THE VIRTUAL UNIVERSITY

Models & Messages | Lessons from Case Studies

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Campus numérique fracophone, Dakar, Senegal

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A newly created institution

United Nations
Educational, Scientific and
Cultural Organization

International Institute
for Educational Planning

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List of abbreviations

AUF	Agence universitaire de la Francophonie (Agency of Universities of the French-speaking World)
AVU	African Virtual University
CED	World Bank Distance Education Centre
CNED	Centre nationale d'enseignement à distance
CNF	Campus numérique francophone (Francophone Digital Campus)
CNFD	Campus numérique francophone de Dakar (Dakar Francophone Digital Campus)
DESS	Diplôme d'études supérieures spécialisées (Diploma of Advanced Specialized Studies)
ESP	Ecole supérieure polytechnique
FCFA	Franc CFA (currency of the West African Economic and Monetary Union)
ICT	Information and Communication Technology
IP	Internet Protocol
ISDN	Integrated Services Digital Network
IT	Information Technology
REFER	Réseau électronique francophone pour l'éducation et la recherche (Francophone Electronic Network for Higher Education and Research)
RESAFAD	African Network for Distance Education and Training
TECFA	Technoloyg for Training and Learning
UCAD	University Cheikh Anta Diop
UNESCO	United Nations Educational, Scientific and Cultural Organization
UVF	Université virtuelle francophone (Francophone Virtual University)

1. The Dakar Francophone Digital Campus and its context

1.1 The international context

Higher education in sub-Saharan Africa has not escaped the crisis that has severely affected African higher education systems in general for over two decades. While the difficulties that African universities are experiencing are numerous, their most frequently encountered problems are due primarily to the following factors:

- students arriving at university are increasingly less well educated;
- long and repeated strikes by students, teachers and administrative and service staff are not always conducive to the acquisition of knowledge in normal conditions;
- student enrolments are increasing exponentially whereas the material, financial and human resources required are remaining at the same level, if not actually diminishing;
- higher education institutions are incapable of retaining a sufficient number of teaching staff in disciplines that are becoming increasingly varied and demanding, at a time when teachers are also attracted by the lure of the private sector, non-governmental organizations, international bodies or expatriation; and
- reference material, scientific and technical information, and the various other kinds of facilities, which students, teachers and researchers cannot do without, are in increasingly short supply.

For some ten years, therefore, the overriding aims of African universities themselves have been undermined. Furthermore, in spite of economic problems and budgetary restrictions, the same universities have continued to enrol large numbers of students in arts disciplines at the expense of scientific and technical fields, notwithstanding the greater relevance of the latter to development issues. One reason, in particular, why African countries have allowed courses in the humanities to expand is that they are less costly than those in scientific and technical fields. While such a policy may have the advantage of ensuring that a large number of young people remain at university and are temporarily given something to do, the drawback is that it ultimately increases frustration among them and, more important, results in a considerable drain on resources rather than an investment in training individuals who would constitute a real force for development in scientific and technological fields.

1.2 The national context

The system of higher education in Senegal consists of both public-sector and private-sector institutions.

The public sector comprises essentially the University Cheikh Anta Diop of Dakar, founded in 1958,[1] and the Gaston Berger University of Saint-Louis, opened in 1990. Alongside these two universities are ‘schools’, such as the Ecole nationale supérieure d’agriculture at Thiès, the Ecole nationale des cadres ruraux at Bambey, the Ecole nationale d’économie appliquée,

[1] The University Cheikh Anta Diop of Dakar was formerly the Dakar school of veterinary medicine, set up in 1916.

or the Ecole Inter-Etats de science et médecine vétérinaires.[2] The state earmarks almost US$33 million for higher education, corresponding to some 20 per cent of the total education budget which, in turn, represents approximately 30 per cent of the general state budget. Overall, both universities enrol almost 25,650 students[3] to which should be added a further 550 or so from the higher, national schools and some 200 students enrolled at the Ecole Inter-Etats de science et médecine vétérinaires, making a grand total of approximately 27,000 students. Approximately 90 per cent are female. Graduation rates range widely from 44 per cent to 84 per cent, depending on whether one takes into account the faculties, or the 'schools', institutes and other higher national schools.

Private higher education institutions were created in the mid-1990s following reforms advocated in the Concertation nationale sur l'enseignement supérieur[4] (national-level consultation on higher education) set up with a view to implementing the Projet d'amélioration de l'enseignement supérieur (plan for the improvement of higher education) financed by the World Bank. Two major decisions were taken in this period.

- On the one hand, the automatic admission to university of those who had just obtained their *baccalauréat* was replaced by a selection process based on an assessment of school reports.[5]
- On the other hand, the period that could be spent in the first intermediate stage of university studies was limited to four years, which had the effect of excluding students who had re-enrolled repeatedly for this stage without ever managing to move on to the second stage. Consequently, many graduates who had just obtained the *baccalauréat* without securing a place at university, as well as those students who had not managed to re-register, ran the risk of being unable to undertake or continue higher education study, with potentially adverse social consequences.

To rectify the situation, the government encouraged the setting up of private higher education institutions capable of enrolling all those unable to study in the public sector. The Dakar-Bourguiba University and a whole range of private institutes or schools were established. At present, these institutions offer training programmes in around thirty branches of study, 90 per cent of which are concentrated in the tertiary sector (computer science and management, executive secretarial studies, accountancy, business administration, etc.) and enrol over 5,000 students.[6] Furthermore, for some years now, given the steady increase in the cost of study abroad and difficulties encountered by students in obtaining foreign visas, foreign institutions have been opening branch campuses in Senegal, such as the Dakar campus of Suffolk University, in which it is possible to study for two initial years in Dakar and then move on to the Boston campus (USA) for a further two years in order to obtain a Bachelor of Science in Business Administration.[7]

[2] The main features of public-sector higher education are likely to be slightly altered following the adoption, in August 2002, of the Law for the establishment of regional university centres. These centres will provide training of a vocational nature up to a level corresponding to 'Bac+2' (two years of further study after the *baccalauréat*), which will reflect the economic profile of the regions in which they are located.
[3] The University Cheikh Anta Diop of Dakar alone accounts for almost 23,500 of the students in this total.
[4] The national-level consultation on higher education was held in August 1992.
[5] The new procedures for admitting holders of the *baccalauréat* to university were adopted in 1994.
[6] Most of these courses lead to the qualification of *Brevet de technicien supérieur* (higher technical certificate).
[7] Cf. http://www.suffolk.edu/international/dakar/home.html.

Over and above numbers alone, the higher education system has to respond to numerous problems and challenges. In addition to those already referred to above, higher education faces other difficulties, such as:

- the retirement of a great many teachers belonging to the first generation of academics;
- difficulties encountered in recruiting new teachers in subjects related to science and technology;
- the difficulty of ensuring that teachers who are proficient in the field of Information and Communication Technology (ICT) remain in service;
- the ever-increasing costs involved in the very necessary use of ICT in teaching, research, and scientific and technical information;
- competition engendered by the growth and diversification of distance education offered by foreign universities;
- a lack of short vocational courses at a time when university graduate unemployment is endemic;[8] and
- the chronic shortage of qualified teachers that will only be aggravated by plans to create regional university centres.

That being said, while higher education has had to confront many problems, circumstances in the country are especially conducive to the use of ICT in education and training in general and to the development of distance education in particular. This may be attributed especially to the following:

- the quality of the existing telecommunications infrastructure;
- favourable tax, legislative and regulatory conditions;
- the number of online educational and training facilities;
- the agreement signed between Sonatel, the Senegal telephone company, and the Ministry of Education; and
- the interest in distance education displayed by the top political authorities.

Indeed, Senegal has been connected to the Internet since March 1996 with a high-speed connection of 53 Mb/s (Sagna, 2001). Furthermore, the possibility of substantially increasing the bandwidth is now greater with the launching, in June 2002, of the 28,000-km SAT-3/WASC/SAFE submarine cable linking Angola, Benin, Cameroon, the Canaries, Gabon, India, Côte d'Ivoire, Malaysia, Mauritius, Nigeria, Portugal, Réunion, Senegal, and South Africa.[9]

At a national level, Senegal possesses an entirely digitalized telecommunications network, which relies on an optical fibre loop almost 2,000 kilometres long linking up the country's main urban centres. Furthermore, since 1998, an Internet Protocol (IP) network based on 155 Mb/s, 34 Mb/s and 2 Mb/s links, depending on the area concerned, will cover the whole of the country. In particular, it will enable the establishment of Virtual Private Networks for the infrastructure of the entire geographical area of Senegal.

The use of ICT in the education and training sector has been made easier by the fact that, apart from the customs stamp duty applicable to all products, computer equipment may be

[8] For almost 20 years, unemployment among *maîtrisards* has been a much discussed topic in Senegal. The *maîtrisards* are students who, despite possessing a *maîtrise* (equivalent to a Master's degree), spend years without finding employment that corresponds to their level of education and training.

[9] With a technical capacity of 120 Gb/s, this cable will enable the transmission of 5.8 million simultaneous telephone conversations, or the content of 35 DVDs, per second.

imported duty free. Furthermore, present legislation and regulations are based on a new telecommunications code adopted on 14 December 2001, which:

- guarantees 'the effective provision of a service for all users throughout the entire country, especially in rural areas and at a cost that people can afford' (Law No. 2001-15, 2001);
- introduces open competition in the value-added services sector; and
- entitles the Autorité de régulation des télécommunications (the telecommunications Regulating Authority) to ensure that the principles of sound and fair competition are respected by all players and that the public interest is upheld.

Quick to take advantage of these circumstances, a whole series of higher education and training institutions have come online via dedicated links, including the University Cheikh Anta Diop of Dakar (UCAD), the Gaston Berger University of Saint-Louis and the Centre africain d'études supérieures en gestion, among others. Other institutions are connected via satellite links, as in the case of the African Virtual University (AVU) on the UCAD campus, or the World Bank Distance Education Centre (CED) on the premises of the Ecole nationale d'administration et de magistrature.

This trend towards the use of ICT has been encouraged by the spectacular fall in the cost of leased links, which plummeted from US$1,645 in 1996 to US$575 in 2002 for a dedicated 64 Kb/s link. Furthermore, the agreement of 31 July 2001 between the Ministry of Education and Sonatel means that it is henceforth possible for education and research institutions to secure a 50 per cent reduction for this kind of connection.

Finally, Abdoulaye Wade, the President of the Republic of Senegal, is strongly in favour of introducing ICT into the education system; he has launched the plan to set up an African University of the Future. This university will use distance education facilities and is expected to enrol almost 5,000 students across the entire continent. The proposal is based on arrangements with prestigious foreign universities for a system of joint degrees, which will be awarded by the African University of the Future and universities that agree to the partnership. As regards the technical aspects of the university, Senegal is in touch with the Texas International Education Consortium, an American body that administers around 40 universities, and it has already found a source of funding of no less than US$14 million from the Government of Taiwan (Agence Education Emploi Formation, 2001).

Distance education and training may thus constitute a response to the problems and challenges confronting Senegalese higher education institutions, their teaching staff and students. Indeed, the sudden proliferation of ICT within the field of education and training offers an open and evolving area for learning and, with it, both a new way of considering educational and scientific concerns and a fresh political approach. That being said, in spite of a supportive technological environment and the existence of experiments such as the AVU, or the Forciir scheme, offering 'second-stage' higher education courses in information sciences[10] and distance education programmes for e-archivists/documentalists in business and industry, there is no real policy in this area either at the national level or among Senegalese higher education institutions. Under these circumstances, the rationale for the Campus numérique francophone de Dakar, or CNFD (Dakar Francophone Digital Campus), of the Agence universitaire de la Francophonie, or AUF (Agency of Universities of the French-speaking World), is to show the way by serving as technical support and as a location for experimentation with many different

[10] The Forciir scheme: http://www.ebad.ucad.sn/forciir/.

projects constituting potential solutions or new approaches, which may serve to inspire policy-makers and academics.

2. The creation, organization and current programme of the CNFD

At the beginning of the 1990s, AUF realized that one of the main obstacles to the development of quality higher education and research in developing countries in general and in sub-Saharan Africa in particular was the difficulty, if not the impossibility, of accessing internationally produced scientific and technical information. It thus created the Réseau électronique francophone pour l'éducation et la recherche, or REFER (Francophone Electronic Network for Higher Education and Research). Composed of SYFED centres[11] established in francophone higher education institutions, this Network sought mainly to facilitate access to scientific and technical information by offering services for consulting online databases and data banks, ordering original documents, and consulting CD-ROMs and videodiscs with bibliographical information or full-text documents. The first SYFED centre was opened in Dakar on 13 May 1991. At that time, the facilities consisted of:

- Minitel[12] terminals used for searching online information via the Questel-Orbit server; and
- microcomputers equipped with CD-ROM or videodisc drives for local-mode consultation of electronic resources.

Following the extension of the Internet to the general public in the mid-1990s, at a time when the developing countries were not widely connected, if at all, AUF added a further facility to its SYFED centres, namely e-mail. This gave birth to REFER and, from 1995 onwards, the SYFED centres became known as 'SYFED-REFER centres'. Users of the centres were from then on able to obtain an e-mail address and exchange electronic mail and files with 'Netizens' throughout the world. Technically, the link was first established via the Minitel, then via microcomputers emulated in videotext mode, and, finally, via computers using TCP/IP as soon as developing countries first came online. The network of SYFED-REFER centres thus offered both access to scientific and technical information and access to e-mail and Internet browsing.

Meanwhile, in the most developed countries, the growth of ICT opened up new prospects for distance education, which, after moving from paper-based materials to audiovisual aids, was tending to rely increasingly on electronic multimedia facilities. It was in this context that, in 1995, the World Bank studied and adopted a strategy document proposing the establishment of an African Virtual University. In an analysis of the global environment, this document stated that the 'new economy' driven by ICT could be expected to enable underdeveloped countries to bypass the normal stages of development and thus offer their citizens better living conditions. However, if real benefit was to be derived from this possibility, the sine qua non requirement was adequate training and, on a sufficient scale, human resources capable of significantly improving the productivity of African business. For this purpose, Africa had to be able in the short term to train very large numbers of people with a firm grasp of ICT, who were also responsive to innovation, capable of adapting to change, skilled in problem-solving, and ready to continue their education throughout their lives. As these aims had not been achieved by means of conventional higher education, it was vital to envisage other solutions and, more particularly, the establishment of an African Virtual University. This university

[11] Système francophone d'édition et de diffusion (francophone publishing and distribution system).
[12] Officially inaugurated in France in 1983, the Minitel is a terminal that uses the Videotext standard.

would rely on the intensive and extensive use of ICT in a way so as to introduce into the labour market a considerable number of people with appropriate training, while also overcoming financial, physical and information barriers. The two main aims to be adopted by the AVU were, first, to improve the quality and relevance of education provided in sub-Saharan Africa in the fields of science, engineering and management, and, second, to increase considerably the number of students enrolled in these subject areas. With this end in view, it was envisaged that the AVU would progress in accordance with a three-point strategy, which involved:

- seeking and acquiring relevant teaching materials already produced by higher education institutions and professional associations, etc. so that they could be adapted to the African context and used for seminars and training courses that would lead to formal qualifications;
- boosting access to higher education and improving its quality by generating and stimulating competition between African higher education institutions; and
- supporting the production of quality teaching materials in Africa by Africans (World Bank, 1995).

Presented during a workshop organized by the World Bank in Dakar in April 1997, the proposal for an African Virtual University was seriously contested by several African academics. They were not hostile to the modernization of African universities and the education they provided, but to an arrangement that they felt would deprive them of one of their essential entitlements, namely the right to devise and produce curricular content, and reduce them to little more than mere tutors.

2.1 Establishment of the CNFD

During the same period, the Francophonie (an organization comprised of fifty-five French-speaking countries) was also considering the establishment of a virtual university. The background of this initiative is important as it constitutes the point of departure for the eventual creation of the CNFD.

In line with the Cotonou (Benin) Resolution on the Information Society adopted at the Summit of French-speaking Communities in December 1995, the proposal to set up a Université virtuelle francophone, UVF (Francophone Virtual University), was officially presented at the Conference of Francophone Ministers Responsible for the Information Highway, held in Montreal, Canada from 19 to 21 May 1997. Adopted by the Conference, the proposal was submitted to the francophone heads of state in November 1997 during the Summit of French-speaking Communities in Hanoi, Viet Nam. In the action plan adopted at the Summit, the heads of state recommended that special attention should be devoted to the 'development of virtual information and training and especially the Virtual University,' and authorized the Association of partially or wholly French-language universities–University of French-language Networks[13] to establish the Francophone Virtual University.

During their meeting in March 1998, members of the Conference of Rectors of Universities in Africa and the Indian Ocean Region drafted a declaration in which they recommended 'the

[13] Prior to May 2000, the Agency for Universities of the French-speaking world (AUF) was officially known as the Association of partially or wholly French-language universities – University of French-language networks (AUPELF-UREF).

development in Africa of the Francophone Virtual University and the setting up of its regional campuses'.[14]

Finally, in April 1998 in Beirut, Lebanon, the Association of Partially or Wholly French-language Universities–University of French-language Networks, at its twelfth General Assembly, officially decided to go ahead with the establishment of the Francophone Virtual University. Presented as a 'unifying concept' that would make it possible to create a synergy between experiments already conducted in the French-speaking world, the UVF had the following major objectives:

- decentralized generation of knowledge;
- circulation and compilation of research findings;
- open distance-education and -training and independent learning; and
- provision of user support services.

Among its specific aims were the following:

- to adapt training courses to the requirements of the universities and countries concerned, gearing this provision to the labour market and national priorities, and significantly reducing the operational and installation costs of ICT;
- to progressively replace traditional teaching methods with a more interactive – and in certain cases less hierarchical – teacher/learner relationship, in which teachers would continue to assume fully their role as facilitators in the learning process;
- to give greater consideration in higher education to cultural and socio-economic characteristics specific to the francophone regions of the global South; and
- to implement innovative cooperation strategies for devising course content, which would lead to the formation of francophone multilateral teams of academics and teachers, the establishment of equivalences, and the award of degrees common to several partner universities in the pursuit of collective excellence.

The UVF target group was the same as that of the SYFED-REFER centres, that is, students enrolled in masters and doctoral programmes, as well as those receiving specialized professional training. There were several good reasons for concentrating on these groups:

- the urgency of a commitment to the training of human resources;
- the major likelihood of a brain drain towards countries outside the French-speaking world;
- the overriding need for first-rate teaching and research; and
- the need to strengthen the research community in the French-speaking world.

Once the establishment of the UVF had been formally accepted by all the francophone bodies concerned, the time had come to put this ambitious proposal into practice. From 1998 onwards, several programmes were implemented that aimed at giving UVF a clear academic identity. The objectives of these programmes were defined as follows.

- Technology transfer provides for the training of trainers in ICT in the countries of the South. The objectives of the training are to help teachers and researchers to adapt to changes in their professions due to the emergence of new technologies. This training focuses essentially on the mastery of technological tools, equipment and networks, as well as the production of multimedia resources and software.

[14] Cf. Paris Declaration and Action Plan of the strengthening of francophone university cooperation in sub-Saharan Africa (http://www.refer.org/sngal_ct/archive/paris.htm).

- The Virtual Media Library and specialized electronic libraries aim at supplying UVF students, teachers and researchers with the resources they need, by:
  - structuring in electronic form resources of totally different origin (sound, video, conventional printed publications, multimedia products, software, etc.);
  - enabling students to access specialized virtual libraries for training and research purposes;
  - making more of academic output, and especially non-formal sources of information (such as theses and dissertations, etc.) within the scope of the Institut de référencement pour l'information scientifique (Referencing institute for scientific information).
- Pronet sets up intranets in the partner institutions to provide for electronic collaboration between researchers, teachers and students.
- Virtual thematic networks aim at forming international groups for project development in specific areas of interest for the purpose of:
  - acting as a federating network;
  - responding to the expectations of francophone countries in the South as regards the development of open education;
  - encouraging exchanges and cooperation between teams producing content;
  - strengthening cooperation between all francophone institutions committed to open education;
  - monitoring activity; and
  - evaluating and selecting projects.
- Initiatives call for bids, finance innovative projects developed by the francophone academic community.

However, with the appointment of Michèle Gendreau-Massaloux in December 1999 as head of AUF, the name 'UVF', although not the concept, was dropped. It was felt that the name, Université virtuelle francophone, might have given the impression that the AUF was setting out to promote a new higher education institution for the purpose of replacing or competing with existing institutions, as the AVU wanted to do. The time had come to promote the concept of a 'francophone digital campus', which was defined as a 'technological platform to support universities, *grandes écoles*, training centres and research laboratories in the global South' (*Official Presentation of Programme 4*).

Encouraged by the backing of the Conference of Rectors of Universities in Africa and the Indian Ocean Region, the Fonds Francophone des Inforoutes (the fund for the francophone information highway) and bilateral cooperation partnerships, AUF decided to begin to establish campus numériques francophones (CNFs) (francophone digital campuses) in countries in the South. In fact, the setting up of CNFs relied quite naturally on the SYFED-REFER centres, which constitute operational AUF field agencies. With regard to sub-Saharan Africa,[15] this network originally consisted of around a dozen centres in Dakar in Senegal, Abidjan in the Côte d'Ivoire, Libreville in Gabon, Ouagadougou in Burkina Faso, Antananarivo in Madagascar, Cotonou in Benin, Lomé in Togo, Yaoundé in Cameroon, Bujumbura in Burundi, Nouakchott in Mauritania and Conakry in Guinea.

With the setting up of the CNFs, the SYFED-REFER centres are now known as *centres d'accès à l'information* (centres for information access). As the basic infrastructure for the CNFs, the centres are staffed by research assistants and offer the following facilities to students, teachers and researchers:

[15] The network of SYFED-REFER centres covers the five continents.

- an area equipped with computers for on-site consultation of CD-ROMs, access to e-mail and web browsing; and
- a service for online database consultation and for ordering primary documents.

The first CNF to be inaugurated was in Yaoundé and it was soon followed by campuses in Bamako[16] and Libreville.[17]

Construction work on the Dakar Francophone Digital Campus (CNFD) did not begin until February 1999. Until then, the Dakar premises of the AUF consisted of a resource centre in a site of around 50 m² equipped with some half-dozen computers. In the light of the Conference of Rectors' recommendations, it was decided to undertake heavy investment with a view to the construction of premises capable of housing a whole range of facilities that could be used to illustrate exactly what a typical digital campus might look like, not to say an 'ideal digital campus'. Work was completed in June 2000 and, a few months later, on 24 October 2000, the CNFD was officially inaugurated by the Rector of AUF, in the presence of several Senegalese ministers and representatives of many African academic authorities.

2.2 CNFD staffing

Headed by a director responsible for its day-to-day work, the CNFD is managed administratively and financially by the West Africa Office of AUF. It is responsible to a Conseil national d'orientation (National Policy Council) consisting of individuals from the academic world, heads of firms, development partners, specialists in open and distance education and training and representatives of users. It is chaired by the rectors of the University Cheikh Anta Diop and the Gaston Berger University, as well as by the Director of the AUF West Africa Office. Its members are constituted in six groupings:

- a 'University' group consisting of the Director of Higher Education, the UCAD Director for Reform and Educational Affairs, deans of faculties, directors of training and research units, and directors of UCAD and Gaston Berger University institutes, as well as the Director of the CNFD;
- a 'Cooperation' group consisting of the Personal Adviser on French-speaking communities to the President of the Republic, the Cultural Adviser at the French Embassy, the Canadian Embassy Representative, the Delegate of the French Community of Belgium, regional representatives and directors of the Institut de Recherche pour le Développement (the Development Research Institute) and of the Centre International de Recherche Agronomique pour le Développement (the International Agricultural Research Development Centre), in Senegal;
- a 'Business' group consisting of an employers' representative and of directors of computer firms;
- a 'Technical' group consisting of the CNFD systems and network administrator and the UCAD and Gaston Berger University computer managers;
- a 'Training of ICT Trainers' group consisting of the CNFD training manager, and representatives of the AVU, the World Bank CED, the African Network for Distance Education and Training (RESAFAD), and the Ecole normale supérieure, etc.;
- a 'Users' group consisting of students, teachers and researchers using CNFD facilities.

[16] The Bamako CNF was inaugurated on 22 February 2000.
[17] The Libreville CNF was inaugurated in June 2000.

The National Policy Council meets once a year. It elects from among its members a 'steering committee' consisting of three presidents and a representative from each of the six groups. This committee meets every three months. Its role is to:

- examine priority action programmes;
- evaluate their suitability to online provision;
- identify procedures for implementing them;
- recommend ways of creating awareness among target groups;
- evaluate results; and
- discuss any changes that may be necessary.

In operational terms, the CNFD is the responsibility of a director assisted by a system and network administrator, a training manager and a resource centre manager.

Acting only as a technological platform, the CNFD does not maintain close relations with distance education institutions or consortia. These contacts are primarily the responsibility of AUF at central level when training is being 'accredited' and relate solely to procedures for its delivery and not its content. Indeed, in keeping with its general approach, AUF does not get involved in academic and/or teaching issues. Naturally, it tries to ensure that commonly accepted standards in this area are respected, but no more than that. Consequently, it determines neither course content nor teaching methods, nor the kind of teachers required, nor the frequency or nature of assessment. Its role is limited to accepting (or rejecting) a particular course because it corresponds (or does not correspond) to the priority subject areas identified by the Academic Council and to the level of education or training generally available from the Agency. It also indicates the share of enrolment fees that may be borne by it and promotes training, etc. All educational aspects are the sole responsibility of the institution that offers the particular course or that has assumed the responsibility for it within the consortium. Locally, AUF may assist with procedures for selecting candidates by making available its premises, infrastructure or even staff to facilitate interviews by telephone or via chat areas, the checking and/or receipt of applications, etc. and, in certain cases, by making its premises and/or computer facilities available to students.

Within this framework, difficulties encountered by AUF often relate to the supervision of students, even though this is not strictly speaking its responsibility. The CNFD is indeed often approached by institutions, responsible for course content and teaching arrangements, which note that students have not submitted homework within the period required, or have not attended regular meetings for assessment purposes. In principle, such matters are not the responsibility of the CNFD, since students are formally enrolled in a university, which should see that they respect its regulations. However, since the enrolment fees of these students are often partly or wholly covered by AUF, it is in the interest of the CNFD to ensure that those selected participate regularly in courses and, more to the point, pass their examinations so that the investment has not been totally wasted.

However, the supervision of students is difficult, as they are under no administrative obligation to report to the CNFD, which exercises no control over them and maintains only minimal contact. Under these circumstances, the CNFD can do little more than remind the students concerned of their binding, moral obligation to AUF, and that, if they ignore or fail to respect the 'rules of the game', they are not just wasting a precious opportunity but acting unfairly vis-à-vis those who were not selected because of the limited number of places available. Another problem that sometimes arises relates to the need to provide enrolled students with properly equipped classrooms, which means that the same number of places is

no longer available for in-class training courses organized by the CNFD or for its other activities. Finally, although this particular problem does not directly concern the CNFD, the bandwidth may be insufficient for students to conveniently access website teaching resources or distance education platforms, or to use effectively the communication tools that a particular course of training requires (e-mail, chat areas, newsgroups, IP videoconferencing, etc.).

2.3 The current CNFD programme

The activities currently implemented by the CNFD, under the AUF programme Technologies de l'information et de la communication et appropriation des savoirs (ICT and knowledge acquisition) essentially focus on six main areas:

- The production of multimedia content and, especially, electronic magazines and website development.
- The promotion of open and distance education with a course offer based on five degree programmes leading to formal qualifications:
  - the Diplôme d'études supérieures spécialisées (DESS) in 'The use of information and communication technology for education and training' awarded by the University Louis Pasteur, Strasbourg in France;
  - the postgraduate Diplôme inter-universitaire in 'Basic rights' awarded by the University of Nantes and the University Paris X in France;
  - the postgraduate Diplôme universitaire in 'International environment law' awarded by the University of Limoges and the University of Nancy II in France;
  - the *licence professionnelle* for Internet professions, awarded by the Université Paris V in France.
- The promotion of a set of six CD-ROMs called *Premier cycle sur mesure*, a specially devised first degree course in mathematics, physics and chemistry developed by the Réseau universitaire des centres d'auto-formation (university network of centres for independent learning).[18]
- Support for the setting up of new innovative firms by means of the CNFD 'incubator'.
- The organization of in-class training, (involving e-mail, Internet browsing and searches, the authoring of HTML documents, Linux systems and network administration, and training provided by the Cisco Regional Academy whose course programme enables students to work for Cisco Certified Network Associate status). This in-class training is intended to help develop the digital literacy of students, teachers and researchers, and strengthen the human resources of higher education and research institutions in the deployment and management of computerized services.
- Access to scientific and technical information via the online consultation of databases and electronically supplied primary documents.

All CNFD distance education programmes are oriented to professional and postgraduate-level study or the second level of university studies (masters). By deliberately opting for this kind of provision, the AUF is seeking to prepare students more effectively for a context in which knowledge and technology are expanding more and more rapidly, with the emergence of new professions, qualifications and forms of employment lying midway between those of higher technicians and engineers or senior managers. Furthermore, the same approach makes it possible to introduce training programmes that call for very closely coordinated activity on

[18] Established in 1987, this network provides an organizational basis for discussing, developing and pooling expertise to provide higher education with new approaches to teaching that are more geared to independent learning by students and rely on modern communication technology (http://www-ruca.univ-lille1.fr/).

the part of universities and other professional sectors so that qualifications with immediate market value can be offered as an alternative to traditional qualifications testifying to the acquisition of essentially theoretical knowledge.

Taking the *licence professionnelle* for Internet professions as one example, this particular qualification has been devised to respond to the need for the professional development and integration at 'Bac+3' level (three years of further study after the *baccalauréat*) of persons who have already received a 'Bac+2' education and seek to upgrade their qualifications despite not having the time and/or ability to embark on training as engineers. The *licence professionnelle* also provides those who have received 'conventional' training in computer science previously with an opportunity to upgrade their knowledge by acquiring new Internet-related skills.

Preparation for the *licence* lasts 20–25 weeks followed by a 2–14-week placement. The content of the programme is divided into 5 teaching modules lasting 381 hours in all, preceded by a 48-hour module, which is intended to ensure that students have reached the level required and which focuses on methodology. These modules are supplemented by a supervised project of some 150 hours that includes a 12–16-week in-company placement. As a whole, this programme is concerned with the following:

- the Internet training environment and services, algorithmics, HTML and an introduction to databases (48 hours);
- English for professional purposes and written and oral French (81 hours);
- the Linux and Windows operating systems, networks and the customer/server, web development, XML and Java programming (228 hours);
- problems of relational databases and practical MySQL, PHP and web/database interfacing (72 hours).

Teaching is divided into three-hour sessions (morning, afternoon and early evening) which may include lessons, independent learning sessions and computer conference tutorials, etc. Finally, as regards assessment, the *licence professionnelle* is validated by means of continuous assessment and examinations.

This degree programme has been offered as distance provision since the start of the 2002/03 academic year. It was previously available in France either as initial training for persons with a scientific or technological 'Bac+2' qualification, or under a qualifying contract in remunerated linked work and training for those who had reached 'Bac+2' level or, in the case of people with a qualification equivalence or a validated record of professional achievement, in full-time continuing education and training. Distance delivery of the course in Senegal has been conducted by the Université Paris V in partnership with the Ecole supérieure polytechnique (ESP) of UCAD.[19] The idea is that on completion of its initial year the course should be transferred to the ESP. Bearing in mind that the *licence professionnelle* is intended mainly for relatively young people, those who devised it have planned for the inclusion of a certain number of in-class sessions, so that learners do not feel unsupported and tempted to drop out before completing the course.

A second example is the diploma in 'the use of ICT for education and training' mentioned earlier. This course has been provided in class since 1998 and involves training teachers and managers of adult training who wish to make new technology central to their own teaching or

[19] This training is also offered in Cotonou, Benin; Tunis, Tunisia; and Yaoundé and Douala, Cameroon.

training activity. During the 2000/01 academic year, it was offered as a distance programme leading to a diploma and, since the start of the 2001/02 academic year, has been formally recognized as a DESS. Devised by an educational consortium coordinated by the French University Louis Pasteur of Strasbourg, which brings together the Belgian Université de Mons and the Technology for Training and Learning Unit (TECFA) of the Swiss Université de Genève, in collaboration with the Senegalese ESP de Dakar and the Tunisian Institut supérieur de documentation, this programme has been conducted in partnership with AUF.

With a 408-hour workload, 50 hours of which are devoted to in-class group activity, the course makes use of the Internet and a distance education platform known as ACOLAD. The in-class provision occupies one week at the start of each stage of training. Its purpose is to develop the ability of learners to grasp certain procedures so that they become familiar with the tools used in distance education and with existing forms of distance provision, and so that they can submit their own personal project. More specifically, the course in this first week consists of a 'mini-module' that simulates distance education situations for demonstration purposes. This in-class training is provided on CNFD premises, which serve as a meeting place for students from sub-Saharan Africa.

The major part of the course (358 hours) takes the form of distance training and is divided into 6 teaching modules, each lasting 51 hours broken down into:

- 15 hours of virtual seminars (equivalent to tutorials) and 36 hours of computer-assisted collaborative work;
- three cross-disciplinary seminars each lasting 10 hours;
- monitoring of individual projects (12 hours); and
- technical monitoring (10 hours).

With regard to the virtual seminars, guidance is provided primarily in synchronous mode (twelve hours in each teaching module), with asynchronous mode used between sessions (three hours per module) to give students instructions concerning the organization of their work and the performance of specific tasks. Tutors make ad hoc appointments so that they can communicate live with one or more students involved in the seminar and check their progress in a given task. All these activities are noted in the work schedule checked and validated by tutors. Course reference literature is formatted in accordance with a pattern based on 'hyperlink' architecture. As the level of telecommunications infrastructure varies very widely from one country to the next, special attention is devoted to technical problems that may arise because the local bandwidth can only transmit to a limited extent the images and simulations used to illustrate coursework.[20]

In the computer-assisted work, which is the equivalent of practical labour, students work, within a group of ten persons, in teams of three or four supervised by a tutor from their virtual seminar. Each team works collaboratively to produce a small-scale project aimed at solving a problem related to a learning situation.

Finally, the distance training project has to be undertaken independently or by pairs of students, in either case assisted by a tutor. The project is carried out in several compulsory stages, as follows:

[20] In general, this type of problem does not arise for the CNFD, which has a dedicated 2 Mb/s link, that is itself connected to the Internet via a 53 Mb/s link.

- the determination of project specifications with, in particular, a clear breakdown between the time devoted to in-class and distance training;
- the planning of the content-development stages and determination of the timetable for the completion of tasks;
- the presentation of the project at the outset, at the midway stage and on its completion;
- discussions with the other students and tutors in synchronous and asynchronous mode;
- project management;
- execution of the project;
- defence of a project dissertation assessed by the supporting tutor and another teacher.

The special feature of this training programme is that it is provided by a group of teachers responsible to one teacher at the Université Louis Pasteur in Strasbourg, who works in the institutions that were originally involved in developing the course (the Institut supérieur de documentation de Tunis, TECFA at the Université de Genève, the Université de Mons, etc.). These teachers are backed up by tutors, who took the course themselves during the experimental year and are enrolled in doctoral studies or have sound professional experience in computer engineering, multimedia or continuing education.

The main role of the tutors is to continually stimulate learner interest and activity, to be constantly on hand to clarify points of methodology and to ensure that the individual learners are part of a joint learning endeavour. In particular, tutors have to follow activities closely and motivate learners as soon as a problem is reflected by prolonged absence from newsgroups or in personal communication. Tutors then intervene to address any indication of disillusion and drop-out with appropriate remedial action. They have resources at their disposal enabling them to:

- exchange messages with learners (e-mail, newsgroup, chat, etc.);
- evaluate the work of learners using assessment documents (working documents shared by the team, personal seminar documents, cross-disciplinary seminar summary documents, written examination papers, and project presentation material).

Out of the 358 hours of the programme conducted in distance mode, synchronous and asynchronous tutoring, which plays a very important part in distance learning, corresponds to approximately 37 hours, amounting to a little over 10 per cent of the total duration of distance training, with an estimated 15 hours devoted to virtual seminar tutorials,[21] 10 hours to the cross-disciplinary seminar[22] and 12 hours to the personal project (out of the total 100 hours that students normally take to complete their project). In technical terms, tutoring relies on the use of the chat facility, e-mail, Internet videoconferencing,[23] newsgroup discussions, areas for joint work, etc., depending on whether it is synchronous or asynchronous.

A final example: the course in ‘Basic rights’ and ‘International environment law’ is offered in more conventional form. Originally, it was part of the University by Satellite programme launched in 1992, which made it possible to obtain a university education leading to a formal qualification and also update and upgrade one’s knowledge and professional expertise, or enhance one’s personal general knowledge via a distance education facility. The programme first involved the production of multimedia programmes of an educational nature, which were subsequently made available on VHS cassettes or on websites. The instruction provided relied

[21] Out of a total fifty-one hours, training activities in computer-assisted joint working groups account for the remaining thirty-six hours.
[22] This corresponds to the entire seminar.
[23] Internet videoconferencing generally relies on use of a tool such as NetMeeting.

on course booklets, while CD-ROMs were used for whatever could not be transmitted by audiovisual means.

All courses for qualifications that were developed for the University by Satellite programme were at postgraduate level. They were devised and administered by French-speaking specialists and carried out in partnership with bodies specialized in distance education. As a result, the following courses were initiated one by one:

- *Maladies parasitaires et tropicales*, that is, 'Parasitic and tropical diseases' (1993), jointly produced with the Centre national d'enseignement à distance (CNED) and in collaboration with the Université Paris VI (twelve audio-visual aids lasting twenty-six minutes);
- *Biotechnologies végétales*, that is, 'Plant biotechnologies' (1995), jointly produced with CNED and in collaboration with the Université Paris VI, the Université Paris XI, the Ecole nationale supérieure d'agronomie de Rennes and the Ecole nationale supérieure d'agronomie de Toulouse (twenty audio-visual aids lasting twenty-six minutes);
- *Droits fondamentaux*, that is, 'Basic rights' (1996), jointly produced in France with the Université de Nantes and in collaboration with the Université Paris X (fourteen audio-visual aids lasting twenty-six minutes and a website); and
- *Droit international de l'environnement*, that is 'International environment law' (1998), jointly produced in France with the Université de Nancy II and in collaboration with the Université de Limoges (thirteen audio-visual aids lasting twenty-six minutes, a CD-ROM and a website).

Students admitted to these courses were selected following a call for applications. The latter were studied by a committee consisting of representatives of the organizing universities and other institutions, specialized bodies concerned with distance education and AUF. Payment of course registration fees could be waived for students originally from member countries of the Organisation internationale de la francophonie (International Organization of French-speaking Communities). In such cases, they received free of charge all the educational materials they needed to follow the distance training programme, were enrolled at the expense of AUF in the university awarding the qualification, and received support in the form of information materials (magazines and books) and priority attention in the SYFED-REFER centres as then constituted.

Today, only the last two courses in the above list[24] are still on offer and both have moved from reliance on audio-visual support to interactive multimedia. Indeed, in calls for applications for courses, candidates are now explicitly required to be online, particularly so that they can access the open campus website *Droit, éthique et société*,[25] that is, 'Law, ethics and society', or have a computer fitted with a CD-ROM drive. For the purpose of this course, the CNFD has placed the services of its *infothèque* at the disposal of over twenty students for the last three years.[26] The modest number of students involved in this open and distance programme is due to the fact that, under the AUF strategy to promote this new type of provision, tuition fees are totally paid for or very largely subsidized. As a result, access to this kind of programme is limited to successive groups of around thirty persons for each qualification from all AUF member countries.

[24] 'Basic rights' and 'International environment law'.
[25] The address of the '*Droit, éthique et société*' open campus website is: http://codes.fc.univ-nantes.fr/codes/.
[26] Support from the CNFD involves primarily the loan of video cassettes, provision for web browsing and access to e-mail and offering access to databases, etc.

3. Administrative issues

3.1 CNFD administration

CNFD has a light administrative structure for its day-to-day management with just a director, programme manager, computer or information technology (IT) manager, resource centre manager and *infothèque* manager. Responsibility is shared between these five persons as follows.

- The director of the CNFD deals with all human resource management matters, financial management, the administration of material resources, external relations and supervision of all actions in the AUF Programme Four (ICT and knowledge acquisition) that are not directly related to providing training programmes.
- The task of the programme manager is to implement arrangements for the smooth provision of open and distance programmes, which means booking rooms, determining necessary/possible configurations with the IT manager, organizing in-class examinations, supervising student selection procedures, monitoring contact between local institutions and those of the North in open and distance education involving a Senegalese institution, and supervising the evaluation of certain tools/educational products, etc.
- The IT manager, liaising with the CNFD director and the programme manager, ensures that the technical infrastructure is functioning properly, installs and tests tools prior to their use for the courses (EAD platform, arrangements for IP videoconferencing, etc.), and monitors and evaluates possible new approaches to improve the working conditions of students involved in these courses.
- The resource centre manager produces multimedia content, supervises students who have to use certain specific facilities (particularly IP videoconferencing) and advises individuals or teams regarding the development of multimedia products.
- The *infothèque* manager is responsible for the daily administration of access to computers that can be used to consult e-mail, browse on the Internet and consult specialized databases, and orders electronic primary documents from INIST services.

3.2 Costs and financing

With regard to the basic CNFD infrastructure, the average total US$500,000 investment was broken down as follows:

- US$220,000 for building construction;
- US$170,000 for computer equipment;
- US$50,000 for electricity;
- US$25,000 for air-conditioning;
- US$25,000 for cabling; and
- US$17,000 for furnishing.

This investment, which came from the AUF's own finances,[27] corresponds to a ratio of US$2,700 for each workstation, resulting in a project that is exceptionally cost effective.

It should be noted that the University Cheikh Anta Diop of Dakar makes a very important contribution from an operational standpoint. It provided the site on which the CNFD is built, expenditure on water and electricity and the security of the facilities. It also provides AUF with a teacher who is responsible for instruction within the CNFD.

Outside of this contribution and the salaries paid by the AUF, the CNFD has the task of generating its own operating budget. This means that all services have to be paid for, even when prices are subsidized in one way or another. The CNFD thus has a fee schedule with three price levels as follows:

- level one for teachers, researchers, students and administrative staff at public-sector universities;
- level two for teachers, researchers, students and administrative staff at private universities, and the staff of public or quasi-public bodies and associations; and
- level three for the private sector and international bodies.

Enrolment fees payable for open and distance courses depend, first, on the particular qualification concerned and, second, on whether or not the student is an AUF grant holder. For example, for the Diplôme d'université in 'Basic rights' and the Diplôme inter-universitaire in 'International environment law', AUF student grant-holders pay just 100,000 Francs CFA (FCFA), whereas those with no grant have to pay FCFA297,000. By contrast, for the *licence professionnelle* for Internet professions, the tuition fees are over FCFA500,000 for students and over FCFA1 million for persons sent by firms. These sums are transferred in whole or in part to the institutions in which students are enrolled.

3.3 The technological infrastructure

The CNFD, which some consider to be the 'flagship' of AUF francophone digital campuses, occupies two floors with a total work area of 800 m². It is connected to the Internet via a 2 Mb/s dedicated link.[28] This link is itself connected to an Ethernet-type virtual Local Area Network with a 100 Mb/s throughput which interconnects all areas dedicated to Internet access, as well as the classrooms for training and self-training, the conference room and administrative premises. In order to activate its various facilities, the CNFD relies on half a dozen Linux-operated servers, including the following:

- a firewall[29] for secure access;
- a server for administrative and management requirements;
- a server for Internet services (e-mail, the web, FTP, news, etc.);
- a remote access server simulating thirty access modems, which enables CNFD subscribers to connect from the workplace or from home; and
- a server housing the ACOLAD distance education platform.

[27] Contributions to the AUF budget come from member countries of the Organisation internationale de la francophonie (International Organization of French-speaking communities), with France itself contributing 90 per cent.
[28] Senegal's international online link is at present 53 Mb/s.
[29] A security system to prevent piracy by filtering incoming or outgoing Internet traffic.

The work areas consist of:

- two classrooms for training and independent learning fitted with twenty-four microcomputers;
- two classrooms for training and independent study fitted with eighteen microcomputers;
- a room for Internet access fitted with six microcomputers;
- a 100-seat auditorium fitted with a video projector, a giant screen, public address system and ISDN (integrated services digital network) videoconferencing equipment;[30]
- a resource centre fitted with nine microcomputers, two scanners and three digital cameras;
- an 'Infolab' housing the Cisco Regional Academy, equipped with five microcomputers, six routers and two switches;
- a business 'incubator' for new innovative firms able to accommodate up to four teams of two persons each.

With regard to computer equipment, it should be noted that the CNFD has procured reconditioned equipment.[31] As a result, it has been able to obtain first- or second-generation computers with a configuration entirely satisfactory for its purposes[32] at a cost 50 per cent lower than that of new equipment. Maintenance of all this equipment is the task of a system and network administrator assisted by a staff member responsible for general maintenance.

In terms of software architecture, the CNFD servers are Linux operated and some of the microcomputers in the classrooms for training and independent study also make use of this operating system coupled to the Galeon free web browser.[33] Tests are currently under way so that all the microcomputers can become Linux operated and fully equipped with open-source software.[34]

[30] The CNFD possesses three 64 Kb/s ISDN links, which may be used for videoconferencing with an image quality equivalent to that of television.

[31] This consists of second-hand computers that have generally been used for two years and are made available when corporate users replenish their computer population.

[32] The computers delivered at the opening of the CNFD were Pentium II-type multimedia equipment with a 64-128 MB central memory, a 1–2 GB hard disk and a CD-ROM drive, a configuration entirely satisfactory for their intended applications.

[33] Galeon is a free open navigator based on Mozilla (http://galeon.sourceforge.net/).

[34] This technical preference is in order to comply with AUF policy for the promotion of free open-source software.

4. Academic issues

4.1 Programme development

The CNFD does not actually conduct any academic activities. The provision of programmes and instruction depends on the orientation given by the AUF Academic Council, and CNFD open and distance training programmes consist of courses, which are developed at AUF member institutions, taken on a distance basis and leading to university qualifications.

This kind of provision is established as follows:

- Institutions wishing to develop or deploy distance programmes get in touch with an AUF regional office.[35]
- For instance, those who administer the AUF 'ICT and knowledge acquisition' programme verify the feasibility of the proposal in educational, technical and financial terms, and its congruency with course-subject priorities. If the request is considered eligible, it is forwarded to CNF managers and regional offices in order to check that it matches local requirements and assistance can be offered with finding potential partners.
- The partners are put in touch with each other to confirm the feasibility of the project. Following their joint agreement, an academic consortium is formed to produce the course content and/or supervise teaching of it.
- An agreement setting out the terms of AUF support and the period for which it is to be provided is signed by the coordinating institution and the AUF. The agreement may be subsequently supplemented by agreements with other partners.

In accordance with the guidelines determined by the AUF Academic Council,[36] priority is currently attached to the following subject areas:

- law, management and economics;
- agricultural and agri-food sciences;
- health;
- mathematics, physics and chemistry;
- information and communication technology (ICT);
- entrepreneurship; and
- engineering sciences.

Basically, the educational offer is in the form of self-contained programmes leading to postgraduate qualifications, with the exception of the licence professionnelle. They are

[35] The AUF has regional offices in Belgium (the West Europe and Maghreb Office located in Brussels), Romania (Central and Eastern Europe Office in Bucharest), Viet Nam (the Asia/Pacific Office in Hanoi), Lebanon (Middle East Office in Beirut), Senegal (the West Africa Office in Dakar), Cameroon (the Central Africa Office in Yaoundé), Madagascar (the Office for the Indian Ocean Region in Antananarivo), Canada (North America Office in Montreal) and Haiti (the Caribbean Office in Port-au-Prince).

[36] The Academic Council is a consultative body responsible both for developing academic policy and determining AUF course evaluation policy, and underwriting the academic quality of courses. To this end, it examines them in terms of their interest and relevance vis-à-vis the goals and resources of the AUF and the needs of its member institutions. The Council consists of twenty-seven members appointed for three years by members of the AUF Board of Directors in accordance with a proposal from the universities and institutional networks (Cf. the AUF statutes adopted by the Quebec Extraordinary General Assembly on 18 May 2001).

necessarily for the benefit of French-language speakers because instruction is provided solely in French. Generally, online calls for applications are placed on AUF websites and set out the admission requirements (qualifications and geographical origin of applicants, etc.), the cost of the programme, a short description of its content, the type of qualification to which it leads and the one or more universities involved. An application form is also included, requesting personal information on candidates, their previous academic record, proposed subject for a dissertation, and an attached authenticated photocopy of their most recent qualification or degrees.

AUF rarely gets involved in the procedures for selecting candidates, which are generally conducted by the awarding institutions. Once candidates have been selected, they are informed by e-mail and then can enrol at the university concerned like any other student registering for a conventional in-class course. Payment of registration fees by students, which entitles them to their student card, is a formality that must be completed before they are allowed to take examinations.

The Agency acts as no more than a go-between in such procedures, and qualifications are awarded under the auspices of the university that has developed and offered the course. To date, the qualifications in question have been either French national degrees similar to the DESS, or degrees comparable to the *Diplôme d'université* or *Diplôme inter-universitaire* whenever several universities are involved. There is no official CNFD involvement in awarding these qualifications, which are sent directly (by the university or universities offering the degree programme) to students who have passed their examinations.

As far as this last point is concerned, there are two major procedures for student assessment:

- students send directly to the university of origin individual or group work completed for the purpose of continuous assessment; and
- written examinations are organized on the premises of the CNFD and supervised by its staff who send the papers to the university concerned.[37]

In 2001, 4 open and distance education courses enrolling a total of 166 students (conventional students or working people undertaking continuing education and training) were supported in this way by the AUF.

4.2 Teaching

The development of distance education raises various types of problems, depending on whether a particular course is prepared and provided by a single institution or a consortium of institutions.

Where just one institution is involved, matters are fairly straightforward. Either courses that have hitherto been developed for in-class provision are offered as distance education or new courses are developed specifically for distance delivery. In either case, a plan for provision has to be drawn up by a team united in principle around a common educational vision, culture and approach to teaching. However, difficulties may arise with the transfer from in-class to distance provision if the institution concerned lacks the experience, competence and facilities needed for this kind of operation, either in terms of the new approaches and practices

[37] In general, this means scanned photocopies sent by e-mail and copies of the original document sent by express postal services.

expected of teachers, the technical expertise needed to design and manage distance education resources (the platform, communication tools, tools for adapting courses to media delivery, etc.), or the technical infrastructure itself.

When the venture is undertaken by a consortium, matters become much more complex given the presence of – if not confrontation between – different educational visions, cultures and approaches to teaching. From the strictly curricular standpoint, institutions have even been known to disagree on the content of the course to be taught. Over and above this issue are the questions of how teaching should best be conducted and learners assessed and monitored. Matters that are already complex for a consortium of several educational institutions in a single country become even more so when the consortium consists of several institutions from different countries, and may become a nightmare if their traditional views of education and teaching differ very markedly.

For example, during development of the diploma in 'The use of ICT for education and training', which mobilized a consortium of five higher education institutions from as many countries, with three different educational traditions,[38] long and sometimes hard negotiations were needed to arrive at an agreement on a qualification acceptable to all.

Teaching materials consist primarily of sets of manuals, which are developed by the teachers who are responsible for the courses, and which learners can consult online or download on their own computers. Naturally, learners are also directed to a set of additional course resources that are often accessible on the web. While they are also provided with conventional bibliographical references, these are only of minor significance, given the very different environments in which learners may find themselves. Indeed, were such references given significance, it would constitute discrimination between those resident in countries, towns or cities with access to the documents in question, and those who lived in places with a dearth of library resources.

Interaction between teachers and learners is based primarily on the use of the ACOLAD distance education platform developed by the Université Louis Pasteur in Strasbourg. The platform uses a web server and FTP server, audio- and videoconference applications, shared facilities (i.e. whiteboards), and a system of electronic messaging and newsgroups. These may be used by teachers to load resources and exercises, and by pupils to store documents gathered on the web along with their working documents (individual and group assignments, dissertations, etc.). As all teaching materials are electronically delivered, the CNFD encounters no special problems associated with customs clearance for course or other teaching materials. Furthermore, as AUF has an agreement with respect to places, it is able to import materials duty free and make local purchases on a tax-free basis.

As far as synchronous communication is concerned, contact between learners and teachers, as well as among learners themselves, occurs primarily via joint work areas,[39] chat areas and, to a lesser extent, via Internet videoconferencing and, in exceptional circumstances, by telephone. The main aims of synchronous communication are to:

[38] The French educational tradition was represented by the University Louis Pasteur in Strasbourg, the Ecole supérieure polytechnique de Dakar, and the Institut supérieur de documentation in Tunis; the Belgian tradition by the Université de Mons, and the Swiss tradition by the Geneva TECFA.

[39] On the ACOLAD platform, these areas are places in which learners may file working documents for possible online use by all group members.

- provide a support facility enabling learners to overcome any sense of isolation they may feel;
- orient them towards concrete objectives; and
- help strengthen their psycho-cognitive capacity so as to boost motivation and prevent them from dropping out.

In asynchronous mode, the most frequently used facilities are the web and FTP servers and, to a lesser extent, the electronic messaging and web newsgroup. The main aims of asynchronous communication are to:

- enable learners to remain autonomous, and allow them to work at their own pace;
- enable joint work, particularly via whiteboards;
- develop group dynamics among learners; and
- facilitate intercommunication (Mokhtar, 2002).

Interest in this experiment with distance education for teachers led the Senegalese Ministry of Education to approach the President of the Université Louis Pasteur in Strasbourg and the AUF for permission to use the ACOLAD platform for the in-service training of secondary school teachers in Senegal, and the request was accepted. The idea is that teachers who have obtained the diploma in 'The use of ICT for education and training' should be used to form a pool of resource persons who can implement a distance training programme for in-service teachers unable to travel elsewhere to attend retraining for the purpose of upgrading their qualifications and skills. However, beyond this particular venture is the likelihood of a move to relocate the diploma in Senegal, so that it would be awarded under the auspices of a Senegalese higher education institution. If this plan comes to fruition, one of the major aims of the AUF in promoting distance education will have been achieved, with the training of human resources able to contribute to bolstering the potential and modernization of higher education institutions in less developed countries.

4.3 Learning

From a limited survey of students who have completed the diploma in 'The use of ICT for education and training', it has been possible to record impressions of this new experience. Overall, they were especially appreciative of:

- the intermediary role of the CNFD as a vehicle for the transmission of administrative information between the Université de Strasbourg and themselves;
- their unlimited access to online computers, which they were offered by the CNFD and without which they would have been unable to pursue their learning activity in good conditions, particularly as regards online consultation of course materials and synchronous appointments with their tutors and members of their working groups;
- the special facilities at their disposal such as 'Webcams' for Internet videoconferencing and telephones for taking calls from the Université de Strasbourg;
- the support they received from the CNFD in helping them to master certain communication tools such as the chat areas or NetMeeting;
- the training the CNFD offered them in authoring HTML documents.

Most of the students felt there was little point in visiting a conventional library or even in consulting electronic libraries, given the interest and variety of the supporting documents they received from their teachers. Indeed, each class offers learners hyperlink access to a large

database containing information and teaching packages available from servers at the partner universities (Geneva, Mons, etc.), so that conventional or electronic library research is of little relevance or value to them.

In all, students considered this experience to have been very worthwhile, since it matched their learning needs. For example, it enabled them to:

- improve their ability to set up the multimedia projects in which they were involved;
- modify their approach to learning, including in-class training; and
- acquire a sound analytic methodology for their professional work assignments.

Generally speaking, this experience of ICT-supported distance learning has helped students to better integrate office automation tools and the Internet in their daily work routines and, above all, has taught them to be creative and to learn using these tools. Many of them consider that the 'multinational' community that they formed and the sense of partnership underlying it fuelled their potential for learning so that they excelled themselves as learners. Be that as it may, the programme is demanding and requires learners to allocate a considerable amount of time with a personal workload of some fifteen hours a week over a forty-week period. For these pioneers, the experience has been so productive that they have asked for this type of training to be established on a permanent basis for the public in general. They even consider that certain areas of content and methodology should be used for short-term in-class training.

Certain problems have nevertheless been noted, such as:

- weakness on the part of certain tutors whose teaching ability was felt to be inadequate; and
- working groups that were overcrowded and might have led some students to rely on the work of others.

Among student suggestions for improving the quality of the course are the following:

- raise the qualifications required when recruiting tutors so that their level of expertise is close or equivalent to that of the academics who are responsible for the course;
- shorten the duration of classes and make individual and group work less intensive;
- increase the number of individual work assignments so that the intrinsic ability of each student is more appreciated; and
- take steps to ensure that tutors prepare their contributions more effectively and reply systematically to the questions put to them.

5. Cooperation

Given the complexity and considerable costs of setting up and operating distance education facilities, AUF has decided to embark on an active cooperation policy with distance education players working in Africa.

First, the constitution of the CNFD National Policy Council has been altered to provide for the establishment of a sixth so-called 'cooperation' group, consisting of representatives of the main bodies involved in distance education in Senegal, such as the AVU, the Distance Education Centre, and RESAFAD. This group now provides an opportunity for dialogue and the exchange of experience on distance education, with a view to more wide-ranging joint discussion of the issue.

Second, the AUF has taken the lead in submitting to the African Virtual University a draft memorandum of agreement to develop the principle of integrated cooperation for the purpose of:

- raising the qualification level of distance education programmes in countries party to the final agreement;
- enhancing the quality of distance education programmes on offer, particularly through reliance on the use of new educational technology;
- providing possibilities for lifelong learning;
- carrying out common ventures in close partnership with the universities of the South as regards the terms of reference, conduct and evaluation of projects.

Since the situation of the universities and the level of cooperation may vary from one country to the next, practical arrangements for cooperation between the AVU and AUF are to be implemented locally and are to be specified in additional clauses appended to the framework agreement signed by both.[40]

In addition, on the assumption that, in training teachers to use ICT, AUF cannot on its own meet all potential or articulated needs, preliminary work has been undertaken for the purpose of establishing an interest group in this field for action in Africa. The idea is to set up a consortium specialized in the training of teachers to use ICT, which would bring together all players in the field (Ecoles normales supérieures, AVU, the World Bank CED, RESAFAD, UNESCO, the Association for the Development of Education in Africa, agencies for bilateral and multilateral cooperation and the Ministry of Higher Education, etc.). One of the main tasks of such a consortium would be to approve an integrated action plan with due regard for needs identified by those concerned, in order to avoid unproductive duplication of effort and enable optimal use to be made of the human, material and financial means earmarked solely for this sector. With this end in mind, it has been decided to establish the CNFD as a Centre of Excellence for the training of teachers in ICT.

[40] Cf. the draft memorandum of agreement between AVU and AUF.

6. Conclusion

The first year of operation of the CNFD was primarily devoted to finalizing the infrastructure and overcoming a certain number of technical problems such as:

- increasing the strength of the electrical power supply to buildings so that they can accommodate their extensive new facilities (computers, printers, air-conditioning equipment, etc.);
- gradual installation of the computers;
- preparation of the internal regulations and the fee schedule;
- increasing the capacity of the dedicated links from 64 Kb/s to 128 Kb/s and then up to 1 Mb/s to handle the increased volume of activity;
- installation and testing of the videoconferencing equipment.

As a result, CNFD was only partially operational during the 2000/01 academic year. It may be added that, as it was newly established, it was little known – if at all – to its potential users, so that a communications policy had to be launched to publicize the services available.[41]

In 2001/02, almost two years after its inauguration, the situation was already different and it can truly be said that the CNFD had moved into top gear. Alongside the distance education programmes already discussed at length, in-class courses have increased considerably in number (office automation, e-mail, Internet browsing and searching, authoring of HTML documents, Linux systems and network administration, etc.) with rapid deployment of services. Videoconferences have been organized with France, Canada, Cameroon, etc., the hosting and design of websites developed with Système de publication pour l'Internet software[42] are expanding rapidly, and the opening of consulting rooms for students of all levels, in return for a low subscription fee, has led to a significant increase in CNFD users.

[41] A special effort has been made to overhaul the design of the CNFD website (Cf. http://www.refer.sn).
[42] Système de publication pour l'Internet is a free software distributed under General Public Licence that enables users to administer magazine-type websites, consisting mainly of articles and short bulletins inserted in a tree structure of interleaved headings (Cf. http://www.spip.org/).

7. Lessons learned

Experience has shown that the main challenges were those of assisting and supervising users, along with the maintenance and replacement of the computers. Indeed, bearing in mind the number and inexperience of certain users in handling computer facilities and a lack of public-spiritedness among others, it was necessary to engage an employee to help and keep watch over users in the various areas. Furthermore, given the large number of machines located in the areas for consultation, training and production, minor breakdowns have even occurred and a second person responsible for computer maintenance has been recruited. In addition, the replacement of at least one-third of the computers[43] has to be planned as of the third year of activity to avoid having to renew equipment in a single operation, which would call for a very heavy budgetary commitment. Finally, faced with the high cost of commercial software licences, and bearing in mind the large number of machines and wide variety of the software, it has been decided to gradually transfer all computers to Linux and use open-source software.

From the teaching angle, the use of distance education programmes is proving successful and demand is rising steeply. This presupposes a greater workload for CNFD staff who, among other tasks, has to administer certain aspects of student selection and/or registration, offer them logistical support, organize and oversee in-class examinations, and handle the administrative follow-up with the universities awarding the qualifications and the AUF central services that oversee this programme.

The main lesson to be learned from the foregoing is that it would be misleading to suppose that distance education can be deployed in developing countries without relying on a relatively heavy technical and administrative infrastructure. Bearing in mind the costs involved, it is thus vital to promote cooperation in this area so as to generate constructive forms of partnership and optimize the use of resources committed by all those concerned, rather than continuing to duplicate initiatives that parallel or even compete with one another.

[43] Around thirty machines.

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