

A cognitive constructivist view of distance education: An analysis of teaching-learning assumptions

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It has been said that assumptions regarding learning are implicit in designs of instruction and education. The purpose of this article is to explore the assumptions of the teaching-learning process in distance education. Cognitive constructivist learning theory is used to clarify current and emerging assumptions regarding teaching and learning at a distance. It is suggested that perhaps a cognitive constructivist view of learning may provide a perspective for distance educators to clarify their assumptions and design instruction that is more than efficient assimilation of prescribed content.

Introduction

To those familiar with distance education it is clear that correspondence study represents not only an historical legacy but a continuing dominance of distance education practice. Although the International Council changed its reference from correspondence to distance education in 1982, the basic assumptions of practice have not changed appreciably (Holmberg, 1989, 1990). Notwithstanding the many technological innovations in distance education, its conception and practice remains largely an industrialised and private form of learning based upon self-instructional texts and print-based communication.

While the promotion and practice of distance education as a private form of learning has predominated, some have attempted to question the assumptions upon which the theory and practice of distance education is based (Garrison, 1989; Garrison and Shale, 1990). There would seem to be a need to reflect critically upon distance education's conceptions of teaching and learning—concepts which are germane to learning in an educational sense. Reliance upon pre-packaged self-instructional materials as a primary method of distance education reflects implicit assumptions regarding the teaching-learning process. Notwithstanding the possible enhancement of self-instructional texts with various communications technology, important assumptions are communicated regarding the educational transaction. Whether we see print materials as the primary source of information and learning for the student or, alternatively, as a resource to stimulate reflection and communicative action represents a subtle but crucial difference in how we view the educational transaction.

This article addresses two views of teaching and learning at a distance which, it is argued, will distinguish existing and emerging paradigms. The purpose is not to advocate a polarisation of distance education perspectives or determine the exact proportion of practice based upon existing and emerging paradigms. The purpose is to clarify subtle but crucial differences in assumptions concerning the teaching-learning process.

With the addition of various communications technologies, it has become less clear which assumptions guide the practice of distance education. While we may choose to accept a postmodernistic 'world in which alternative and conflicting paradigms are a reality' (Hlynka, 1991: 30), at least we should be aware of conflicting paradigms. It is the intent here to clarify current and emerging assumptions regarding teaching and learning through the application of behavioural and cognitive theories.

Two perspectives

It is believed there is a fundamental change in how distance education is practised and perceived. More specifically, it is argued that much of distance education instructional design and delivery has been based, either explicitly or implicitly, upon behavioural learning theories or assumptions. Further, the position taken here is that emerging perspectives and practices are, and ought to be, consistent with socio-cognitive constructivist theories of learning.

The reality is that pre-packaged self-instructional course materials inherently carry a behavioural orientation to learning. Although attempts are made to make the materials flexible and interactive, they remain a prescriptive and private learning process. Winn (1990: 53) argues 'that behavioural theory is inadequate to prescribe instructional strategies that teach for understanding'. In particular, Winn suggests that analysis of conditions and pre-selection of strategies before implementation of instruction is not appropriate for higher-level cognitive goals. That is, pre-packaged self-instructional course materials are behaviourally based and are not appropriate for achieving understanding of complex and ill-structured subject areas. Behavioural theory is based upon reinforcement and correction in guiding student responses toward a prescribed learning goal. This matches the design of self-instructional materials. Little opportunity exists for the negotiation of learning goals, collaborative learning decisions, or for learners to assume responsibility for constructing meaning for themselves, based upon their previous knowledge structures.

In classic behavioural theory there is a separation of design from implementation—ostensibly to standardise instruction to a high level. What

behavioural theory does not address is the dynamic nature of learning. As Winn (1990: 59) states,

as soon as the student begins to study the instructional material, the student has different knowledge and skill from that which he had before instruction began ... [and it] is likely that subsequent decisions concerning instructional strategies would be different.

A behavioural approach to instructional design assumes a static and standardised view of knowledge. Feedback is simply whether responses are correct. On the other hand, a cognitive approach may provide explanatory feedback and allow for the construction of new and unexpected knowledge structures. Pre-packaged self-instructional materials fit into the behavioural approach to instructional design and, therefore, the assumptions that guide these forms of distance education need to be examined closely.

Cognitive constructivist learning theory

Against the above necessarily brief and bold statement on behavioural theory we might compare some cognitive constructivist theory.

A pervasive assumption of current cognitive psychology is constructivism—a view that knowledge is constructed by the individual in context based upon interpretation of experience and previous knowledge structures (Resnick, 1991). Cognitive constructivist learning theory is concerned with meaningful learning. The learner takes responsibility to construct meaning actively, not in isolation, but through dialogue with oneself as well as others. The most important objective in the cognitive constructivist approach to learning is understanding—not observable and measurable behaviours. DiVesta and Rieber (1987: 221) suggest that 'Understanding is an effective objective since it makes provisions for material to be assimilated and integrated into the learner's knowledge structure'. The implication is that learning from cognitive constructivist principles go beyond the assimilation of facts and implies the construction of meaningful and useful knowledge structures.

Shuell (1987: 415) suggests that cognitive psychology has significantly influenced learning theory in a number of ways: (1) 'learning is an active, constructive and goal oriented process that is dependent upon the mental activities of the learner'. What is important are the mental activities that may lead to a behavioural change or response; (2) the existence of metacognitive or higher-level learning processes such as regulation of learning activities and strategies for enhancing learning; (3) the explicit recognition that learning is influenced by prior knowledge; (4) knowledge is represented by complex structures and the concern is how the learner extracts meaning; and finally, (5) 'concern for analyzing learning tasks and performance in terms of the cognitive processes that are involved' (Shuell, 1987: 415).

The most important implication of cognitive constructivist learning theory for education is that learning is an active and evolving process. Winn (1990: 64) states that for 'instruction to be successful, it must therefore constantly monitor and adapt to unpredicted changes in student behaviour and thinking as instruction proceeds'. Learners must be actively engaged in integrating new information into existing knowledge structures. Since new knowledge structures can only be created by the learner, the role of the teacher is to monitor continually the learner's cognitive processes and challenge or question inappropriate or unclear perspectives. Through the on-going interaction between teacher and student, development of meaningful, valid and increasingly complex knowledge structures are encouraged. This dynamic and often unpredictable learning process necessitates continuous mediation by a teacher to ensure worthwhile outcomes that DiVesta and Rieber (1987) refer to as flexible, durable, transferable, and self-regulated knowledge.

The teacher may provide a tentative structure of knowledge. Through sustained communication, however, learners will begin to construct and confirm their own understanding. Further tests of the learner's understanding may be carried out through interaction with fellow students. In this view of the educational process, knowledge is not static but is negotiated between teacher and learner. Knowledge in general is a social artifact and in education it is the outcome of the interaction between teacher and learner. Learners attempt to interpret, clarify and validate their understanding through sustained dialogue (i.e. two-way communication) and negotiation. While the purpose of education is to study society's meaning structures (knowledge), individuals build upon their previous experience and cognitive structures to develop new views and knowledge structures. Through dialogue we ensure the learner's active construction of meaningful knowledge as opposed to disseminating prescribed information to a relatively passive and uncritical learner. To paraphrase Perkins and Salomon (1989), education should be about educating minds instead of training memories.

With regard to implications for practice, both the learner's and teacher's role need to be clarified. Learners must appreciate that there are multiple ways to construct knowledge and they must come to understand the role of their biases and perspectives in constructing meaning. Teachers, on the other hand, being aware of the above, must become facilitators of learning where control of the learning transaction is shared by the teacher and learner. Svinicki suggests that teachers in a cognitive paradigm face two tasks:

First, we must organize the course and its content in a way consistent with what we believe about how learning takes place paying attention to structure, sequence, examples, and activities. Second, and simultaneously, we must help students learn how to learn content, a step in sophistication above the mere learning of content itself. (Svinicki, 1991: 29)

While the focus is upon learning and the learner taking responsibility to construct meaning, this does not diminish the role of the teacher. As noted previously, the teacher carries a heavy responsibility to structure content that provides a framework to connect and make sense of ideas and facts. The goal is not simply the assimilation of facts. To account for deficiencies in previous knowledge structures, teachers must relate new knowledge structures to those already possessed by students. This demands extended two-way communication between teacher and student. Such communication serves a multitude of purposes but essentially it is a recognition that knowledge is not static and it cannot be transmitted in whole from the teacher to the student.

Resnick (1991: 2) states, 'much of human cognition is so varied and so sensitive to cultural context that we must also seek mechanisms by which people actively shape each other's knowledge and reasoning processes'. Students do not construct meaning/knowledge in isolation. The social context, particularly the teacher, contributes to the construction of meaning. Perret-Clermont et al. (1991: 46-47) suggest that cognition is not an autonomous function

but is the result of the individual's depending on the communication constraints of the settings in which the individual grows and the patterns of intersubjectivity that the individual's partners invite him or her to establish.

The genesis for restructuring one's thoughts is dependent upon sociocognitive conflict depicted by an interactionist and constructivist model of cognitive development (Perret-Clermont et al., 1991).

Such social interactions go beyond internal or private thought processes precipitated by print materials. They include two-way communication where students attempt to explain their interpretation and listen to others' understanding. The more constrained the communication the less chance there will be for constructing meaning.

Implications for distance education

The issue of a paradigm shift in distance education was recently raised by Holmberg (1990). His argument is that a paradigm shift is a myth since 'today's distance education is either identical with or a direct descendent of traditional correspondence education' (Holmberg, 1990: 55). In essence, Holmberg bases his understanding and defining assumptions of distance education upon the prevalence of current (and past) practice which is, of course, correspondence study. This is consistent with his view of distance education which is 'not under the continuous immediate supervision of tutors ... but which, nevertheless, benefit from the planning, guidance and teaching of a supporting organization' (Holmberg, 1989: 3). It is important to note his observation that distance teaching represents the activities 'of the

tutorial organization, particularly its authors and tutors' (Holmberg, 1989: 3).

This last statement regarding the supporting or tutorial organization reflects subtle and implicit assumptions concerning the educational transaction. The teaching function is the responsibility of course authors and tutors. Course authors reflect the paradigm of pre-produced self-instructional texts. Tutors are available to respond, often by print, to assignments of pre-produced course units. At the end of these course units 'students are invited to answer (and ask) questions, compute, translate, solve problems, write essays, etc. and to submit this work for correction and comment' (Holmberg, 1989: 4). The emphasis is on producing a package of materials that will be so complete that the learner shouldn't need much (if any) contact with a tutor or teacher. The tutor is a marker and often a resource of last resort. The tutor does not and is not expected to assume a sustained proactive role in the learner's quest to construct meaning. In another context, Coldeway (1991: 9) reports, Athabasca University 'students and tutors have telephone contact approximately once every four weeks'.

This view represents a subtle denigration of the teaching function in correspondence-based delivery which significantly alters the educational process. Holmberg (1989: 7) states that 'Any learning can be an educational experience'. But not all learning is educational. Learning in an educational sense necessitates consideration of alternative perspectives, discussing discrepancies with regard to previous understanding, and generally negotiating meaning with the teacher and fellow students. Holmberg rejects the 'unity' of teaching and learning since, as he states, there is not always learning when teaching occurs. Granted that it may not be the learning prescribed but, if open dialogue regarding differing perspectives occurs, then there is a unity of teaching and learning. Teaching is not the transmission of prescribed information—it is a process of facilitating the exploration and creation of meaning through collaboration. The teacher can enhance motivation, facilitate learning, and encourage critical analysis. Through these processes and the arrangement of the educational environment the teacher can significantly influence the quality of learning. Although the learner is ultimately responsible for learning, educationally the quality of that learning experience is established through the proactive interaction and guidance of a teacher.

What makes learning educational is the transaction between teacher and learner. The teacher is not an optional resource in an educational transaction, because the teacher communicates social values and knowledge. At the same time, the intent of the educational process is not to indoctrinate students with narrow societal values. The goal is to integrate and encourage learners to view society from a broad but critical perspective. While all learning is to some extent a social phenomenon, learning in an educational

context is a process of transmitting and consensually validating societal values and knowledge as well as critically examining differing perspectives and assumptions. Acquiring knowledge is never complete and, therefore, we must see our understanding as tentative and subject to constant validation and revision. It is not entirely up to the learner as to what constitutes knowledge. We must see the complexity of societal knowledge and not retreat to an ideological insularity. Therefore, the teacher is an integral component of the educational transaction—not simply an optional resource or marker. The goal of all education is to construct meaning through critical and collaborative analysis and consensual understanding.

Holmberg (1989: 162) states that his view of distance education 'is based on motivated deep-learning as an individual activity' (p. 162). The key phrase, however, is 'as an individual activity' which is consistent with our interpretation of his description of the role of the tutor as being an optional resource. However, is it reasonable to expect motivated deep-learning from individuals studying in private? It is the position here that few students by themselves have the ability to analyse their current knowledge and beliefs critically, to assume the responsibility of constructing new meaning, and to act upon that understanding for purposes of confirming its usefulness and long-term assimilation.

Communications technologies must do more than enhance the private learning process. Interactive communication does more than merely convey information. Without sustained interaction the learner has few opportunities to develop deep understanding (Ramsden, 1984) and is not encouraged to do more than assimilate information. Integrating, elaborating, and restructuring concepts are 'more likely when one is required to explain, elaborate, or defend one's position to others, as well as to oneself' (Brown and Palincsar, 1989: 395). Negotiating goals, clarifying and challenging assumptions are not factored into the equation. Pre-packaged learning materials are generally prescriptive in nature and afford little flexibility over what is to be learned and how. The first objective is to pass the exam or complete the assignment 'correctly', not to analyse the content critically for meaning (i.e. deep learning).

Bereiter and Scardamalia (1989: 385) state that to 'develop high-level skills of learning from text, the student must do more than try to answer assigned questions'. This activity does not encourage students to identify the significance of the message and the principles involved. Marton and Saljo (1976: 124) contend that learning depends upon task demands and when questions are of a technical nature, that is, recalling and summarising text materials, learning is 'reduced to a search for the type of knowledge expected on the test'. The goal for most adult learners is to set and achieve personal learning goals such that learners take responsibility to construct meaning and not simply extract answers for prescribed questions. Pre-

packaged independent learning materials inherently promote technical knowledge and rote recall, unless opportunities are provided for sustained communication encouraging learners to construct personal meaning and validate understanding socially.

Technology and ideals

It is argued here that the dominant paradigm in distance education, that of pre-packaged materials designed for minimum tutor/teacher contact, ensures that new technologies capable of supporting sustained two-way communication will simply remain an 'unimportant add-on'. Salomon et al. (1991: 8) suggest with regard to cognitive impact that

no important impact can be expected when the same old activity is carried out with a technology that makes it a bit faster or easier; the activity itself has to change.

They

distinguish between two kinds of cognitive effects: Effects with technology obtained during intellectual partnership with it, and effects of it in terms of the transferable cognitive residue that this partnership leaves behind in the form of better mastery of skills and strategies (Salomon, et al., 1991: 2).

That is, in the latter case the effect of technology is not concerned with just the assimilation of the content in a more efficient manner but with 'relatively lasting changes in students' general cognitive capacities' and the construction of new knowledge. Salomon et al. refer to 'effortful' and metacognitively-guided learning as a state of 'mindful' engagement. In other words, the learner takes responsibility for constructing meaning.

With the technology of independent study via pre-packaged course materials there is little opportunity for choice or mindful engagement. Content, activities, and evaluation are prescribed and carried out with minimal interaction. If the goal is to engage learners in a mindful interaction where they are encouraged and supported to construct their own meaning, not simply asked to assimilate other's understanding, then the activity itself must change. The technology must have the effect of developing transferable cognitive abilities, not simply more efficient recall of prescribed information. This goal will only be reached from a paradigm and with technologies that recognize and support interdependence, not physical independence. Independence of mind and thought, paradoxically, is best achieved through sustained two-way communication where scepticism and the challenging of assumptions are modelled and encouraged.

While it is not always possible to have all the dialogue that ideally would maximise learner control and critical learning, distance educators should have an ideal to strive toward. It is the assumption concerning the necessity

of sustained two-way dialogue that distinguishes the paradigms and technologies of distance education. As Duffy and Jonassen (1991: 7) state, 'our theory of learning is implicit in our design'. However, the structural constraints of practice blur the distinctions and ideals that we hold with regard to distance education. The critical question concerns the ideals and guiding principles we strive for. Assumptions and guiding principles provide direction to future plans and funding priorities. Whether our guiding principles are to be free from the constraints of time and place—and hence reliant on pre-packaged content—or maximising teacher/learner collaboration will go a long way in mapping the design directions of our distance education delivery systems. At the risk of setting up a false dichotomy the choice of ideals may be seen as prescription versus collaboration; or in terms of learning theory—behaviourism versus cognitive constructivism.

Mezirow (1991: 199) suggests that ideals are not unattainable goals of perfection, but are 'present in every action, as a judgement of better and worse' (p. 199). The ideal of sustained two-way communication and collaboration is easily within the reach of developed nations. Existing low-cost technologies such as audio-teleconference and computer-mediated communication are readily available. At the same time it is recognized that many countries will have to rely on print and the mail system for their communication. However, the ideal educational transaction that maximises communication should not be lost. Distance educators must maximise communication—not isolation. It is the nature of the educational transaction and the type of learning that is to be achieved that should be the focus of discussion in distance education. We simply do the best we can and make the trade-offs that least compromise the learning process. Those of us that have the technology must design the learning process not just to learn information faster or easier but that will encourage and challenge learners to construct their own meaning and create new knowledge.

Conclusion

Education is a search for meaning and truth. Without the opportunity for critical discourse, meaning cannot be challenged. We must recognize the tentativeness and contextually constrained nature of knowledge. Understanding and validating knowledge is dependent upon communicative action. Mezirow (1991: 96) states that

Communicative competence, a condition necessary for significant learning and development in adulthood involves an individual's ability to negotiate meanings and purposes instead of passively accepting the social realities defined by others—in other words, to participate in rational communicative action.

The question is whether print-based, self-instructional distance education materials can simulate such interaction or even whether the assumption of communicative action is tenable with these methods of delivering education at a distance.

If the goal of distance education is to facilitate learners in their construction of meaning then methods, materials and evaluation must be congruent with that goal. As Ramsden (1984: 145) states, 'a student's perception of the learning context is an integral part of his or her experience'. That is, teaching and assessment affect what they ultimately learn. A cognitive or meaning orientation must include the expectation and opportunity to critically interact with new information and relate it to previous knowledge. Thus, an independent learning experience implicitly encourages a different kind of learning from that of a collaboratively and socially situated learning transaction. Ramsden (1984: 163) suggests that the most important message from his research on the context of learning

is that intense effort must be made in course planning, and in the setting of assessment questions, to avoid presenting a learning context which is perceived by students to acquire, or reward, surface approaches.

It is difficult to see how pre-packaged self-instructional course materials by themselves can do otherwise but encourage surface approaches.

The argument presented here is that excessive reliance on pre-packaged self-instructional materials represents serious limitations with regard to cognitive development. The implications of this conclusion for distance education are substantial and far-ranging. As has already been indicated, what one would view as an appropriate and effective distance education system differs substantially from a behavioural or a cognitive perspective. Winn (1990) has described how these two perspectives would affect one's approach to instructional design. In addition, this distinction affects in a fundamental way understanding of commonly held rubrics in distance education such as interaction, independence, and communication. Even the long-established metaphoric language that has grown up around distance education assumes a very different flavour and meaning depending on whether we embed the language in a cognitive or behavioural context.

Distance educators should become aware of their ethical positions. That is, they should be prepared to examine and defend the assumptions which underlie the practice of adult education. It is these assumptions which reflect distance educators' ideals and norms of what constitutes quality distance education practice. Reed and Sork (1990: 30) state that 'there has thus far been no attention given to ethical considerations in the practice of distance education'. Awareness of ideals (i.e. ethical sensitivity) can discourage capricious and unethical distance education practice. Do the ideals of pre-packaged and self-instructional materials encourage uncritical assimilation of content? Or as Reed and Sork (1990: 36) ask, 'to what extent is the

developer obligated to include exercises or provide delivery mechanisms that encourage the learner to be critical about knowledge and ideas?' (p. 36). Such ethical questions may be reduced to balancing often-conflicting issues of access versus quality. At a minimum, understanding the assumptions and ideals of distance education practices will encourage ethical sensitivity in distance education.

In the attempt to reach mass audiences in an open and cost-effective manner distance education may risk the diminution of essential educational processes; perhaps to the point where the learning can no longer be considered educational. It is the position taken here that, if we continue with and logically extend the behaviourally-based assumptions of self-instructional materials, the end product may be of questionable educational quality. In any case, such a paradigm is significantly different from a collaborative view of the educational process where the goal is to bring teacher(s) and students together in a real or virtual manner. Clearly the ethical and educational implications of these two views need to be explored more fully.

It is recognized that adhering to a cognitive constructivist paradigm risks setting often unreachable goals or ideals, because of the environmental constraints with which distance education must contend. These ideals, however, help us understand where we want and ought to be heading. It is better if they are explicitly stated and recognized. In any case, assumptions do exist that guide our practice and reflect the methods we use whether they are implicitly or explicitly understood. But what are the ideals of pre-packaged self-instructional course materials? The end product may be an isolated individual assimilating fragmented information without proper consideration of the realities of social life or consensual knowledge validation.

Clearly the realities and constraints of many educational contexts demand self-instructional materials but this does not excuse us as educators to ignore fundamental assumptions of the teaching-learning transaction. There are serious dangers from an educational and quality learning context if we choose to ignore the essence of and assumptions underlying a learning experience. The issue is that we must be aware of the assumptions which guide our practice and recognize the limitations of a learning approach that inherently has set limits on communicative action (i.e. true two-way sustained communication). Perhaps a cognitive constructivist view of the learner taking responsibility for constructing meaning may provide a model and vision for distance educators to clarify their ideals and design learning that goes beyond faster and easier assimilation of prescribed information.

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