

Experience with a large scale ODL IT-programme in Belgium.

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Retro Acta.

From 1996 on the Belgian industry, bundled into a professional association, urgently knocked at the University of Ghent's door for a special effort for a large scale IT educational programme. This was due to many reasons: e.g. an acute shortage in IT-professionals (upcoming Y2K problem, Euro, industrial expansion...), while at the same time IT was evolving so fast that even many IT professionals were outperformed by the youngsters coming out of the universities (Object-Orientation, Java...). Accompanying signals were sent out that this programme should be carried by all universities acting as *one* entity, and also that the programme should take into account the mobility problem and the high professional workload of the participants. There above, some of the companies - as subsidiaries of large multinationals - showed an interest in such an IT-educational programme on an international scale.

The Institute for Permanent Education (IVPV - Engineering Faculty) of the University of Ghent was appointed to organize the course on behalf of the 4 Flemish universities in Belgium (Ghent, Leuven, Brussels, Antwerp). The result was a large-scale IT-programme, covering more than 500 hours, and leading to a certificate of 'postacademic education' undersigned by the rectors of the 4 universities.

The IT course content.

The programme is focused around 7 main 'groups' or topics: computer architecture, system software, communication, programming languages, design methodology, databases and graphics. Each group is further divided into modules, where a module is the lowest entity to which an attendee can subscribe. 'Labs' or practical PC exercises accompany some of the modules. A module runs somewhere between 12 and 30 hours, whereas the total programme covers 417 hours of lectures and 87 hours of exercises. The programme started on March 1998, runs until June 2000 and is held twice a week for 3 hours during the evening. Lectures are given (in English) by professors from all Flemish universities and technical highschoools, while practical 'lab' exercises

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are given by assistants in PC-rooms. Tests (examinations) are taken per module, and a full 'postacademic certificate' is rewarded to each 'student' having followed at least 270 hours of classroom lectures plus the accompanying lab projects and who has successfully passed the tests. Special conditions are foreseen for university students (choosing modules as credits for their doctoral education) and for highschool students.

ODL techniques: videoconferencing.

In view of the large geographical and organizational scale, important ICT ODL techniques should be setup to fulfill the educational requirements. In order to bridge time and space efficiently to comfort the student's attendance as much as possible, from day one videoconferencing was chosen as the underlying technology for the lectures, accompanied by either PowerPoint, html or plain text files. As application sharing packages over many ISDN lines turned to be unstable, and the Internet could not yet guarantee a stable bandwidth, the decision was made to use bi-directional ISDN-videoconferencing by 3 ISDN-lines (i.e. 6 B-channels) with a capacity of 384 Kbps. The cost of such high quality links (because of the considerable communication times) is extremely high. Fortunately the national Belgian Telephone Operator (Belgacom) - being also an interested party to bring the course inside its premises - was prepared to largely support the ISDN communication. All lectures were given in the premises of one of the 4 organizing universities and broadcasted to all other three and to 9 industrial sites by videoconferencing, covering 12 real-time remote sites plus extra international sites (Berlin, Stuttgart, Barcelona) served in (real-time) 'slave' mode by one of the industrial partners.

Exercises on the other hand were given in a 'classical' way in groups of maximum 10 participants in PC-rooms all over the country, guided by assistants sent out from the universities. To fulfill the huge switching facility a voice-operated 'Multi-Conference Unit (MCU) was hired at a central location (Imec Leuven) in Belgium.

Complementary ICT supporting techniques.

- a. Since it could be expected that the education programme would interest a very large number of people, an efficient information channel was necessary. A large Web site was setup which contained not only all details of the course, but which serves also as a messaging system (scheduling, examinations, results...) between the organization, the remote sites and the students. Even before the start, the full

detailed programme contents, lecturer information, books... for each course hour was made available at the Web (<http://www.ivpv.ftw.rug.ac.be/infotec/>).

- b. The communication between the central organization at the IVPV in Gent and the remote sites (distribution of course texts / slides, examinations forms...) was established by a (protected) ftp information server (UNIX) at the central site in Ghent, from where all texts and presentations (pdf) could be downloaded.
- c. Communication between students in distant learning and 'virtual classrooms' is not self-organizing. Although in this IT-project one could expect fruitful discussions between participants from the same company (although...), other discussions and exchange of experience (e.g. on labs and homework) are not evident. Therefore a discussion list at the central server in Gent by using the well-known Majordomo system (on Unix) was set up. Students could subscribe / unsubscribe on sub-lists per course module. This feature immediately became a hit. Students started in depth discussions among themselves, with their professors watching in background, intervening or stimulating when necessary.

Course attendance: some figures.

Some raw figures (as of January 2000) about attendance:

- total number of individuals ever subscribed: 1 103;
- total number of participants summed up over all 23 modules: 9 465;
- total number of [hours * participants] over all 23 modules: 228 984.

An important point in postacademic courses is whether participants would not drop off during the course track. For people doing a full-time job, sometimes under high pressure, it is not evident to go to a class room twice a week for 3 hours during 2 years, especially when the study material is highly technical and on academic level. After evaluations, some conclusions about student dropouts could be made.

- The internal company culture and follow-up is critical. Companies who didn't put any restriction and didn't follow up attendance and progress on the course showed the quickest drop out in attendance. Companies who carefully selected and followed up their employers regularly maintained a much more stable attendance.
- The pre-knowledge of the participants is also a crucial success factor. In informatics, people in industry have the tendency to over-estimate their skills. From the universities no pre-assessment was done. This turned out not to be a good idea, since the supposed company assessment was often neither not done, nor trustful.

Course Evaluation.

The project was evaluated in depth by an independent source through a scientific programme submitted to a governmental scientific body (IWT). Detailed figures can be found in [De Bens, 1999] and in [Boullart-1, 1999]. But some remarkable outcomes regarding the videoconferencing were:

- is videoconferencing static? 43.1% agree, 42.3 neutral, 13.8% disagree;
- is videoconf. little interactive? 72.3% agree, 22.3 neutral, 4.6% disagree;
- is presence of a life teacher essential? 20.0% agree, 29.2% neutral, 49.2% disagree.

About using the mailinglist, 70% of the participants regarded it as promoting the communication between students, and 78.5% found it to encourage communication between teacher and students.

Overall satisfaction can be concluded by the fact 70.8% of the participants would advise their colleagues to follow the IT-course.

Technology issue: the quest for the Holy Grail [Boullart-2, 1999]?

After careful evaluation it turns out that in today's state-of-the-art technology most 'problems' concentrate around videoconferencing and the interactivity of the medium.

- The quality of image and sound should be enhanced, and possibly - since ISDN videoconferencing at 384 Kbit/sec isn't actually cheap - at a much lower cost. IP over an Internet link with a guaranteed (high) bandwidth (ATM-encapsulation, IPV6...) could be a candidate, since raw bandwidth will be a non-issue in future.
- The picture of the lecturer on the screen is desirable to catch the audience's attention, but not necessarily at the cost of a high bandwidth and a high resolution, and could be replaced in the limit by a clipped photograph. On the other hand slides are necessary with the highest (screen / projection) resolution, but since they are more static in nature, this requires normally not really high bandwidth.
- The question of multicast is technically not fully established yet, especially in larger area networks, although the carrier companies are becoming more aware.

This means there is a tremendous need for tools which transfer a computer image with the highest resolution / low bandwidth, a camera image with lower resolution / lower bandwidth and sound with relatively high bandwidth, all this at an affordable price and in multipoint. Current application sharing packages do not cover this. Application sharing packages should be understood more as to transfer the applications themselves

(e.g. the slides) to the other sites *beforehand* and as to send in real time only 'synchronization' signals. This lowers the request for bandwidth dramatically, and gives an interesting final bandwidth balance sheet, even thinkable within a medium speed link.

With authoring software the problem is not that there are no good authoring tools, but that they are all too complicated and too much time consuming. Software builders should be aware that no university professor is prepared to devote a huge amount of his precious time in authoring a course, especially in fields (such as ICT...) where the underlying contents may change overnight. A "poor men's" solution, i.e. cheap, easy to use, probably far from perfect, but pragmatic and asking not more e.g. than twice a normal lecture time to set up, would be a killer.

Conclusion.

This project has demonstrated the feasibility of ODL in a large educational curriculum. Nevertheless on many frontiers a huge amount of work is still to be done: communication aspects, authoring tools, application sharing... With raw bandwidth being a non-issue in the near future, some shortcomings will disappear by itself. The question whether 'life' or 'distant teaching' should be chosen also still remains an open debate, where both the 'servers' (e.g. universities) and the 'clients' (e.g. companies) have ever changing perceptions over time.

Bibliography.

[Boullart-1, 1999] Large Scale Permanent Education Programme in IT in Belgium, Proc. 18th EUCEN European Conference Joensuu 1.-4.12.1999, Continuing Education Centre, University of Joensuu, Finland.

[Boullart-2, 1999] ICT opens new horizons in large scale IT permanent education programme in Belgium, Proc. Workshop Information and Communication Technology for teaching and training (IC3T), Gent 9-10.9.1999, eds. E. D'Hollander et al, Communication and Cognition, University of Ghent, Belgium.

[De Bens, 1999] IWT-Medialab Project 960073, "Evaluation of the postacademic interuniversity course in IT with videoconferencing", report University of Ghent, Dept. Communication Sciences, Belgium.