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ABSTRACT

The first of two papers in this publication is "Teaching by Satellite in a European Virtual Classroom" (Desmond Keegan). It describes the first accredited university course by satellite, a 1-year certificate course in safety and health at work offered by the University College Dublin. It discusses the enrollment of 219 students at 10 sites (the target enrollment was 10) and the 5 interlocking didactic structures: printed distance education materials, satellite-transmitted lectures, live and interactive telephone discussions via satellite, tutorials, and assessment activities. It reports that only one student dropped out and students and tutors agreed about the academic excellence of the course. The second paper, "Open Universities--Their Rationale, Characteristics, and Prospects" (Borje Holmberg), is a presentation of the concept of the open university. It discusses the development of open university system and then analyzes the educational characteristics, organizations, evaluation, and economics of open university work. The student bodies are described, and the problem of completion and dropout is discussed on the basis of empirical studies. The last two sections refer briefly to research on open university work, its organization in open universities, and the expected development of independent open universities as well as of parallel work more closely related to the mainstream of university education. Appendixes list 32 references and 8 suggestions for further reading. (YLB)

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Z I F F P A P I E R E 92

Desmond Keegan

Teaching by Satellite in a European Virtual Classroom

Börje Holmberg

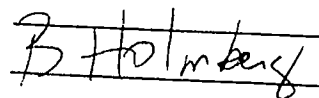
Open Universities
- Their Rationale, Characteristics and Prospects

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TEACHING BY SATELLITE IN A EUROPEAN VIRTUAL CLASSROOM

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May 1994

1. TEACHING FACE-TO-FACE AT A DISTANCE

Conventional face-to-face, group-based education

From time immemorial man has been involved in education.

Education is the comprehensive activity in which we come to know ourselves and the world around us. It is the activity in which a society transmits its traditions, its values, its hopes and its fears from one generation to the next.

Most modern textbooks of the History of Western Education start about 2400 years ago with Plato in the Grove of Asclepius. The characteristic structures of this form of education - the dialogue, the dialectic and the analysis-, have been characteristic of Western education ever since.

The lecture was added to this range of didactic strategies by the medieval universities. Humanism added the seminar and the tutorial. Today these are the characteristics of education in our schools, colleges and universities:

- * face-to-face education
- * between teacher and learner in the learning group
- * based on interpersonal communication.

Teaching at a distance

The history of distance teaching begins 150 years ago. The wondrous developments of technology associated with the Industrial Revolution in Northern Europe and North America made it possible for the first time in history to teach at a distance.

What is essential to distance education is the separation of teacher from learner and of the learner from the learning group. Distance education recognised that teaching and learning are separate acts that can safely and effectively be carried on by means of communications technology even though teacher and learner are separated in space and time.

Distance education is characterized by the replacement of interpersonal face-to-face communication in the learning group by an apersonal mode of communication mediated by technology. As a result the first 100 years of distance education were characterised by doubts and criticism. But the development of open universities throughout the world in the 1970s brought rapid improvements in the quality, the quantity and the status of provision. By 1994 at least 20 000 000 students, mainly

adults, studied at a distance worldwide and the acceptance of distance university degrees was generally conceded.

Teaching face-to-face at a distance

The possibility of teaching face-to-face at a distance was made effective in the mid 1980s by an Electronics Revolution in telecommunications. This can be attributed to three factors: an urge to deregulate, the speeding up of chips and the introduction of broadband technology. Telecommunications became consumer-driven as governments sought the breaking up of monopolies and open tendering for better services for government money.

These developments of the period 1985-1994 are of vital interest to educators and the wondrous developments in telecommunication of the Electronic Revolution made it possible for mankind for the first time in history to teach face-to-face at a distance. The coming together of television and telephone technologies offers the possibility of teaching face-to-face at a distance in virtual classrooms via compressed video or full bandwidth or satellite links and brings a wondrous new array of educational possibilities.

This paper deals with teaching by satellite in a European virtual classroom.

It should be underlined that conventional face-to-face teaching continues and will continue to prosper in schools, colleges and universities throughout the world. It should be underlined that correspondence and other distance teaching based on earlier technologies continues and will continue to prosper in correspondence schools and open universities throughout the world. But today it is possible to teach face-to-face at a distance from Dublin in Ireland to Hagen in Germany or from Hagen to Dublin.

2. THE PROBLEM

In Europe the first accredited university course by satellite, teaching face-to-face at a distance, began on 1 October 1993 and is now finished. It was a one year Certificate course in Safety and Health at Work. The last lecture took place from University College Dublin (UCD) on 6 May 1994 and the university examinations were held on 27 May 1994.

The problem addressed by this course was:

- * EU and national legislation on Safety and Health at Work in the years 1987 to 1994 is extensive. Much of it is prescriptive. Most small and medium-sized enterprises (SMEs) need and want to have staff trained as safety officers and safety representatives. The first major Court cases under the new legislation will occur shortly and companies need staff trained in this area.
- * Although Ireland is a small country roads are poor and it is inconceivable that company staff from all over Ireland could travel to the capital at regular intervals to attend the course.
- * Live, interactive didactic strategies and technologies were required by the nature of the course and the expectations of business students from SMEs
- * Safety and Health is a multidisciplinary study dealing with Law, Chemistry, Ergonomics, Organizational Behaviour, Agriculture and Accident Causation. The lecturers, chosen from semi-government bodies, universities and industry, are mostly based in Dublin. It is inconceivable that they could travel from the capital at regular intervals to lecture at sites throughout the country.

The challenge was to provide the course from the university in Dublin to students at or near their workplace in such a way that students would only be absent from work for 2 hours a week plus local travel time and in such a way that academic excellence in teaching and learning would be achieved, at least on a par with that of students travelling to the university on a regular basis to attend conventional lectures.

3. THE SOLUTION

The solution was a virtual satellite-based system, which we called the European Virtual Classroom for Vocational Training.

The European Virtual Classroom comprises an electronic classroom from which the course is taught, a network of specially equipped electronic classrooms at which students are present, and the satellite, microwave or cable linkages between them.

In the Irish Virtual Classroom system the electronic classroom from which the course is taught is at the Audio Visual Centre, University College Dublin. The specially equipped electronic classrooms at which the students are present are located in Irish Regional Technical Colleges (*Fachhochschulen*) and other centres in Ireland, with a potential network of hundreds of additional receive sites throughout Europe (see Figure 1).

In the Irish system the sound and vision output leaves the Audio Visual Centre by a permanently installed 23 GHz microwave link to the Radio Telefís Eireann mast and is retransmitted by the permanently installed European Broadcasting Union uplink to the Eutelsat 2F4 satellite at 11 GHz to the European Broadcasting Unit transponder and is then downlinked to the satellite dishes at the colleges and centres in Ireland and to other receivers throughout Europe.

The satellite has a footprint from Iceland to Israel and from Moscow to Morocco (see Figure 2).

The equipment selected for the Irish Virtual Classroom system is:

A suitably located classroom, tiered if possible, suitable for 30 adult students containing:

- * 1 cable linking to 1.2m satellite dish and receiver
- * 1 screen (approx 1.5m x 1.5m)
- * 1 Liquid Crystal Video Projector
- * 1 Darome audioconferencing unit
- * 1 telephone
- * 1 fax machine.

At these receive sites the audio and video signals are separated at the receiver. The audio travels via the Darome audioconferencing unit. This allows talkback facilities during transmission from the remote site to the UCD studio whilst eliminating feedback. A loop in the audio system would exist when the remote location tried to speak on air. The audioconferencing unit, however, has a switch which, when

activated, cuts the incoming satellite sound thus breaking the loop when the remote site is live on air (see Figure 3).

The target enrolment for the course was 10 students at 5 electronic classrooms in different parts of the country. In the event 219 students enrolled and we had to create 10 sites. These were:

- * Athlone Regional Technical College
- * Dundalk Regional Technical College
- * FAS Athlone (Government Employment and Training Agency)
- * Letterkenny Regional Technical College
- * North Tipperary VEC
- * Radio Telefís Éireann Training Centre
- * Tallaght Regional Technical College
- * University College Dublin Centre I
- * University College Dublin Centre II
- * Waterford Regional Technical College.

In addition listeners from the Netherlands, France and Greece participated live by telephone from receive sites in their countries.

Costs

The costs of the course are:

EU	£200 000
UCD	£100 000
Fees	<u>£100 000</u>
Total	£400 000

The target for next year without EU funding would be 300 students @ £600 each or £180 000 .

Other educational uses of satellites

There has been extensive use of satellites in education in the United States of America. The National Technological University at Fort Collins, Colorado, for instance, is a consortium of 44 member universities that provides a large range of distance education courses broadcast by satellite.

American journals like *The American Journal of Distance Education* have published evaluation studies of courses by satellite for a number of years (Orchard et al 1993).

There has been considerable reporting in the literature on the educational use of satellites in Europe over the last decade. A W Bates, for instance, formerly Professor of Educational Technology at the Open University of the United Kingdom and now at the Open Learning Agency at Vancouver, Canada, gives considerable space to the educational use of satellites (Bates 1993) with details of projects by Olympus, Delta, Europace and Comett. Van den Brande in her book *Flexible and distance learning* published in 1993, gives extensive consideration to the educational use of satellites in Europe, focusing particularly on Eurostep, Channel e and Europace (van den Brande 1993)

The University College Dublin (UCD) course differs from all these other initiatives listed in the European literature in the following:

1. The UCD satellite course was approved by the Faculty of Science of the university, then by the Academic Council of the university. The Governing Body of the university gave full accreditation to the course as a University College Dublin Certificate. UCD is believed to be the first European university to accredit a satellite course.
2. Structures have been put in place whereby students from all over Europe can enrol in the course, be examined by UCD and receive the UCD Certificate. These structures detail the fees to be paid, enrolment policies to be followed, tutorial arrangements, details for submission of assignments, time and place of UCD examinations.
3. Negotiations have begun for the registration of the Certificate on the European Credit Transfer System (ECTS) schedules. It is anticipated that the Certificate will be the first satellite course registered.
4. In the UCD Certificate the satellite lectures *are* the course. In the other initiatives listed in the literature the satellite provides background, motivation, interest, enrichment, educational information or administrative advice.
5. In the UCD Certificate course students pay the university fees, they are enrolled in UCD, they follow UCD lectures and tutorials, their assignments contribute to their final award and certification, they will pass or fail at the UCD examinations and their results and certification will be moderated by university external examiners. The concept of university failure or certification is absent from the other European uses of satellite technology in education.

4. DIDACTIC STRATEGIES

Students were enrolled at 10 centres throughout Ireland in September 1993 and received two volumes of specially prepared learning materials at an evening session at their centre in late September 1993. For 26 weeks from the beginning of October 1993 to the beginning of May 1994 they came to their centres at 9.00 am where they received their lecture live from the university TV studio (40 minutes lecture, 20 minutes question and discussion). This was followed from 10.00 am to 11.00 am for each of the 26 weeks by a face-to-face tutorial given by a specially trained local tutor.

The pursuit of academic excellence in the Euroform Certificate in Safety and Health at Work rests on five interlocking didactic structures:

- * printed distance education materials
- * 40 minute satellite transmitted lectures
- * 20 minute live and interactive telephone discussions via satellite
- * tutorials
- * assessment activities.

This didactic structure was chosen so that students studying in the European Virtual Classroom would achieve learning on a par with or better than students who might study the same course on-campus at the university, and would score just as well as face-to-face students in competitive university examinations.

Printed distance education materials

Each student received two volumes of printed distance education materials. These volumes can be regarded as lectures in print, giving the content of the course in printed form. They were written by leading authorities on safety and health at work chosen from the university, business and semi-government sectors and were already experienced in lecturing on this subject at diploma level. The same lecturers gave the live satellite lectures.

The volumes were specially designed for adult students studying at a distance, most of whom have work, family and social responsibilities in addition to their study programme.

Satellite broadcasts

The hour-long broadcast delivered live each week by satellite took the form of a 40 minute illustrated lecture followed by a 20 minute discussion or question and answer session, by telephone and fax with the students, tutors and other viewers throughout Europe.

The television production team aimed to achieve a design which was effective pedagogically, user-friendly to the lecturer and the students, and acceptable for television broadcast standards.

A key factor in the design was the facility provided for the lecturers to control their own lectures while at the same time becoming aware of and using the best features of the medium. A self-controlled teaching space was arranged, with full dual control either by the lecturer or the production crew.

Tutorials

From 10.00 am to 11.00 am on each morning of the course tutorials were held at the local centres by qualified tutors, chosen and trained by UCD. In this way students get the advantage of both face-to-face tutoring plus the distance education lectures from UCD.

The tutorials contribute to the didactic structure in many ways: peer group help; discussions of levels of study or advice on how much study is needed for success; analysis of lectures and responses to pertinent questions that could not be raised on air; preparation for the next week's lecture; preparation for and advice on assignments; possibility of forming study groups; administrative procedures.

Assessment

The course design achieves a balance between formative and summative assessment. There are 24 self-assessment questions which provide formative assessment, two university assignments, which can provide both formative and summative assessment and the final examination in May 1994.

The self-assessment questions are planned as a written task of about 30 minutes length. The purpose is to enable students to reflect and apply what they have studied to a practical task so that they can judge for themselves how well they have understood and mastered the content of the topic. Students receive feedback on their self-assessment in the tutorials by comparing their answers with those of other students and with the solutions proposed by the tutor.

Two assignments are programmed in the year's study programme. These are longer pieces of work that are first discussed in the tutorials, then completed and handed to the tutors by a fixed date for marking and feedback. Each assignment is worth 15% of the final grading for the Certificate in Safety and Health at Work.

Course revision and examination preparation is an on-going activity throughout the year's study, with special emphasis on the period in May between the completion of the final lecture and tutorial, and the final examination which is set and marked at UCD and sat for at the local college or centre. The examination is worth 70% of the final grading for the Certificate in Safety and Health at Work.

5. DIDACTIC SUCCESS

There is confidence that the results of the students studying by satellite will be just as good as if the students had travelled to the university to attend lectures, laboratory sessions and seminars in the usual way. There are four reasons for this confidence:

- * evaluation of dropouts
- * evaluation by students
- * evaluation by tutors
- * evaluation by course directors.

Evaluation of drop-out

At 31 December 1993 one student had dropped out of the course, a drop-out rate of 0.4%.

There has been a lengthy discussion for the last twenty years in the distance education literature on the phenomenon of drop-out in distance education. Much of this research suggests that there is a relationship between distance education and dropout.

It is time to query this finding.

There is clear evidence from data collected over 70 years from children's distance education courses that children do not dropout from distance education courses. The data is constant from Australia, France, Canada and New Zealand. There is also clear evidence from the world's largest system today, the 650 000 students enrolled in the Chinese system, that there is no unsatisfactory dropout phenomenon.

It might be claimed that adults in capitalist economies taking on a distance study programme in addition to work and family/social commitments are shown to have problems with persistence in many of the dropout studies referred to above.

This satellite course is an example of adults in a capitalist economy taking on a distance study programme in addition to work and family/social commitment. Students show no propensity to dropout.

Where is the variable that seems to have been missed by other researchers?

A questionnaire to all students revealed that 178 of the 218 students enrolled were paid for by their company. It is clear that if those 178 arrived at work between 9.00 am and 11.00 am during the course the manager or the Personnel Manager of their small or medium sized enterprise would ask why they were not at their distance education course at their local centre.

Student questionnaire

Further evaluation of the course was carried out by questionnaires to all students enrolled and their tutors:

Students were asked:

1. *Is it possible to achieve academic excellence in a satellite delivered course?*

Strongly agree	23%	Agree	63%	Uncertain	14%	Disagree	0%	Strongly disagree	0%
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Asked anonymously about the academic excellence of a highly innovative, satellite-delivered university course, only 14% of students were uncertain. None disagreed. No fewer than 86% were in agreement. It is important to recognise that this is not a sample - it is the judgment of all students: those who were studying hard and those in danger of failing; those with previous university degrees at masters or doctorate level and those who had never done third level studies before; those in senior management in Irish SMEs and those who list their occupation as 'caretaker'.

2. *Was your learning from the course hampered because you did not attend face-to-face lectures?*

Strongly agree	1%	Agree	5%	Uncertain	11%	Disagree	66%	Strongly disagree	16%
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3. *Will your examination results be just as good as if you studied with face-to-face lectures at the university?*

Strongly agree	16%	Agree	56%	Uncertain	23%	Disagree	5%	Strongly disagree	1%
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4. *Would you enrol again in a satellite delivered course?*

Strongly agree	40%	Agree	54%	Uncertain	6%	Disagree	0%	Strongly disagree	1%
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No fewer than 94% of the students enrolled in Europe's first satellite-delivered university accredited course stated they would enrol again in a similar course. Similar questions were asked of the tutors to establish the academic success of the innovation.

Tutor questionnaire

Tutors were asked:

1. *Is it possible for students to achieve academic excellence in a satellite-delivered course supported by texts?*

Strongly agree	50%	Agree	40%	Uncertain	0%	Disagree	10%	Strongly disagree	0%
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2. *Do you agree that students' learning from this course would not be hampered because they do not attend face-to-face lectures?*

Strongly agree	20%	Agree	60%	Uncertain	10%	Disagree	10%	Strongly disagree	0%
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3. *Are you confident that your students' results will be just as good as if they studied with face-to-face lectures at the university?*

Strongly agree	70%	Agree	20%	Uncertain	10%	Disagree	0%	Strongly disagree	0%
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4. *Would you advise students to enrol again in a satellite-delivered course?*

Strongly agree	70%	Agree	20%	Uncertain	10%	Disagree	0%	Strongly disagree	0%
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It seems clear that if UCD taught this course face to face and that students from both groups were to sit for the same competitive examinations that the results of the students who study by satellite would be as good as or better than those of normal students. This judgment is based on the standards achieved by ordinary students in the 2 year part time Diploma in Safety and Health at Work taught conventionally at the university and the standards achieved by the satellite students in the two assignments submitted and evaluated in the satellite course.

Not only has a significant innovation in European university provision been established, a surprisingly warm evaluation of the success of the innovation has been given by university tutors and by students employed by Irish small and medium-sized enterprises, many of whom have extensive previous experience of conventional university studies.

6. CONSEQUENCES

The wondrous developments of technology of the Industrial Revolution of the 1850s brought to man for the first time the benefits of teaching at a distance.

The wondrous developments of telecommunications technology of the Electronic Revolution of the mid 1980s brought to man for the first time the benefits of teaching face to face at a distance.

Technologies already developed and available for distance education development include universal mobile telephony, universal personal telephony, further satellite provision, enhanced computer linkages, fibre to the local loop, or to the home, or to the curb.

For the first time in history a student attending a class in Hagen can interrupt or interact with the teacher in Dublin or vice versa.

The benefits and challenges are immense. Amongst them are:

- * a university can be linked to a series of other universities in the same region, province or country
- * courses can be received and studied by students at a centre near their home or workplace
- * students participate in a classroom as wide as the footprint and have classmates from other regions or nations
- * scarce lecturing expertise is rendered present in local areas which would never otherwise have a university presence
- * the course profile of local colleges or universities is broadened and Europeanized
- * an academically rigorous structure is created for teaching university and training courses face to face at a distance via satellite at local centres throughout Europe.

7. REFERENCES

Bates, A W (1993) Technology for distance educationL a ten-year prospective in Harry, K, John, M and Keegan D (eds) *Distance education: new perspectives* London: Routledge, 176-190.

Oxford, R et al (1993) Factors affecting achievement in a satellite-delivered Japanese language program. *American Journal of Distance Education*, 7,1,11-25.

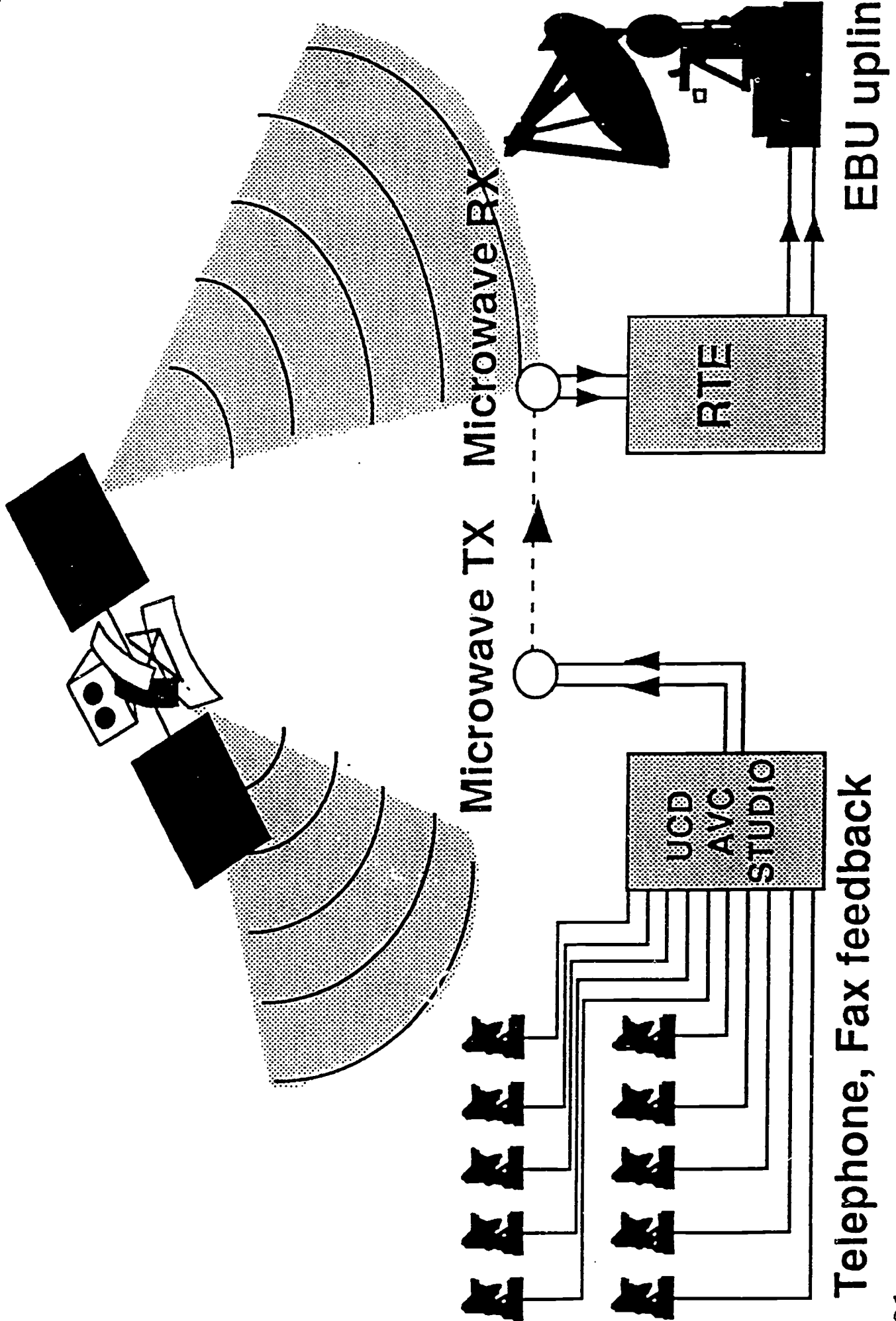
van den Brande, L (1993) *Flexible and distance learning*. Chichester: Wiley.



TELSAT II-F4 enhanced Widebeam Coverage at 7° East.

Fig 1

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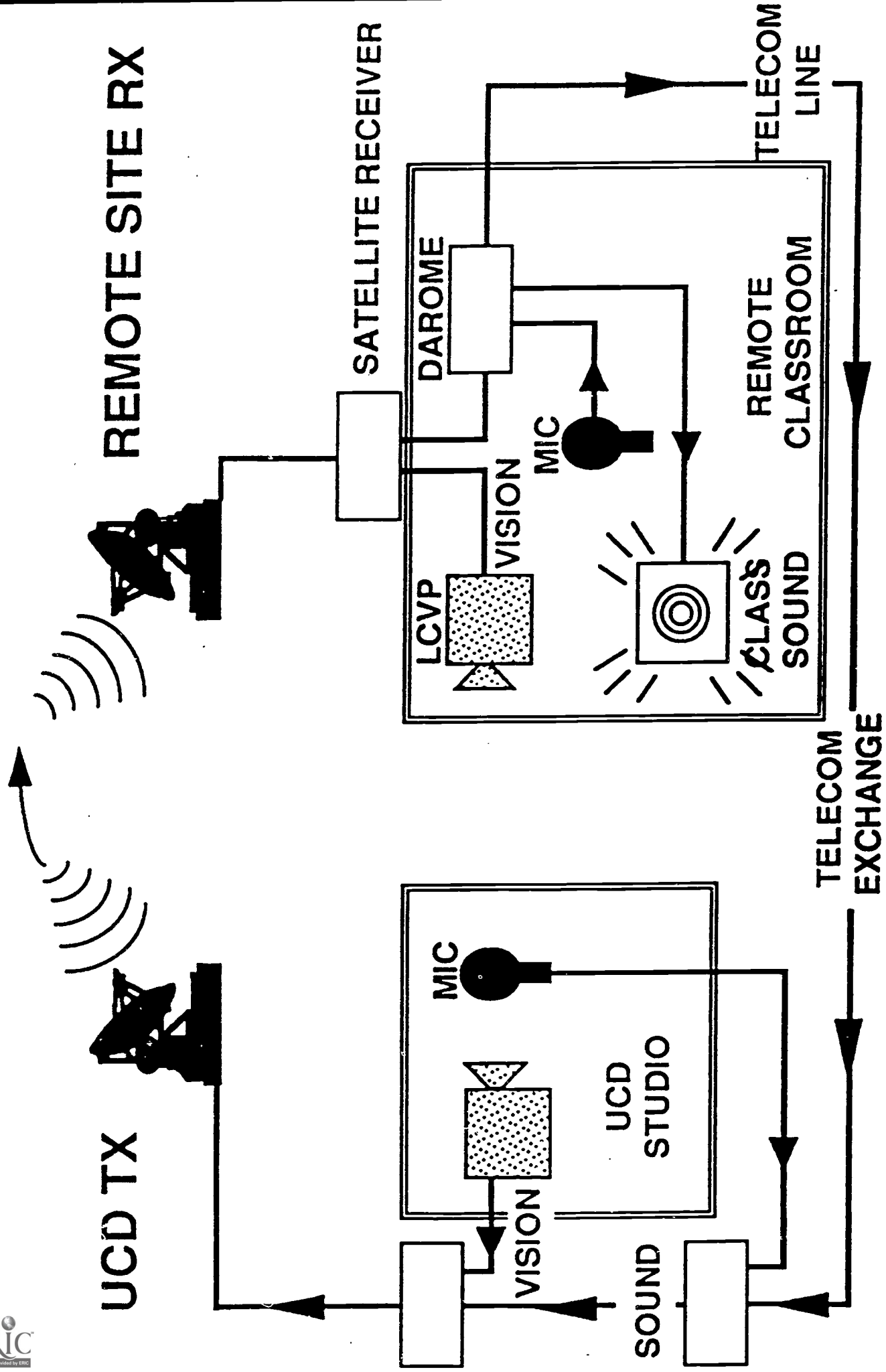


Fig 3

OPEN UNIVERSITIES - THEIR RATIONALE, CHARACTERISTICS AND PROSPECTS

By Börje Holmberg

This is a presentation of the concept of open university and its application in various parts of the world.¹

Although open universities largely - or almost exclusively - rely on distance education as their mode of teaching, the following is not basically about distance education. Only to the extent that the procedures of distance education are immediately relevant to the open-university work are they looked into here.

As a consequence of the analysis of the open-university concept not only the independent open universities but also a number of organisations which do similar work are included. The educational characteristics, organisations, evaluation and economics of open-university work are analysed. The student bodies are described and the problem of completion and drop out is discussed on the basis of empirical studies.

The last two sections briefly refer to research on open-university work, its organisation in open universities, and to the expected development of independent open universities as well as of parallel work more closely related to the mainstream of university education.

1 THE OPEN UNIVERSITY CONCEPT

The term *open university* was introduced when, under the name of the *Open University*, a distance-teaching university with open access was founded in the UK in 1969. The adjective *open* in this context has been variously interpreted. In modern usage distance-teaching universities are usually called open universities even if, as far as access is

¹This text is a slightly revised version of the authors contribution "Open University" to the second edition of the **International Encyclopedia of Education** Oxford, Pergamon 1994 and printed in the series ZIFF Papiere by permission

concerned, they are no more open than traditional universities. This applies to the *FernUniversität*, e.g., which has the same rules for student enrolments as other German universities (to be accepted as degree students applicants must have passed the *Abitur* or a corresponding university-entrance examination).

However, if by openness in education we mean a maximum of choice and control left to students, openness with regard not only to admission to study, place and time of learning, but also openness with regard to content and mode of learning, it is not in the 'open universities' that we find its most pronounced exponents, but rather in the higher-education institutions which make provision for so-called contract learning, such as the English *Polytechnic of East London* and the US *Empire State College* in the state of New York (Hinds 1987, O'Reilly 1991, Worth 1982).

It has been argued that distance education is always to some extent open as it allows students to learn when and where it suits them. Distance education, which is the mode of teaching and learning of open universities, is taken to cover the various forms of study which are not under the continuous, immediate supervision of teachers present with their students in classrooms but which, nevertheless, benefit from the planning, guidance and teaching of a supporting organisation. The addressees of open universities are usually adult, individual students. Open universities as higher-education organisations in their own right sometimes as to their activities overlap with other educational bodies. - On the concepts of open learning and distance education see Boot & Hodgson 1987, Foks (1987) and Holmberg (1989a).

2 THE DEVELOPMENT OF OPEN-UNIVERSITY SYSTEMS

If - as is usually done - distance-teaching universities are regarded as open universities, the oldest open university is the *University of South Africa*, originally founded as an examining body (like *London University*) and starting teaching at a distance in 1946 (Boucher 1973). With this exception the open universities in the world have started their work in the 1970s, 1980s and 1990s. The *Open University* in the UK presented its first course in 1971.

Well-known open universities in 1992 are: (in brackets the year, when they began teaching students)

- Allama Iqbaal Open University, Pakistan (1975)
- Andhra Pradesh Open University, Hyderabad, India (1982)
- Athabasca University, Alberta, Canada (1975)
- Central Broadcasting and Television University, China (1979)
- FernUniversität, Federal Republic of Germany (1975)
- Indira Gandhi National Open University, New Delhi, India (1985)
- Korea Air and Correspondence University, South Korea (1982)
- Kota Open University, Rajasthan, India (1987)
- Kyongi Open University, Korea (1982)
- Nalanda Open University, Bihar, India (1987)
- The National Open University of Taiwan (1987)
- Open Universiteit, Netherlands (1980)
- The Open University, United Kingdom (1971)
- The Open University of Israel, Tel-Aviv (1976)
- Ramkhamhaeng University, Thailand (1972)
- Sri Lanka Institute of Distance Education (1978)
- Sri Lanka Open University (1980)
- Sukhothai Thammathirat Open University, Thailand (1978)
- Télé-Université (part of the network of the University of Québec), Canada (1972)
- Unisur (Unidad Universitaria del Sur de Bogotá), Colombia (1981)
- Universidad Estatal a Distancia, Costa Rica (1978)
- Universidad Nacional Abierta, Venezuela (1977)
- Universidad Nacional de Educación a Distancia, Spain (1973)
- Universidade Aberta, Portugal (1990)
- Universitas Terbuka, Indonesia (1984)
- University of the Air, Japan (1985)
- University of South Africa, Pretoria (1946 see above)
- Yashwantrao Chavan Maharashtra Open University, Nashik, India. (1989)

There are a number of organisations which do work similar to that of these universities and which might have been included in the list, among them

- The National Distance Education Centre, Ireland,
- The International University Consortium, Maryland, U.S.A.
- North Island College, British Columbia, Canada
- The Open Education Faculty of Anadolu University, Turkey

- The Open Learning Agency, British Columbia, Canada
- The Open Learning Institute of Hong Kong.

Further should be mentioned the so-called dual-mode universities with special commitment to open learning, well known in Australia. Since 1989 there are eight Australian "distance-education centres", viz.

- Deakin University and Monash University in Victoria (a brokering company called the Open Learning Agency of Australia was founded at Monash University in 1993)
- The University of New England and Charles Stuart University in New South Wales,
- The University College of Central Queensland and the University College of Southern Queensland
- The University of South Australia
- The Western Australian Distance Education Centre (Murdoch University).

A great number of other private, state-owned, church or foundation financed organisations, university departments, colleges of advanced education and schools serving open learning are active in various parts of the world. Some of them are members of national and/or multinational professional bodies, such as the *International Council for Distance Education (ICDE)*, the *Asian Association of Open Universities (AAOU)*, the *Association of European Correspondence Schools (AECS)*, the *European Association of Distance Teaching Universities (EADTU)*, the *European Distance Education Network (EDEN)*, the *National Home Study Council based in the U.S.A.*, and the *Open and Distance Learning Association of Australis (ODLAA)* until 1993 called *Australian and South Pacific External Studies Association (ASPESA)*.

As evident from the above list of open universities some developing countries make consistent use of open-university approaches to higher education. In others traditional universities use open-learning methods to a limited extent, thus, e.g., in Kenya and Zimbabwe. Plans for new open universities have been developed for Southern Africa and Vietnam. Teacher training, the training of paramedics and basic business administration are common fields of open-learning activities in developing countries. Much experience of this has been gained, for example, in East Africa and Latin America.

Many open universities are very large. The British Open University and the German FernUniversität have student bodies of between 120 000 and 55 000 students, the French Centre National d'Enseignement à Distance has more than 250 000 students enrolled and the open universities in Thailand and China work with even larger numbers of students (700 000 to a million students in each of these countries).

3 EDUCATIONAL CHARACTERISTICS OF OPEN UNIVERSITIES

The application of distance-education methods to open learning usually means that two components characterise the teaching of open universities, i.e. (1) the presentation of subject matter in pre-produced, in most cases printed courses, and (2) mediated interaction between students and tutors in writing (correspondence), on the telephone or by other media. The latter is part of the student-support activities that are usually considered necessary; these also include counselling. Electronic mail and telefax are to some extent used in the industrial parts of the world to speed up the communication. Tutor-student interaction is in most open universities also brought about by supplementary face-to-face sessions, usually in regional and local study centres. Some universities even wholly refrain from mediated person-to-person interaction and replace this by self-checking exercises, interaction with computer programs and face-to-face tutorials. The Open Universiteit in the Netherlands and Unisur in Colombia are cases in point.

Radio, television and satellite communication are available in many areas, not only in the developed parts of the world, and serve mass audiences. This applies to a very great extent to China, for example. While most open-university students learn entirely individually there are examples of group learning. This can be - and is to an increasing extent - brought about by tele and computer conferencing.

4 THE ORGANISATION OF OPEN-UNIVERSITY TEACHING

From an organisational/typological point of view we have reason to distinguish between independent organisations and organisations which are part of and dependent on larger units. A third type can be described as networks. The higher-education institutions called open or distance-teaching universities and their foundation-owned or commercial counterparts as a rule belong to the independent type. Well-known examples of the second type are the extra-mural department of US and Canadian universities; so are university providers of Australian external study (cf. above) and East European distance teaching. Examples of networks occur in England, Germany and Norway.

The independent organisations decide on their own course offer and teaching principles and, if they are official universities, on their own curricula, examinations and degrees to

the extent that national regulations allow. Open-learning departments of conventional universities, on the other hand, by distance-teaching methods do part of the same teaching as that given face to face by the mother organisations. The typical open-learning service of an Australian dual-mode university is run by an administrative unit which relies on regular university staff to develop courses for and teach open-learning students. These are given the same learning content, study - as far as individual courses are concerned - within the same time limits and are examined in the same way and at the same time as 'regular' students.

The distinction between independent organisations and those belonging to larger units overlaps with a dichotomy between large-scale and small-scale systems of distance education. The former develop large editions of each course, sometimes for several thousand students and often do so by team work, and engage a sufficient number of tutors (who need have nothing to do with course development) to comment on students' assignments and teach in other ways. The small-scale approach implies causing teachers to develop courses exclusively for their own students so that the course writer is identical with the tutor. The large-scale organisations, as typically represented by, for example, the British Open University and the Spanish Universidad Nacional de Educación a Distancia, can be regarded as innovations outside the traditional educational systems. The small-scale organisations, on the other hand, find it important to keep within the mainstream of education. The Australian University of New England in Armidale, New South Wales, is often referred to as a prototype.

The networking bodies, the third type, have coordinating functions and supplement the course offer of other open-learning agencies. *Norsk Fjernundervisning* in Norway is a case in point, and so is the Canadian *Knowledge Network* in British Columbia, which synthesises 'the experiences of open learning systems and educational television networks' (Forsythe 1982 p. 283). The Knowledge Network was incorporated in the Open Learning Agency in 1988). The German *DIFF (Deutsches Institut für Fernstudien)* at Tübingen University is a further and somewhat special kind of network. Among other things it develops courses for use by other institutions, runs a department for research on the psychology of learning and offers documentation service.

This institute in 1993 changed its name into Deutsches Institut für Fernstudienforschung - German Institute of distance education research.

As a further example of networking the activity of *the National Extension College* in Cambridge, England, that is called flexistudy should be mentioned. This term refers to flexible arrangements not only for individual learning based on pre-produced course materials but also for teacher-contact time and the use of other resources.

5 OPEN-UNIVERSITY STUDENTS

The open-university students can by no means be described as a homogeneous group. The only common factor is that these students are usually adults and gainfully employed and/or look after their families. The 25-35 age group seems to be the largest in most open universities. The reasons why adults choose open learning are primarily the availability, convenience, flexibility and adaptability of this mode of education to individual needs. A predilection for entirely individual work is frequently mentioned. In a Swedish study, including students at the British Open University, 63% of the population (about 4000) stated their preference for working on their own at the same time as they stressed the importance of the support given by their teaching organisation. Free pacing, a privilege given only to a limited extent to open-university students, was mentioned as an even more important argument in favour of open learning (distance education) (Flinck 1980 pp. 6-9).

There are indications that open-university students consider themselves independent and capable. An investigation reporting on interview studies of dozens of FernUniversität prospective and real students in Germany showed that these 'saw themselves as more competitive, achievement oriented and assertive' than the average general population and student groups investigated. 'Only small differences were found between dropouts and persisters ...; the persisters (before enrolment) had portrayed themselves as more competent and successful in coping with academic and social demands' (Göttert 1983 in a summary before the list of contents). Nevertheless, quite a few open-university students seem to doubt their ability to cope. This has caused intensive counselling activities.

6 COMPLETION AND DROP OUT

While some open universities have succeeded in taking most of their students to successful completion in the form of degree examinations (this is above all true of the British Open University), it is nevertheless a fact that, on the whole, the completion rate in open learning and distance education generally is fairly low. It would not be correct invariably to regard discontinuance as a sign of failure, however, as open-university courses are often used by individual students who do not declare either their ultimate goals or the period over which they intend to spread their study. Thus it is often

impossible to say for certain whether non-completion means interruption, or drop out in the sense of failure, or if it accords with students' intentions or plans. It is also something of a problem how to regard non-starters, i.e. those who have registered as students but show no signs of actual study. 'When non-starters are included among non-completers, drop-out rates around 50 per cent are not unusual...Non starters are sometimes as frequent as - or even more frequent than - 'real' drop outs' (Bååth 1984 p. 32).

A general characteristic is that drop out, when it occurs, usually happens at the beginning of the study. It makes sense to regard the first few months of study as a trial period. In agreement with this thinking, the British Open University requires an introductory period of study and, after this period, a reconfirmation of study intentions before a student is regularly registered. Those who drop out during the introductory period are not included in the university statistics.

Several scholarly studies of the causes of drop out and the possibilities to improve completion have been carried out (cf. Bååth 1984; Cookson 1990; Rekkedal, 1993; Schuemer & Ströhlein 1991). The agreement between personal interest and courses offered as well as inclinations for individual rather than collective work have been found to favour completion (Bartels 1983). So have learning - matter presentation and tutor-student interaction characterised by an empathy approach (Holmberg 1989, 162 ff.), but the only really safe general conclusion to be drawn from the studies carried out is that individual study motivation is the most decisive factor. It is evident that 'neither age nor distance nor domestic environment nor any other quantifiable term stands out as a salient feature. It is motivation above all else which, despite physical and general social and environmental problems, brings success' (Sewart 1983 p. 168).

7 THE EVALUATION OF OPEN-UNIVERSITY WORK

The amount of prestige conferred on open universities varies a good deal. In the UK the Open University, although it has its own specific degree structure and prepares students for less specialised degrees than traditional universities, has acquired much general recognition, and both in Germany and Spain its sister universities, which apart from their use of distance-education methods, are basically traditional universities, enjoy much prestige for their high standards of teaching and research. Whereas this reflects the situation in some parts of the world the situation is different in others. In some cases

open universities represent only the second best. In a few countries (Thailand may be an example) they seem to act as safety valves by expanding the intake of higher-education students and thus absorbing youths for whom there are no jobs while traditional universities are considered more prestigious. Limitations of the opportunities for tutor-student interaction, mediated or face to face, and also pure prejudice in some countries make politicians and educationists query the quality of open learning.

If and when weaknesses of the kind intimated occur counter measures are possible. Improvements can be brought about along the lines of well-established and successful open universities. The most successful of them all seems to be the British Open University, which during the first twenty years of its existence produced more than 120 000 graduates.

Systematic course and systems evaluation has proved very helpful. In this context 'course' denotes not only the course materials but the whole process of interaction between students on the one hand and, on the other hand, tutors, counsellors and other representatives of the teaching organisation. Measurement techniques have been developed for the assessment of students' achievements and the evaluation of courses and programmes. A study of the practices in this respect of 16 distance-teaching organisations occurs in Chia (1990). So called formative evaluation investigating teaching and learning with a view to improving courses can be of decisive importance for the quality of open learning. Developmental testing of the kinds carried out at, for example, the Open University in the UK and the FernUniversität in Germany has exerted much valuable influence. This applies even more to an evaluation approach developed at the Open University of Israel (based on Guttman's facet theory which is well known to statisticians). 'Specification of course content and its instructional objectives in "course maps" served as a basis for preparing a teaching syllabus, establishing a computerized bank of questions and assessing all course components' (Ganor, 1991 p. 80). The information collected through this evaluation work is used as a foundation for staff development. The technique used means specifying problems to be investigated in 'mapping sentences'.

8 THE ECONOMICS OF OPEN UNIVERSITIES

Sweeping statements about the economics are hardly possible. Open universities differ in the ways they work and thus in their economy. The British Open University includes the

use of television and radio for its teaching, whereas the German FernUniversität does so only marginally. Both these universities run a number of study centres where students are offered tutorials and various media facilities. This type of service is not provided everywhere. Some open universities and other higher-education institutions offering open-learning facilities make use of the telephone for oral tutorials, whereas others do not. Some make use of advanced information technology; others limit themselves to presenting learning matter in print and interacting with students by written correspondence. In the Australian New-England system parallelism with on-campus study has gone so far as to include the same student/staff ratio as conventional university teaching. This makes for a financial situation which is very different from the one of large-scale open universities, which produce courses in large editions and use various kinds of technology, labour-saving devices and division of labour to attain economies of scale.

The economics of open universities and similar organisations has been subjected to a series of careful investigations (see Rumble 1986 and Keegan 1990). A safe conclusion is that open-university teaching is characterised by very favourable cost-benefit relations if the distance-education element consistently predominates. It is primarily arrangements for face-to-face sessions (study centres, residential schools and classes of various kinds) and, to some extent the use of very sophisticated technology, that may modify the validity of this statement. Nevertheless, the average cost per graduate in the British Open University, which makes extensive use of both study centres, other face-to-face facilities and advanced technology, is below half of that at conventional universities (Wagner 1977, p. 365).

9 RESEARCH ON OPEN-UNIVERSITY WORK

Some kind of institutional research occurs at most open universities and other organisations offering open-learning facilities in higher education. This institutional research is usually combined with course evaluation. Investigations of more general conditions of open learning, development and testing of theories relevant to open-university work, studies on media and methods are continuously being carried out at some open universities. The German FernUniversität has both an institute for institutional research, evaluation and development work serving the disciplinary faculties and an independent institute for research on distance education and open learning. Much scholarly literature on the subject has been published although it is a fairly new area of

research. A selective bibliography of 1990 lists some 1500 titles, in a systematic part divided into 36 specific areas of study (Holmberg 1990). There is an International Centre for Distance Learning based at the British Open University which collects and disseminates information worldwide using two computerised data bases.

10 THE FUTURE

There is a strong tendency towards further growth. New open universities and other new applications of open-university principles are constantly being discussed or planned in most parts of the world. To what extent new activities will tend to develop along the lines of the independent large-scale open universities or move in the direction of the mainstream of university education is uncertain. The same uncertainty prevails as to some of the present open-university activities. The two opposite approaches reflect an ideological issue as to on the one hand student autonomy and respect for the individual student's predilections, on the other hand the appreciation of social elements (personal meetings and peer-group interaction) and of traditional teacher-student relations. This is related to an early discussion whether open learning and distance education represent a mode of education in its own right or is merely a substitute for conventional education when 'regular' teaching is not available. The former view has developed with great acumen as early as 1973 in an analysis of distance education as an industrialised form of teaching and learning (Peters 1973). - For discussions of these issues see Garrison (1989), Holmberg (1986) and (1989b p. 150 ff), Peters (1989) and Smith & Kelly (1987).

Most probably the future will see a further strengthened open-university movement with applications of different kinds stressing to varying degrees the values and views indicated.

Considering the relative newness of open universities further research on practically every point is desirable. This includes instructional design, mediated student-tutor interaction, the potentials of modern information and communication technology and organisational-administrative concerns as well as theory building and the testing of possible predictive theories.

REFERENCES

- Bååth, J.A., (1984)
 Research on completion and discontinuation in distance education.
Epistolodidaktika, 1984: 1+2, 31-43
- Bartels, J., (1983)
Studienabbrecher, Hagen: FernUniversität, ZFE
- Boot, R.L. & Hodgson, V.E., (1987)
 Open Learning: meaning and experience. In Hodgson, V.E., Mann, S.J. &
 Snell, R. (eds), *Beyond distance teaching - towards open learning*, 5-15 Milton
 Keynes, Open University Press
- Boucher, M., (1973)
Spes in arduis - a history of the university of South Africa. Pretoria, University of
 South Africa
- Chia, N., (1990)
 Measurement techniques in distance education: definition, classification,
 characteristics, selection and application *Epistolodidaktika* 1990: 2, 51-93
- Cookson, P.S., (1990)
 Persistence in distance education - a review. In Moore, M.G. (ed): *Contemporary
 issues in American distance education*, 192-204, Oxford: Pergamon
- Flinck, R., (1980)
 The research project on two-way communication in distance education: an
 overview. *Epistolodidaktika* 1980: 1-2, 3-10
- Foks, J., (1987)
 Towards open learning. In Smith, P. & Kelly, M. (eds), *Distance education and the
 mainstream.*, 74-92 London: Croom Helm
- Forsythe, K., (1982)
 Knowledge Network - a new hybrid for learning systems. *Distance education*
 3, 2, 282-292
- Ganor, M., (1990)
 On the structure of evaluation at a distance. In Croft, M. Mugridge, J. Daniel, J. &
 Hershfield, A. (eds) *Distance education: development and access*, 167-169. Caracas:
 ICDE / Universidad Nacional Abierta
- Garrison, D.R., (1989)
Understanding distance education. A framework for the future. London & New
 York: Routledge
- Göttert, R., (1983)
 Fernstudieninteressenten. Ihr Selbstbild und weiterer Studienverlauf. *ZIFF
 Papiere* 47 Hagen: FernUniversität
- Hinds, E., (1987)
 The school for independent study and international links. *ZIFF -Papiere*
 69 Hagen: FernUniversität

- Holmberg, B., (1986)
Growth and structure of distance education. Beckenham: Croom Helm
- Holmberg, B., (1989a)
 The concepts and applications of distance education and open learning.
International Journal of Innovative Higher Education 6, 1 and 2, 24-28
- Holmberg, B., (1989b)
Theory and practice of distance education. London / New York: Routledge
- Holmberg, B., (1990)
A bibliography of writings on distance education. Hagen: FernUniversität, ZIFF
- Keegan, D.J., (1990)
Foundations of distance education. London and New York: Routledge
- Moran, L., (1993)
 Genesis of the Open Learning Institute of British Columbia. *Journal of Distance Education*, VII, 1, 43-70
- O'Reilly, D., (1991)
 Developing opportunities for independent learners. *Open Learning* 6,3, 3-13
- Peters, O., (1973)
Die didaktische Struktur des Fernunterrichts. Untersuchungen zu einer industrialisierten Form des Lehrens und Lernens. Tübinger Beiträge zum Fernstudium 7 Weiheim: Beltz
- Peters, O., (1989)
 The iceberg has not yet melted: further reflections on the concept of industrialisation and distance teaching. *Open Learning*, November 1989, 3-8
- Rekkedal, T., (1993)
 Research and development work to improve completion rates in distance education. *Epistolodidaktika* 1993, 1, 41-58
- Rumble, G., (1986)
The planning and management of distance education. Beckenham: Croom Helm
- Schuemer, R., R. & Ströhlein, G., (1991)
 Diagnosis and Therapy: theoretical and methodological aspects of drop - out research. In: Holmberg, B., & Ortner, G. (eds.) *Research into distance education / Fernlehre und Fernlehrforschung*, 196 - 222, Frankfurt / Bern / New York / Paris: Peter Lang Verlag
- Sewart, D., (1988)
 Students and their progress. In: Sewart, D., Keegan, D., & Holmberg, B. (eds.), *Distance education: International perspectives* 165-168. London and New York: Routledge
- Smith, P. & Kelly, M. (eds.), (1987)
Distance education and the mainstream. Convergence in education
 London: Croom Helm

Wagner, L., (1977)

The economics of the Open University revisited. *Higher Education* 6, 3, 359-381

Worth, V., (1982)

Empire State College / State University of New York Centre for Distance Learning. DERG Papers 7 Milton Keynes : The Open University

SUGGESTIONS FOR FURTHER READING

Three of the works listed above, *Garrison 1989, Holmberg 1989 and Keegan 1990*, are up-to-date presentations of the most important aspects of open-university work and are to be regarded as standard handbooks. An updated and revised second edition of the second of these books is being printed in 1994.

Other general works of similar kinds are, e.g.:

Casas Armengol, M. (1986) *Universidad sin clases. Educación a distancia en América Latina*. Caracas: Kapelusz

Henri, F. & Kay, A. (1985) *Le savoir à domicile. Pédagogie et problématique de la formation à distance*. Québec: Presses de l'université de Québec, Télé-université

Verduin, J.R. & Clark, Th.A. (1991) *Distance education. The foundation of effective practice*. San Francisco and Oxford: Jossey Bass

Vertecchi, B. (ed.) (1988) *Insequare a distanza*. Firenze: La Nuova Italia Editrice

On theory and research a two-language presentation is available in

Holmberg, B. & Ortner, G.E. (eds.) (1991) *Research into distance education / Fernlehre und Fernlehrforschung*. Frankfurt am Main - Bonn - New York - Paris: Peter Lang

Somewhat older more general books that are still relevant are, for example,

Kaye, A. & Rumble, G. (1981) *Distance teaching for higher and adult education*. London: Croom Helm in association with The Open University Press

Rumble, G. & Harry, K. (eds.) (1982) *The distance teaching universities*. London: Croom Helm

The development of an open university and the principles and problems connected with it are discussed in an illuminative way in

Perry, W. (1976) *Open University. A personal account by the first Vice Chancellor*. Milton Keynes: The Open University