Embodied Knowing in Online Environments

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Abstract

In higher education, the conventional design of educational programs emphasises imparting knowledge and skills, in line with traditional Western epistemology. This emphasis is particularly evident in the design and implementation of many undergraduate programs in which bodies of knowledge and skills are decontextualised from the practices to which they belong.

In contrast, the notion of knowledge as foundational and absolute has been extensively challenged. A transformation and pluralisation has occurred: knowledge has come to be seen as situated and localized into various 'knowledges', and the status of the body has taken on renewed significance in epistemological debates. Rather than thinking of knowledge as transcending the body, the embodiment of knowledge has become a key factor in understanding the nature of knowledge and what it means to know.

In this paper, we adopt a phenomenological perspective in exploring the notion of embodied knowing as it relates to higher education programs and, more specifically, the ways in which information and communication technologies (ICTs) are used in these programs.

Keywords: online learning, embodied knowing, higher education, information and communication technologies

In higher education, the conventional design of educational programs emphasises imparting knowledge and skills, in line with traditional Western epistemology. This emphasis is particularly evident in the design and implementation of many undergraduate programs in which bodies of knowledge and skills are decontextualised from the practices to which they belong. Even where periods of practicum, work experience, or projects are incorporated into programs, they are usually presented as opportunities to practise or apply the knowledge and skills gained. In postgraduate research programs, while knowledge and skills are often developed by carrying out research, an emphasis on the intellect as the principal dimension of interest points to similar epistemological assumptions.

In contrast to this emphasis on decontextualised knowledge, the notion of knowledge as foundational and absolute has been extensively challenged. A transformation and pluralisation has occurred, such that knowledge has come to be seen as situated and localized into various 'knowledges'. At the same time, the status of the body

has taken on renewed significance in epistemological debates. Rather than thinking of knowledge as transcending the body, the embodiment of knowledge has become a key factor in understanding the nature of knowledge and what it means to know.

In this paper, we adopt a phenomenological perspective in exploring the notion of embodied knowing as it relates to higher education programs. More specifically, we focus on embodied knowing through critically analysing ways in which information and communication technologies (ICTs) are used in these programs. We have selected ICTs as a vehicle in our analysis because the body is notable for its ostensible absence in many of the online worlds brought to us through developments in ICTs, such as the internet. On the face of it, the virtual or online environments made possible through modern technologies appear to undermine the centrality of the body in cultural, social and educational interactions. This ostensible absence of the body occurs as technologically mediated transactions radically reconfigure spatio-temporal proximity.

In this way, a technological turn away from the body and epistemological re-orienting toward the body present a challenge to attempts to understand the impact of online technologies on knowing and embodiment. It is this challenge, however, that opens new opportunities for exploring the significance of embodied knowing in higher education programs, as well as for understanding how learning occurs in online environments.

Below we outline a number of issues relating to learning in conventional higher education programs, exploring some limitations of these programs. We propose an alternative approach that focuses on embodied knowing. We then explore this alternative in relation to learning in online environments, with implications for learning in higher education, more generally.

Decontextualisation in Conventional Higher Education Programs

The conventional design of higher education programs emphasises imparting of knowledge and skills. The point of departure in these programs is usually a formalised body of knowledge and skills, often identified in textbooks. Curriculum design typically assumes progressive accumulation of a body of knowledge and skills, with basic levels to be acquired in early phases and more advanced knowledge and skills later in a program of study. A focus on knowledge and skills acquisition is inadequate, however, as skilful practice demands an understanding of when, how, and why it is appropriate to employ particular knowledge and skills and in what circumstances.

Not only is a focus on knowledge and skills acquisition inadequate, but the epistemology inherent in such a design has been demonstrated to be fundamentally flawed (Billett, 2001; Bourdieu, 1977; Chaiklin & Lave, 1996; Giddens, 1984, 1993). Within this epistemology, knowledge and skills are seen as attributes that can be decontextualised from the practices to which they relate. For instance, a body of knowledge and skills has been identified for professions such as medicine, engineering, architecture, policing, teaching, and social work (Freidson, 2001). Jean Lave (1996) called into question such a 'container' view, where practice is seen as an objective structure comprising institutionalised social rules and norms.

Within such a view, practice and its content (for instance, knowledge and skills) are artificially separated.[1] As Raymond McDermott (1996) argues, decontextualised content is then formalised and taught in educational programs with the assumption that those completing such programs will enter an appropriate 'practice container' and be able to perform within it.

An emphasis on acquisition of decontextualised content is evident in the design and implementation of many undergraduate programs, particularly through a focus on the acquisition of knowledge and skills that are artificially separated from associated practices. For example, physics is typically taught as an independent segment in engineering programs. Similarly, human physiology and communication skills are usually taught as self-contained components of a medical program. We acknowledge that there are some exceptions to these conventional designs, such as problem-based learning or curriculum designs that focus on process rather than content. However, residues of conventional designs often remain. For instance, student achievement is typically assessed in the form of knowledge retention and/or acquisition of specific skills (e.g. communication techniques). More importantly, conventional designs persist and are prevalent in higher education institutions around the globe. It is for this reason that we direct our critique primarily to these designs.

Although periods of practicum, work experience, or substantial project work have been incorporated into some higher education programs, these activities are usually presented as opportunities to practise or apply the knowledge and skills acquired. Donald Schön (1983) called into question such a separation of knowledge acquisition and application, challenging the notion of learning to intellectualise about practice as a separate activity from that practice. Hence, practicum periods, work experience, and project work often tend to simply reinforce the notion of decontextualised or disembodied content to be applied in practice. In postgraduate research programs where knowledge and skills are usually developed by engaging in research, an emphasis on development of the intellect points to similar epistemological assumptions. In the latter case, development of the mind is seen as having primary importance at the expense of development of the person.

In a critique of a focus on the intellect in higher education institutions, Ronald Barnett (1997) proposes an alternative way of framing higher education for contemporary society. He challenges the appropriateness of the university's claim to promoting critical thinking through teaching and scholarship as a distinguishing feature of its contribution to society. Barnett argues, instead, for a broadening of the university's conception of itself and its role to encompass 'critical being, which embraces critical thinking, critical action and critical self-reflection' (p. 1). He explains, further, that critical persons are not only critical thinkers: 'They are able critically to engage with the world and with themselves as well as with knowledge' (p. 1). Barnett demonstrates that his notion of critical being extends beyond a traditional focus on thought and the intellect.

Similar to Barnett, we argue for a broadened focus for higher education. We propose a transformation in the design, implementation and evaluation of higher education programs. This transformation would require a shift in focus from acquisition of decontextualised knowledge and skills to an integration of knowing,

acting, and being in the form of 'embodied knowing'. Terry Flew highlights the relevance of such a notion when he argues that:

> … the rise of a global knowledge-based economy point(s) to a rethinking of the nature of knowledge, and to a recognition that it is as often tacit and embodied in people and interpersonal relationships as it is explicit and able to be codified and distributed across networks. (Flew, 2002, p. 7)

Consistent with our notion of embodied knowing, higher education programs would focus on developing not only necessary knowledge and skills but, more importantly, ways-of-being (Dall'Alba, 2004) appropriate to the areas of study in question.[2] For instance, medical education programs would move away from a conventional focus on symptoms and sicknesses. Instead, in the foreground would be the development over time of appropriate ways of being and acting (in relation to patients, relatives and other health professionals) towards achieving the best possible health for the person concerned.[3] While diagnosis and treatment of symptoms and sicknesses would be an important part, it would neither be conceived as sufficient in itself nor the primary focus of a medical program. Efforts to identify graduate attributes or capabilities to be developed during a course or program can be seen as attempts to capture the embodied nature of knowing.

The notion of embodied knowing, with its base in the phenomenological literature (Heidegger, 1993/1978, 1996/1927; Merleau-Ponty, 1962/1945, 1998/1964), allows us to explore what an integration of knowing, acting, and being would mean for higher education programs. Below we draw upon phenomenological and other research literature in outlining what we mean by embodied knowing. As a means of further exploring this notion, we then turn our attention to issues relating to embodied knowing and online learning.

Embodied Knowing

The notion of embodied knowing presents us with a seeming contradiction of terms and a paradox. Since Plato, epistemology has concerned itself with the distinction between knowledge and belief, and determining what can be known reliably, or indubitably, and that which cannot. Epistemology, therefore, has equated knowledge with the intellect and rationality. Western philosophy has not only privileged the intellect over the body but has also actively sought to disassociate the two. As a consequence, the idea of 'embodied knowing' is anathema to the way in which the question of what it means to know has traditionally been conceived.

Our aim in this paper is at odds with traditional epistemology and its concern with formalised knowledge as propositional content. Instead, we explore how knowing can be understood as embodied, or lived. This is no straightforward task, however. As the quotation below from Elizabeth Grosz suggests, the body, as both site and subject of knowing, resists and exceeds understanding:

> We don't know what a body is because a body is always in excess of our knowing it, and provides the ongoing possibility of thinking or otherwise

knowing it. It is always in excess of any representation, and indeed, of all representations … which doesn't mean that it is unthinkable but that we approach it in thought without fully grasping it. (Grosz, 2001, p. 28)

An account of embodied knowing must itself resist the temptation to merely incorporate the body into traditional epistemological models, as if it were just a matter of 'bringing it in from the cold'. Rather, through re-thinking the body—or thinking through the body—epistemology itself must be transformed. Here we provide a preliminary investigation of embodied knowing for the purpose of exploring its implications for online learning.

As noted in the introduction, the decontextualisation evident within conventional pedagogical models is coextensive with traditional, Western epistemology. The human subject as rational knower attempts to locate itself at a vantage point free from context: biology, politics, society and history. Rationality, that is, is equated with objectivity and detachment. The radical disembodiment of the rational knower is most explicit in Descartes' seventeenth century deduction and now famous assertion: 'I think therefore I am':

Can I affirm that I possess any one of all those attributes of which I have lately spoken as belonging to the nature of body? After attentively considering them in my own mind, I find none of them that can properly be said to belong to myself … I am therefore, precisely speaking, only a thinking thing, that is, a mind, understanding, or reason. (Descartes, 1901/1641: II paragraph 6)

In the Cartesian model, mind, or *cogito*, and body are utterly distinct as irreducibly different *substances*, to use Descartes' terminology. The mind, or consciousness, is thought of as having the properties of understanding and intelligence. In contrast, the body, and the physical and organic world more generally, are seen as having the property of spatial extension, and thereby as inert, or dumb. While Descartes accepts that interaction occurs between the mind and one's own body, he maintains that no substantial connection exists between the two. This is crucial for asserting the possibility of epistemological certainty. Descartes' model achieves certainty for the rational subject by jettisoning all that does not admit to certainty: everything other than 'I think'. One's own and other bodies, things and entities are relegated to a dubious and uncertain 'outside'. What the rational subject can know for certain, however, is that it thinks, that is, that it is rational.

In an effort to avoid the solipsistic tendencies that result from Descartes' deduction (if mind and body are fundamentally separate then how do we know there is a world 'out there' at all?) perception came to play a key role in accounting for mind-body interaction in later thinkers. The empiricist model, for example, treats perception as the process whereby external impressions, or 'sense data', are received and transferred to the brain to become information or knowledge. The body becomes a cumbersome, if somewhat unfortunate yet necessary, transmitter of causal 'messages' from the physical world to the mind, or consciousness (see O'Donovan-Anderson, 1996). Within this model, perception has the role of enabling

access between the world and consciousness, while ensuring the two remain distinct (with all the benefits this bestows epistemologically).

While the neat binary logic of the Cartesian schema became, and remains, pervasive, it has also been widely challenged within the twentieth century. Indeed the 'problem of the body' to which it gives rise has become a key issue across the humanities and beyond. This is evident within the phenomenological / hermeneutic traditions (Husserl, Heidegger, 1993/1978, 1996/1927; Gadamer, 1989/1960; Bachelard, 1964; Merleau-Ponty, 1998/1964, 1962/1945), post-structuralism (Lyotard, 1984; Derrida, 1978) and feminist theory (Grosz, 1995, 2001; Irigaray, 1991). Our focus in this paper is on the critique of Cartesianism that occurs within the phenomenological / hermeneutic tradition and the notion of what we are calling 'embodied knowing' to which it gives rise.

The enduring legacy of Husserl, the founder of modern phenomenology, is to have posited the importance for epistemology of intentionality – the directedness of consciousness towards something other than itself. Husserl saw the possibility of a world available for consciousness, or Descartes' *cogito*, as a consequence of intentionality. Recall that the Cartesian model treats the mind and body as fundamentally distinct. Against this 'container' view of the body, where the body is just another object *for* consciousness, Husserl proposed that consciousness can only engage with the world because it is already within, and a part of, the physical, corporeal world.

Merleau-Ponty is perhaps the most well known phenomenologist to have devoted his attention to developing a phenomenology of the body. For him, and indeed in line with other phenomenological thinkers, being embodied, or living in and through a living body, is the primary locus of the subject's experience of the world. The way that this is manifested, particularly in his later work, such as 'The Visible and Invisible' (1998/1964), is through the idea of extension. Embodiment is not restricted to the confines, the parameters and boundaries, of one's own body. While my own body is always the seat of my living relation to the world, through my body I also extend into and unite with other bodies, entities and things that comprise the world. This is the role of perception. The perceiving-body (a tautology) not only provides access to, but indeed is a part of—or extends into—what Merleau-Ponty describes as the perceivable: the colours, sounds, smells, etc, of the world, or that which gives itself to perception. There is an inextricable adhesion and overlapping in Merleau-Ponty's ontology between the perceiver and that which is perceived. Through my body, therefore, I am both perceiver and perceived, not just of others and things but also of myself. Perception involves the subject in a transgression whereby, in the words of Merleau-Ponty, 'the "touching subject" passes over to the rank of the touched, descends into the things' (1998/1964, p. 169).

While the merits and flaws of Merleau-Ponty's project deserve attention in their own right,[4] of interest here is what his project seeks to do. In Merleau-Ponty we find an encroachment and infringement between subject and object, inside and outside, seer and seen. This challenges the neat binary logic of the Cartesian mind-body, or subject-object, dichotomy. Whereas in the Cartesian model knowledge is possible through the radical separation of mind and physical body, for

Merleau-Ponty the opposite is the case: the sensible intertwines both see-er and seen, subject and object. For Merleau-Ponty, it is the embodiment of the subject, its belonging to the sensible, which facilitates, rather than obstructs, knowing. This is not knowing achieved from the 'outside', as it were, but from being both inside and outside: by being constituted—like everything else—by that which, in Merleau-Ponty's words, 'I do not form, [but] which forms me' (1998/1945, p. 173).

Significantly, if knowing is embodied, then this becomes crucial for understanding how the world, that is, things, people, cultures etc, are constituted, and becomes a key task of phenomenology. In contrast to the Cartesian model, phenomenology can be understood as engaging with the 'animated' body, or with the mind-body as integrated whole (see Zaner, 1964).

Below we examine in more detail the implications of a phenomenology of embodiment, but first it is interesting to note the support for an ontology such as Merleau-Ponty's within recent developments in neuroscience. In what has been described by Fritjof Capra in *The Hidden Connections* (2003) as the first scientific theory that overcomes the Cartesian division between mind and matter, the Santiago Theory of Cognition questions the idea of the mind, cognition and the brain as synonymous. Instead, mental activity is treated as coextensive with the interactions of all living organisms with their environment. According to this theory, cognition is immanent to matter, or the biological, cellular, processes of living systems. In Capra's words:

> In this new view, cognition involves the entire process of life—including perception, emotion and behaviour—and does not even necessarily require a brain and a nervous system. (Capra, 2003, p. 30)

The Santiago Theory of Cognition treats mind and matter as inextricably connected where, significantly, mental activity is characterised as a process rather than a thing—as in the Cartesian model. The cogitative processes of the mind are understood as occurring within the entire organism, not just the brain, which is treated as one—albeit complex—site of mental activity. While the brain is essential for consciousness, by not reducing mental activity to a singular organ—the brain—consciousness can be considered without the binary logic of the mind/body dichotomy. It is possible to begin to think of the mind as extending throughout the body and beyond.

The account of embodiment merely glimpsed here through Merleau-Ponty and Capra re-situates the human subject as an inextricable part of the world rather than a detached observer, reflecting on the world from 'outside', as it were. Tantalizingly, it appears that rather than being understood strictly as properties of either the mind or the body, intelligence and physical extension have the potential to be understood as qualities that are shared in an integration of mind and body. How does this help us in our move from a decontextualised account of knowledge to embodied knowing? Most clearly, the situatedness, or context, of the knower not only becomes a factor that cannot be dismissed or ignored in knowledge claims, but becomes the condition for knowing *per se*. Objectivity, in any absolute sense, becomes untenable. Moreover, perception alone is not enough for knowing, which

depends on language for signification, but knowing is situated within the perceiving, context oriented and orienting, body.

Indeed, for Heidegger (1993/1978, 1996/1927) and Gadamer (1989/1960), being situated implies taking a position or adopting a particular perspective. This is not only unavoidable; it is also that which makes meaning—and meaning making—possible. This notion is known as the 'hermeneutic circle' of interpretation. The idea is that understanding is never presumptionless in that our approach to questions or problems is always informed by cultural and historical factors which influence the kinds of questions we ask and what we take to be problems (see Scott and Usher (1996) in regard to educational research).[5] Understanding, according to this model, is always partial and incomplete, but is not already-constituted and predetermined.

Knowing through the body makes the kind of certainty that Descartes craved impossible. As Brian Massumi highlights in *Parables for the Virtual* (2002), a defining feature of the body is change. The transformative nature of embodiment must be essential to an account of embodied knowing.

Rather than fully develop such an account here, however, our concern is with what a notion such as embodied knowing has to offer for understanding the experience of online learning. Are online learning environments conducive to embodied knowing? Alternatively, does the ostensible absence of the body in online environments reinforce conventional learning models, and therefore Cartesian epistemological and ontological paradigms?

Delimiting Terminology

Prior to exploring these questions, we specify the terminology used in the remainder of this paper. In the literature, terms such as new technologies, digital technologies, and information and communication technologies (ICTs) are widely used. The learning environments that are of interest in this paper are referred to in the literature as both virtual and online. In line with other commentators (Borradori, 2003; Ihde, 2002; Massumi, 2002), we are critical of equating the digital with the virtual, as though what we are presented with through digital technologies can be reduced to a simulacrum of a non-digital 'real world'. Instead, we see virtuality as a dimension of human experience, more broadly, in that 'the real' cannot be reduced merely to that which is actualised, as is often assumed. Potentiality is as much part of the 'real' as actuality. In an effort to avoid confusion we use the term 'online' learning environments in this paper, except when referring explicitly to notions of 'virtual reality' in contrast to 'reality'.

Our discussion concerns those recently developed digital technologies that are used for communicating and accessing or interacting with information for educational purposes. For instance, we include databases accessed through the internet, web-based platforms (e.g., Blackboard and WebCT), blogs (i.e. online logs), digital packages (e.g. those using CD-roms, multimedia and/or simulations), synchronous (e.g. chat groups and conferencing systems) and asynchronous interaction among students and teachers (e.g. email exchanges, online hypertext systems, or wiki, and

discussion lists). As these examples suggest, we include a variety of digital media and online environments that are used for the purpose of supporting student learning. Our concern is not to explore differences among them, but to deal with issues relating to online learning at a more general level. (For discussion of students' responses to various technologies used for educational purposes see Barraket *et al.*, 2000 and Goodyear *et al.*, 2001.)

More specifically, the context of our discussion is online learning in higher education, which is mediated by information and communication technologies. We acknowledge that some higher education courses are offered entirely online, while an increasing number are in 'blended' mode, incorporating both face-to-face and online interaction. Our interest in online environments in this paper relates to the light that might be thrown on embodied knowing in higher education programs through an exploration of learning online.

Below, we analyse and reflect upon some current uses of ICTs in higher education programs against the background of our notion of embodied knowing. More specifically, we identify ways in which content and methods continue to be decontextualised in much of the literature that addresses online learning.

Current Use of New Technologies in Higher Education

Given the notion of embodied knowing outlined above, a question can be raised about the extent to which online learning environments present a break with conventional higher education programs. In recent literature on learning in online environments, claims made about conditions for learning are also valid for learning in other environments. For example, Marion Coomey and John Stephenson (2001) reviewed 100 research reports and journal articles published between 1998 and 2000 on web-based online learning. They identified four features of online learning essential to good practice, as follows: incorporation of dialogue; active involvement of learners with learning materials or activities; provision of support; and enabling learners to take appropriate control over their learning. These conditions for promoting learning are similar to those identified in much recent literature on learning in environments that are not online (e.g. Brockbank & McGill, 1998; Brown & Glasner, 1999; Ramsden, 2003; Walker, 2001), as Coomey and Stephenson acknowledge.

While some conditions for learning are valid across learning environments, there are also parallels between desired approaches to teaching. For instance, Geraldine Torrisi-Steele (2002) argues that a desired approach to integrating ICTs 'does not focus primarily on technology but instead directs focus on learner needs, discipline requirements, learning outcomes and reflection on teaching practices'. Such an approach is consistent with the research literature relating to learning environments that do not necessarily involve ICTs (e.g. Brockbank & McGill, 1998; Brown & Glasner, 1999; Ramsden, 2003; Walker, 2001).

As well as similarities in conditions for learning and productive teaching approaches, principles and methods for evaluating teaching and courses are also largely similar across learning environments. Gregory Jackson (1990) points out

that one of the few differences in methods used in evaluating the use of ICTs is the capacity to keep unobtrusive and even anonymous records of how students use them. He points out, however, that such records of activity indicate only how technologies are used, not explanations of such activity. Interpreting activity records of this kind would require interrogating them in terms of their contribution to situated accounts of what students are doing and the purpose of those activities, as perceived by the students.

In contrast to similarities across learning environments, claims are made in the literature about increased effectiveness of online environments for promoting learning. Where such claims are made, however, there is frequently confusion with changes to pedagogy. In a review of studies about online learning, Barry Jackson and Kyriaki Anagnostopoulou point out that 'where effectiveness is demonstrated, it can often be attributed to a pedagogical improvement rather than to the use of the technology itself' (2001, p. 61). As the emergence of new ICTs is coincident with challenges to conventional pedagogies (Alexander and Boud, 2001), there is ample opportunity to confuse the two. Peter Goodyear (1999) argues that one of the difficulties of assigning credit for improvements in learning relates to the lack of a clear pedagogical framework in many attempts at innovation involving ICTs.

Not only are claims made that ICTs improve learning, but also that they have the potential to transform teaching and learning (e.g. Laurillard, 2002a,b; Noss & Pachler, 1999; Torrisi-Steele, 2002). The latter claim has largely not been borne out in practice to date. For instance, Shirley Alexander and David Boud (2001) point out that 'much of the early use of the Internet in teaching has been to automate existing practices in a way that appears up-to-date but which is essentially a more time-consuming and expensive way of reproducing existing (and often ineffective) practices' (p. 5). They give the example of 'online learning' that consists of delivering lectures in the form of text, audio and/or video. In a similar vein, Flew argues, as follows:

> ICTs are least likely to enhance educational quality if they are conceived of as 'bolt-ons' to existing practice, based upon low-cost 'shovelware', or the migration without modification of existing print-based materials to the online environment. … Even flexible delivery has typically involved the use of technology to improve access or enhance the quality of existing learning materials, rather than the development of what Tony Bates (1997) has termed distributed learning environments. (Flew, 2002, p. 167)

Rather than transforming teaching or learning, such practices simply extend the decontextualised nature of conventional programs into the realm of online environments. Flew proposes that new technologies being used for educational purposes be evaluated according to the 'Five Ps' of: practical issues, such as, costs, benefits, and access; pedagogical issues; policy issues, such as accreditation, quality assurance, and consumer protection; personal issues, such as appropriateness of ICT use for learning goals; and philosophical issues, such as the role of the university.

Furthermore, and despite claims to the contrary, there is no evidence that ICTs are driving the substantial shifts in pedagogy reported in the research literature

(e.g., in Brown & Glasner, 1999; Walker, 2001). For instance, in the early 1970s Donald Bligh (1971, 2000) challenged the prevalence of conventional lectures in higher education. Bligh's work has been influential in directing attention to the need for learners to actively engage with what they are learning. Subsequent challenges to conventional pedagogies were associated with a crisis of confidence in higher education, which Donald Schön (1983, 1987, 1995) and Alexander and Boud (2001) have highlighted. Responding to this crisis, Barnett (1997) has issued a call to re-construct university teaching according to a critical action agenda. These moves towards transforming pedagogies extend well beyond ICTs, as does our own argument for enhancing embodied knowing in higher education programs.

Instead, it could be argued that it is not ICTs that are bringing about transformations in teaching, but teachers responding to new challenges in enhancing student learning. These challenges include, but are not limited to, opportunities to use ICTs to promote learning and to enable students to learn about their use. After reviewing some of the research literature about online learning, Jackson and Anagnostopoulou conclude, as follows: 'The potential for rich learning experiences online is mostly exploited by teachers whose conceptions of learning and teaching predispose them to consider deeply and continuously the needs of the learners in any situation, regardless of technology' (2001, p. 61). In other words, informed teachers are finding creative ways of using technology to enhance learning among students, rather than technology transforming teachers. This conclusion is consistent with past experience of technology use in higher education, even prior to the emergence of digital technologies. When providing rich learning experiences that are mediated by technology, teachers employ technologies in achieving certain aims for particular students in specific circumstances. These teachers embed or situate the use of the technology within a specific learning context (at least at the level of the course or program, if not always within the broader world of the learner).

Consistent with our argument above, Diana Laurillard (2002b) identifies a need to embed technologies within the educational purposes and activities to which they can contribute, when she considers the limited impact of ICTs in higher education to date:

> Educational technologies, especially new ones, demand effort and ingenuity in the development of materials, but rarely is this extended to the embedding of those materials in their educational niche. This is one of the key reasons why they have made relatively little impact in higher education, despite their potential. (Laurillard, 2002b, p. 199)

Laurillard is critical of a focus on the technologies themselves rather than promoting learning among students, which characterises much of the use of ICTs in higher education contexts. She argues that 'design has to be generated from the learning objectives and the aspirations of the course, rather than from the capabilities of the technology' (2002a, p. 22). While this point may appear to be stating the obvious when technologies are used for educational purposes, it is all too often overlooked. Some examples of design that focus on student learning are outlined by Laurillard (2002a,b) and by Robin Mason (2001). Where design falls short of

such a focus, the use of ICTs is decontextualised from the enhancement of specific kinds of student learning in particular contexts and, thereby, simply extends conventional learning and pedagogies into online environments.

In underlining the need to re-direct focus from technologies themselves to learning through technologies, Alexander and Boud (2001) argue that the current higher education context and usage of ICTs do, indeed, primarily extend rather than transform conventional pedagogies. They point out that the emergence of new ICTs is coincident with both a crisis of confidence in conventional forms of education and an expansion of higher and continuing education in a context of inadequate resources. They note that ICTs have been hailed as providing solutions to many of the challenges arising from the current higher education context. Flew cautions, as follows:

> … although new media technologies and the knowledge-based economy are linked to the increased use of ICTs in educational service delivery, the use of ICTs should not be seen as synonymous with making education and training more responsive to students' needs, nor should it be seen as a 'silver bullet' able to address every problem and challenge of higher education in the twenty-first century. (2002, p. 162)

One such challenge relates to reaching more students more economically. Torrisi-Steele warns that 'significant institutional and social pressures to adopt new technologies exacerbate superficial, inappropriate use of technologies in learning environments' (2002, p. 2). As Alexander and Boud argue, 'there is a vital role for pedagogy that is in danger of being neglected in the rush to make all things possible in the open environment of the Internet' (2001, p. 14).

In contrast to an emerging emphasis on the centrality of pedagogy for promoting learning, there is a trend to regard students as mere consumers of knowledge. In the latter case, ICTs are seen as enabling individual students to manage their own learning. For instance, Coomey and Stephenson optimistically propose that 'online learning may be the means by which managing one's own learning becomes a common feature of all undergraduate experience' (2001, p. 49; see also Stephenson, 2001). While there is a sense in which students in higher education organise their efforts to learn, learning cannot be reduced to such a consumerist and disembodied notion. Meaning making and the associated production of knowledge are essential features of meaningful learning. Regarding learning merely as something to be managed overlooks its potentially transformative nature, whereby learners engage with, and embody, what they learn.

Furthermore, a notion of managing learning gives rise to a question about how balance is to be achieved between providing direction for learners and openness to their learning paths. Obtaining access to some form of direction and rigour is presumably one reason that some students enrol in higher education programs, rather than learn on their own. In the case of professional education programs, such direction and rigour are considered essential to the development of high quality professionals. There also appears to be a contradiction between claims about students managing their learning and demands being made internationally

for greater accountability and a heightened focus on performativity. Increased accountability and performativity requirements typically entail more precise specification of outcomes and processes, rather than management of learning by individual students. While we may take issue with aspects of these increasingly intrusive requirements, the notion of learner-managed learning falls short of dealing with them at all. More importantly, this notion fails to address the question of how learning is to become embodied, rather than simply 'managed.'

While analysis of affordances or opportunities promoted by ICTs can be useful, ambitious and far-reaching claims about online learning often overlook the complexity and impact of students' perceptions of online learning opportunities in specific contexts and for particular purposes. (See Jackson & Anagnostopoulou, 2001, for an example of such complexity.) In other words, such claims tend to decontextualise technologies from their use by students and teachers in achieving certain ends. Furthermore, such claims underestimate the significance of transforming embodied understanding of teaching and learning if substantial changes are to be achieved in teaching practice[6] and in improvements to learning.

With Alexander and Boud, we argue that the context surrounding the emergence of ICTs has major significance for patterns of usage in higher education. Consistent with our argument throughout this paper, we see the usage of ICTs as situated within webs of social practices, such as those in higher education, which, in turn, are embedded within broader social, historical and cultural contexts. Flew identifies some 'drivers of change' in higher education, as follows:

> … the shift from elite to mass higher education; changing learning profiles and expectations; the move to lifelong learning and 'portfolio' careers; flexible learning; rethinking pedagogy around student-centred learning; cost pressures on the higher education sector; the transformation of educational media with the use of ICTs; the renewed stress upon creativity in the knowledge economy, and its implications for the learning process; globalisation; and new education providers, such as for-profit universities and the specialist corporate providers. (Flew, 2002, p. 163)

These, and other, forms of change impact upon ways in which ICTs are taken up, or resisted, in teaching and learning contexts.

As we elaborate below, technologies are not neutral instruments, but offer affordances or openings for certain kinds of activities. In contrast, in much of the online learning literature, ICTs are largely treated as methods that are decontextualised from the learning contexts in which they could productively form a part, as well as from the broader contexts in which they are embedded. Consistent with some previous literature (e.g. Alexander & Boud, 2001; Laurillard, 2002a,b; Torrisi-Steele, 2002), we see a need to locate explorations of learning in online environments within the relevant educational contexts. In addition, we argue for investigating ways in which online environments open new avenues for enhancing forms of embodied knowing that are relevant to the contexts in which ICTs are employed.

While the use of ICTs may have the potential to transform certain teaching and learning practices, a question can be raised about the extent to which these

technologies will transform the inherent nature of teaching and learning *per se*. The teaching-learning relation is intersubjective and directed to achieving learning (Bengtsson, 1995; Dall'Alba & Sandberg, 1996; van Manen, 1977, 1991). It is unlikely these fundamental features of the relation will be changed through technology. The forms of expression that this relation takes, however, may change when mediated by technology. As Goodyear and colleagues argue:

> … The ways in which 'good teaching' is expressed may be very different in the two settings of face-to-face teaching and online teaching. This implies that a robust competence analysis needs to move down a further layer of detail, to capture the specific techniques that online teachers use to instantiate good teaching in the online environment. (Goodyear *et al.*, 2001, p. 71)

If technology is to facilitate change in certain teaching and learning practices, what might this change involve? How might this change contribute to promoting embodied knowing in higher education programs? As a background to exploring these questions, a framework is needed for investigating the relationships between technologies and those who use them in higher education contexts. When considering research and teaching teams across Europe who were working on online learning projects, Goodyear noted the consequences when such a framework was lacking. He observed that 'deep and unexplored philosophical differences within a team can lead to fatal divergence in the day-to-day operational work' (1999, p. 6), with important consequences for the outcomes of both student learning and research. This is one of the reasons a clarification of philosophical position of the kind we attempt in this paper has value for both practical activities in online environments and furthering our understanding of learning in those environments. Furthermore, clarification of this kind can provide new insights into enhancing embodied knowing in higher education programs, more generally.

   Below we outline our position on learning and technology, incorporating the notion of embodied knowing elaborated above. Against the background of our critical analysis of current uses of ICTs in higher education programs, we then outline some opportunities and limits when using ICTs in enhancing embodied knowing.

Embodied Knowing and Technology

As discussed above, we have drawn upon the phenomenological literature to inform a notion of embodied knowing. Embodied knowing foregrounds embodiment, rather than the intellect in isolation, in its critique of traditional, Cartesian ontology and epistemology. We also noted that the privileging of the disembodied intellect in the Cartesian model leads to an epistemological preoccupation with (a particular form of) knowledge where the body only figures as a necessary yet cumbersome intermediary. Now a further point needs to be made. Perception and the nature of experience, in the Cartesian model, are considered only in relation to their role in knowledge production (i.e. the role of the senses in 'transferring' information to

the brain). The focus on embodiment by thinkers from within the phenomenological tradition—for example Merleau-Ponty and Heidegger—challenges this. For these thinkers:

> … perception is *not* in the service of *knowledge* (or even, more generally, it does not merely or primarily yield information about the world's material structure); rather, *it is in the service of action*. That is to say, perceived objects *are what the body does or can do to them*. (Zaner, 1964, p. 246)

Attending to the perceiving-body turns attention within the phenomenological tradition away from propositional knowledge and belief to praxis. Acting and doing are the primary modalities of the perceiving body. This insight has led to an interest within the phenomenological tradition with human—object relations, that is, the relation or interface between hand and tool, human and machine/artefact.

In Heidegger's early work, such as *Being and Time* (1996/1927), this interest emerges through a critique of the prioritisation of theoretical modes of understanding over the subject's practical or everyday interaction with the entities, objects and things that are encountered in the world. The primary way that things are encountered, according to Heidegger, is as instruments or obstructions to our projects and goals, rather than as objects of theoretical analysis (which Descartes' deduction assumed).[7] When I go to make a cup of tea, for example, the tea, cup, kettle, etc are absorbed into my project of tea making. The teacup is no longer a separate entity and becomes an extension of my hand. It is only if I can't find the kettle or the cup breaks that I may become overtly conscious of these things as objects, or as abstractable from an ordinary context as elements of tea making. Merleau-Ponty (1962/1945) also explored the way that ostensibly separate entities become embodied within one's own body through ordinary, or everyday, practices—a blind person's cane, for example. A parallel can also be drawn with the extension of the 'user' that occurs through ICTs for the purposes of learning, in contrast to a focus on the technologies in isolation.

In Heidegger's later work his attention turns toward what Don Ihde calls the 'human—technology relations' that emerge through modern technologies. In an essay entitled 'The Question Concerning Technology' (in 1993/1978), Heidegger's critique of modern technology centres on the ontological insight that the way that being—or what is—is understood in the modern age has become technological. It is technological in the sense that the modern way of thinking (borrowed ultimately from Nietzsche) treats things (including ourselves) instrumentally, or calculatively, as resources to be used and disposed of within an all-encompassing logic of efficiency and control. This instrumental way of thinking, or of framing the world, is particularly evident in the design and use of modern technologies (for instance, Fordism and the battery chicken farm, as well as the education system). Heidegger's critique helps us to recognise that technologies are not merely neutral or docile tools, malleable to the intentions of the 'user'. Rather, through their design and application, technologies embody and promulgate particular ways of framing the world, thereby promoting particular ways of being and relations between ourselves and things.

Not surprisingly, Heidegger's critique of modern technology has been taken up within contemporary debates on learning and the internet, particularly through the work of Hubert Dreyfus (1996, 2001) and others (see Thomson, 2001, and Peters, 2003). Dreyfus uses Heidegger's insights to evaluate the kind of learning practices promoted by new technologies, for example, the way that writing practices are transformed along with technological developments. Where Heidegger was concerned by the separation of hand and pen introduced by the typewriter, Dreyfus is troubled by the way modern word processors enable what is written to be constantly written over, thereby promoting flexibility over decisiveness. Dreyfus is also concerned about the learning practices promoted by the internet. In particular, he sees the hyperlink and lack of hierarchy as promoting 'unfettered' exploration, encouraging eclecticism over careful selection and refinement.

We believe the work of Ihde (1991 & 2002) is more promising for furthering understanding of the impact of ICTs on learning, despite the fact that the role of ICTs in learning is not addressed explicitly in his work (see Barnacle, 2003). The benefit of Ihde's approach is that he utilizes phenomenological insights regarding embodiment and human—technology relations but is more open to the potential of such relations than others working in the same tradition, such as Dreyfus.

Ihde, like others in the phenomenological tradition, foregrounds the phenomenological insight that 'bodily perceptions can be embodied through instruments' (2002, p. xvi), thus enabling perception to be understood as extending the body into the world. Along with other thinkers perhaps not associated with phenomenology (such as Haraway, 1991, and Latour, 1999), Ihde has a longstanding interest in the role of instruments, and instrumentation, within cultural practices, particularly modern science. This interest has turned his attention toward the way that one's sense of embodiment is transformed through the extension of the body that is granted within sophisticated modern technologies, such as magnetic resonance imaging devices (MRIs), electro-telescopes, and the internet.

Ihde explores the way that the digital environments of new ICTs transform conventional spatio-temporal locatedness and interpersonal relations, enabling simulacrums of 'real', face-to-face, encounters through technologically generated events. He notes, however, that despite much of the hype around virtual reality, the environments they offer remain largely bi-dimensional, consisting of audiovisual media but lacking in other dimensions of tactile experience, such as smell and touch. For Ihde, the idea that 'virtual reality' is superior or may one day replace 'reality' speaks more of the Cartesian legacies within our own techno-fantasies than of the potential of technologies themselves. He rejects such thinking for retaining the 'now outdated seventeenth-century epistemology that does not recognize embodiment or performance of the production of knowledge' (Ihde, 2002, p. 128). In understanding the impact and role of technologies it is inadequate to think of ourselves merely as 'users'. Instead, we need to foreground relationality—the relation between a knowing, acting, and perceiving subject and an artefact. Our engagement with technologies, that is, is always already embodied.

Moreover, body and tool, human and machine, each mediate the other, and this informs the way we understand the world and the things we do. In Ihde's words:

> Technologies do not determine directions in any hard sense. ... While humans using technologies enter into interactive situations whenever they use even the simplest technology—and thus humans use and are used by that technology, and all such relations are interactive—the possible uses are always ambiguous and multistable. (Ihde, 2002, p. 131)

Technologies orient our behaviour and practices, but they are not all determining. So while the word processor does indeed transform writing practices, the transformation is not simply an imposition. Rather, the transformation occurs through the mediated relation between 'user' and machine, where the parameters and potentials of both are transformed (although not necessarily symmetrically). For Ihde, the effect is not necessarily either beneficial or destructive as opportunities are both revealed and concealed through human-technology relations. The impact of technologies, therefore, is neither singular nor predictable as their performance also reconstitutes our own desires and actions. (For an interesting example in relation to mobile phones see Arnold, 2003.)

The key import of Ihde's approach, therefore, is that human-technology relations have to be understood as just that: a relation. This approach transforms the knowing subject from 'present to itself' (Descartes' I think therefore I am) to an in-between condition; that which emerges through relation (and, therefore, as always becoming other). Embodied knowing is inherently multistable, thereby lacking in singularity, because it emerges in the action of relations. Importantly, therefore, human-technology relations occur as a two-way exchange that can manifest in multiple and manifold ways, the complexity and ambiguity of which defies singular determination.

This insight has relevance for ways in which ICTs might be employed in higher education and, in particular, for their use in enhancing embodied knowing. Below we discuss human-technology relations within higher education programs. In particular, we outline new opportunities provided by ICTs, as well as some limits on their usage. There is a need for further research, however, to identify the kinds of practices emerging from various human-technology relations within educational settings.

Opportunities and Limits of ICTs in Higher Education Programs

What are some of the ways that ICTs are impacting upon and transforming the learning experience in courses or programs offered by higher education institutions? As noted above, the literature on online learning demonstrates there are many similarities in teaching and learning across learning environments. In addition, much of what is currently done with ICTs has been occurring previously in higher education contexts in other forms. At the same time, ICTs are opening new opportunities in higher education, although their potential is arguably not yet being fulfilled (Alexander & Boud, 2001; Laurillard, 2002a,b).

Below we outline some of the opportunities being offered through the use of ICTs, as well as identifying some limits on their usage in higher education programs. In doing so, we draw upon the preceding analysis of embodied knowing,

technology, and learning in higher education contexts. In particular, we incorporate notions of: human-technology relations, including their multiple and potentially ambiguous manifestations; extending the body through technologies; situating students and technologies within specific teaching-learning contexts; opening new worlds through technologies; the (dis)embodied nature of learning in higher education; and the significance of embodied understanding of teaching and learning for use of ICTs in educational settings.

In online, face-to-face, and blended environments the presence of teachers and learners takes somewhat different forms. In many situations, teachers are more limited during online interaction in the extent to which they can perceive students' reactions or difficulties that are not made explicit (for example, see McConnell, 2000, ch. 6). On the other hand, some teachers are not alert to such reactions or difficulties even when students are present in the same location. The presence of teachers and other learners as a form of readily available resource or support differs both within and across learning environments. As a result, opportunities for extending the body through technologies can have direct relevance for the kinds of presence that are possible. The forms of presence that are relevant across learning environments and their impact upon ways in which both teachers and learners experience the learning that occurs would be a potentially fruitful area for research. For instance, Norm Friesen (2002) provides an account of how presence and embodiment can be experienced in an online course in a way that brings to the fore some opportunities and limits of the human-technology relation in question.

Some students value a face-to-face component in their courses for educational and/or social reasons. For example, some students who relocate to study and many on-campus international students see the opportunity to interact with local students in person during classes as part of a broader experience of a new location or host country. Retention rates for on-campus when compared with external students suggest face-to-face contact assists some students with their studies. In addition, Flew (2002) points out that recognition of the importance of 'soft skills', such as communication and teamwork, in the knowledge-based economy is prompting renewed emphasis on face-to-face contact in some institutions. On the other hand, online access may provide the opportunity for some students to participate in higher education, for example, full-time employees, those caring for young children or other dependents, and people for whom geographical location is a barrier.

While communication between students and teachers is as old as education itself, ICTs have opened new avenues for communication (to the dismay of some teachers overwhelmed by countless email messages from students awaiting a rapid response). These technologies allow additional forms of communication among learners and teachers that can complement, or provide an alternative to, face-to-face contact. Guidelines clarifying the availability of differing forms of communication in a course or program are necessary to avoid a mismatch of expectations.

ICTs can also facilitate communication of both academic and social character among students. In this way, access to ICTs can improve communication for students studying externally, but also for internal students who cannot readily meet face-to-face outside classes. As financial pressures and other commitments require

that many students engage in paid employment or other activities in parallel with their studies, opportunities to meet in person may not be readily available. Synchronous and/or asynchronous communication online can contribute both to maintaining contact and exchanges about what is being learned. Through transforming spatio-temporal locatedness and interpersonal relations in these ways, access to ICTs can enrich the higher education experience for students. The contribution of ICTs to the nature of the higher education experience is an area in which research is largely lacking to date.

The transformation of spatio-temporal locatedness and interpersonal relations through ICTs also has other pedagogical implications. For instance, synchronous communication online may promote spontaneity and decisiveness over thoughtfulness and reflection, while the reverse may be the case for asynchronous communication that is used accordingly, provided momentum is maintained. In these ways, technologies may encourage particular ways of knowing and acting, while making others less salient. An awareness of the kind of learning that is promoted through the use of ICTs in particular contexts is necessary to informed pedagogy. Research directed to exploring human-technology relations and the associated impact on learning would be invaluable to an informed pedagogy.

Following arguments made about a potential for increased democratic participation through digital technologies, such as the internet and the world wide web (Rheingold, 1994), it has been proposed that online environments can promote the 'sharing of power' (McConnell, 1999, p. 237) between teachers and students. McConnell gives an example of collaborative self, peer and tutor assessment to illustrate such power sharing. While ICTs can be used to facilitate collaboration, especially for students who are geographically isolated, democratic teaching-learning relationships are possible across all learning environments. (See, Gonzalez, 2001, for an example in an on-campus course.)

As a communication medium, ICTs present a paradox in offering a form of anonymity when compared with communicating face-to-face, while at the same time potentially reducing some of the anonymity of being one in a sea of faces in large classes. Although there is an apparent disembodiment associated with communicating online, this form of communication may contribute to both enabling and situating interaction among students and teachers in particular contexts. The significance of ICTs for situating students in (or presenting barriers to) particular teaching/learning contexts could be an area for informative research.

It is possible to foresee potential positive and negative consequences of the relative anonymity of communication that is mediated by ICTs. On one hand, communication might become less personable and even more readily offensive, as is sometimes evident in chat groups. On the other hand, online communication may reduce some of the preconceptions or prejudices that place limits on learners and their learning. However, the importance of facility with a shared language and the predominance of text-based formats may introduce other prejudices. It cannot be assumed, though, that communicating via ICTs necessarily presents obstacles when compared with face-to-face communication. This is because some students communicate more fluently in writing than orally, including students with particular

disabilities and some students using a foreign or second language. The significance of the form of anonymity that ICTs may offer is an area that could benefit from further empirical research. An exploration of the extent to which digitally mediated inter- actions are experienced as (dis)embodied could form part of such a research agenda.

As ICTs allow interaction to be incorporated into learning activities despite students' geographical location, these technologies can provide opportunities for changing the nature of external (and also internal) studies. This means enhanced opportunities for cooperative or collaborative learning, particularly for students studying externally but also for internal students. Jan van den Branden (2001) gives some examples of how ICTs can be used to promote collaboration among students located in different countries, although not without some difficulties and limitations. These technologies have the potential to facilitate collaboration across borders of various kinds if they are used in culturally sensitive ways. Such collab- oration can entail challenges arising from cultural and linguistic differences, which are typically integral to exposure to substantially different perspectives. Meeting such challenges can be both a cost and benefit of exposure to other perspectives. The ways in which new worlds are opened for the learner through the use of ICTs is a potential research area that has largely been overlooked.

In enhancing collaboration across borders, ICTs have the potential to substan- tially increase the diversity of the student group for programs that are offered externally, with associated challenges for both teachers and fellow students. ICTs may also increase the diversity of student groups studying face-to-face or in blended modes. As information about programs on offer is more accessible than was previously the case, increasingly mobile students can locate courses and programs of interest.

The use of ICTs facilitates or obstructs not only communication among students and teachers, but also the provision of information. As the body is extended through technology, students and teachers can 'reach' other locations in space and time. While internet searches open potentially unlimited sources of information, typically this information is relatively unstructured and may be of uncertain status. Associated difficulties are becoming 'lost in cyberspace' while attempting to locate information of interest, as well as attempting to reach websites that are no longer functional. In contrast, books, journals, library catalogues, and similar sources provide information that is usually clearly structured and of more readily identifi- able status, although they, too, may be missing from the library.

Targeted searches of a broad range of information sources are possible through the use of ICTs, providing powerful mechanisms for obtaining particular information. The skills required in using ICTs for search purposes differ somewhat from those demanded in locating information by other means. In online searches, filtering and sorting are often likely to take precedence over locating and identifying infor- mation. In educational contexts, these differences have implications for designing learning activities and materials, as well as providing advice and support to students.

The predominantly visual format of ICTs can also be expected to influence the ways in which these technologies are employed and how they contribute to student learning. The dominance of the visual in online learning environments may reinforce a mistaken form of disembodiment, for example, the idea that looking is not touching.

As Grosz suggests below, however, the inauguration of visual pre-eminence occurred well before the advent of the internet and other new ICTs:

> Cyberspace has become embodied in the screen not accidentally or contingently but because of the visualized nature of our culture and its prevailing pleasures. The technology predicated on an economy of watching has been pervasive for at least a century. (Grosz, 2001, p. 23)

The predominance of visual formats in online learning environments presents specific challenges, and potential barriers, for students with some visual impairments. However, most face-to-face and blended courses in higher education also rely heavily on text-based materials. For students with particular visual impairments, the difficulties may be exacerbated in online environments.

On the other hand, for students with disabilities that restrict their mobility, online learning may be the only realistic means by which they can participate in higher education courses and programs. Online learning environments can open new worlds to these students. Other difficulties can arise, however, for those students with impaired motor skills, such as those who are unable to use a keyboard. While technologies are available to reduce some of these difficulties, access to them may be an additional limiting factor.

Potential contributions of ICTs to learning, as outlined above, are dependent upon reliable access and support in using these technologies (Barraket *et al.*, 2000). Such access and support is not the norm for scores of (potential) students and teachers in many countries around the globe. Presumptions of technological ubiquity and neutrality also tend to ignore gender issues (Grosz, 1995; Haraway, 1991; Ihde, 2002). Even assuming access to ICTs, hardware and software compatibility problems or other technical difficulties can present potentially insurmountable hurdles in some instances. This is not to deny the role technologies might play, but simply to recognise that many of the ambitious claims made about ICTs and online learning environments are only relevant for some students and teachers in particular contexts, if they apply at all.

Availability and access to ICTs are no guarantee that either teachers or students will grasp the opportunities that are available and harness them for productive ends. Whether or not unique achievements are made through the use of ICTs will depend upon the purposes for which they are employed, ways in which they are used, and the extent to which they are integrated into specific educational contexts. In turn, the broader context—at institutional, national, and international levels— promotes or discourages particular forms of technology use. Similarly, the embodied understanding of teaching, learning, and ICTs among the teachers and students who use them will have significance for ways in which these technologies are used. Empirical research that insightfully situates specific technology use within local and broader contexts would make a valuable contribution to an understanding of the contribution of employing new technologies in higher education.

An implication of the points made above is that both teachers and students need to be educated and supported in the use of new ICTs for educational purposes. The availability of these technologies provides one opportunity among many for

re-thinking teaching and learning. A parallel challenge is to harness the facility with, and enthusiasm for, new technologies that many (especially younger) students demonstrate (e.g. see Crook & Barrowcliff, 2001), while remaining sensitive to the discomfort and resistance that others may experience. As in the past, there are no clear and unequivocal solutions to the range of challenges that emerge in educational settings. Not surprisingly, the complexity of human interaction and efforts to learn are played out across learning environments.

Conclusion

This paper sought to provide a theoretical investigation of embodiment from a phenomenological perspective, as it relates to learning in online environments. We have sought to demonstrate the need to foreground issues of embodiment in efforts to evaluate and understand the role of ICTs in learning. We have argued, in line with various thinkers from the phenomenological tradition, for the need to challenge simple dichotomies between mind / body and human / machine, focusing instead on the interface, or relation, between such elements. The way that bodily perceptions, particularly sight and hearing, are facilitated through modern technologies is such that the instruments and machines that we use cannot be treated simply as 'tools', or as objects *for* consciousness. Since perception is aided, enhanced or even obstructed by technologies, ICTs are not merely objects of inquiry. Instead, they become the means of inquiry: technologies become an extension of us. Perceptions are embodied through instruments, artefacts and the like, from the pen and the keyboard through to complex imaging and audio devices.

A central argument of this paper, therefore, has been that human-technology relations within online learning environments need to be examined through a frame of performativity. What are the ways, paradoxical or otherwise, that the performance of technologies and learners is transformed or re-oriented through coming into relation? How does this inform what and how we learn? We have explored some of the ways that ICTs are impacting upon and transforming the learning experience in courses or programs offered by higher education institutions. Further insights are required, however, through additional empirical research.

Following from the argument above, a key question that emerges for educators is how to promote embodied knowing in online learning contexts. One strategy that might be envisaged—mistakenly in our view—is that of incorporating additional non-visual elements into curriculum design in an attempt to emulate ordinary multi-sensory experience, for example. Nor should the focus be on attempting to replicate social or cultural contexts on-line. A key issue is not so much 're-embodying' the learner in relation to new ICTs, because the learner, indeed any 'user' of technological devices (and therefore everyone), is already embodied. Instead, the issue is recognition and design: recognising the nature of human-technology relations in the design of learning activities and models. Rather than treating technologies as neutral tools, awareness is required of the practices that are both encouraged and delimited by their use, and thereby the ways of being, and of framing the world, that emerge.

When we think of ourselves as detached 'users' of technologies we fail to realise the extent to which we are also 'used by' them, as well as the extent to which the boundaries between ourselves and artefacts collapse and intermingle. This recognition and, by extension, consideration of how technologies orient and change how and what we learn, needs to be incorporated into pedagogical models. A key issue is acquainting teachers and learners with their own embodiment and technology relations and, thereby, promoting recognition that knowing, acting and being are integrated. By recognising this integration, the account of embodied knowing we have put forward foregrounds the way that worlds open up through the mind-body / machine nexus. The potency of technologies—their power to orient our behaviour in potentially negative as well as positive ways—makes recognition of the integration of knowing, acting and being in relation to the use of new ICTs a particularly salient issue for higher education.

Acknowledgements

Notes

1. Lave reminds us that efforts to decontextualise knowledge and skills in this manner are also a form of social practice.
2. Dall'Alba and Sandberg (1996) outline some guidelines and principles for curriculum design that are in line with the proposal made here.
3. It may be important to point out here that we do not advocate a form of social engineering in which all 'products' of a higher education program should, or could, be identical. Rather, by virtue of the fact that they are educational enterprises, such programs promote—directly or indirectly—particular ways of acting and being. As these programs have an educative role, the development of appropriate ways of being and of acting is, arguably, defensible.
4. For a critical account of Merleau-Ponty's phenomenology of the body see Zaner, 1964.
5. A full account of the hermeneutic model must also include the special role of language as 'world revealing' and therefore contributing to meaning and knowing.
6. Laurillard (2002a,b), Torrisi-Steele (2002), and Jackon and Anagnostopoulou (2001) also argue for the need to transform understanding of teaching and learning, albeit from a somewhat different theoretical perspective.
7. It is of interest here to note the connection Moran points to between theoretical ways of knowing and the visual; the often misguided idea that through observation we do not 'interact' with things, as if: 'Sight stands at a distance and seeing does not tamper with the thing seen' (2000, p. 233).

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