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**Professional Training of Teachers in Biological
and Agricultural Sciences for Rural Areas**

Report No. 7

**Current Status of Vocational
Distance Learning in Agricultural
Sciences in EU Countries**

by

Claire Coote, Natural Resources Institute, UK

with contributions from
the University of Hohenheim



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1. Introduction

The aim of this report is to review the development of distance learning vocational training, particularly in the agricultural and biosciences fields in the UK and Germany, and to make recommendations for future action in Romania, Slovenia and Bulgaria. The Natural Resources Institute of the University of Greenwich leads this activity. This report is based on a review of published information - official documents, websites and research papers.

1.1 Historical and cultural perspectives of vocational distance learning, particularly in agriculture and the biosciences

This paper examines the development and impact of all kinds of distance learning. Distance education is not a new phenomenon; it has been a mode of teaching and learning for at least the past 100 years using printed course material delivered by post. However, there is likely to be most interest in the provision of electronic, or 'e-based', learning. There has been a rapid growth in the provision of electronic distance learning programmes in recent years, with the development of the internet and email, and the report focuses on this medium of delivery.

In Europe, with the exception of a few large companies, uptake of e-learning has been much slower than in the USA¹. One of the main reasons for this is considered to be the different types of training systems prevalent in Europe and the fact that each European country has a different training system. This includes the way people access training; the way training is funded, and whether people train as individuals, through their employers, or as part of publicly-provided systems. Such systems have evolved through discussions among employers, government agencies, educational institutions, accreditation authorities, and trade unions. In Germany, for example, these systems are highly structured. Individuals can do some e-learning and improve their skills but without fitting into the job system in terms of accreditation it would not necessarily improve their job prospects or mobility. Uptake of e-learning is also related to a complex set of contextual issues. Many of the people involved in the systems are proud of them and are unlikely to want to start changing things without being convinced that it is likely to provide a better system than they have already.

The European Union is keen that its citizens become familiar with the use of electronic media for skill improvement. There are government initiatives to promote computer literacy and use of e-learning in all EU member states. In the UK the government has

¹ This section is based on views given in "Straight Talk: Understanding Systems - An analyst's take on why Europe is slow to adopt e-learning" by Kim Kiser in e-learning magazine www.elearningmag.com



promoted the 'University for Industry' initiative. This initiative uses the brand 'learndirect' to deliver, through new technologies as well as learning centres, further training and personal development to people who need to acquire basic to professional skills. In Germany the federal training authority is involved in a number of initiatives to support the development of quality standards in e-learning and the development of good practices in its training systems.

1.2 Definitions of distance learning

The term distance education refers to intentional processes of teaching and learning in which physical space separates instructors and learners. Learners and instructors communicate through various media, and an educational organisation exists to design, facilitate and evaluate the educational process. Distance learning is a broader concept. The term distance learning refers to the use of educational materials or media by learners who are not necessarily linked with an educational organisation or engaged in communication with an instructor. Distance learning can be an outcome of distance education processes, but it can also take place without an active relationship between those doing the learning and an educational agency (McLean, 2001).

The basic media currently used in distance education are print, audio and videotapes, radio and television, teleconferencing, computer-based instruction, and computer conferencing. Each medium has strengths and weaknesses in different contexts. The selection of media for a distance education initiative needs to reflect the instructional objectives and learning activities, the characteristics of the learners and their environment, and the economic and organisational feasibility of different options.

The general principles (Truelove, 1998) are:

- teacher and student(s) are separated by physical distance;
- lesson materials are prepared in a structured, sequential order for study by students on their own;
- media (i.e. print, audio, video), sometimes in conjunction with face-to-face communication, is used for the exchange of learning materials; and
- there is the presence of an educational organisation.

There is much variation within distance learning environments with respect to such things as:

- level of interaction between teacher and students;
- level of interaction between students; and
- type and extent of utilisation of media.



Distance education programs may be formal (associated with an institution and accredited) or non-formal. An entire course (degree program, diploma course) may be offered through distance education or single courses within a larger programme (Truelove, *op.cit.*).

The distinctions between open learning and distance learning are becoming more blurred as instructors increasingly make use of web-based materials within conventional courses (Cook, 1998).



2. Current Status of the Availability and Use of Vocational Distance Learning, Including On-Line Learning, In Agriculture

2.1 A review of provisions in the UK

2.1.1 How it has evolved and developed

Print, radio and television were the main teaching technologies available to distance learning until the late 1970s. Vocational correspondence courses in agriculture and horticulture have been provided in the UK since the 1930s. One example is the Horticultural Correspondence College², a private company that offers postal courses in horticulture, gardening and agricultural subjects. Materials generally consist of lesson texts with sets of questions. The individual works through the texts, looks up references or gets additional information and sends in their answer. These are read and marked by an individual specialist tutor. He or she returns the marked work generally within a couple of weeks, together with a letter of comments, a profile of the answer and a set of specimen answers. Radio is still used widely in the UK as a tool for both distance and class-based education. The use of audio cassettes and videos, which enable the student to use them at their own convenience, are also used extensively in distance education

The development of Computer Mediated Communication (CMC) has opened opportunities for computer conferencing facilitated by an experienced virtual teacher and the operation of virtual classrooms. This technology is being used by universities, colleges to increase the number of people they can serve, as well as by private companies offering training courses. However, it is still very new so we will also consider conventional print-based forms of distance learning.

'E-based learning' in particular is considered to open up opportunities to provide training to people who are unable to devote enough time to study full or part-time at an institution. Courses cover both professional and vocational subjects. Key subjects include book-keeping, accounting, travel industry, customer and business skills, IT skills. However, there are very few, if any, electronic distance learning courses in agriculture in the UK.

Agriculture is a particularly difficult subject to teach as distance education since while theory can be taught at a distance, agriculture is essentially a practical subject and needs land and equipment. Distance learning does not lend itself so well to courses that require a lot of practical work. The crops, animals, machinery and facilities also vary significantly from farm to farm even in the same area which can make it difficult to provide a 'one course fits all solution'. Also, since farmers are isolated and in many

² <http://www.hccollege.co.uk>



cases not used to studying alone it can be difficult to maintain their motivation without contact with tutors and other learners (Cook, 1999).

However, the demand for distance education courses in general, and for distance education courses in agriculture specifically, is considered by some observers to be likely to increase in the future. Studying by distance education can be a cost effective alternative to full-time study. Distance education eliminates the costs of travel to, and residence in the vicinity of, the study institution and can take place while continuing full-time employment (Truelove, 1998). For those working in agriculture who are required to continually upgrade their qualifications but are unable to leave their jobs to engage in full-time study, distance learning offers an alternative.

2.1.2 Educational levels at which agricultural distance learning is most applied

The majority of courses in distance education in agricultural distance education have been at the postgraduate diploma and masters degree level, where the need for practical work is far less and theoretical abstractions and generalisations are often more important than individual examples (Cook, *op.cit.*).

Most agricultural vocational education takes place on full, part-time or day-release courses in agricultural colleges (see project report no. 6). In the UK a key qualification is the National Certificate in Agriculture, which is a one-year full-time course for young entrants to farming. Emphasis is placed on practical skills and regular assessment of these practical skills.

Continuing vocational training for farmers is available through Lantra, the Sector Skills Council for the Environmental and Land-based Sector (formerly the Agricultural Training Board), which promotes learning, skills and business competitiveness in agriculture. The courses they provide are mainly concerned with practical aspects and involve a physical demonstration and/or a "hands-on" session, and is usually given on a farm.

However, with farms becoming increasingly computerised Lantra has been developing links to on-line courses provided by 'learndirect'³. The first of these is a farm diversification package called 'New Horizons - Making the Most of Your Farm', which became available in April 2001. Over 3,000 farmers enrolled on the course during its first year. The course covers:

- Analysing the situation - users are able to assess themselves, their business and their location and generate suggested activities that are in line with their assessment, read examples and case studies, and print out any information of interest to them;

³ <http://www.learndirect.co.uk>



- Exploring some options - where users are able to read success factors and pitfalls to avoid for different types of activity;
- Conducting a viability test - where users can assess the weaknesses and strengths of a particular type of activity for their situation; and
- Planning for success - where, by working through a checklist of questions divided into various action areas (Legislation, Finance etc.), users can research and plan the first concrete steps for any of the types of activities featured. There are also fact sheets which will enable the user to find out a whole range of topics relevant to diversifying their business, as well as access to useful contacts for further information.

The course is designed to help farmers assess existing business enterprises and to find alternative activities to enable them to generate additional income. It does not lead to a qualification - the main motivating factor is improving their income. One farmer who enrolled on the course is quoted as saying,

"I find the learndirect approach very flexible. I can log on at a time that suits me and do as much or as little as I want. This flexibility is incredibly useful and fits in well with my day-to-day farming activity. 'New Horizons' has made me consider other options that I probably wouldn't have thought about otherwise"⁴

2.1.3 Target audiences

In the farming sector web-based learning is likely to be existing farmers, farm managers and farm workers wishing to upgrade their knowledge.

Agriculture is becoming increasingly sophisticated, using new and rapidly changing technologies. This is coupled with increased need to understand environmentally sustainable farming practices and regulations such as compulsory certification for some practices (e.g. pesticide sprays). These new demands mean there is a need for continual knowledge updating.

2.1.4 Cost-effectiveness of distance learning

Distance education is sometimes presented as being more cost-effective than conventional education. Past experiences in both developed and developing countries indicate that this is not necessarily the case. Distance education has the potential to be, but is not necessarily, more cost-effective than conventional education. There are a number of factors that contribute to large cost differences between different distance education initiatives. These include numbers of learners enrolled; mixture of communications technologies; media and learning materials; degree of learner support

⁴ Lantra Press Item 13.3.02

http://www.lantra.co.uk/lantra/nto/Press_releases?PressItem.asp?item=184&indtype=1



and interaction; salaries and employment conditions of distance education staff; production standards, and institutional working practices and overhead costs. It is considered that distance education tends to be more economically attractive at higher levels of education. This is because the costs of distance education are relatively similar at all levels, whereas the costs per student of conventional education are higher at higher levels (McLean, 2001).

Distance education should not be seen as an inexpensive alternative to other forms of education. In some cases, distance education may provide a very cost-effective means of reaching target groups of learners, but in other cases conventional, face-to-face contact may be more cost-effective. The assumption that distance education is a low-cost alternative can undermine the quality and impact of distance education programmes by systematically depriving them of necessary resources (McLean, *op.cit.*).

Distance education requires considerable investment before a single student can be enrolled - in both the development and production of course materials and the design and implementation of an institution's infrastructure. The ratio of fixed to variable course costs in conventional British universities was 8:1 whereas in the British Open University it was 2000:1. The cost per student tends to be lower in distance education. A distance system may cost more in absolute terms to set up than conventional systems, but it can be more cost-efficient if it has sufficient students to bring the average cost per student down below that of conventional systems.

Those planning a distance education system in the hope that they will reap economies of scale must ensure that:

- the variable cost per student is less than in conventional systems operating at a similar education level;
- the number of students is large enough to bring down the average cost per student to a level where it is lower than the average cost found in conventional educational systems; and
- The drop out rate is kept at a reasonably low level.

These conditions have very significant implications for:

- the choice of media. In theory distance educators have a wide choice available to them. In practice this is often constrained not only by the absolute costs of a particular medium but by the effect its adoption may have on average student costs;
- market research - aimed at ensuring that sufficient students will be attracted to particular programmes at the institution to enable economies of scale to be achieved;



- the resources put into student services. Since these costs are a student variable cost, the degree of investment in student support services has to be weighed against the effect on the average cost per student and on drop-out rates; and
- the resources put into the central infrastructure. Fixed costs of the institution must not be too large relative to student numbers.

2.1.5 Quality management and assurance

The purpose of quality management in distance education is to ensure that the organisation's resources are focused on customers' needs. Quality management should be directed not only at students, but at all other stakeholders - instructors, institutional administrators, remote-site co-ordinators, employers, and professional associations.

Quality management activities should include conducting on-going needs assessments (formal and informal); developing teamwork among people and institutions necessary to meet needs; establishing feedback mechanisms to judge the effectiveness of marketing and programme delivery and allow corrections and adjustments, and organising communication among stakeholders⁵

According to Robinson (1995) the quality of distance learning is often judged in terms of the learning materials, whatever the medium. She points out that a course is more than just the materials; it is also the totality of experience of the learner. The purpose of a distance learning provider is to create the conditions for learning. Therefore, its success depends on how well the course production, delivery and student support sub-systems function, and how well they all integrate in operational terms. Excellent materials are useless if not delivered to students; poor materials have limited value even if delivered on time.

Quality assurance is increasingly used for managing quality in education. This is a set of activities or procedures, followed by an organisation, to ensure that its standards are specified and consistently reached for a product or service. Its goal is to create reliable systems by anticipating problems and designing procedures to avoid as many errors and faults as possible. Other approaches emphasise the 'people' aspect of managing quality. The Open University uses the 'Investors in People' initiative, which sees participation in policy and decision-making, and staff development for all individuals at all levels as a major way of maintaining and improving institutional quality. Both approaches can contribute to the management of quality within the same institution (Robinson, *op.cit.*). In the UK the Open and Distance Learning Quality Council (ODL QC)⁶ was set up by government in 1968 to operate a voluntary registration scheme for providers of home study, distance learning, online or e-learning and other open learning courses. To

⁵ Taken from World Bank Global Distance EducationNet

⁶ <http://www.odlqc.org.uk>



register, a provider has to meet ODL QC standards. If people choose a course with an ODL QC accredited provider they are told they can feel assured of a quality service.

2.1.6 Training of e-teachers

Another of the issues and challenges to the uptake of e-learning is the expertise needed to develop course material for e-learning and the resources this requires. There is a great need to train vocational teachers and trainers to give them the skills they need and a level of expertise that allows them to identify what kind of e-learning to use, under what circumstances and for which learners. Few traditional vocational teachers have the necessary expertise. There are few formal opportunities for people to improve their skills around e-learning. Professional development of trainers is fragmented across Europe.

In the UK some companies and universities run courses on developing distance learning courses. The International Extension College⁷ runs workshops and short courses for people planning projects and programmes in distance learning. They also run a distance learning post-graduate diploma or MA in distance education with the University of London. Courses include: Education and development; adult learning and communication in distance education; the organisation of distance education; electronic media in distance education; management of distance education, and computer mediated communications in education.

2.1.7 Other issues

Most people need some kind of context in which to learn, it has to be relevant and they need support. That support needs to be in human form - a mentor, a tutor, a coach or a peer. Another restriction of e-learning is the lack of face-to-face contact with a teacher. Students can feel insecure in the absence of a teacher and apprehensive regarding their progress in the lack of close feedback and interaction with peer learners.

Students become more insecure if the direction of the course is not very well structured, and if it is not very clear where they are in relation to its completion. Student 'drop-out' is much more common in distance than conventional education because it is easier for a student to exercise the option of withdrawing from the relatively impersonal relationship of a distance course than it is from a conventional curriculum. In response to such concerns, the distance teacher has to take various measures to ensure the course is very well structured, with clear objectives and well considered allocation of students'

⁷ <http://www.iec.ac.uk>



time. The communications media must be used in attractive, rewarding, and motivating ways⁸.

A problem identified with distance education programmes in developing countries relates to a lack of participation, on the part of those individuals and communities who were supposed to benefit, in the design and delivery of the programmes. The need for participatory educational practice has been identified by the FAO in a guide entitled *Participatory Curriculum Development in Agricultural Education* (2001). This categorises general groups of stakeholders in curriculum development as the 'insiders' (leaders with training organisations, teachers, students, producers of educational materials), and the 'outsiders' (policy-makers, politicians, educational administrators, educational experts, employers, professional bodies, clients, funders, parents, past students and interest groups).

The guide stresses that early in the analysis of a potential educational intervention, it is important to identify the stakeholders, understand those stakeholders' diverse interests, and develop a process through which such stakeholders will be represented in the planning, implementation and evaluation of the intervention. This helps to ensure that distance education initiatives are undertaken for the right reasons, are sensitive to the contexts of learners and their environments, the content is relevant and it fits well into the local culture and its approach to learning (McLean, 2001).

2.2 A review of provisions in Germany

2.2.1 How it has evolved and developed

General and vocational education are still sharply separated in Germany, and young people choose relatively early whether they will go on vocational or university education. The school types guide their students towards general education or vocational training: Gymnasiums lead to university studies while Hauptschule and Realschule lead to vocational training within the dual system.

Vocational training usually is done in a company or, especially for craftsmen, in small private businesses. Practical work is considered very important during the training.

In 2000 out of 140 000 people doing distance education courses, 30 % took courses in economics, 13% took technical courses, 5% took language courses while 13% studied for their general education. In general economics and bookkeeping/office work are the main areas of interest.

⁸ World Bank Global Distance Educationnet, Teaching & Learning,



In Germany there are currently no distance learning vocational training courses in agriculture. There are some computer programmes available, especially in plant and soil protection, mainly for self study or to be used in schools to educate future farm managers.

2.3 A review of provisions in other countries

There are a number of examples of successful vocational distance learning courses in agriculture in other countries, particularly the USA, Australia and New Zealand. Some of the institutions deal with the requirement for practical aspects by including an element of residential training - from weekends to longer sessions.

2.3.1 Australia

Australia has a long history of providing correspondence schooling for its far-flung rural population. The Australian Correspondence School (ACS) offers a number of certificate and diploma level courses in agricultural and biosciences subjects which it says are internationally accredited, by the International Accreditation and Recognition Council⁹. It offers courses agriculture, animal husbandry, agricultural marketing, animal breeding, animal health, aquaculture, beef cattle, calf rearing, dairy cattle, farm management, irrigation and irrigation management, pasture management, pigs, poultry, sheep, soil management, sustainable agriculture and weed control.

Its advanced diploma in animal husbandry consists of 21 modules; attendance at three 1-week workshops; three industry conferences or seminars and three 100 hour research projects and takes 2,600 hours to complete. The target student is a person with five years' industry experience, with year 12 standard of education.

From the course requirements it would appear that these courses are aimed at people who already have considerable practical knowledge and experience and who want to gain more technical knowledge about the areas they are working in and/or gain a qualification.

The ACS offers the following support:

- Students can talk directly with tutors by phone;
- Tutors respond quickly to faxed or emailed questions by phone, email or fax;
- Personal tuition by video conferencing is available if desired;

<http://www1.worldbank.org/disted/Teaching/teaching.html>

⁹ IARC <http://www.iarcedu.com>



- Access to additional notes whenever needed from an educational database of more than 350,000 pages;
- Videos to borrow;
- Students can visit the ACS offices to use the library or make an appointment with a tutor;
- Mail order bookshop which provides a wide range of books; and
- A unique 'students only' website that includes a chatroom, forums, student directory, and assignment submissions.

2.3.2 USA

The USA has a long history of providing agricultural information to farmers, via its agricultural extension service linked to state universities. One example is the the Kentucky Cooperative Extension Service/University of Kentucky College of Agriculture (UKCA) courses designed for High School students. The courses are designed to have an on-site facilitator actively involved, helping the students develop their note-taking, study, and test-taking skills to a college level. Exceptionally disciplined and motivated students may be able to take these courses successfully on their own if they commit the time and effort required. The course content is very general in nature and broad-based. Although the courses are primarily created by schools in the state of Kentucky, every effort is made to address national perspectives. The courses are primarily about basic scientific principles and vocabulary, which are applicable to all students across the country.

The UKCA Educational Media offers five different electronic field trips and free on-line curriculum materials to support them¹⁰. These field trips offer students the opportunity to experience agriculture from their own classrooms. They can choose an electronic field trip to help learn more about a topic and view the written materials. An electronic field trip to a beef cattle farm is an interesting way to learn about beef cattle and farming without leaving the classroom. Students who live in towns, cities, and suburbs might be very curious to learn what life is like on one of those farms. During the field trip to Salt River Farms in Boyle County, students learn what makes the Bluegrass region so good for raising beef cattle and other livestock, what a typical day on a beef cattle farm is like, how a vet knows that a cow is with calf, and a little about the economics of farming. There are many activities from which to choose. The electronic trip to an orchard features also includes instructions for an apple experiment to learn about what conditions are necessary for life. This experiment could be done at home using everyday materials.

¹⁰ <http://ca.uky.edu/dl/Ftrips>



3. Findings

In Western Europe there is very limited experience of vocational distance learning that we can draw upon in agriculture. However, there is a huge amount of research and literature on all aspects of distance education (see annex 1 for some relevant sites). The World Bank website on distance learning is a very useful compendium of experience, is particularly informative and worth reading.

The main advantage of distance learning is that it enables people to learn how, when and where they want. It provides new ways of learning, new opportunities, and new qualifications. People can take responsibility for their own learning.

At the same time people need the motivation, discipline and time to study. The material they learn needs to be relevant to their needs. People also learn through interaction with others. There are likely to be subjects, and people, which are more suited for distance learning study.

Quality control, and accreditation, of a course are important, and, depending on the type of course, it may be vital that the qualification is recognised, or awarded by, a relevant institution.

The costs of developing a distance learning programme may not be lower than that of a normal course. Distance Learning courses are time consuming and expensive to set up, and require good administrative support.

Participation and consultation in the design of the course by stakeholders - employers, teachers, students - is important to ensure the relevance and acceptance of the course content and aims.

Agriculture is recognised as being particularly difficult to teach through distance learning to people in need of vocational training. It is more relevant for teaching background, more theoretical information, and/or to people already working in the profession who have a lot of practical knowledge. The reasons why distance learning in agriculture is limited are also likely to apply to Romania, Slovenia and Bulgaria.



4. Recommendations for action for Romania, Slovenia and Bulgaria.

It is recommended that:

1. The findings of this report are taken into consideration in any decisions regarding the development of distance learning.
2. Further work is undertaken to investigate the details of establishing distance learning courses in agriculture and biological sciences in Western Europe and elsewhere.
3. Discussions are held with stakeholders on vocational training needs in agriculture and how these could be provided, and the relevant costs of alternative methods investigated.
4. The partner countries who already have some experience of distance learning in other domains investigate how effective and well-considered these programmes are.
5. If electronic distance learning is to be pursued, key people involved in its development should consider enrolling for a post-graduate diploma in distance education.



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Annex 1 Selected organisations involved in supporting distance learning, including in agriculture

Food and Agriculture Organisation (FAO): The Education Group, Extension, Education and Communication Service Research, Extension and Training Division (SDRE), FAO Sustainable Development Department

<http://www.fao.org/>

International Extension College, UK

<Http://www.iec.ac.uk>

Open and Distance Learning Quality Council, UK

<http://www.odlqc.org.uk>

The Commonwealth of Learning

The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to encourage the development and sharing of open learning/distance education knowledge, resources and technologies. COL works with Commonwealth nations to improve access to quality education and training.

In co-operation with the Asian Development Bank and the International Extension College, the COL has produced six comprehensive manuals for use by training distance educators. These are: An overview of open and distance learning; Designing materials for open and distance learning; Planning and management of open and distance learning; use and integration of media in open and distance learning; Quality assurance in open and distance learning; Learner support in open and distance learning.

<http://www.col.org/programmes/training/toolkits.htm>

The World Bank

The Global Distance EducationNet (Global DistEdNet) is a knowledge guide to distance education designed to help clients of the World Bank and others interested in using distance education for human development. The Network consists of a core site located at the World Bank see <http://www1.worldbank.org/disted>.

Zentrales Institut für Ferndienforschung (Central Institute for Distance Education Research), Fern University in Hagen, conducts research on distance education and methods of teaching.

<http://fernuni-hagen.de/ZIFF/>

