

When performance is the product: problems in the analysis of on-line distance education¹

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ABSTRACT This is a background paper about frozen ideologies in education. It arises from two projects in the field of ICT and instructional design. One project is in the area of folkbildning (liberal adult education), the other is in the area of online assessment. Two specific ideas generate the substance of the paper: (a) that means can be separated from ends (or processes from products); and (b) that learning is merely a process of knowledge acquisition. The contrary positions, also discussed, are that processes can also be ends, and that learning can also be a side-effect of doing. Using ideas from economic history, theories of practice, systems theory, theories of knowledge acquisition, constructivism and discourse analysis, this paper summarises how two frozen ideologies have been defrosted and repackaged in an analyses of on-line conversation.

KEY TERMS: knowledge, elearning, adult education, distance education, constructivism, assessment, dialogue

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Obviously, before launching the Educational Media Task Force, responsible...[European Commission] bodies had not opted for an unambiguous new educational philosophy.

Educational technology participates in the cultural context and is as much a part of the learning problems to be identified as it is of the solutions to be implemented.

(Bélisle, Rawlings, & van Seventer, 2001, pp. 16 & 25)

"The Act is TRUTH. Nothing that was ever recorded is truth. Nothing that was ever said is truth. Only the ACT." This is the best definition that I am aware of for performance art.

(Jack Bowman, retrieved 19th November 2002 from <http://www.bright.net/~dapoets/performa.htm>)

We began preparing this paper in December 2002. The deadline for proposals had past; Christmas was approaching; and the outside temperature in Umeå was below freezing. December, therefore, is a good time to defrost the domestic freezer and repack its contents.

This paper serves a analogous purpose. It unpacks educational ideas that, following the Swedish historian of ideas, Sven-Erik Liedman, we characterise as 'frozen' educational ideologies.

A frozen ideology unconsciously influences those who work in universities, through the way that groundrules are established, judgments are made, teaching is enacted and research is organised. (Liedman, 1997, p. 216, our translation)

Two specific ideologies provide the focus for this paper. First, that means can be separated from ends (or processes from products); and secondly, that learning is merely a process of knowledge acquisition. The contrary positions, also discussed, are that processes can also be ends and that learning can also be a 'side-effect of doing' (Lindström, quoted in Linderöth, 2002, p. 253).

The need to unpack these various positions has arisen in two projects in the field of ICT and instructional design. One project is in the area of folkbildning (liberal adult education), the other is in the area of online assessment. Both of these projects share an interest in learning and, in particular, the relationship between learning and on-line conversation. The folkbildning project focuses on the *transformation* of conversation as it goes on-line; while the assessment project is concerned with the *development* of on-line conversation as a form of instructional feedback. Further information on these projects can be found, respectively, at <http://www.pedag.umu.se/forskning/projekt/> and www.onlineassessment.nu .

Both projects, however, have a common problem. If conversations are an exchange of meaning, how can they be regarded as outcomes, products or, in Bringslish (Brussels-English), as 'deliverables'? In posing this problem, we follow Crook & Light (2002). On-line conversation, they suggest, is an 'activity in context'. It is a performance that 'radically re-mediate' earlier, face-to-face practices. Such 'human activity', therefore, cannot be 'decoupled' from the artefacts, technologies, symbol systems, institutional structures, and other cultural paraphernalia within which it is constituted (p. 156, emphasis added).

Is it possible to decouple 'activity in context' and represent it as an 'outcome' in the dissemination activities or final reports of the Umeå projects? Should we freeze conversations in the form of audio-visual DVDs? Or is this reductionism a betrayal of the TRUTH (cf. Bowman's epigraph)? Or, from a scientific perspective, is the commodification of knowledge an attempt to relaunch the meaning-less Anglo-American behaviourism, empiricism and logical positivism that lost its market appeal in the 1970s?

Finally, as scientist-developers we face a further dissemination problem. Is the freezing of conversations enough? Does it satisfy the modernist expectation that research outcomes should include context-free generalisations (i.e. *laws*) applicable in other situations? Or, in the case of a *development* project, does it satisfy the modernist expectation that outcomes should include culture-free products that can be *marketed* in the global economy?

To solve these problems, we have turned to economic history, theories of practice, systems theory, theories of knowledge acquisition, constructivism and discourse analysis. This paper summarises how we have defrosted two frozen ideologies and repackaged them in our analysis of on-line conversation.

Industrialising the Learning Society

The dis-association of processes from products - or means from ends - has a long history in education. It is discussed by Aristotle, in his *Nicomachean Ethics* written around 320BC. Saugstad identifies this (dis)association in the following words: 'Today knowledge is understood primarily as a product, as something you have (principally on paper or in a computer)'. In turn, she relates the subsequent separation of processes from products with the decoupling - or alienation - of human activity. Aristotle did not make this separation. Rather, Saugstad suggests, he perceived knowledge as 'a competence, as something you are or something you do' (2002, p. 378).

One current manifestation of the decoupling of human activity is the notion that technology is merely a delivery system for knowledge produced elsewhere. To this extent, the history of educational technology is implicated in the history of control engineering - the organisation of delivery systems. Early chapters in this history include F. W. Taylor's reorganisation of iron mills in Pennsylvania, USA and the introduction of moving production lines into the Ford Motor Company before the First World War. New delivery-, steering- or drive-systems were developed to increase production. Taylor described these procedures in terms of '[work]shop' or 'scientific' management (Taylor, 1947), while later commentators described these developments as taylorism or fordism. Subsequent chapters in this history of production engineering include the genesis of *Operations Research* (OR) during the Second World War; the creation of *Total Quality Management* after the Second World War; and the establishment of the *New Public Management*, a post-keynesian innovation, in the 1980s.

New Public Management introduced industrial and commercial thinking into one of the largest public sectors: education. Its international impact on education took three forms: (1) the promulgation of theories about education and economic performance by the Organisation

for Economic Cooperation and Development (OECD); (2) the re-engineering and re-tooling of education systems along lines endorsed by the OECD; and (3) the development of cross-national testing programmes to assess this 'reinvention' of production (Power, 1999, p. 41; see also Bonnet, 2002 and Lohmann, 2002).

As indicated, re-engineering included a feedback component, in the form of auditing or quality assurance procedures. This shift in educational production highlighted the importance of outputs. The current Chancellor of the Swedish Universities, Sigbrit Franke noted this new development in the early 1990s. She claimed that while behaviourist or empiricist models of evaluation had given way to more 'process oriented models in the 70s', the fortunes of *product* evaluation 'revived in the late 80s and 90s' (quoted in Rekkedal, 2002, p. 35).

These late-twentieth century innovations consolidated the separation of process from product. Education practices were labelled using a vocabulary drawn from industrial production; and educational policy was infected with determinist and utopian assumptions about the advancement of social progress. New technologies would, in themselves, deliver a golden future. It is no accident, perhaps, that *Designing Tomorrow's Education* (2000), a report from the European Commission, had the subtitle: *Promoting innovation with new technologies*.

The implications of this decoupling of human activity from technology were profound. The worst case scenario was that teachers and teaching would disappear from 'tomorrow's education'. They would be replaced by 'technologically based learning environments' and a 'learning' rather than a 'teaching' paradigm (Bélisle, Rawlings, & van Seventer, 2001, p. 15). From this perspective, the *learning* (or *information*) society has a one-dimensional, technological foundation.

The association of re-engineering and auditing can be discerned in European Commission documents. The prioritisation of products is explicitly linked to auditing practices, for instance, in *eEurope 2005: an information society for all* (2002). Under the heading 'Benchmarking', it indicates that 'the rationale behind these indicators is to focus on output' and that outputs are 'the final objectives of policy, not the policy itself' (p. 19). Moreover, the same document even reduces processes to frozen products: 'the detailed analysis of good practice should result in templates or guidelines' (p. 18). One of the unintended consequences of the new public management is that the world of learning is further decoupled from the 'activity in context' of teachers and teaching.

Technology and Practice

The industrialisation or technologisation of the learning society is underpinned by a mythology of the *autonomous* and *disembodied* tool. A tool becomes autonomous when it can be used anywhere, anytime; and it becomes disembodied when its use does not require the mediation of a knowing user. The technologisation of the learning society assumes that learning environments are technical systems that deliver learning. By analogy with fast food, they deliver fast knowledge. The world of elearning, therefore, is reduced to the delivery of McKnowledge.

There is, however, a contrary perspective. Tools can also be seen as prostheses, extensions of the human hand and mind. Tool-based production is, therefore, a socio-cultural system. This feature of production engineering was highlighted more than 70 years ago when a Harvard Business School professor, Elton Mayo, studied social relations and industrial output at the General Electric Company's Hawthorne (Chicago) works between 1927-32. His key finding was that the social dimension of workplace activity also has a major impact on productivity.

Indeed, Mayo's insight launched the so-called 'human relations' school of business management.

The tension between technical and socio-cultural perspectives on delivery took a new turn about 20 years later: the word *medium* (plural *media*) was substituted for *tool*. This lexical innovation strengthened the sense of delivery as *transfer*. It was taken up in educational technology and in the Multimedia Unit of the Director General for Education and Culture - the Brussels agency that funds and supervises the Umeå project on internetbased assessment.

This new stance, that media are not so much delivery systems as communication systems, derives from communication theory and, in particular, the work of Claude Shannon published during the 1930s and 1940s in the *Bell System Technical Journal*. As Romiszowski suggests in *The Selection of Use of Instructional Media* (1988), Shannon's general idea was that communication is a linear, delivery process 'from some transmitting source (which maybe a human being or an inanimate object) to the receiver of the message (which in our case is the learner)' (Romiszowski, 1988, p. 8).

In fact, Shannon was aware of the tension between technical and cultural (or meaning-full) communication. On the one hand, he wrote:

The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have *meaning*; that is, they refer to or are correlated according to some system with certain physical or entities. (Shannon & Weaver, 1963, p. 3)

Yet, as an applied mathematician, Shannon discounted the problem of meaning: 'the *semantic* aspects of the communication', he wrote, 'are irrelevant to the engineering problem' (p.3, emphasis added). The problem of meaning, however, did not go away. By the 1980s, however, even Romiszowski acknowledged its existence. He was aware, for instance, of Marshall McLuhan's insight to the effect that 'the medium is the Message' (1964). Yet, Romiszowski seems to have held to Shannon's original engineering perspective:

in the context of education or training, we have ample evidence that it is the content and how it is transmitted that is the key factor in the communication/learning process. (1988, p.8).

Romiszowski, that is, held to the earlier view that instruction is a delivery system. It is, he claimed, a 'three-phase process of [1] establishing precise and useful objectives, [2] planning study methods and [3] testing them' (p.6, cf. Tyler, 1949).

Closed and Open Systems

In fact, Romiszowski's work seems to have taken another direction. He incorporated Norbert Wiener's new ideas about *Cybernetics* that had also come to prominence in the 1940s (Wiener's *Cybernetics: or, Control and Communication in the Animal and the Machine* was first published in 1948). Romiszowski's notion of an educational medium combined Shannon's model of linear communication with Wiener's insight that delivery (in humans, animals and machines) could also be analysed as a 'two-way communication system' (1988, p. 6; see also Noble, 1984, pp. 47-76). Further, such feed-forward and feed-back requires multiple channels. From an historical perspective, then, Shannon's *medium* became Wiener's *media*.

This cybernetic view influenced the European Commission. For instance, the Educational Multimedia Task Force, established in 1995, identified media with:

educational products or services which could be accessed via television sets or computers...*and offering a high level of interactivity'* (Bélisle, Rawlings, & van Seventer, 2001, p. 4, emphasis added).

Nevertheless, Shannon's ghost did not entirely disappear from the educational machine. His original work had not only posed the problem of meaning, it also identified another issue that, to this day, haunts communication theory: the problem of external sources of *noise* (or interference). High fidelity (i.e. faithful) communication requires that noise be reduced to a minimum. Romiszowski, for instance, recognised two general sources of noise. It originates from 'either party' (i.e. transmitter or receiver) or from an unknown number of 'external sources' (p. 5; see also, Juarrero, 1999). In practice, however, Romiszowski seems to have ignored the second source of noise, in much the same way that he discounted the importance of meaning.

At this point in the history of ICT, the late 1980s and early 1990s, Romiszowski and others (e.g. Laurillard, 2002/1993) followed Shannon and designed *closed* or, following the usage of Campbell & Stanley (1963), *quasi-closed* instructional systems, representing them as sets of activities linked by arrows (see also Romiszowski, 1987). This is a reductionist stance. If instructional systems are subject to external interference, they cannot be closed systems. Rather, they are *open*, living, socio-cultural systems (cf. von Bertalanffy, 1973). The proliferation of feed-forward and feed-back channels on the one hand, and the randomness of noise, on the other, creates new sets of circumstances. In turn, 'new tools' foster 'new pedagogical practices' (Bélisle, Rawlings, & van Seventer, 2001, p. 7) that revolve around noise control and the management of feedback. Put another way, instructional systems must be seen *in context* - as pedagogic (i.e. socio-cultural) systems.

In summary: the turbulence of the last 70 years has failed to create shared understandings about ICT. The field is a junkyard of discarded jargon, mantra and acronyms. Yet, somehow, salvation is always just beyond the horizon. This manic-depressive conjuncture, also known as 'policy hysteria' (Stronach & Morris, 1994), is illustrated, for instance, in the call for papers for the 2003 conference of the European Distance Education Network (EDEN):

elearning is perceived *either* as new ICT media *and* pedagogies making up the emergent flexible learning environments,

or as the new paradigm of knowledge acquisition with related competencies in the information society. (Listserve message, 11th December 2002, emphasis added)

The first - or depressive - part of this quotation looks back to the dualistic legacy of ICT (informatics/pedagogy); while the second part - the manic new paradigm - indicates a way forward towards the information society.

The same roller-coaster, mountain and valley scenario can also be seen in the Educational Media Task Force report. In the 1990s, 'Learning and *not* the curriculum *nor* the teaching activities' were to be the 'core element of all educational multimedia enterprises' (Bélisle, Rawlings, & van Seventer, 2001, p. 16, emphasis added).

Paradigms of Knowledge Acquisition

By the end of the 1990s, three ideas had come together: (1) the notion of delivery (taken from communication theory); (2) the significance of feedback in control systems (taken from cybernetics); and (3) the pervasive impact of socio-cultural 'noise' (also taken, ultimately, from communication theory).

A remarkable document, the European Commission's Educational Multimedia Task Force Report, embraces these developments. The significance of this document is four-fold. (1) It takes a self-critical and reflective stance (see epigraph: 'Obviously...') on elearning policy; (2) it recognises that educational technology is culturally embedded (see epigraph: 'educational technology participates...'); (3) it suggests that the learning society should be based on a constructivist view of learning, rather than a technological concept of delivery; and (4) it is the only EC document that we have been able to find which recognises that elearning can be steered by (at least) 'two approaches in learning theory' (p. 32) - *behaviourist* and *constructivist*.

The authors recognise that the initial integration of computers into teaching and learning followed a 'behaviourist approach'. Knowledge was seen as 'externally mediated information' which a teacher 'transmits to a learner'. At that time, learning was identified with 'acquiring existing knowledge'. Since the 1970s, however, a 'constructivist epistemology' has gradually become 'dominant', one that takes into account 'the complex cognitive processes which learning involves' (p. 33). The Report summarises these developments and, significantly we feel, links knowledge acquisition to multimedia, cybernetics and constructivism:

In the multimedia learning environments developed, technology was not only a means of transmitting and storing information but also, *if not mainly*, a means of facilitating interaction with information [cybernetics], that is, generative processing, relating new information to prior knowledge [constructivism], activating appropriate schemata, interpreting new information and inferring new knowledge. (p. 33, emphasis added)

The Task Force report also acknowledged the significance of internal and external noise. The unacknowledged significance of external noise, including the knowing user, is highlighted in its assertion that, hitherto, developing multimedia learning environments had been a 'technologically driven activity' where the 'main actors' - teachers, trainers and learners at all levels - were 'not really involved'. Accordingly, the Report suggested that the subsequent process of '*integrating* technology' into practice has proved more complex than '*developing* technology'. (p. 25, emphasis added).

The strongest EU expression on socio-cultural knowledge acquisition can be found in the 2002-2006 framework document for the Information Society Technologies Programme of the European Community (n.d.). Research in *Technology Enhanced Learning*, (the title of the document), should follow a strategy based on the '*inseparability* of pedagogy and technical and organisational aspects' of learning (emphasis added). A similar view is expressed in Priority 7 of the Sixth Framework Programme – 'Citizens and governance in a knowledge-based society':

Different manifestations of knowledge and its uses should be addressed from a multidisciplinary perspective, bringing together approaches which emphasise different aspects. These aspects are linked to information, belief, culture, norm, gender, rule, regulation, didactics and learning, opinion, rationality and its different manifestations in codified, tacit, narrative, embedded and embodied forms, and processes of individual, social, organisational and institutional action as well as individual and collective learning. (European Commission, 2002a, p. 4)

This is the same insight that has emerged in the Umeå projects - that a conversation is an 'activity in context'.

Constructing Inseparability

The Umeå folkbildning project attempts to study the integration of the communication inheritance of ICT with the pedagogic inheritance of more than 100 years of Scandinavian

adult education (Korsgaard, 2001). Likewise, the Internet-based Assessment (IBA) project has had to come to terms with the troubled history of testing (see Roos, 2003). In both cases, the pedagogic inheritance is prioritised. There is a shared assumption that the so-called medium (ICT) should be subordinate to the messages - or purposes - of adult education and educational assessment.

One perspective on this last problem is to see the Umeå projects in terms of three metaphors: *communication*, *participation* and *acquisition*. The communication metaphor reaches back to Shannon's insights of the 1930s and 40s; while the *participation* and *acquisition* metaphors came to prominence with the differentiation of constructivist and behaviourist conceptions of learning in the 1950s and 60s.

The key difference between the last two metaphors is that acquisition relates to knowledge while participation relates to knowing. Sfard elegantly elaborates this distinction. The acquisition metaphor:

Brings to mind the activity of accumulating material goods. The language of 'knowledge acquisition' and 'concept development' makes us think about the human mind as a container to be filled with certain materials and about the learner as becoming an owner of these materials. (1998, p.5)

The participation metaphor, on the other hand, is:

conceived as a process of becoming a member of a certain community. This entails, above all, the ability to communicate in the language of this community and act according to its particular norms. The norms themselves are to be negotiated in the process of consolidating the community. While the learners are newcomers and potential reformers of the practice, the teachers are the preservers of its continuity. (Sfard, 1998, p. 6)

These two perspectives can be reconciled, however, if knowledge acquisition is seen as an 'activity in context'. Learning is the acquisition of knowledge. Such knowledge is also embodied, possessed, even owned. But, as a commodity, the value of acquired knowledge depends upon its context of use. Pierre Bourdieu recognised this more than 30 years ago. His discussion of the 'mode d'acquisition et modalité de l'utilisation', with reference to 'l'inégale distribution entre les différents classes sociaux du *capital linguistique scolairement rentable*' accepted that knowledge or knowing valued in one context may have a different value in a contrary set of social relations (Bourdieu & Passeron, 1970, p. 144-5).

In an acquisition context, learning is a substantive, a noun as in 'I have learning'. In a participation context, however, learning is a verb, as in 'I am learning'. Participative learning, therefore, is endless. Like literacy or feminism, it is always 'in the making' (cf. Johns, 1998, hooks, 1984). It is a process of being and becoming. It takes place in a particular context and, since it is always 'in the making', it is directed towards future contexts (cf. Engeström's distinction between *action* and *activity*; in Engeström, Miettinen & Punamäki, 1999, *passim*).

The participation metaphor, therefore, supports a non-deterministic viewpoint. Technology does not create social change. Rather, human beings acquire knowledge through their engagement with learning environments that, in the broadest sense, are also educational technologies (for a general discussion of technology, see Nordkvelle, 2002). To return to the ideas of Taylor and Mayo, a learning environment is a delivery system. Knowing is a state of mind, 'something you are' that is manufactured (literally: hand-made) through the medium of both material (i.e. prosthetic) and socio-cultural (i.e. human) elements. For this reason, 'technology enhanced learning' necessarily assumes the inseparability of the pedagogical, organisational and technical aspects of teaching and learning.

This reconciled view of learning is summarised in the claim, made earlier, that learning is a side-effect of doing. It is further elaborated in Lave & Wenger's *Situated Learning: Legitimate peripheral participation* (1991). Learning, they suggest, is an 'integral constituent of 'engagement in social practice' (p. 35). It arises from activity which involves 'the whole person'; it takes place 'in and with the world'; and it is a social practice where the agent, activity and the world 'mutually constitute each other' (p.33).

Discourse as learning in the making

This attention to learning 'in the making', through 'engagement in social practice' is central to *folkbildning*, *flexible learning* and the *net university* in Sweden. In these contexts, the preferred social practice is conversational (*samtal* in Swedish, *conference* in early modern English). Indeed, the interactive basis of such learning is symbolised in the name of a web platform created for this purpose - *Ping Pong*.

When face to face conversation is transferred online (i.e face to *interface*), the simplest form of communication is univocal. It comprises message-posting in a conference milieu (see, for instance, Hamilton, Dahlgren, Hult & Söderström, 2002). Sometimes, however, message posting evokes a response. It becomes dialogic; and, to investigate this interaction, more complex forms of cybernetic, or discourse analysis are needed (cf. Söderström, Dahlgren, Hamilton & Hult, 2002).

Another approach to the analysis of interaction is to regard messages as 'utterances' - in the sense embraced by Mikhail Bakhtin. A conversation comprises utterances that, to varying degrees, respond to earlier utterances. Put another way, a conversation draws on a *heteroglossia*, a pool of different ideas that, when exchanged, foster learning. According to Bakhtin every utterance has a double significance. It is both univocal and dialogic. It is an expression of a 'unitary [common] language' used to conduct the conversation and, at the same time, it builds on the 'social and historical' differences embedded in the different voices that activate the heteroglossia (1981, p. 272).

Bakhtin's contemporary, Yuri Lotman, offered a similar analysis of conversation. He described conversations as multi-authored texts rather than as multi-voiced heteroglossia (see Bakhtin, 1994, for a discussion of Lotman). In a cultural system, he suggests, texts 'fulfill at least two basic functions: to convey meanings adequately, and to generate new meanings'. He continues:

The first function is fulfilled best when the codes of the speaker and the listener most completely coincide and, consequently, when the text has the maximum degree of univocality.

The second function, to generate new meanings, arises from the problems of noise or interference raised in the earlier work of Shannon:

A text ceases to be a passive link in conveying some constant information between input (sender) and output (receiver). Whereas in the first case a difference between the message at the input and that at the output of an information circuit can occur only as a result of a defect in the communication channel and is to be attributed to the technical imperfections of this system, in the second case such a difference is the very essence of a text's function as a 'thinking device'. What from the first standpoint is a defect, from the second is a norm, and vice versa. Of course, the mechanism of a text must be organised differently in the second case. (Lotman, 1988, pp. 34, 36-37)

Combining Shannon and Lotman, an educational conversation is a noisy thinking device. It is a social practice that makes possible the distribution and re-distribution of knowing. Each utterance is both a performance and the product of an earlier performance. Performance and product come together. Their combination, in conversation, provides new opportunities for students to participate in knowing (or learning) and to acquire knowledge (or learning). At the same time, this unity of knowing and knowledge, learning (as a verb) and learning (as a noun) gives teachers, like all educational technologists, the opportunity to reflect on learning environments as both texts and thinking devices.

Summary and Conclusions

This conference paper explores epistemological tensions that have arisen in the work of two research and development projects that focus on elearning. In general, tensions arose in the attempt to reconcile project aspirations with frozen educational ideologies that occur in the intellectual baggage of ICT. These tensions include the separation of means from ends and the separation of the act of knowing from the acquisition of knowledge. The reconciliation of these problems is possible, however, if teaching and learning are regarded as socio-cultural processes where human conversation builds on the mediation of knowing users - teachers as well as learners.

The analysis in this paper, like all acts of knowing, is unfinished. It has been difficult to research the historical transition from IT to ICT, and to appreciate the differences between informatics and pedagogics. Likewise, it has been difficult to trace documents that illustrate these changes in the European Commission's policies and programmes. Many policy documents are available on-line, and listed in appendix A of the Commission's staff working paper: *elearning: Designing tomorrow's education* (European Commission, 2002b). Yet, it is still difficult to clarify which programmes generated the documents, which documents have been seminal or, indeed, whether there is a common EU perspective on elearning as the reconciliation of communication, acquisition and participation.

Two further problems relate to the rhetorical form of this paper. Much attention has been given to the educational use of metaphors taken from industrial production. Such a strategy, like treating knowledge as a 'product', may raise 'more questions than it solves':

Although universities are undoubtedly involved in some kind of production, the nature or essence of what they produce can at best be expressed metaphorically; from this it follows that it is difficult to evaluate such an enigmatic product, and equally difficult to optimise its production, the technology of which is far from clear. (Czarniawska & Genell, 2002, pp. 456-457)

A further problem with the rhetoric (i.e. plausibility) of this argument is that it only runs to 6000 words. The problem, however, is not that data or ideas may have been ignored but, rather, that these omissions have also shaped the form - or performance - of the argument in this paper. Despite Bowman, the ACT may not be the TRUTH. For example, it has not been possible to compare the 1993 and 2002 editions of Diana Laurillard's *Rethinking University Teaching*. In the second edition, she combines a (quasi)-closed model of informatics with an open model of education. Did she, for example, hold the same view in 1993?

Finally, there are many lines of inquiry that are untouched in this paper. If 'technology enhanced learning' is inseparable from the pedagogical, technical and organisational aspects of instruction, how does the argument of this paper apply to earlier historical epochs (e.g. the invention of the alphabet, zero, or moveable-type printing)? And in what sense is it reasonable to describe the advent of ICT as a revolution - an issue raised, like the problem of

the 'downturns in the ICT sector', in the EU Working Paper (European Commission, 2002b, p. 5; see also Grafton, 2002)?

From a socio-cultural perspective, technology has always been part of the problem *and* part of the solution. Or, as Marshall McLuhan chose to describe the process/product enigma: 'the content of a medium is always another medium' (1964/1997 p. 151).

Note: The following work appeared after this paper had been drafted. It also focuses on the analysis of conversation: Olga Dysthe (ed.) (2003). *Dialog, Samspel och Lärande*[*Dialogue, Interplay and Learning*]. Lund: Studentlitteratur.

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