Total Educational Technology (TET): Challenging Current Limits

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In a cable from London just over a hundred years ago, Mark Twain remarked "reports of my death are greatly exaggerated." A similar thought comes to mind when reading David Mitchell's important perspective "The future of Educational Technology is Past." Mitchell (1989) argues that "educational technology has no future -because it is dead (though not yet buried)," although he concludes his discussion more optimistically wondering whether resurrection is possible. To make three valid points about the present status of educational technology (a systematic rather than systemic orientation, a narrow view of worthwhile educational problems, and need for a new research paradigm), he exaggerates his case.

MEANING IS IN THE USE

Mitchell's use of a "purple passage" as a literary device to gain attention for his position, although overstated, does little to diminish the substance of the main body of his thesis. Educational technology has, indeed, failed to realize its potential, and it has not emerged as "the central humane discipline of the future" (Richmond, 1967, p. 106). Probably it can never attain this goal. As Kenneth Richmond (1970) argued unceasingly, instrumentation changes means and ends.

Instrumentation alters orientation, techniques, and thelearning situation itself, often in unique and sometimes imperceptible ways. Each new invention or development extends the range of what can be achieved. It is a cumulative, yet dynamic process, that has shifted the onus for learning from teachers and educational technologists to learners in association with parents and employers. Also, it has extended the art and the range of what is necessary and possible. In this sense, educational technology has died. But is has died many times, and has always been reborn with enhanced potential for becoming a humane discipline.

Unfortunately, the cult of efficiency, with the growing subordination of education to inappropriate business goals, has often eroded the effectiveness of what educational technology can offer. Quality, which Mitchell fails to address, has too often been a low priority, at least in terms of identifying and then taking steps to meet or exceed our client's expectations. Even our client's identity has sometimes been obscure, and the idea of internal and external clients (customers) as well as end-users is novel to educational technologists.

To use a tag of Wittgenstein's (1958, p. 139), the meaning is in the use, and in educational technology, as Mitchell says, we have often failed to deliver our promise. In the formal literature of the profession, technologists define for each

other the nature of the field; in use they have conveyed a more limited meaning. Because of this failure, less has been expected. We have become complacent and less threatening to our colleagues in other areas, and we have been sucked into the main stream of the education machine.

In seeking to become more professional, we have lost our way. Mitchell is right when he refers to the three traps (compromised integrity, adherence to the status quo and solidification) which Beckwith (1988, p. 8) postulated that we needed to avoid, as symptoms of our present woe. Educational technology does not have the richness of meaning that it ought to have. It has acquired mechanistic, systematic, engineering nuances, that seem to deny our wider educational responsibility, There is an unfortunate void between our words and deeds, ideas and practice.

EDUCATIONAL TECHNOLOGISTS PART OF THE SOLUTION

Educational technologists have a bias for action, and this bias has, at times, caused us to lose track of our vision. Mitchell argues that "Educational technology must be dedicated to the efficiency (sic) of education as a whole and not simply to specific operations. . . The field of educational technology-in its concern for optimal organization of education – must not be limited to time-honored structures. Nor should it perpetuate failures." Laying aside Mitchell's use of the word "efficiency," this view, not unreasonably, widens the scope of educational technology.

No longer is educational technology a synonym for instructional development (with its sometimes narrow orientation towards the design, development and evaluation of instructional materials). Educational technology takes on the twin imperatives of enabling nations to enhance their collective human potential, while helping people realize their own.

This, as Mitchell realizes full well, revolutionizes the scope of the educational problems that educational technology can be expected to resolve. The challenges and opportunities are endless, but the traditions are not yet there. The perspective has been limited. Perhaps the view of instructional development, with its concern for often only instructional materials, has become an albatross around our necks. The perspective is too narrow. It limits the scope that on the one hand demands a world view, and on the other a concern with the whole range of human potential and performance – including not only fitting people to a task and environment, but also fitting the task and environment to people.

But do educational technologists currently have the competencies to undertake two such challenges? In a recent *ad hoc* study (Davies, 1988) of educational technologists in two large American corporations, strengths and weaknesses were assessed by people who were responsible for them.

Educational technologists were perceived as beinghighly able, technically competent in their professional activities, and having good people skills. However, they were also perceived as lacking a business orientation,

ment skills and experience, and even an issues or problem orientation. They were criticized for being reactive, rather than proactive, and for not being team players. While they had a well developed educational technology network, their education and business networks were poorly developed. If these characteristics are in any way typical, the profession can take pride in the ability of the people it has attracted. Their training, however, needs to bere-focussed and enriched to overcome these criticisms.

Educational technologists need a balanced mix of competencies in order to perform their role effectively, This mix changes in content and balance as technology or know-how develops. The physical component of the role is declining as a result of the increasinguse ofinformation technology, freeingup more time for front end analysis. Also, the judgement component, always a key constituent of professional activity, is becoming increasingly important.

The distinctly humane skills ofperception and intuition, together with the crucial element oftiming, are also becoming increasingly important in the mix. Two further competencies stand out in the performance of the more successful educational technologists (Davies, 1988). These are the twin skills of influence (which depends upon the "clout" which is developed in the organization), and facilitation (which relates to the ability to get things moving, as well as to sustaining the process). Influence is a personal skill while facilitation is an inter-personal one.

A TOTAL APPROACH TO EDUCATIONAL OPPORTUNITIES

Educational technology has been dominated by a systematic perspective (see Davies, 1984, p. 9), even when the words claimed to be otherwise. Yet, as Mitchell remarks, central to the idea of educational technology is a systemic approach. Such a perspective considers the total system, with its interacting systems and sub-systems, which work together to achieve the system's goals and objectives for its total environment. But it is more than Mitchell suggests. It is a total socio-technical system, each part of which depends upon the configuration of the other – social and technical systems jointly optimized.

Mitchell fails to point out, however, that it is the total system that is optimized, while sub-systems and components are satisficed, i.e., are designed to do well enough (see Ackoff, 1970, p. 5-9). Educational technologists in the past have often unwittingly optimized sub-systems and components, and so created a cancer that ultimately threatens the "health" of the total system. This is one reason that educational technology projects have sometimes failed to realize their potential. Problems were conceived too narrowly, and designs developed in isolation from their environment. It is an example of what Adler calls the fallacy of reductionism – "assigning a greater reality to the parts of an organized whole than to the whole itself" (Adler, 1986, p. xix)

A total systems perspective is essential, if the field is to deal effectively with the wide range of global problems that Mitchell envisages. But total

implies more than Mitchell suggests, it has three inter-related meanings. Total describes not only the effectiveness of the system, but also the steps that are taken to maintain the system once it has been designed and implemented, and the total participation of all stake holders (learners, teachers, educational technologists, administrators, organization, parents, shareholders, community, etc.).

Mitchell proposes control theory, as the new paradigm for behavioral research, in order to escape from the dilemma of two models one for the controller (the instructional system), and one for the controlled (the learners). Central to this cybernetic approach is the attention that is given to feedback in the total system. In "the absence of universal reinforcers in educational settings," Mitchell points out that a "person's behavior controls their perception in relation to their intentions." He argues that this implies that educational technology has two options. Educational technologists can either "implement schemes that limit individual differences" or promote schemes that promote optimal enhancement of individual potential.

This is an important rational, but it avoids the importance of the feedback obtained from breakdowns in the total system after implementation. Ideally, instructional systems are designed so that failure is unlikely. But this is rarely the case, and educational technologists are becoming increasingly aware of the importance of taking time to analyze human error down to root causes (Davies, 1981). Five options are available to educational technologists to help eliminate or prevent system failures. The first two, taking steps to maintain a well regulated instructional system and adhering to the designer's operating procedures, improve the operation of the instructional system. The other three, restoring deterioration in the instructional system, removing weaknesses in its design, and dealing with human error as a critical source of information, involve enhancing the reliability of the system.

CONCLUSION: THE FUTURE OF EDUCATIONAL TECHNOLOGY

Whether educational technology will become the central humane discipline of the future (Richmond, 1967), and whether it will help create "health, ideal space, and peace" (Beckwith, 1988) are matters of conjecture. What is more important is that from a consideration of both the possible and the probable futures of educational technology, we can take steps to ensure the desirable ones. David Mitchell, in his perspective "The Future of Educational Technology is Past" describes one, but there are other futures for us to consider as we seek continually to renew our field. The future is now.

REFERENCES

Ackoff, R. L. (1970). *A concept of corporate planning.* New York, NY: Interscience.

Adler, M. J. (1985). *Ten philosophical mistakes.* New York, NY: Macmillan.
Beckwith, D. (1988). The future of educational technology. *Canadian Journal of Educational Communication, 17* (l), 3-20.
Davies, I. K. (1981). Task analysis for reliable human performance. *Performance & Instruction, 20* (2), 8-10 & 31.
Davies, I .K. (1984). Instructional development: Themata, archetypes, paradigms & models. In R.K Bass & C.R. Dills (eds). *Instructional deuelopment.* Dubuque, IA: Kendall Hunt.
Davies, I. K. (1988). *Competencies of educational technologists in two large American corporations.* Unpublished paper. Bloomington, IN: School of Education, Indiana University.
Mitchell, P. D. (1989). The future of educational technology is past. *Canadian Journal of Educational Communication, 18* (l), *3-27.*
Richmond, W. K. (1967). *The educational industry.* London: Methuen.
Richmond, W. K (1970). *The concept of educational technology.* London: Weidenfeld & Nicholson.
Wittgenstein, L. *(1958). Philosophical investigations.* Oxford: Blackwell.

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