

Trends and needs in distance education research: the death of distance

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ABSTRACT

Now that the University of South Africa and other South African universities are making full use of electronic media, we need to reflect, again, on some of the traditional trends and needs in distance education research. In developed countries, distance education has been mediated by different means, these being correspondence, telecommunications and computers. The fourth is now emerging: the virtual classroom, which uses a combination of merged media. In both the developed and developing world, distance education is the education of the future. The merging of the technologies will completely revolutionise the way distance education is designed. Distance education in South Africa still relies on correspondence and telecommunications, but is rapidly starting to make far more use of computers and, indeed, the virtual classroom. Many lessons can be learnt from the international experience and it is not necessary for South Africa to reinvent the wheel. This article summaries some of the trends and needs in distance education research.

INTRODUCTION

During the past ten years, a number of newcomers have become involved in distance education in South Africa. Historically, distance education in South Africa has been dominated by the University of South Africa, but now both private companies and residential universities are entering this field. This is partly because distance education is cost-effective compared with "face to face" tuition; also, distance education also makes it possible for many learners to benefit from the teaching of one good instructor (ie via electronic media). Some developed countries (eg the United Kingdom) have been using electronic media for over thirty years while South Africa, a developing country, is still experimenting with how best to use these new communication technologies. As South African universities start to make increasing use of technology such as digital video distribution, it might be useful to again reflect on some of the traditional trends and needs in distant education research. This article makes extensive use of the research work of Professor Michael G Moore, Penn State university, who has been publishing in this area for over twenty-five years.

DEFINITIONS OF DISTANCE EDUCATION

At the first conference on Distance Education in Russia, Moscow, in 1994, Professor Michael G Moore of the American Centre for Study of Distance Education (ACSDE) highlighted a number of trends and needs in Distance Education (DE) research. As editor of *The American Journal of Distance Education*, he regularly reviews the progress in this field (<http://www.ed.psu.edu/acsde/ajde>). In 1995, *The Economist* predicted that "The death of distance will mean that any activity that relies on a screen or a telephone can be carried anywhere in the world". Moore points out that this will greatly influence both teaching and leaning.

Distance Education (DE) has traditionally meant that the tutor and learner are separated by geographical space. Correspondence packages initially included printed study guides and reference books, and learners and tutors communicated by written assignments and exams. According to Moore (1994:2) "distance education consists of all forms of education in which the learner is normally in a different place from the teacher, so that the normal media of communication is the printed and electronic media".

DE forms part of a planned learning programme. It has been seen largely as self-study and is often perceived as inferior to the teaching and learning offered at residential universities.

However, Knight (1994:129) believes that, with the rapid developments in digital and telecommunication technologies, in at least some parts of the world information can now be delivered and knowledge imparted that is equal to or even better than traditional face-to-face teaching. The field of DE research has been expanding rapidly over the last two decades. There is now a body of knowledge from which a structure is emerging (note that data in this field has been systematically collected over a number of years).

THE GENERATIONS OF DISTANCE EDUCATION

In developed countries, there have been three "generations" of DE. Moore (1994:3) states that DE has moved through three different generations (correspondence, telecommunication and computer) and is still moving. The fourth generation - that is, the virtual classroom - is just emerging. However, Ljosä (1993:183) does not agree with this notion (ie of three generations), because this implies that a certain technology is obsolete and will not survive. Instead, he sees DE as being characterised by different systems that one can choose from. He believes that "old" and "new" technologies will merge in new ways and that the postal, printed and broadcasting media will not disappear.

First generation: correspondence courses

During the first three quarters of the 20th century, the main method of distance learning was by printed correspondence courses. Education was delivered "through the mail" but, from the 1960s onwards, distance education started using recorded audio, video and broadcast programmes. Moore (1994:3) states that, globally, this combination of media probably still supplies instruction to more students than any other.

Second generation: Open University model

During the 1970s and 1980s many countries initiated national Open Universities, the best known being the British Open University (OU). Moore states (1994:3) that they were different from correspondence institutions in many respects: "they were autonomous, degree granting and spent huge amounts of money on sophisticated course design and intensive student support networks". Flourishing research departments emerged, and they reported extensively on their students' achievements and attitudes, as well as on the logistics of their programmes. They also kept check on the effectiveness of resource usage. However, Moore (1994:4) believes that there is little generalisable knowledge in this research.

Third generation: new technologies for teaching programmes

- Interactive: Moore (1994:4) claims that, in America during the 1990s, there was a sudden, huge upsurge of interest in the possibility of applying new teleconference technologies to education. Unlike the one-way broadcast (which has been criticised for encouraging a "passive" learning model), teleconferencing technologies were interactive in that they allowed the instructor and trainee to communicate visually with each other via an auditory channel.
- Limited interactive television (LITV) is described by Lemak and Miskin (1992:2) as "the use of microwave, fibre optic and/or cable television to transmit video and audio signals to remote sites and allows students to respond back via telephone lines". Although Lemak and Miskin are focusing specifically on television, talk radio would also be a medium.
- Unlimited television (UITV) Unlike LITV, UITV enables the instructor and trainee to both hear and see each other. Lemak and Miskin (1992:3) define UITV as "TV studio class rooms at both the origination and remote sites", which allow audio and visual interaction between tutor and learner and between all learners at all sites This sophisticated technology is, indeed, very interactive and can even be used across national borders (by satellite broadcasts). Unfortunately, it is not cheap.

Fourth generation: virtual reality

The concepts of virtual class and global university have emerged since the teleconferencing media made it possible for learners in distant groups to communicate in real time. Moore (1994:4) states that computer-controlled "multimedia" programmes combine new forms of recorded and interactive media which allows "learners to receive instruction from any source and from a variety of sources". The merging of the technologies will revolutionise communication. This type of learning can be independent of any institution. Jennings, Davies and Reif (1994:11) described virtual distance learning as a programme having "no bricks and mortar main campus or physical central administration centre, but consisting of co-operating groups of administrators, course providers, tutors, authors, technology providers and learners who are physically separated from each other often across national boundaries but who work and learn interactively using advanced telematic technologies".

Figure 1 outlines the major stages of DE, and the "add on" technologies. As I said earlier on, DE in South Africa is still largely first- and second-generation DE; experimentation has only just started with third and fourth generation DE models.

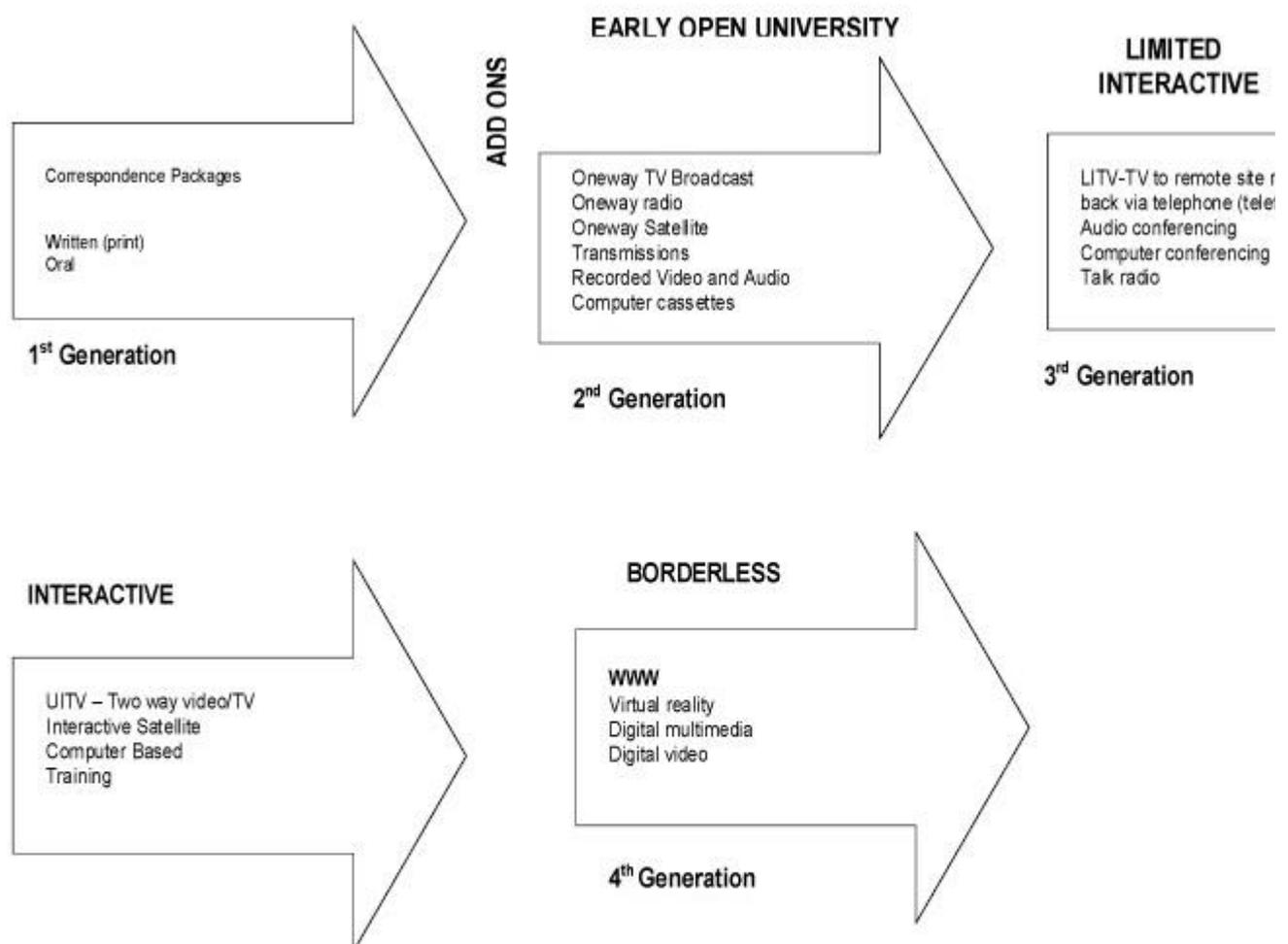


Figure 1: The stages of distance education in developed countries
Adapted from Makin, V Doctorate of Business Administration, Pretoria University, 1996

TRENDS AND NEEDS IN DISTANCE EDUCATION RESEARCH

Professor Michael G Moore explains that DE research is characterised by a systematic collection of data, based on a conscious effort to relate relevant questions to previous research and theory. Much of what is called research, he claims, is in fact just "show and tells", with limited generalisability or understanding of the historical and theoretical body of knowledge relating to DE. He quotes Coldway: "Science is not primarily concerned with the uniqueness of events but with what they have in common with other events in order to explain that uniqueness in terms of general principles" (Coldway 1988:46).

Moore (1994:16) identifies many areas and concludes that, over the past decade, the amount of research has increased considerably and "... the quality of the better research has improved greatly". However, from a scientific perspective, the field is still "... extremely infantile in the method it uses ...". There is now a body of knowledge from which a structure is emerging. Moore (1994) reviews the following trends and needs in Distance Education Research: comparative effective studies; learner achievement and attitudes; course design and media selection; the role of instruction and instructors; cost-effectiveness of DE technology; institutional and national policy and administration; and theory and research methodology.

Comparative effectiveness studies

These studies compare two or more teaching media. In the last 60 years many such studies have been done. They show that correspondence is just as effective as face-to-face teaching. The results indicate that there is no significant difference between the quality of learning in a "face-to-face" lecture compared with the quality of learning gained through a multi-media package of correspondence, text, study schools, group visits and assignments supported by videotape.

According to Moore (1994:5) there is a great deal of evidence "that studying at a distance, especially that which uses interactive electronic telecommunications media, is effective, when effectiveness is measured by the achievement of learning, by the attitudes of students and teachers and by cost-effectiveness". However, this point of view is not necessarily conclusive because, according to Moore, it is based on anecdotal evidence offered by persons and institutions who vested interests in DE.

Research need: Comparative effectiveness is no longer regarded as of prime importance because it has been established that there are no achievement differences between groups when two or more teaching media are compared. However, there is a need to identify the variables that make a difference in performance between individuals within these groups. There is a need for both research generalisability and more integrated programmes. In the next section, I shall explore research done on learner achievement and attitudes.

Learner achievement and attitudes

Moore (1994:8) quotes substantial research in this area (BajtelSmith 1988, Chacon 1985, Biner 1993), but states that there is very little "sophisticated research and many questions remain unanswered" (1994:9). As far as academic achievement is concerned, distance learners are in no way disadvantaged by the use of technology. However, according to Biner, (1993:63) researchers have largely neglected the study of distance learner satisfaction, that is, attitude to the medium.

Learner achievement

Moore (1994:8) quotes from numerous studies on what contributes to student achievement (Woodley & Parlett 1983, Chacon 1985 in the USA, and BajtelSmith in 1988 in Venezuela). These studies show that a number of variables contribute to student achievement, but no indication is given of the relative importance of each of these variables. Woodley and Pratt

found that drop-out was associated with "gender, course workload, average number of students per tutor, course age and mathematical content". Chacon's (1985, 1989) studies show that the significant dependent variables for student achievement are "... course age, number of students per tutor, course workload, average age of students, instructional quality of printed medium, variety of other media different to print, the time required to complete the course, the reactive behaviour of the tutor and the number of courses previously completed".

Moore (1994:8) refers to studies on learning styles and achievement (Gibson 1988; Bajtelsmith 1988) and found that achievement is related to "the students' age, intention to obtain a degree, amount of courses completed in the institution, motivation for professional achievement, positive self-image about the program, intensity of study hours and self-confidence in examinations ...". This research is of the utmost importance because it shows that there is no difference in learner achievement rates between those students exposed to more traditional face-to-face tuition and those learning through DE (ie DE using electronic media). However, more research is needed on the individual variables which influence course completion. Trainees' attitudes to media can also play an integral part in achievement.

Attitude

According to Moore (1994:8), many studies refer to the effect of communication technologies on the teaching environment, but few researchers have considered how to change the learner's attitude (ie so that the learner is more favourably disposed to the new media). Studies have been done on learner attitude (Biner 1993, Biner et al 1994), but there are still many unanswered questions. Globally, students' attitude to telecommunication tends to be positive (see studies mentioned by Moore (1994), such as Partin & Atkins (1984), Nelson (1985), Barker (1987a)).

Partin and Atkins (1984) claim that management students regard distant delivery as being effective, but they also make the point that the presence of a facilitator at each site and the proper functioning of equipment is very important. Nelson (1985) reported that 97% of students surveyed indicate no more problems in a televised class than in traditional classes, while 67% believed they accepted more responsibility for their behaviour and learning. A willingness to enrol in another TV class was indicated by 97% of the group surveyed and the majority, 94%, believed their level of achievement was as high or higher in TV classes.

However, Barker (1987b) found that 24% of students perceive satellite courses to have the same level of difficulty as regular classes, while 65% believed them to be more difficult. Although, globally, all this seems to be good news for TV technology as a learning medium, this information has not been surveyed in South Africa.

Moore (1994) quotes Pryor (1985) and Bevan (1983) as having done research on resistance and changing users' attitudes. The former sets out a model for changing negative attitudes. Obviously, any change requires extensive training to prevent participants feeling frightened of the new technologies (techno phobia). Moore (1994:9) indicated that there is also some suggestion that a positive student attitude and achievement is more closely related to the support system designed to help the learner and concludes that, although there is much anecdotal evidence on the effectiveness of DE, little exists in the way of sophisticated research.

Research need: According to Moore (1994:9) research is still needed to distinguish, methodically, between the different types of learners who learn successfully. The following questions need to be considered:

- What is the exact relationship between individual differences and learning achievement?
- Which learner prefers and learns best from which media?
- Do some people learn better at a distance or "face-to-face"?

There is still a need for systematic studies that consider many variables such as intelligence, socioeconomic background, learning styles, and how best to use this information (Moore 1994:10).

Course design and media selection

Course design is a complex area because it means combining expert knowledge from various sources such as the target learner, content expert and the communication medium. Poor design of an integrated learning package can lead to conflict and poor communication and, ultimately, to a disappointing learning experience for the student. To Moore (1996) the "art of effective instructional design in DE depends largely on making the right selection among media for each particular content and each type of learner within various constraints, particularly those of cost" (<http://www.ed.psu.edu/acsde/ajde/e103.asp>). All the research on course design and media selection focuses on how to put together multimedia programmes and optimise the medium that is used. However, the medium must always be brought back to the learner. Designing a learning package may involve project teams consisting of as many as 20 people and may have million dollar budgets. Organisation and control for maximum efficiency and effectiveness is vital, as is the development of good group dynamics and creativity within groups.

According to Moore (1994:7), there are many research areas which have still not been clarified. Some of the questions raised are:

- How can academic content be effectively structured for the learner?
- What is the relationship between the printed material, electronic media and the classroom teacher?
- How can one provide for different learning paces?
- What instruments are appropriate for evaluating distance learning?• How can participation be "designed into" the package?

Moore (1994) also quotes Dutton and Lievrouw (1982:113) and says that the desired learning outcomes should provide the basis for technology choices - in other words: "content driven rather than technology driven". However, cost considerations obviously come into play here.

There are many variables that influence course design, either from a learner perspective, a pedagogical perspective or a financial perspective. Although there seems to be many warnings against not allowing the education process to become hardware (technologically) driven, authors writing for academic journals tend to be highly educated and thus might favour content (simply because of their vested interests). Although the voices of television directors are unlikely to be heard in a scientific journal, many might warn verbally against boring "talking heads" and not using the TV medium effectively.

According to Moore (1994:7), certain characteristics have been identified (by Wagner & Reddy 1987) in teleconferencing delivery transmission:

- "audioconferencing (good for discussion of abstract concepts)
- audiographic teleconferencing (combination of verbal messages and visual material provides both abstract and concrete learning experiences)
- video teleconferencing (permits audio and visual interaction, thereby improving learner satisfaction)
- computer conferencing allows convenient transmission of text or graphics".

Research need: This area is vast, but it basically aims to obtain knowledge for practitioners so that they can make rational choices about choice of media. Although some media selection models have been proposed in recent years, the field seems to still be wide open (Lane 1989, Stubbs & Burnham 1990). In the following section, I will emphasise the role of instruction and instructors.

The role of instruction and instructors

Given the availability of new technologies, is a classroom or a classroom teacher still needed? Some of the questions raised by Moore (1994:10) are:

- "What is the role of the teacher - counsellor, facilitator of interaction?"
- How is this going to influence teacher training when most teachers training courses did not include the use of technology?
- How is effective teaching achieved?"

Moore summarises Herr and Gillespie's (1994:379) work by quoting their conclusion - "Essential to academic success is an administration that provides adequate recognition and appropriate planning, training and support systems for faculty and staff assigned to design, deliver and evaluate instruction for distance learners".

Kilpert (1994:185) of Unisa's Bureau of University Teaching (BUT), which provides guidance in teaching skills, sums up most academics' attitude to BUT as "... apprehension, distrust and or scepticism ..." or put another way - BUT ... what's in it for me? Moore (1994:10) reviews the work of Bronstein, Gill and Koneman (1982), Boone and Basset (1983), Boone (1984), Haaland and Newby (1984) and Schaeffer and Roel (1985) in this respect.

Teaching skills

Teleconferencing teaching skills tend to be different from classroom teaching. According to Bronstein, Gill and Koneman (1982), teleconferencing teaching skills include the following:

- promptness in coming on the line
- starting the programme on time
- use of a natural style of delivery
- speaking slowly and enunciating clearly
- spontaneity
- avoidance of "reading from a script".

In investigating students' perception of teaching behaviours needed to effectively deliver course content (both conventionally and via teleconferencing) Haaland & Newby (1984) observed five statistically significant differences in the frequency of effective teaching behaviours on the part of teachers using teleconferencing. These are:

- use students' names,
- set out clear statements of purpose,
- use printed material,
- encourage discussion
- do not speak in a monotone.

According to Moore (1994:11), in a study aimed at finding out which teaching behaviours students consider necessary in teleconferencing and in "face-to-face" courses, Shaeffer and Roel (1985) discovered that there were differences in students' perceptions of the two delivery modes. By using group interviews and questionnaires to obtain student feedback, they discovered that students in teleconferencing courses gave higher ratings of the course and the instructor's teaching ability than did those in the "face-to-face" course. This feedback was based on students' perceptions of instructor clarity, enthusiasm, organisation, pacing and the fact that students felt the teleconferencing instructor encouraged student participation. Shaeffer and Roel suggest that these differences might result from the instructor's attempts to alter behaviour because of a knowledge of appropriate teleteaching techniques, techniques which, if used, might also increase student satisfaction with "face-to-face" instruction.

Implications for teaching

According to Moore (1994:11) all the following skills are needed to improve electronic teaching: "course design and curriculum development; skills and techniques of writing and recording; teaching for both particular media and for the integration of media, including working in design and presentation teams; the production of written, recorded and teleconference teaching; planning and managing distance education systems at local, state and national levels; techniques of facilitating interaction; research and evaluation techniques; student support and counselling".

In Moore (2000) there is still debate about whether Distance Teaching is more work or less (<http://www.ed.psu.edu/acsde/ajde/ed143.asp>), but the cases that were compared were very different and no conclusion is given.

Research need: These skills are teachable, but how to help teachers in lifelong learning has not yet been established. What will the teacher of the future look like? Although their effectiveness, according to Moore (1994:11) still seems to "depend on knowledge, skills, enthusiasm and commitment to innovation", the highly talented teacher is rare. However, DE can distribute the work of master teachers to large numbers of students. What will this mean - resistance to change by more average teachers? Teaching becoming more important than publishing in order to attract "large" audiences as the entertainment industry does? A more democratic style of teaching replacing the more autocratic style?

Autonomy

How can one make a learner autonomous or how do different learners react to autonomy? Although DE seems to now accept that students should be capable of "independent academic effort", initially there was more of a climate of how best to control students rather than trusting them to behave in an autonomous way (Moore 1994:12) Today, the belief is that learners' autonomy should be the goal of DE and that learner independence is a valuable resource.

Research need: Moore (1994:12) has suggested that "learners have different capacities for making decisions regarding their own learning". Designers must use these abilities and help learners develop a personal learning plan that fits their needs and environment. The objective of DE should be to encourage and support students to become self-directing learners. Much more research is needed on how to achieve this.

Group interaction

How can effective group dynamics be developed in DE? According to Moore (1994:13) much research "is needed to find out about the characteristics of successful distance learning groups, so that eventually we will be able to train both instructors and students in the knowledge and skills needed to make such groups successful." DE can be an isolated activity, but it is not the solitary activity it used to be. The use of learning centres, tutors, group formation and video conferencing are some of the ways used to increase socialisation and learning.

Research need: The reason for one group being more successful than another is unclear but, according to Moore (1994:13), it seems to depend on the personalities in the group, personal autonomy, inter-personal dynamics and on an informal leader or shared leadership. Good group interaction leads to increased learning. According to Moore (1994:14), problems occur when someone who wants a leadership role is rejected, when two or more people compete for leadership, or if the level of autonomy in the group is so low that no one takes the lead in the decision-making process. Individuals who have difficulty collaborating or who depend on "control" from the distant instructor can cause conflict and this, in turn, may disrupt the group to the point that it breaks up.

DE cost-effectiveness and technology

Generally speaking, the main point is that DE is extremely cost-effective especially when numbers are large, quality is high, and when the opportunity costs are considered. However, it must be borne in mind that the cost of broadcast TV tends to be much higher than printed costs per hour of study and it can cost between five and thirty times as much as for radio programmes (Adey 1990:90).

Moore (1994:14) believes that many variables influence cost-effectiveness, some of which are listed below :

- cost of telecommunication compared to traditional delivery
- potential savings due to reduced travel expenses
- savings on fewer teachers
- increased enrolments.

Costs can be broken down into many components and the control and evaluation of these components is obviously essential. This is obviously particularly important in a developing country that is experiencing serious economic difficulties.

Batey and Cowell (1986) suggest the following:

- a model for obtaining and analysing cost information
- determining overall costs
- component costs
- per student costs
- determining costs of alternative delivery methods
- a record of all cost data, including already paid for costs
- relating costs to educational gains.

Research need: An effective evaluation or management system must be in place to measure costs. What is the best way of obtaining strategic synergy to increase the numbers and decrease the costs, especially in a developing country where resources are limited? The need to design effective packages is essentially a cost-saving concern, because poor quality packages are a waste of time and resources. Further research is needed here, because it is not always clear what constitutes a waste of resources.

Some examples could be missing the target audience; using a more expensive medium when a cheaper one might have been just as effective; communication conflicts between interested parties; poor presentation skills; and alienating learners. In a developing country, where resources are limited, research is needed to ensure that time and money are not wasted on "reinventing the wheel". Much of this research has already been done and is being put to practical use in developed countries. This research could form part of a national policy for DE in South Africa (although, of course, local conditions must be taken into consideration). Research on national policy and administration is covered in the next section.

Institutional and national policy and administration

Institutions and nations need to undertake research into problems that might arise when a new or unfamiliar system is put into place. Expert input is essential for administrators tasked with developing institutions and/or DE programmes. According to Moore (1994:6) there is often a gap between those who have real expertise and "those who catch the eye of the policy- and decision-makers". At Penn State University, a task force from one of the university's faculty was briefed to investigate change. Part of their recommendations included incentives and training for the faculty.

Research need: Moore (1994:6) identifies a need for research into "mechanisms that might lead to good policy making". In South Africa, an analysis of the new democratic policy-making procedures, including the work of the ANC policy groups, could be valuable for future DE work.

All the above trends and needs in DE research form part of the theory and methodology of this field. Research into the formulation of theory and suitable methodologies will be discussed in the following section.

Theory and research methodology

There still seems to be much research needed into the theory and methodology of DE research. Moore criticises most models in DE, because they lack robustness or are "theoretically shallow". In the last twenty years, however, Moore claims that DE research has improved greatly: "the quality of the better research has improved greatly". However, he feels the methods used are still rather unsophisticated. Although, globally, this view may be valid, DE research data have been systematically collected for a number of years now. In South Africa this field is relatively new and, although there are reports on how to use technology for DE education, this doctoral study (1996) is the first that examines the domain of management education and interactive technology.

Research need: An integrative model is needed that is based on causal modelling techniques that examine variables and how they impact both on each other and the dependent variables. Integrative theory, quasi-experimental research, experimental and advanced ethnographic research are also required (Moore 1994:16).

CONCLUSION

The research domain of DE is extensive, complex, multi-disciplinary and interconnected. The developed world has been using communication technologies for DE for decades and much can be learnt from past experiences. Some general lessons from developing countries are included in this report. It is not necessary for South Africa to reinvent the wheel.

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