RUNNING HEAD: ETHICS AND THE TECHNOLOGIES OF EMPIRE

Ethics and the Technologies of Empire: E-Learning and the US Military

Dr. Norm Friesen
Canada Research Chair in E-Learning Practices
Thompson Rivers University
Box 3010, 900 McGill Rd.
V2C 5N3, Canada
Phone: 250 852-6256
Fax: 250 828 5328
nfriesen@tru.ca

Keywords: instructional technology, instructional design, military, politics, ethics, critical theory of technology

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Abstract

Instructional technology, and the cognitivist and systems paradigms that underpin it, grew out of the military-industrial complex during the Cold War. Much as the Pentagon and this military complex defined the architecture of the Internet, they also essentially created, ex nihilo, the fields of instructional technology and instructional design. The results of the ongoing dominance or influence of the Pentagon in these specific disciplines have been traced in research that appeared during the final phases of the Cold War. But this research has not been updated to reflect circumstances now most definitive of the post-Cold War world: the rapid development of Internet infrastructures and applications, and the aggressive expansion of US military spending and activity. Tracing the imprint left by the US military on instructional technology and design, this paper considers how this influence may now extend, like the Internet itself, into schools and the university. It will conclude by stressing that the end of the Cold War, along with more recent developments concerning the US military, presents a juncture offering both opportunity and challenge to the evolving field of educational technology or "e-learning."

1. Introduction

In the late fall of 2004 and early winter of 2005, the University of Toronto's world-renown Institute for Knowledge Innovation and Technology (I-KIT) became known not so much as a site of research as the locus of politically-charged conflict. According to community activist groups, what was at issue was nothing less than the "militarization of the University of Toronto" itself. At the centre of the controversy was I-KIT's plan to have the Canadian Department of National Defense (DND) and the American-based military contractor, Atlantis Systems International (ASI) join their publicly-funded education research project entitled "Beyond Best Practice: Research-Based Innovation in learning and knowledge work." ASI provides training and services used in the maintenance of military aircraft such as the F-15 Eagle, F/A-18 Hornet, and Black Hawk helicopters which are being used in the Iraq War and elsewhere. I-KIT's publicly-supported research project, allegedly the most generously funded of its kind in Canada, focused on the development of advanced "technology and instruments" to be used in "knowledge work in many different sectors," including training, business, and in research and development themselves. If successful, the benefits of such research to training and development in high-tech industries would be obvious. As a spokesperson for ASI explained, the research partnership between this military contractor and the I-KIT group:

> will help build new capabilities for the company in the areas of cognitive-based learning, e-learning, knowledge building, and research and development… Building our knowledge in these areas will provide recurring revenue opportunities for our company and create added value for our customers by allowing us to apply these capabilities to our existing products and services. It also paves the way for our entry into other markets. (as quoted by CIARS/OISE-UT, 2005)

The director of I-KIT and the principal investigator in the research, Dr. Marlene Scardamalia, and her colleague Carl Bereiter, met with those opposed to the involvement of ASI and the DND in the research project. Scardamalia and Bereiter stated first that their research was intended "for peace, democratization and providing access to citizens" (CIARS/OISE-UT, 2005). These e-learning researchers were reported as further defending their position by asking about the relationship of commonplace technologies to the military, and about the ethical questions that such technologies might raise for their users: "Why do we use the Internet" they were reported as asking, when, after all, "it is made and used by the military?" Scardamalia and Bereiter could have well asked about other technologies, familiar in education, that also have their origin in the military. These include innovations such as "overhead projectors, language[-learning] laboratories, instructional films, [and] instructional television…." As Douglas Noble explains in his book *Classroom Arsenal*, these technologies, too, have their origin in efforts of the US military and its industrial complex in support of military training (Noble, 1991, p. 51).

Recent and ongoing political and military developments have made these kinds of ethically-charged questions concerning complicity and resistance of obvious relevance in both academic and high-tech sectors. A different but not unrelated example is provided by the American Psychological Association (APA), and its policy towards its members' participation in "enhanced interrogation" or psychological torture. This professional group, with close ties to both e-learning and the US military, initially ruled in 2005 that its members *could* assist in military interrogations, despite opposition on ethical grounds from many of its 148,000 members. After more than a two years of controversy (e.g. Eban, 2007), the APA followed the lead of comparable professional organizations (e.g. the American Medical Association and American Psychiatric Association) and finally "voted to ban its members from taking part in interrogations at the prison at Guantanamo Bay, Cuba, and other military detention sites" (Tanner, 2008).

The circumstances in the case of I-KIT and the APA point to a common question: How is it possible to understand the relationship between research and development (on the one hand) and the political and military developments that they enable, and from which research and development might benefit (on the other)? To return to the question posed by Scardamalia and Bereiter, and to focus this question specifically on the discipline of instructional design and technology or e-learning, one can ask: "What is the significance of the use of the Internet and other technologies of military origin in educational research and development? Are the military origins of these technologies and their use in e-learning entirely separate?"

These kinds of ethical questions have been considered earlier in the pages in *AI & Society* specifically in Douglas Noble's 1989 article, "Cockpit Cognition: Education, the Military, and Cognitive Engineering." In this article, Noble traces the influence of military priorities and paradigms in the application of computer technology and cognitive science to contemporaneous public education settings, and concludes rather forcefully that this influence is so pervasive as to present "a militarized debasement" of education, and a "massive [pseudo-] 'scientific' distraction" (Noble, 1989; 289). Many things have changed, however, in the military, in education, and in related technologies since Noble's analysis, with the effect of making these questions more urgent and complex. First, the contours of a new, *post*–Cold War military and strategic configuration have emerged—one in which aggressive military investment and action in the "global war on terror" are pivotal. At the same time, the reconfiguration of the Internet as a mass medium and the rapid growth of computer and network technologies in education have intervened, changing the landscape of the field in question.

The purpose of this paper is to address the questions framed above and considered by Noble specifically in the light of recent developments in politics, technology and in e-learning initiatives. It begins by considering the importance of the US military in the development of training technologies generally. It then introduces critical methodologies for tracing the influence of military priorities and paradigms in advanced technologies generally, and in e-learning systems in particular. Referring specifically to the discourses of the Cold War, the paper shows how technologically based metaphors in particular are expressed in politics and technological designs of the Cold War era, and how these designs are relevant to instructional technology and e-learning today. Finally, it examines the more recent history of U.S. military influence in training, and traces both material and metaphorical examples of this influence and its ethical implications in e-learning to the present day.

2. The Critical Theory of Technology

It is widely acknowledged, for example, that the fields of instructional technology and design as well as the systems and cognitivist paradigms that underpin them grew out of the military-industrial complex during the Cold War (e.g., De Vaney & Butler, 1996; Lachman, Lachman, & Butterfield, 1979). Also, much as the Pentagon and this military complex defined the architecture of the Internet, they also essentially created, almost ex nihilo, the fields of instructional technology and instructional design.

The reasons for the singular importance and influence of the American military in these fields are not complicated: The U.S. military currently maintains over 750 military bases around the world (Johnson, 2004, p. 288); its budget takes up more than half of the discretionary spending of the American federal government. The size of this budget is growing, with annual levels of spending having recently surpassed half a trillion dollars.

Given its cost and the sophistication of its systems and operations, it is no surprise that U.S. military spends more on training, education, and associated technologies than any other organization globally:

> Since the 1950s [the United States] has spent $150 to $250 million each year on research and development (R&D) in education, training, training devices, and simulators. It maintains what may be the largest, most extensive training operation in history[,] accompanied by what may be the largest, most extensive training research and development effort ever undertaken. It would be remarkable if all of this activity did not yield some techniques and technologies that are of general interest and applicability beyond the military. (Fletcher & Chatelier, 2000, p. 269)

It would be just as remarkable if these techniques and technologies, once more widely applied, did not bear some significant imprint of this influence. The challenge, of course, is to be able to trace this imprint, and provide some basis for establishing its absence or presence and understanding its ramifications. Such a challenge is central to the ethical questions at the core of this paper. For military technologies—like technologies generally—are not simply neutral in their application or effects. As Andrew Feenberg explains, dominant or hegemonic "values and interests are installed in the very design of rational procedures and machines" (Feenberg, 2002, p. 14-5). Feenberg uses the term "technical code" to designate this installation or "encoding" of values and interests in technology. These technical codes not only "express and prescribe certain hegemonic values" but are also often effectively invisible, generally appearing as normal and inevitable (Selfe, 1999). The form and function of a given technology, as Feenberg further emphasizes, is also *not* inevitable. Just as hegemonic values can be encoded into their design, so too can technical systems be "reconfigured," as Feenberg says, "to take into account a broader swath of human needs and capacities" (Feenberg, 2001, p. 188).

In fact, the more that technical designs are depicted as rational and neutral, the more they are to be suspected of harboring political interests, and particularly, the interests of specific social groups and classes. Quoting Herbert Marcuse, Feenberg explains that

> critical theory rejects the neutrality of technology and argues instead that "technological rationality has become political rationality." The values and interests of ruling classes and elites are installed in the very design of rational procedures and machines even before these are assigned a goal. (pp. 14–15)

In this sense, technology—despite the fact that it is often seen as purely rational and functional—can be said to embody ideology in tangible form. And this ideology is evident not only in its manifest physical design, but also in the networks of practices, discourses and even metaphors and figures of speech that emerge with these technologies.

However, Feenberg warns against a direct or unqualified equation of ideology with technology. Just as technology cannot be reduced to purified instrumental function or rationality, it also is not *simply* the arbitrary expression of political interests. Technologies are designed to accomplish a task, but in giving this task a technological definition and solution—and often, in creating further, unforeseen tasks and problems—technology is profoundly political. In this sense, these and other technologies present an inextricable mixture of both function and value: "The dominant form of technological rationality…stands at the *intersection* between ideology and technique where the two come together to control human beings and resources in conformity with [their] technical codes." (p. 15)

3. The Cold War and its Metaphors

Memories of everyday strategic and security concerns that were integral to the Cold War in the West are fading. Discussion of limited nuclear wars, of first-strike targets, of "survivability" in order to preserve "second-strike capabilities" at the time of the Cold War all labeled frighteningly plausible eventualities. But these terms and concerns have since been replaced or distorted in the light of very different geopolitical vocabularies and issues. For example, it is a commonly held view that the Internet was originally intended as a communications infrastructure capable of surviving a nuclear war. At the time of the Cold War, however, the idea of a decentralized, computerized communication system was actually developed out of elaborate hypothetical scenarios. The point was actually not to survive a nuclear war per se, but to *deter* a first strike by providing *evidence* of a communications infrastructure that could survive such a strike (Abbate, 1999). This infrastructure was developed to create the *perception* that massive second-strike retaliation would be possible by the United States, even if all other American infrastructure had been destroyed. The Internet, in other words, was not principally about robust communication itself. At its origin, it was instead primarily a *symbolic* technology, a *potential* strategic capability. Unlike similar network protocols and infrastructures (e.g., the X.25 or OSI protocol suite), it was not so much simply a question of its manifest use, or its actual merits or weaknesses. Instead, it was more a matter of a move in a game of military postures and probabilities. The strange and hermetic Cold War concerns that led to the Internet's conception may help explain a number of anomalous aspects of its subsequent development and utilization (e.g. its initial incubation in academic and other public institutions, and even its very openness, pliability and adaptability).

The way that the Cold War influence is traced in this paper is not primarily in terms of overt and direct linkages represented by causes and effects—although these do play a role. The question here is instead one of shared discourses, sets of assumptions, or even a shared political and cultural "world." The historical epoch of the Cold War (like any other historical period) can be said to bring with it a shared set of understandings, a common way of talking about and articulating issues and concerns, in both informal and more specialized terms.

One historian of science and technology, Paul N. Edwards, has identified a metaphor or rather, a "metaphorical constellation" that can be used to sum up the paranoid and hermetic ways of thinking characteristic of the Cold War (1997). This is the metaphor of the "closed world;" and at its centre, as Edwards explains, lies the technology of the computer:

> As machines, computers controlled vast systems of military technology central to the globalist aims and apocalyptic terms of Cold War foreign policy. First air defenses, then strategic early warning and nuclear response, and later the sophisticated tactical systems of the electronic battlefield grew from the control and communications capacities of information machines. As metaphors, such systems constituted a dome of global technological oversight, a closed world, within which every event was interpreted as part of a titanic struggle between the superpowers. …the key theme of closed-world discourse was global surveillance and control through high technology military power. Computers made the closed world work simultaneously as technology, as political system, and as ideological mirage. (p. 1)

The computer, in other words, provided systems and capabilities that were central to the Cold War, and in doing so, this technology enabled a number of broadly metaphorical ways of thinking and speaking about this world and its politics. Drawing from Edwards and other scholars of the Cold War, the principal characteristics of this metaphor—as well as further metaphors deriving from it—can be listed as follows:

1. Computer and computer networks enabled modeling of aspects of the world specifically as *closed systems*. This is exemplified in computer and other technologies used in systems of North American continental air defense: These systems integrated advanced radar, computers and aerial defense technologies in a kind of closed informational loop. “Closed systems” of these kinds are to be understood entirely on their own terms, without reference to outside or environmental factors. Edwards associates this notion of the closed system with the metaphor of the “world as closed system”—or simply, what he calls the “closed world” of the Cold War.
2. These closed computerized systems provided “centralized, instantaneous, automated command and control” over vast geographic regions (p. 15). Hierarchical military command was exercised in real time over these regions to control military forces and assets, leading to the belief that this kind of control could be could be applied in non-military areas as well. Military command, as Edwards explains, was conflated with total control (p. 15), resulting in the metaphorical equation of "command as control." When combined with a simplified morality of “good” versus “evil,” moreover, this emphasis on regional control fed Manichean fantasies of an apocalyptic, global struggle.
3. The presence and power of these technologically-advanced military systems encouraged the redefinition of political and military challenges specifically as

> tractable technical *problems.* This redefinition, in turn, led to the development of advanced, overarching and even "total" "technical-rational" solutions (p. 15) to these problems. In keeping with their exclusively technical nature, these solutions were understood in engineering terms of "uniformity," "metrics," "tolerance," and "standardization" (Noble, 1991, p. 30). the metaphor of "challenge-as-problem (and solution) then completes the metaphorical constellation of the Cold War closed world.

The degree to which these characteristics and metaphors are embedded in the thought and language of the Cold War is given dramatic illustration in the Strategic Defense Initiative (SDI) or Star Wars project initiated by Ronald Reagan in 1983, and still funded to this day. Famously framing the complexities of Cold War conflict in terms of a black and white struggle of good versus evil, of the free versus the communist world, Reagan called upon "the scientific community" of his day to undertake "a formidable, technical task." In his famous Star Wars speech, Reagan described this task as involving a decades-long "research and development program to *begin to* achieve [the] ultimate goal of eliminating the threat posed by strategic nuclear missiles" (Reagan, 1983; emphasis added). Reagan readily allowed that this ambitious undertaking would involve contemporaneous technologies of the greatest sophistication—implying standards and tolerances for materials and systems that remain unrealized today. Reagan asked his audience to imagine a massive scientific and technical enterprise that could only be justified in terms of an all-encompassing geopolitical solution:

> What if free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack, that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?

The realization of Reagan's vision would, of course, represent an overarching technological solution to an otherwise complex politico-historical situation. Also, issues of command and control play a central if not overt role in Reagan's vision: antiballistic defense requires exponentially more precision, speed, coordination, and control in systems of surveillance, response, and interception than previous systems and technologies of command and control. In addition, the solution proposed by Reagan would represent a kind of "trump card" in the hypothetical games of first strikes, survivability, and second-strike retaliation. In this way, Reagan's famous speech invokes, affirms, and builds on many of the metaphorical and discursive characteristics of the "closed world" of the Cold War, including the notion of war as a grand struggle to achieve total, hemisphere-wide command and control.

4. "Man-Computer Symbiosis"

Of all of the scientific and engineering challenges presented by SDI, and by the command and control technologies that preceded it, there is one that is emblematic of "closed world" metaphors generally, and relevant to e-learning in particular. This is the integration of users (or operators or decision makers) into enormously sophisticated and technical systems—systems that dwarf human capabilities in their scope, speed, and of course, destructive capabilities. This challenge and possible solutions to it have gradually crystallized around a particular set of issues or problems centered on the interface that connects human and machine. This is the problem of the "man/machine system." This issue has come in be relevant to instructional systems and design—and ultimately in e-learning—through the way it has been taken up in psychology, above all, in cognitive psychology. Speaking of events that started with U.S. involvement in the Second World War, one early introduction to cognitive psychology explains:

> Faced with the problem of war, psychologists [developed] a new view of man...the "man/machine system." This concept emphasized the functioning of the human being and the machine as an operating unit. [...] An important feature of the man/machine system concept was that the human operator served as an information transmitter and processing device interposed between his machine's displays and their controls. (Lachman, Lachman, & Butterfield, 1979, p. 58)

These same authors go on to emphasize that the process of "decision making" has been another "important feature" of this "new view of man." One military scientist, R.J.C. Licklider, has described the goal of such research and development as "man-computer symbiosis" (of course, the gender-exclusivity of this characterization and in those provided just above is not insignificant).

The challenges and solutions associated with the task of integrating human and machine, have a long and varied history. They begin with early cockpit designs and the Second World War anti-aircraft technologies, and they extend through the early warning systems of NORAD, and reappear in Reagan's Star Wars and advanced weapons systems of the present day (Mindell, 2002, pp. 310–322). In each case, the function of the "human operator" as a "processing device interposed between [a] machine's displays and [its] controls" is of central concern. Whether these displays and controls be a radar screen and a light-gun (as with aerial defense early in the Cold War), or a controller and a detailed video image (in human-directed smart bombs in both Iraq Wars), the underlying configuration is that of a system in which human and machine systems are coupled as "tightly" as possible: The human is situated as a critical processing component or at a decision point—for detecting enemy aircraft, launching and directing computerized weaponry, or pressing the proverbial "red button"—in a much larger and very sophisticated system of command and control.

The goal of connecting humans and computers in "symbiosis" acquires its specific relevance to e-learning through cognitive science. This is an area of research that connects the field of educational research in a fairly seamless way with the work of the military-industrial complex. "Cognitive science," as the *Stanford Encyclopedia of Philosophy* (2002) states, has as its "central hypothesis...that thinking can best be understood in terms of representational structures in the mind and computational procedures that operate on those structures." Cognitive science provides the terms needed to understand the human user as a specifically *computational* component "interposed" between a computer systems' input and output devices. Texts in e-learning, and in educational technology before it, invoke the discourse of the "dyadic" and "symbiotic" relationship of learner and computer in a manner remarkably reminiscent of language used by military researchers and historians like Licklider and Edwards. For example, the ideal of "human-computer symbiosis" is articulated in ongoing characterizations of computers as "cognitive technologies" (Jonassen, 2003; Pea, 1985), "cognitive tools"

(Lajoie, 2000) or “mindtools” (Jonassen et al., 1999). In these contexts, the computer is seen as forming a close “partnership” with the learner, allowing her to “share,” “extend,” and “amplify” her cognition (Jonassen, 2000). Characterizations of this kind continue to appear in the literature of e-learning to the present day (e.g., Keengwe, Onchwari, & Wachira, 2008; Dror & Harnad, 2008). A further, prominent example is provided by discussions in education and training of “computer-augmented cognition” (or “augcog”), implying an almost cyborg-like integration of human and computer capabilities and “components” (e.g., augmentedcognition.org).

It is also for this particular aspect of military influence that David Noble reserves his harshest words. He emphasizes how the military priorities underlying what he calls “cognitive engineering” have been introduced into educational research, development, and policy as a kind of “Trojan horse” dressed up as science. At the same time, however, it is worth noting that Noble’s critique is made *prior* to developments in both cognitivism generally and human-computer interaction, in particular that have led to a deemphasis on the direct comparability and potential symbiosis of human and computer. It is worth noting that these approaches are part of a growing emphasis on the situated, social, and embodied nature of human activity and computer use.

5. From Ada to ADL

Given the emphasis on the “closed world” solutions presented by the literal functions and the metaphorical potential of computer technology, it is hardly surprising to learn that late into the Cold War, more than $3 billion was being spent annually on software in the U.S. military. At the time, a problem was emerging in the process of software development: more than 450 programming languages were in use in projects and products across the military, resulting in a veritable “Tower of Babel” for software engineers. As a result, in 1974, the development and adoption of a common language for the U.S. military was proposed. In 1983, the language, called Ada (named after Ada Lovelace, the first programmer) became a national standard. By 1987, the U.S. Department of Defense issued the “Ada Mandate,” officially requiring the use of Ada for every new software project in the military. As the 1980s came to a close, the Department of Defense was attempting to foster nonmilitary commercial use of this language, and initiated an effort to establish its longer-term viability. But by the 1990s, its military use was abandoned altogether. As one military report explained, the rapid development of software technologies, combined with a recognition of the necessary plurality of software languages, led to the conclusion that the use of Ada solutions was “no longer the best approach in many [military] application areas” (CSTB, 1997, p. 2).

The lessons that the development, growth, and especially, the abandonment of Ada presented to the Department of Defense were significant. Above all, it also became clear that the military could not “go it alone” when it came to software development technologies and standards—however indispensable these were to command and control projects. It became clear that the Pentagon would have much to gain from active participation of nonmilitary sectors in the development and implementation of software solutions.

During the same year that overall support for the Ada language was withdrawn, the Department of Defense launched a project that reflected the lessons learned, but that was equally ambitious on its own terms. This was the Advanced Distributed Learning (ADL) initiative, whose far-reaching vision was and still is “to provide access to the highest-quality learning and performance aiding that can be tailored to individual needs and delivered cost-effectively, anytime and anywhere” (2007). Founded during the Clinton-Gore presidency, in the wake of the popular success of the Internet, ADL was envisioned as “a resource center that will promote the use of new training technologies across [all government] departments” (Weinstock, 2001). ADL would do this by working together with systems developers, academics, and government and military trainers to develop “a set of standards to help guide e-learning vendors, content providers and users” (Weinstock, 2001).

In terms of its most basic outlines, ADL is clearly illustrative of the “lessons” of Ada and the “Ada mandate.” Academics, developers and the private sector were encouraged to play an active role in its development, dissemination, use, and implementation. The ADL and the standards it was set to produce, moreover, were intended to serve *all* government departments, rather than being confined to the Pentagon.

Also, considered on its own terms, the ADL initiative shares many characteristics of the Cold War–closed world described above. This is the case in terms of both the discourse and the practical outlines of ADL. This begins with its mission (cited above), which is so broad and ambitious as to promise a revolution in human affairs. However, a number of recent accounts of the goals and intentions of the ADL go even further. They speak of how its systems and solutions hold out the promise of providing “a teacher” or a “personal learning associate” for “every learner” (Fletcher & Tobias, 2003, p. 29; Fletcher, Tobias, & Wisher, 2007), or even more grandly, “an Aristotle for every Alexander” (Fletcher, 2005, p. 23)—a wise personal tutor for even the most brilliant and audacious student or soldier. Like Reagan’s missile defense shield, ADL promises, in effect, a complete technological solution to the complex human “problems” presented by education and training. The discourse of a total solution to a technically-defined problem, initially applied to a Cold War situation, is directed to military training and education generally. The universality of this solution is further underscored by the claim that ADL is intended not only to meet the needs of the military and “to provide a model for all Federal Agencies” (Fletcher, 2006, p. 31), but to also be valuable in almost any educational context: “Its anytime, anywhere instructional goals include classrooms as well as workplaces, conference rooms, job sites, and homes” (p. 32). Finally, in at least figurative correspondence with SDI and other overarching solutions of the Cold War era, ADL’s goals are to be accomplished through a kind of pinpoint targeting of specific, individual needs and requirements:

> Each [individual user’s] interaction would be tailored, on-demand and in real time, to the outcome being sought, the learner’s level of knowledge, skill, and style of learning, and the instructional strategy that was indicated by instructional principles. (Fletcher, 2005)

“Learning” in the words of one striking discursive formulation, can be conceptualized “as a weapon system” (Baskin & Schneider, 2002): a set of problems to be tackled through advanced, large-scale and lightning-fast mechanisms of command and control.

A source for many of the most recent and strident claims on behalf of ADL is J.D. Fletcher, a research staff member at the Institute for Defense Analyses in Alexandria, Virginia. Fletcher sees ADL’s educational solutions as the culmination of a long history of developments in educational psychology and technology, from behaviorist computer based instruction through cognitivism and hypermedia. In forums as wide-ranging as the CIA (Fletcher & Johnston, 2007) and the American Educational Research Association (Fletcher, Tobias, & Wisher, 2007), Fletcher makes the case (referencing a carefully selected set of training statistics) that ADL is making a measurable and pivotal contribution to an epochal “revolution in learning” (2007).

In keeping with the technological determinism inherent in Cold War, closed-world discourse, this is a revolution that will be driven by inevitable technological developments, rather than by educational cultures, teachers, students, or trainees. Fletcher (2006) explains that this revolution is to be understood exclusively as a triumph of scientific, technical, and engineering capabilities:

> Basically we seek an engineering of instruction…. Such engineering would ensure that outcomes such as retention of skills and knowledge, application and transfer of learning, motivation to continue study, speed of response, accuracy of response, and so forth are reliably achieved by each learner to the maximum extent possible within the constraints imposed by instructional time and resources. (p. 44)

The myriad issues involved in any teaching and learning situation are defined here exclusively in terms of measurable variables for experimentation and control in science, or reduced to manipulable parameters for testing and optimization in engineering. As indicated above, this positivistic, scientific-experimental research emphasis represents yet another conspicuous characteristic shared by the discourses of the military and e-learning.

6. The ADL SCORM

During the first ten years of the ADL’s existence, these scientific, engineering, and technological developments have been focused on one particular set of solutions: the Shareable Courseware Object Reference Model (SCORM). In keeping with ADL’s vision and goals, the SCORM is defined as “a collection of [technical] standards and specifications adapted from multiple sources to provide a comprehensive suite of e-learning capabilities…” (ADL, 2007b). These technical specifications, currently seven in total (collected into three documents, each around 250 pages in length), dictate how learners’ interactions and competencies can be recorded; how “shareable content objects” (generally multimedia and interactive resources) are to be identified and described; how these content objects are grouped, sequenced, and transmitted; and finally how user interactions with these objects are recorded and shared. The intended end result of the SCORM and ADL models is illustrated in the diagram below.

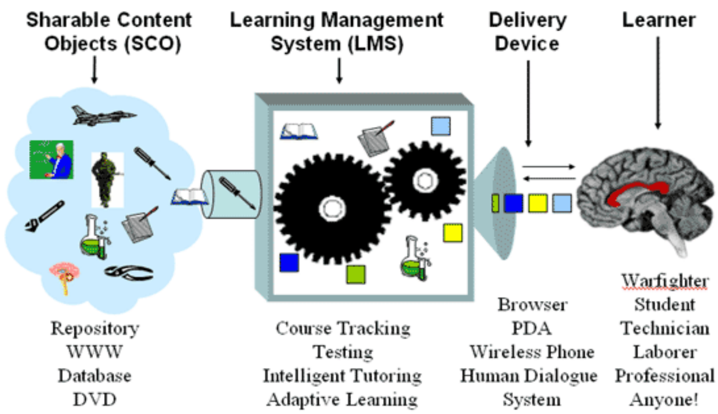

Figure 9.1: The ADL Model (Slosser, 2002, p. 4)

Besides its depiction of the main components and interrelationships of the SCORM solution (content objects, learning management system, delivery device, learner), this diagram illustrates the relentlessly reductionist orientation of this approach. The representation of the learner—"student, technician, laborer, professional, warfighter, anyone!"—as a mere organ is perhaps the strongest illustration of this. The human learner is depicted, in effect, as a specialized, functional component interposed in a much larger electronic system. In this case, the "human factor" interacts with a delivery device, which receives and feeds packages of content organized by a Learning Management System. As in the case of the human-machine conceptualizations in previous eras of military research and development, the interaction between the learner and processed content—the human-computer dyad constituted here by "delivery device" and "learner"—is a subject of considerable concern in SCORM as well. Indeed, Fletcher (2005) envisions the development of a new kind of "instructional grammar" for this interaction, enabling a coupling of human and computer in a manner that mimics the ease and fluency of "conversation": "…the ADL vision is that training, education, and performance aiding will take the form of human-computer…*conversations* tailored to each learner's or user's needs, skills, knowledge, abilities, and interests" (p. 4; emphasis in original). Fletcher goes on to characterize these conversational interactions in terms of a

> generative capability [that] requires the system to devise on demand—not draw from predicted and pre-stored formats—interactions with students. […] These interactions must be generated from information primitives using an 'instructional grammar' that is analogous to the deep structure grammar of linguistics." (p. 7)

The interactive responses of the learner in such an instructional conversation complete the circle: they are fed back into the system, and recorded down to the smallest detail, closing the systems-theoretical feedback loop in this configuration, forming a kind of "instructional" closed world. In this way, values and understandings associated with the closed world of the Cold War are effectively "encoded" in a grand vision for the educational application of computer and Internet technologies.

7. Conclusion: Learning as a Weapon System?

This short overview of military discourses and their relationship to those of e-learning and educational technology not only shows how closely this discourse is tied to the strategic interests of the U.S. military; it also intimates the ways in which these interests are encroaching—both in conceptual-metaphorical and material terms—into educational sectors. The material encroachment grows out of the need of the U.S. military for broad acceptance and implementation of its computer standards and frameworks. This finds its most concrete expression in the form of ADL "co-labs" and "partnership labs," which have been established in receptive American academic and corporate settings and nations: Australia, Canada, Great Britain, and South Korea. Central to the purposes of these labs is "the development and acceptance of global [i.e., SCORM-based] e-learning standards" (ADL, 2007a). One prominent and recent example of the systematic implementation of these standards is provided by the South Korean Cyber-Home Learning System. It is described as a national technology infrastructure program utilizing SCORM to furnish an "organic system of…resources that support independent study over the Internet that matches the learning level of each student" (Park, 2006, p. 6). Currently being used by 840,000 students in Korea, the program claims to be the "first e-Learning system to be distributed nationwide and applied to the K-12 areas" (Cho, 2006), and as Fletcher and others (2007) point out, the users of this system are employing thousands of "ADL instructional objects daily" (p. 98).

In considering the more general influence of ADL and SCORM, it is important to emphasize that the history of the support and maturation of the ADL initiative is a varied one. Judging by nature of recent ADL activity—and the tone and quantity of Fletcher's and others' recent publications (e.g., Brumfield, 2006)—this initiative appears to be currently launching what might be a last offensive to establish its standards and overall approach as *the* "global interoperability framework for technology-enabled learning, education and training" (Barr & Richards, 2007). In keeping with this universalist goal, ADL has recently proposed the formation of a consortium to undertake "stewardship" of SCORM standards, and to expand their support and adoption. Again it is Fletcher (2007), echoing concerns from the legacy of the Ada programming language, who provides a clear explanation as to why this is being done: to provide "help" to ADL, to enable the "learning enterprise to grow (in a way that helps us [i.e., the U.S. military])" and to "get to the future." Of course, the question is whether or not other educational sectors and stakeholders wish to "get to" the same future as the U.S. military, its contractors, and trainers. It is clear that ADL needs the larger e-learning community to sustain its vision. The question is: Does the e-learning community need it?

The metaphors and the discourse of the Cold War closed world are not difficult to recognize in the ADL's and others' descriptions of "total" scientific, technological solutions—solutions that, in effect, use the power of computers and networks to vanquish the "evils" of ignorance and inefficient learning. It is also not difficult to see how U.S. military thinking or values—for example, its prioritization of technological and engineering approaches, its emphasis on "absolute" solutions to human problems—are articulated as a kind of technical code in the standards and systems of SCORM and ADL. Not only do these standards and systems involve total, technical solutions to complex problems though high-tech command and control; they also include the extension of these solutions globally, ideally to all educational sectors.

Observations of these kinds make it possible to provide a kind of answer to the question that was posed earlier by e-learning researchers defending military involvements in their publicly-funded efforts: “Why [or on what ethical basis] do we use the Internet when it is made and used by the military?” In what way, in other words, does the Internet encode military values, and how is it possible to *avoid* the affirmation of these same values? This paper has shown that the imprint of military values on related technological designs and capabilities is clear if not entirely direct. On the one hand, the origins of the Internet as a kind of “hypothetical” or “symbolic” Cold War infrastructure are evident, perhaps ironically, in its very adaptability and flexibility. On the other hand, other aspects of the Cold War closed world are more directly evident in the military influence in particular adaptations and applications of this technology. An ethically-informed response to this situation would be one that, of course, that steers clear of the tendentious technocentricity particular to total, “closed world” solutions. In place of an exclusive emphasis on technical capabilities, such a response would involve a constructive awareness of the social, cultural and ideological dimensions of technological design and innovation. As shown briefly below, the outlines for such a response can be articulated in terms that are both principled and pragmatic.

Speaking pragmatically, it is fairly obvious that the expression of Cold War closed world values in e-learning programs and designs present significant practical problems. First, there is the question of economies of scale. As emphasized at the outset of this paper, the scale of the U.S. military and its investments in training and related technologies is unparalleled. Other, public education systems, meanwhile, are not only frequently underfunded, they are also generally constituted on local or regional levels (South Korea being a notable exception to this). The result is that the value and viability of a *global* educational framework or infrastructure are cast into serious doubt. Second, there is an important technical and engineering argument. Repeated failures in Artificial Intelligence (generally undertaken in the military-industrial complex over the course of the Cold War) have shown that the reproduction of human-like conversational (or instructional) interactions with current computer architectures is highly unlikely. What's more computer scientists have themselves said such goals represent an *unproductive research direction* (e.g., see Gams, Paprzyski, & Wu, 1997; Whitby, 1996). Related research has shown that languages and interactions cannot be reduced to “informational primitives” or “deep structures” as Fletcher and others would have it (e.g., Dreyfus, 1992). There is no “natural science” of micro-level (or even macro-level) educational action and interaction; and ongoing research has tended to confirm that these interactions are inextricably bound to elements like context and embodiment that resist quantification and formalization (e.g., Lave & Wenger, 1990; Varela, Thompson, & Rosch, 1991). Finally, and arguing more generally, the natural-scientific and techno-centric closed world articulated in ADL and the SCORM itself has a dubious historical record. It crystallized initially in order to defeat an “evil empire,” a geopolitical threat that no longer exists (or many would argue, never existed). Historical research shows that Cold War weaponry and ways of thinking contributed little to the eventual diminution of this threat, but instead, actually created new threats in Afghanistan, Iraq, and other geopolitical hotspots in which these same paradigms are again being anachronistically reapplied (Johnson, 2004).

Recent developments in psychology (e.g., Edwards, 1997), human-computer systems design (e.g., Suchman, 2007), technology studies (Hutchby, 2001), and other fields emphasize the irreducibly situated, discursive, embodied nature of human learning and activity in general. Ever since the publication of a number of seminal studies applying ethnographic and ethnomethodological methods to the study of learning (e.g., Lave, 1987) and technology use (e.g., Suchman, 1987), perspectives have been developed in both theory and practice that provide significant alternatives to the totalizing technocentricity of SCORM and ADL. Examples of such alternatives include work on new Web 2.0 “participatory technologies” and “cultures” (e.g., Jenkins et al, 2006), and in other researchon situated learning through the use of mobile telephone/communication devices (e.g., Raessens, 2007). In each case, processes of teaching and learning are *not* understood simply as technical problems in need of precision engineered solutions, but as an inextricable part of a changing political, historical and cultural situation. Research and practice of this kind can provide constructive, ethically-informed re-encoding of Internet and computing technologies that may have originally been developed for radically different purposes.

Despite the enormous and ongoing influence of the Pentagon on e-learning techniques and technologies, different directions in the future development of this field and others like it still seem possible. Just as the development of technologies and the values they encode and express is not inevitable, the development of e-learning as a field itself is not beyond reconsideration and redirection. This development can follow the hegemonic code that is articulated in grandiose technical frameworks, programs, and projections; or the technology can be recoded to work *against* ambitions of control and even empire, to address changing and heterogenous needs of education.

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