

Moore, M. "Theory of transactional distance." Keegan, D., ed. "Theoretical Principles of Distance Education (1997), Routledge, pp. 22-38.

Theory of transactional distance

Michael G. Moore

TRANSACTIONAL DISTANCE

The first attempt in English to define distance education and to articulate a theory appeared in 1972. Later this was called the theory of transactional distance. What was stated in that first theory is that 'distance education is not simply a geographic separation of learners and teachers, but, more importantly, is a pedagogical concept. It is a concept describing the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/ or by time. This universe of relationships can be ordered into a typology that is shaped around the most elementary constructs of the field - namely, the structure of instructional programmes, the interaction between learners and teachers, and the nature and degree of self-directedness of the learner.

The concept of transaction. is derived from Dewey (Dewey and Bentley 1949). As explained by Boyd and Apps (1980: 5) it 'connotes the interplay among the environment, the individuals and the patterns of behaviors in a situation'. The transaction that we call distance education occurs between teachers and learners in an environment having the special characteristic of separation of teachers from learners. This separation leads to special patterns of learner and teacher behaviours. It is the separation of learners and teachers that profoundly affects both teaching and learning. With separation there is a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner. It is this psychological and communications space that is the transactional distance.

Psychological and communications spaces between any one learner and that person's instructor are never exactly the same. In other words, transactional distance is a continuous rather than a discrete variable, a relative rather than an absolute term. It has been pointed out (by Rumble 1986, for example) that in any educational programme, even in face-to-face education, there is some transactional distance. Seen in this way, distance education is a subset of the universe of education, and distance educators can draw on, and contribute to, the theory and practice of conventional education. Nevertheless, in what we normally refer to as distance education, the separation of teacher and learner is sufficiently significant that the special teaching-learning strategies and techniques they use can be identified as distinguishing characteristics of this family of educational practice.

Even though there are clearly recognizable patterns, there is also enormous variation in these strategies and techniques and in the behaviour of teachers and learners. This is another way of saying that within the family of distance education programmes there are many different degrees of transactional distance. It cannot be emphasized too strongly that transactional distance is a relative rather than an absolute variable. 'The whole point and purpose of distance education theory is to summarize the different relationships and strength of relationship among and between these variables that make up transactional distance, especially the behaviours of teachers and learners. (It should be pointed out that other variables exist in 'the environment, the individuals and the patterns of behaviors' besides those of teaching and learning. This means there is room for more than one theory. There is need for a theory of distance education administration; a theory of distance education history; a theory of distance learner motivation and so on. The example of distance learner motivation also points out that some theories, such as the theory of transactional distance, are more global than others, and that room exists for more finely focused, molecular theory within the framework provided by a more molar theory.)

The special teaching procedures fall into two clusters; in addition a third cluster of variables describes the behaviours of learners. The extent of transactional distance in an educational programme is a function of these three sets of variables. These are not technological or communications variables, but variables in teaching and in learning and in the interaction of teaching and learning. These clusters of variables are named Dialogue, Structure, and Learner Autonomy.

INSTRUCTIONAL DIALOGUE

Dialogue is developed by teachers and learners in the course of the interactions that occur when one gives instruction and the others respond. The concepts of dialogue and interaction are very similar, and indeed are sometimes used synonymously. However, an important distinction can be made. The term 'dialogue' is used to describe an interaction or series of interactions having positive qualities that other interactions might not have. A dialogue is purposeful, constructive and valued by each party. Each party in a dialogue is a respectful and active listener; each is a contributor, and builds on the contributions of the other party or parties. There can be negative or neutral interactions; the term 'dialogue' is reserved for positive interactions, with value placed on the synergistic nature of the relationship of the parties involved. The direction of the dialogue in an educational relationship is towards the improved understanding of the student.

Whether dialogue occurs its extent and nature is determined by the educational philosophy of the individual or group responsible for the design of the course, by the personalities of teacher and learner, by the subject-matter of the course, and by environmental factors. One of the most important of the environmental factors - and the one that usually gets most attention from persons both inside and outside distance education - is the medium of communication. As the distance education field matures it is to be hoped that greater attention will be paid to variables besides the communication media, especially design of courses and the selection and training of instructors and the learning styles of students.

Communications media

It is obvious that the nature of each communications medium has a direct impact on the extent and quality of dialogue between instructors and learners. For example, an educational programme in which communication between teacher and learner is solely by one-way television, an audiotape, or a teach-yourself book, will have no teacher-learner dialogue simply because these media cannot carry messages back from the learner to the teacher. Students usually make internal responses to what is communicated on the one-way medium, but they are not able to make their personal individual responses to the teacher. By comparison, a student taught by correspondence through the mail is able to have two-way interaction and therefore dialogue with the teacher, though the medium slows down the interaction. The dialogue is less spontaneous but perhaps more thoughtful and reflective than a similar course taught in either a classroom or at a computer-mediated conference. It should be apparent that this interactive nature of the medium of communication is a major determinant of dialogue in the teaching-learning environment. By manipulating the communications media it is possible to increase dialogue between learners and their teachers, and thus reduce the transactional distance.

It is worth noting though that, as suggested above, a form of dialogue between teacher and learner occurs even in programmes that have no interaction, such as when the learner is studying through printed self-study materials, or by audiotapes or videotapes. Even in these media there is a form of learner-instructor dialogue because the learner does have an internal or silent interaction with the person who in some distant place and time organized a set of ideas or information for transmission for what might be thought of as a virtual dialogue' with, an unknown distant reader, viewer, or listener. By contrast, highly interactive electronic teleconference media, especially personal computers and audioconference media, permit a more intensive, more personal, more individual, more dynamic dialogue than can be achieved in using a recorded medium. Programmes that use such media are therefore likely to bridge the sectional, distance more effectively than programmes using recorded media.

There are other environmental factors that influence dialogue and thus transactional distance. These include the number of students each distant teacher must provide instruction to and the frequency of opportunity for communication, usually determined by administrative and financial constraints; the physical environment in which the students learn and the physical environment in which teachers teach (teachers have been known to conduct audioconferences from a telephone in a public hallway and student groups frequently attempt to engage in dialogue through noisy office speaker phones); the emotional environment of teachers, especially the regard, or, more likely, the degree of disregard given to their distance teaching achievements by their administrators; and the emotional environment of learners, especially the regard with which their study is seen by significant persons in their home and work-places.

Dialogue is further influenced by teacher personality, by learner personality, and by content. It cannot be said with certainty that any medium, no matter how interactive its potential, will provide a highly dialogic programme, since it is controlled by teachers who might, for good reasons or bad, decide not to take advantage of its interactivity, and it is used by learners who might not be able or willing to enter into dialogue with their teachers. Finally, experience suggests that the extent of dialogue between teachers and learners in some content areas and at some academic levels is higher than in others where similar media are used. Teaching courses at graduate level in social sciences and

education offer opportunity for highly inductive, Socratic teaching approaches, with much small-group work or individual case-study and Project work. Teaching basic information courses in sciences and mathematics usually requires a more teacher directed approach, with considerably less dialogue.

Whatever the dynamics of each teaching-learning transaction however one of the major determinants of the extent to which the transactional distance will be overcome is whether dialogue between learners and instructors is possible, and the extent to which it is achieved.

PROGRAMME STRUCTURE

The second set of variables that determine transactional distance are the elements in the course design, or the ways in which the teaching programme is structured so that it can be delivered through the various communications media. Programmes are structured in different ways to take into account the need to produce, copy, deliver, and control these mediated messages. Structure expresses the rigidity or flexibility of the programme's educational objectives, teaching strategies, and evaluation methods. It describes the extent to which an education programme can accommodate or be responsive to each learner's individual needs.

As with dialogue, structure is a qualitative variable, and, as with dialogue, the extent of structure in a programme is determined largely by the nature of the communications media being employed, but also by the philosophy and emotional characteristics of teachers, the personalities and other characteristics of learners, and the constraints imposed by educational institutions.

With regard to the media, a recorded television programme, for example, is highly structured, with virtually every word, every activity of the instructor and every minute of time provided for, and every piece of content predetermined. There is no dialogue and therefore no possibility of reorganizing the programme to take into account inputs from learners. There is little or no opportunity for deviation or variation according to the needs of a particular individual. This can be compared with many teleconference courses which permit a wide range of alternative responses by the instructor to students' questions' and written submissions. These media permit more dialogue and require less structure. A common mistake among unskilled teachers using interactive video or audio is to overstructure their programmes in ways that make them resemble one-way media presentations, and so neglect the potential for dialogue that could be having a looser structure. When a programme is highly structured and teacher-learner dialogue is non-existent the transaction between learners and teachers is high. At the other extreme, there is low transactional distance in those teleconference programmes that have much dialogue and little predetermined structure. As stated earlier (but it cannot be overemphasized), the extent of dialogue and the flexibility of structure varies from programme to programme. It is this variation that gives a programme more or less transactional distance than another.

In programmes with little transactional distance learners receive directions and guidance regarding study through dialogue with an instructor in a programme that has a relatively open structure, designed to support such individual interactions. In more distant programmes, where less or little dialogue is possible or permitted, the course materials are tightly structured to provide all the guidance and direction and advice that course designers can anticipate, but - without the possibility of the individual learner modifying this in dialogue with the instructor.

In highly distant programmes therefore, learners have to take responsibility for making judgements and taking decisions about study strategies. Even where a course is structured to give maximum direction and guidance, if there is no dialogue students may decide for themselves whether the instructions will be used, and if so when, in what ways, and to what extent. Thus, the greater the transactional distance, the more such -autonomy the learner will exercise.

Since learners are such important actors in the teaching-learning transaction, the nature of the learner - especially the potential to undertake autonomous learning - can have an important effect on the transactional distance in any educational programme. There appears to be a relationship between dialogue, structure and learner autonomy, for the greater the structure and the lower the dialogue in a programme the more autonomy the learner has to exercise.

Successful distance teaching depends on the institution and the individual instructor providing the appropriate opportunities for dialogue between teacher and learner, as well as on appropriately structured learning materials. Frequently this will mean taking measures to reduce transactional distance by increasing the dialogue through use of teleconference, and developing well-structured printed support materials. In practice this becomes an extremely complex matter, because what is appropriate varies according to content, level of instruction, and learner characteristics, especially the optimum autonomy the learner can exercise. Much time and creative effort, as well as understanding of the characteristics of the learner population, have to be devoted to identifying the extent of structure needed in any programme, and in designing appropriately structured presentations and interactions. Much skill is needed to facilitate the degree of dialogue that is sufficient and appropriate for particular learners. To overcome

transactional distance in these ways by appropriate structuring of instruction and appropriate use of dialogue is very demanding. It requires the engagement of many different skills and it requires that these skills are systematically organized and deployed. It requires changes in the traditional role of teachers and provides the basis for selecting media for instruction.

In distance education teaching is hardly ever an individual act, but a collaborative process joining together the expertise of a number of specialists in design teams and delivery networks. The typical model is that of the course team of content experts, instructional designers and media specialists, providing structured materials which are then used as the basis for dialogue between learners and specialist teachers (often called tutors). A very rough analogy for this process might be found in the entertainment industry where the medieval troubadours who wrote and sang their own songs gave way in modern times to the television team of writer, singer, producer, camera persons, editors and others. The simile has a very limited application, since there are additional processes that have to be organized in education, such as the need of the learner to have practice, feedback, and counselling.

Structuring instructional processes

The following are some of the processes that must be structured in each distance education programme.

1. *Presentation.* In most programmes there are presentations of information, demonstrations of skills, or models of attitudes and values. The recorded media (i.e., text, audiotapes, videotapes and computer discs) are usually the most powerful for delivering such presentations. For information with a short shelf life the computer may be preferred over print as a means of rapidly updating information and may also serve as an electronic library for persons who find access to hard copy libraries difficult.
2. *Support of the learner's motivation.* Having planned or been given a curriculum, a programme of content to be taught, course designers and instructors must stimulate, or at least maintain, the student's interest in what is to be taught, to motivate the student to learn, to enhance and maintain the learner's interest, including self-motivation. This is done by various techniques of stimulation within films, recordings and text, through feedback from tutors, and through unstructured, individual, personal teacher-learner dialogue.
3. *Stimulate analysis and criticism.* These are higher order cognitive skills with associated attitudes and values, that learners are expected to develop in higher education. Structuring the development of such skills and attitudes at a distance is especially demanding. The recorded media are often regarded as having special authority, and the student must be assisted to analyse their contents and to challenge them. Ways in which this can be done include hearing experts expose their differences on tape, or organizing discussions by teleconference in conjunction with a recorded or printed presentation.
4. *Give advice and counsel.* The instructional programme must provide guidance on the use of learning materials, on techniques for their study, and some form of reference for individuals who need help with developing study skills and dealing with study problems. Many of these problems can be anticipated and provided through structured teaching materials, but eventually many must be dealt with on an individual basis by telephone, mail, e-mail, and face-to-face interviews.
5. *Arrange practice, application, testing and evaluation.* The students must be given opportunity to apply what is being learned, either the practice of skills that have been demonstrated, or manipulation of information and ideas that have been presented. For this purpose, written assignments delivered by personal computer or by mail are usually important. The tutor is especially valuable in responding to the learners' attempts to apply new knowledge. Even highly self-directed learners are vulnerable in the process of application since they do not know enough about the subject to be sure they are applying it correctly. The well-structured distance education course provides opportunity for dialogue with an instructor as a means of helping the student in this process of reality testing and getting feedback.
6. *Arrange for student creation of knowledge.* The opportunity for students to engage in sufficient dialogue to share with teachers in the process of creating knowledge has been denied to distance learners until very recently. It is this very important process that promises to be the personal computer's main contribution to distance education.

Selection and integration of communications media

To deliver teaching programmes that are maximally effective in overcoming transactional distance it is necessary to select the appropriate medium to provide each teaching process, with the appropriateness being dependent in part on other variables in the transactional environment, such as learner characteristics and content characteristics. In general however, some teaching processes can be seen to be more appropriately delivered by certain media.

Table 2.1 suggests, by varying numbers of crosses, the strength of each medium for delivering each of the teaching processes - namely, presentation, motivation, analytic and critical development, application and evaluation, and learner support. The practical significance of this idea is that the course designers apply the idea of dividing the functions of the teacher - and delivering instruction that was assembled by a team of specialists, through numerous media. The learner benefits from the highly structured presentation strengths of the broadcast media as well as from the dialogue possible by correspondence and teleconferencing. (Nevertheless Table 2.1 has to be regarded as a statement of hypotheses, since there is little empirical evidence at present regarding the relative strengths of these media for these processes.)

Table 2.1 Relationship of dialogue, structure and instruction

	<i>Media with no dialogue and highly structured</i>				
	<i>Pres</i>	<i>Mot</i>	<i>AnICr</i>	<i>ApplEval</i>	<i>Supp</i>
Self-study guide	x	x	x		x
Audio recordings/broadcast	xx	xx	x		x
Video recording/broadcast	xxx	xxx	x		x
	<i>Media with dialogue structured</i>				
	<i>Pres</i>	<i>Mot</i>	<i>AnICr</i>	<i>ApplEval</i>	<i>Supp</i>
Correspondence	xx	xx	xxx	xxx	xx
Video conference	xx	xx	xx	xx	x
Audio conference	xx	xx	xx	xx	xxx
PC conference	xx	xx	xxx	xxx	xxx

Notes: *Pres* = presentation; *Mot* motivation; *AnICr* = analytic and critical development; *ApplEval* = application and evaluation; *Supp* = learner support.

THE AUTONOMY OF THE LEARNER

When the theory of Transactional Distance was first put forward it represented a fusion of two pedagogical traditions that, in the 1960s, often appeared to be at war with each other. One was the humanistic tradition, which gave special value to interpersonal 'generally opened and unstructured dialogue in education as in counselling from which many of the educational techniques were borrowed. The other was the behaviourist tradition, which gave great value to systematic design of instruction that was based on behavioural objectives with maximum teacher control of the learning process. In the early 1970s distance education was dominated by the behaviourists. The importance that was given at the time to challenging the behaviourists hegemony is indicated by the title of the first paper in which the theory of Transactional Distance was publicly presented (Moore 1972); it was called 'Learner autonomy - the second dimension of independent learning'. In that paper it was argued that university correspondence educators (the term 'distance education' was not yet used) were constraining the potential of their method by neglecting the ability of students to share responsibility for their own learning processes.

Analysis of the data used to generate the concepts of distance, dialogue and structure suggested that there were recognizable patterns of personality characteristics among students who preferred, or who succeeded in, teaching programmes that were more highly dialogic and less structured, compared with those who preferred, or succeeded in, less dialogic and more structured programmes. It also became obvious that many students used teaching materials and teaching programmes to achieve goals of their own, in their own ways, under their own control. The term 'learner autonomy' was chosen to describe this process. Learner autonomy is the extent to which in the teaching/learning relationship it is the learner rather than the teacher who determines the goals, the learning

experiences, and the evaluation decisions of the learning programme. A description was given of an ideal, fully autonomous learner (in gender specific terms that would be avoided if the description was written today). This ideal was a person who was emotionally independent of an instructor, a person who in the words of educational psychologist Robert Boyd, 'Can approach subject matter directly without having an adult in a set of intervening roles between the learner and the subject matter' (Boyd 1966). According to Malcolm Knowles such autonomous behaviour should be natural for the adult, who, being adult, has a self-concept of being self-directed. However this statement about learner autonomy did not suggest that all adults *were at* a state of readiness for fully self-directed learning. On the contrary, as stated by Knowles, because learners are trained to be dependent in the school system 'adults are typically not prepared for self directed learning; they need to go through a process of reorientation to learning as adults' (Knowles 1970). While only a minority of adults might be practising as fully autonomous learners, the obligation on teachers is to assist them to acquire these skills.

Distance education programmes can be examined to see to what extent the teacher or the learner controls the main teaching-learning processes, and can then be classified according to the degree of learner autonomy permitted by each programme. When this was done with the sample of programmes generated in the inductive study that provides the data for the theory of Transactional Distance, a relationship was hypothesized between transactional distance on the one hand and learner autonomy on the other. Students with advanced competence as autonomous learners appeared to be quite comfortable with less dialogic programmes with little structure; more dependent learners preferred programmes with more dialogue; some wanted a great deal of structure; while others preferred to rely on the informal structure provided in a close relationship with an instructor. When tested in an empirical study this relationship appeared to exist, but far more testing of this is required before it can be said to have been proved beyond doubt.

DIALOGUE, STRUCTURE, AND AUTONOMY IN TELECONFERENCE INSTRUCTION

Since the theory of Transactional Distance was written, the most important evolution in distance education has been the development of highly interactive telecommunications media. This is the family of teleconference media - i.e., the use of interactive computer networks and audio, audio-graphic, and video networks, which may be local, regional, national and international and are linked by cable, microwave and satellite. Their use has added the possibility of faster dialogue with the teacher and, by computer conferencing, more individual dialogue. These media provide less structured programmes than the recorded or print-interactive media. Above all, the teleconference media allow a new form of dialogue that can be called inter-learner dialogue. Inter-learner dialogue occurs between learners and other learners, alone or in groups, with or without the real-time presence of an instructor. By audioconference, videoconference, and computer conference, groups can learn through interaction with other groups and within groups. There are enormously significant implications in this potential, in every process of teaching-learning. In particular, such dialogue by learners to learners within and between groups makes it possible for distance learners to share in the creation of knowledge. This engagement of the 'collective intelligence' is what Kowitz and Smith (1987) define as the third and most advanced form of instruction, after teaching basic knowledge and teaching technical abilities. Groups and 'virtual groups' also provide opportunities for exercises aimed at developing skills of analysis, synthesis and critique of knowledge, as well as testing and evaluating. In particular, the personal computer is opening new opportunities through its combined asynchronicity and relative lack of structure. Not only can each individual student interact with the ideas of others, but this can be in his/her own time and at his/her own pace. This is something not available before in either distance education or conventional education. It promises to give all students the benefit of shared learning but to reduce the embarrassments experienced by many students in conventional education, since the slow and reflective student is able to contribute as well as the quicker and more extrovert.

The teleconference media permit learners to exercise and develop autonomy by making presentations to classes and in other ways acting as resources for their peers. Such participation in presentation also reinforces or enhances motivation, including self-direction. Being able to share the activities of teaching, the distance teacher has access to a greater variety of activity than can be accomplished by the teacher alone. Teleconference can provide a more friendly and -supportive atmosphere than less dialogic forms of teaching and even many conventional learning environments. It has been a consistently observed phenomenon that students report pleasure 'at the interdependence they develop in teleconferencing. Instructors in teleconference mode must not overstructure, nor be overanxious about keeping control of the details of the dialogue that develops among students. Persons familiar with writing for academic publication often overstructure, and miss the point that the media being used are powerfully dialogic and therefore permit participation by everyone. Instructors must give everyone frequent opportunities to contribute and be aware of who is not contributing, yet not impose too much pressure.

THE PLACE OF TELECONFERENCE IN DISTANCE EDUCATION THEORY

The arrival of teleconference technologies offers the opportunity of making a very important modification of figures that were presented in the original theory of transactional distance. A place for teleconferencing must also be found in the typology of programmes that was developed as part of that theory.

In the original theory of transactional distance a series of graphical drawings was used to show relationships between teachers and learners. This was based on Maccia's (1971) figure that showed a conventional classroom as a one in which person A (the teacher) influences persons B, C, D (the students), and was represented as shown in Figure 2.1a.

Following this principle, figures were produced to show distance teaching-learning relationships, with some programmes having lines to show dialogue between teacher and learners, and others with only one-way communication from teacher to learner (see Figures 2.1bg). In programmes of less structure there were several rays emanating from the source of instruction to represent the greater flexibility from the learner's perspective. (The term 'telemathic' was used for 'distance'.)

The modification that is necessary to take into account the impact of teleconference technology is simple, yet has profound implications, as suggested above. It requires a diagrammatic drawing together of the learners into a network or networks that might be independent of the instructor, or at times linked to the instructor. What is shown in these diagrams (see Figures 2.2a-f) is that in all forms of distance education, using such traditional media as correspondence, or highly structured radio or television broadcasts or tapes, what was before a bilateral relationship between a teacher and a distant learner is now a multilateral relationship that brings an enormous number of dialogues between and among participants.

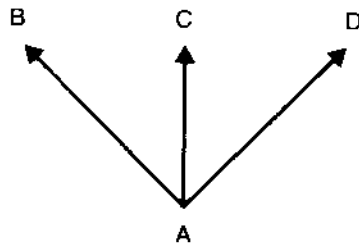


Figure 2.1a Conventional teaching

Figures 2.1b–2.1g Forms of distance teaching before introduction of teleconference media

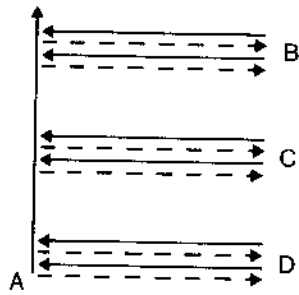


Figure 2.1b Telemathic teaching type + D + S (e.g. correspondence)

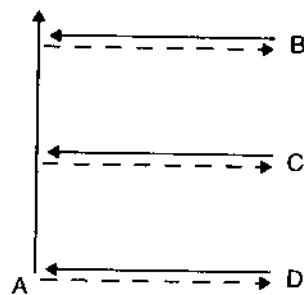


Figure 2.1c Telemathic teaching type - D + S (e.g. radio programme)

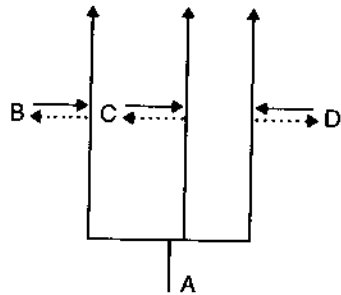


Figure 2.1d Telemathic teaching type + S - D (but less structured than Figure 2.1c - e.g. programmed text)

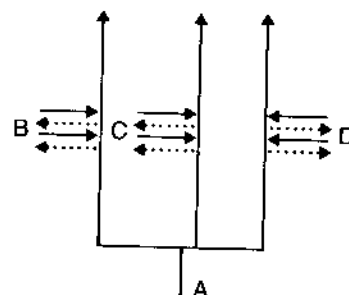


Figure 2.1e Telemathic teaching type + S + D (but less structured than Figure 2.1d - e.g. computer-assisted instruction)

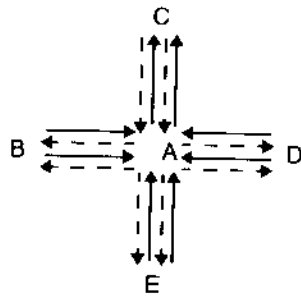


Figure 2.1f Telemathic teaching type + D - S (e.g. tutorial)

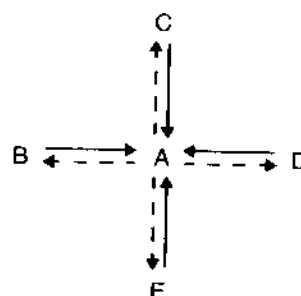


Figure 2.1g Telemathic teaching type - D - S (e.g. textbook)

Figures 2.2a–2.2f Forms of distance teaching after introduction of tele-conference media

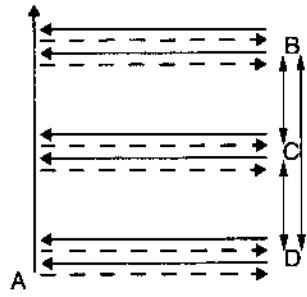


Figure 2.2a Telemathic teaching type + D + S (e.g. correspondence)

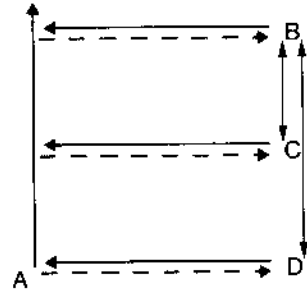


Figure 2.2b Telemathic teaching type - D + S (e.g. radio programme)

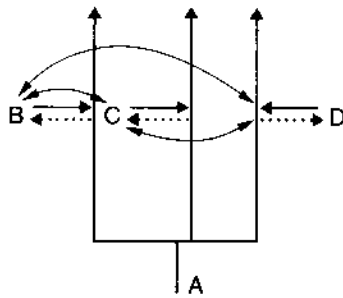


Figure 2.2c Telemathic teaching type + S - D (but less structured than Figure 2.2b - e.g. programmed text)

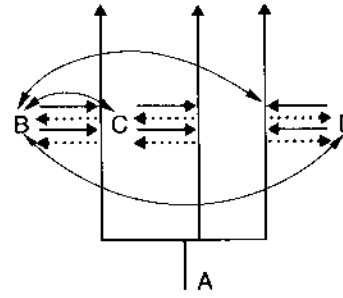


Figure 2.2d Telemathic teaching type + S + D (but less structured than Figure 2.2a - e.g. computer-assisted instruction)

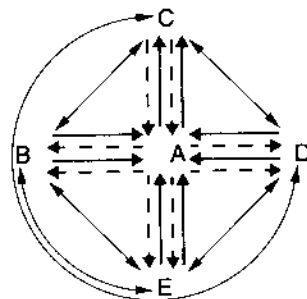


Figure 2.2e Telemathic teaching type + D - S (e.g. tutorial)

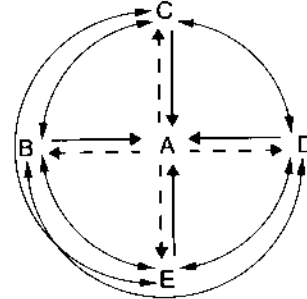
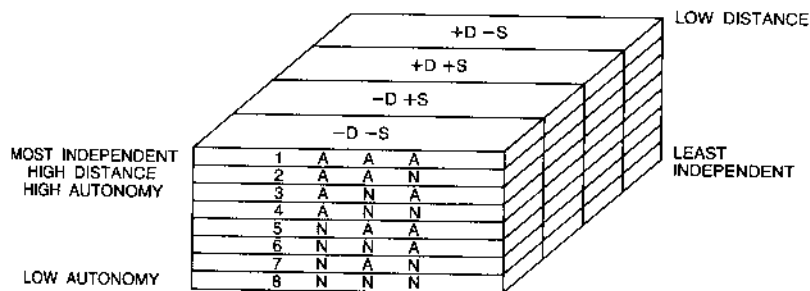


Figure 2.2f Telemathic teaching type - D - S (e.g. textbook)



THE PLACE OF TELECONFERENCING IN THE TYPOLOGY

The typology of distance education developed in the original theory of transactional distance, as reproduced in Moore (1983) is represented in Figure 2.3.

Compared with broadcast, recorded or correspondence media, learner-instructor interaction by teleconference is more dialogic and less structured. Programmes are –s + ,i.e., less distant. On the original typology they fit approximately above the tutorial and below the correspondence method. What about autonomy? Are learners more able to plan, implement, and evaluate? Compared with selfdirected study, no, since there is an instructor who often dominates (or at least influences) planning, implementation and evaluation. Compared with other institutionally provided distance education programmes such as those delivered by correspondence, the higher degree of student participation should result in relatively autonomous learning. There is greater potential for instructors to consult the learner group by audio and video and the individual by computer. There is greater potential for individual self-directed implementation, and more self-evaluation. Above all, there is great potential for peer support and for peer generation of knowledge. Therefore it can be hypothesized that in the hands of progressive teachers, teleconferencing gives opportunity not only to reduce distance but also to increase the autonomy of learners.

REFERENCES

- Boyd, R. A. (1966) 'Psychological definition of adult education', *Adult Leadership* 13, November, 160-81.
- Apps, J. W. and Associates (1980) *Redefining the Discipline of Adult Education*, San Francisco: Jossey-Bass.
- Dewey, J. and Bentley, A. F. (1949) *Knowing and the Known*, Boston: Beacon Press.
- Knowles, M. (1970) *The Modern Practice of Adult Education*, New York: Association Press.
- Kowitz, G. T. and Smith, J. C. (1987) 'Three forms of instruction', *Journal of Educational Technology Systems*, 15(4) 419-29.
- Maccia, E. S. (1971) 'Instruction as influence toward rule governed behavior', in R. Hyman (ed.), *Contemporary Thought on Teaching*, Englewood Cliffs, N.J.: Prentice-Hall.
- Moore, M. (1972) 'Learner autonomy: the second dimension of independent learning', *Convergence* V(2), 76-88.
- (1973) 'Toward a theory of independent learning and teaching', *Journal of Higher Education* XLIV(12), 661-79.
- (1983) 'On a theory of independent study', in D. Sewart, D. Keegan and B. Holmberg (eds), *Distance Education: International Perspectives*, London: Croom Helm.
- Rumble, G. (1986) *The Planning and Management of Distance Education*, New York: St Martins Press.