, the teacher and the student. Rather than a hierarchical conception of knowledge, e-learning and its technologies promote a 'flatter', more democratic, more potentially dialogical relationship between the learner and knowledge. Furthermore, 'knowledge' is seen to be in a state of perpetual development. Third, transduction is easier with a multimodal computer interface than without it. Transduction is one aspect of transformation, which in itself is a major aspect of learning theory; however, it is the element that is most observable as evidence of learning in that it creates new products, like the notes, essays, artworks and oral productions of students. Lastly, any new theory of e-learning needs to bear in mind that just as learning was always subject to a spectrum of access and use, according to socio-economic, geographic, cognitive and motivational factors, so too e-learning (while it appears to 'democratize' learning possibilities) is actually stretching the spectrum of access – and thus use – still further.

Lacunae that have been pointed out in the research literature on e-learning theory need to be filled. In particular, because social network theory, learning theory and e-learning description and reflection have tended to operate as different and largely unrelated fields, e-learning theory itself remains relatively undeveloped. This lack of development may be because it is felt that there is no need for such theory; that existing and new learning theory can account for e-learning because e-learning represents 'merely another site for learning'. I have tried to argue in the present article that the differences between conventional learning and e-learning are sufficiently significant to warrant the beginnings of a new theory of e-learning itself.

The answer to the question in the title of this article, then – does e-learning require a new theory of learning? – must therefore be ‘yes’. The first three points made in a previous paragraph, distilled from the article as a whole, suggest that in terms of learning as (a) a psycho-social construct, (b) an epistemologically-informed practice, and (c) a multimodal social semiotic process, e-learning is gradually bringing about a new theory of learning.

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