

Online Education Systems in Scandinavian and Australian Universities: A Comparative Study

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This article was conceived at a two-week study tour of eight Australian universities in Queensland and New South Wales. It was later nurtured through e-mail with representatives from the universities and a number of other contacts. The Universities were:

- University of Southern Queensland (USQ), Toowoomba, www.usq.edu.au
- University of Queensland (UQ), www.uq.edu.au
- Central Queensland University (CQU), www.cqu.edu.au/
- Griffith University (GU), Logan Campus, www.gu.edu.au/
- Charles Sturt University (CSU), www.csu.edu.au/
- University of Technology, Sydney (UTS), www.uts.edu.au/
- University of Wollongong (UW), www.uow.edu.au/
- James Cook University (JCU), Cairnes Campus, www.jcu.edu.au/

Thirty representatives from Norwegian and thirteen representatives from Swedish Universities participated in the traveling seminar and much time was spent on discussions and reflections on differences and similarities between the national educational systems. The seminar was arranged by the University College of Lillehammer, which also developed a web site with information about the seminar and articles from the participants (australia.hil.no).

This article is also based on the author's participation in the European Web-edu project (http://www.nettskolen.com/in_english/web_edu.html) which aims to study Internet based learning management systems to provide comprehensive recommendations and reference material for European education and training organizations.

The author has written a book about online education from a Scandinavian perspective (Paulsen 2001 and 2002), and he has some previous knowledge of Australian online education from his international analysis of online education (Paulsen 2000) conducted in the CISAER-project (www.nettskolen.com/in_english/cisaer/index.html). Further knowledge about higher education in Australia is also based on the Higher education report for the 2001-2003 triennium (DEST 2001).

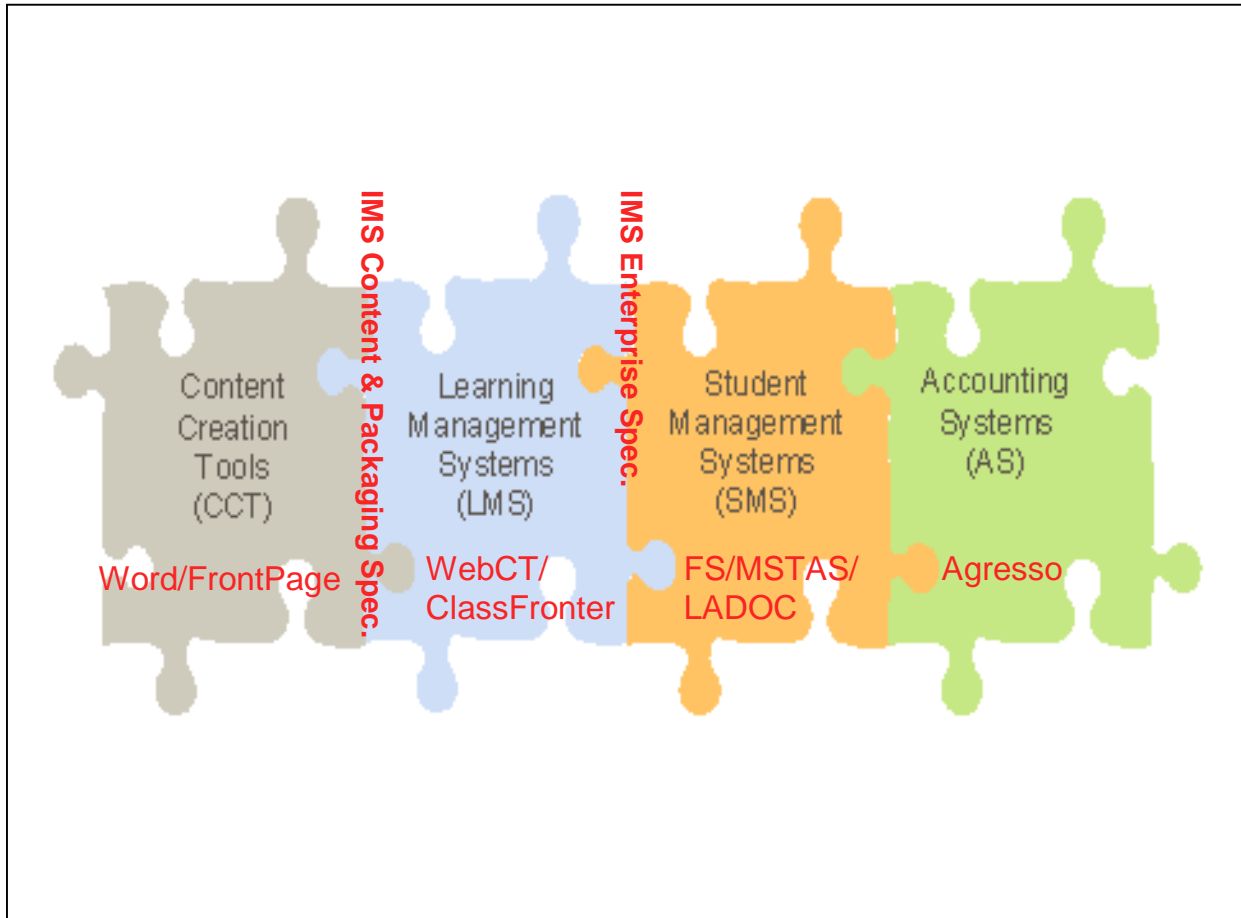
Online Education Systems

In this article, the online education environment is discussed from a systems perspective that comprises a chain of four systems as listed below and shown in Figure 1:

- Content Creation Tools (CCT)

- Learning Management Systems (LMS)
- Student Management Systems (SMS)
- Accounting Systems (AS)

Figure 1. The chain of online education systems



These online education systems are more or less integrated. They may be overlapping, exchanging data, or working seamlessly together. So far, the integration between these systems seems to be very limited in most institutions. In a discussion of integration between LMS systems, SMS systems, and AC systems in Norwegian higher education institutions, Runnestø and Ristesund (2002, 159) conclude that there is a general lack of integration between LMS systems and SMS systems.

It is important to realize that there are several emerging specifications of standards, such as for example IMS (www.imsproject.org) and SCORM (www.adlnet.org/scorm/downloads.cfm), which may result in better and easier integration between the four systems. However, this analysis has found little focus on standards in Australian, Norwegian, and Swedish higher education.

A compilation of the online education systems used by the visited universities is presented in Table 1. Unfortunately, the author has not had the capacity to compile information about which CCT and AS systems the universities are using.

Table 1. Online education systems used by the visited institutions

University	LMS	SMS and other systems	Standards mentioned
USQ	Blackboard, WebCT Vista	Peoplesoft Web-trends, Rightnow.com GOOD	XML, IMS
UQ	WebCT	Peoplesoft	
CQU	WebCT	Peoplesoft	
GU	Blackboard	Peoplesoft Self Developed (learning@GU)	
CSU	In-house, Blackboard, WebCT	Banner	
UTS	Blackboard, WebCT	Student One	
UW	WebCT	In-house LOL	IMS
JCU	Blackboard	In-house (studentsonline)	

In the following, each of the four categories of online education systems is discussed with focus on systems integration and national differences.

Content Creation tools

The content creation tools are used to develop learning material. Typical examples of these systems are DreamWeaver, Frontpage, Word, PowerPoint, and Director. These are generic tools with few features developed specially for online education, and there are probably few national differences with regard to educational use of these systems.

There are many types of content such as for example plain text, slides, graphics, pictures, animations, audio, video etc. Due to this variety, it is likely that institutions need several CCT tools. For the same reason, it is unlikely that an LMS system could meet all the needs for content creation.

Integration between CCT and LMS systems

It is important to note that the growing focus on standards such as IMS and SCORM that may provide greater exchangeability of content between LMS systems. For example, *The IMS Content and Packaging Specification* will make it easier to create reusable content objects that will be useful in a variety of learning systems. One should notice that these are specifications rather than

standards. As such, these are still developing and have not yet been ratified by any international standards-accrediting agencies. BlackBoard and WebCT, for instance, are partners with IMS to develop and support the specifications.

It is also worthwhile to notice that some of the LMS systems provide more or less advanced features for content creation. Creation of quizzes, multiple-choice assignments etc. are often handled better by the LMS systems than by the generic CCT systems. There are also specific content creation tools for creation of tests, and *The IMS Question Test Specification* addresses the need to share test items and other assessment tools across different systems.

Finally, one should be aware that LMS systems might require templates and provide publishing features that may support or complicate the integration between CCT and LMS systems.

Learning Management Systems

In Australia, WebCT seems to be the most widespread LMS system and Blackboard seems to be the first runner up. A NCODE-FLA (<http://ncode.mq.edu.au>) LMS survey (NCODE-FLA, 2002) of 34 Australian institutions conducted by Sue McKnight shows 25 instances of WebCT, 12 instances of BlackBoard, and 7 instances of in-house developed LMS systems. The details are shown in Table 2. This is supported by a briefing on leading learning platforms (The Observatory on Borderless Higher Education, 2002.) which claims that Australia is the country with the highest penetration of BlackBoard and WebCT licenses in the world since 76 percent of the country's 34 universities have such licenses.

The study tour showed that WebCT is used at UQ, CQU, and UW. Blackboard is used by USQ, GU, UTS, CSU, and JCU. The tour also indicated that the raw figures would need examining to see how many of the reported instances are used at subject or department level compared to enterprise level. One CSU representative claimed that he had a feeling that WebCT has the majority of that market in Australia, but that Blackboard probably has the majority of enterprise installations. He further stated that there are many LMS installations that are standalone and will never integrate with enterprise systems. These lower level systems are consistently counted in raw data of surveys, but one may question if they should be counted equally.

UTS reported that they recently have changed from WebCT to BlackBoard after a long, democratic process of discussion. CSU stated that they are currently using an in-house developed LMS. They were only just beginning a trial of Blackboard. They have also used WebCT in the past for various small projects.

USQ has recently invested in WebCT Vista, due for release in Australia at the end of March 2002. They will use this for local and domestic students, but also continue to use Blackboard for USQOnline in conjunction with their commercial partner, NextEd. Their intention is to manage the rendering to both LMS platforms from GOOD via the IMS specification.

Table 2. Instances of LMS systems in the 34 Australian universities (NCODE-FLA, 2002)

LMS	Number of instances
WebCT	24
BlackBoard	12
In-house	6
TopClass	3
WebMentor	1
FirstClass	1
Callista	1
Lotus Learning Space	1

The NCODE survey (2002) shows that BlackBoard is the only LMS that is supported centrally at Edit Cowan University (ECU). However, they have previously used both WebCT and an in-house developed system. Further details from ECU are available in a case study (The Observatory on Borderless Higher Education, 2002).

It is interesting to observe the dominance of commercial North American systems in Australia. It seems to be a lack of Australian developed commercial systems, but there are some in-house developed systems. This seems to raise some concerns in Australia that the two major LMS players have the market stitched; that the systems are embedded in the operational culture of the institutions and that uncompetitive pricing structures could evolve.

In Norwegian higher education, the dominant system is the Norwegian-developed system ClassFronter (www.fronter.com). Some colleges use standard commercial systems, and some institutions have developed their systems in-house. Runnestø and Ristesund (2002, 36) surveyed 54 of Norway's universities and colleges. Out of these, 32 institutions claimed that they offered online education. Several of them had used more than one system as shown in Table 3.

Table 3. Instances of LMS systems in 54 Norwegian institutions of higher education (Source: Runnestø and Ristesund, 2002)

LMS	Number of instances
ClassFronter	21
In-house developed	9
LUVIT	6
IT's Learning	4
First Class	3
Kark	3
WebCT	3
BlackBoard	2
TopClass	1
Lotus Learning Space	1
TeamWave	1
Response	1

An important observation seems to be that Norwegian institutions emphasize the importance of using a Norwegian developed system that is responsive of the needs and feedback from the Norwegian institutions.

In Sweden, no systems seem to be dominant, but a number of standard commercial systems are used. According to personal e-mail communication with Fredrik Rexhammar (March 18, 2002), one of Sweden's leading experts on LMS-systems, Luvit (www.luvit.com), Lecando, Infinity, Grade, Platon, and Web Academy are Swedish providers of LMS systems. In the same e-mail he states that WebCT and Blackboard are the most used foreign LMS systems used at Swedish universities and colleges. In addition, the author has found that the Swedish-developed system PingPong (www.partitur.se) is used by some institutions. An overview of the market for LMS systems conducted in Sweden is available at www.ssv.gov.se/avit/pform2.htm. It lists the following systems: Luvit, Mentor, Telia Instant Education, Maestro, FirstClass, Comenius online, Lecando, Librix, Marratech, PingPong, Surfa och lär, and WebCat.

Integration between LMS and SMS systems

For historical, legal, and financial reasons, the SMS system is much more important than the LMS system for most institutions. This means that the SMS is likely to be the master system from which the LMS access the necessary data. This could be handled by allowing both systems to access the same database, or by transferring the data between the systems.

One may also state that the integration could be more or less sophisticated and that one may distinguish between the following levels of integration:

1. Both systems access one database. This could be hard to achieve for security reasons and because very few existing systems were designed with this in mind.
2. The systems have separate databases, but the data are frequently updated and exchanged both ways (synchronized), for example in a daily batch process.

3. The data are frequently transferred one way, from the SMS database to the LMS database, for example in a daily batch process.
4. The data are transferred from the SMS database to the LMS database in the beginning of each semester when all enrolled students are registered in the SMS. This process could involve more or less manual labor.

IMS, SCORM and other specifications may ease this data exchange and hence make it easier for institutions to substitute one system with another. In other words, these specifications may make the institutions less dependent on the system providers. For example, *The IMS Enterprise Specification* is aimed at administrative applications and services that need to share data about learners, courses, and performance across platforms, operating systems, and user interfaces. Similarly, *The IMS Learner Profiles Specification* describes ways to organize learner information so that the systems can be more responsive to the specific needs of each user.

A representative from one Australian university stated that an IMS consultant recently claimed that WebCT, Blackboard and PeopleSoft had agreed on IMS interoperability specifications, presumably for future releases.

Runnestø and Ristesund (2002, 159) pointed out that they found a general lack of integration between LMS system and SMS systems in Norwegian Colleges and Universities. The awareness of this lack is however increasing in both Australia and Scandinavia. A text analysis of a NCODE-FLA survey (2002) shows that 11 of the 34 Australian reported some form of integration as shown in the quotes below:

[Adelaide] Full integration with PeopleSoft with nightly updates for staff and student details.

[Deakin] Callista is the Student Record System; Concept is the HR system. These are integrated with TopClass, with a fairly administrative intensive transfer of records between FirstClass and the corporate administrative applications. There is no link with WebCT.

[Edith Cowan] We currently have a homegrown records system and enrolment system – these will be replaced by Callista in the future. The HR system is Concept. Blackboard is integrated with the existing systems (both student and HR)

[Griffith] PeopleSoft – fully integrated.

[James Cook] Integration with JCU web and purpose built StudentsOnline and StaffOnline systems is ongoing.

[Northern Territory] Currently using ASCOL student admin system. Developing Callista TAFE version. When this is completed, Callista will be implemented University wide. Plans are that integration will happen as Callista is implemented.

[Melbourne] Both our student administration (Merlin) and HR systems (Genesys) are homegrown and they are integrated with WebRaft (our LMS). WebRaft is also integrated with the University's email system.

[New England] Banner Student and Concept. Highly integrated using API with Banner and with username and password systems.

[Sunshine Coast] PeopleSoft for Student Administration, Finance, HR and Payroll. All are live except for Payroll, which will be live in July 2002. In our LMS tender we are looking for integration with our PS systems.

[Tasmania] In the market for a new student system. In-house system at present. Concept HRMS. Both integrated with WebCT.

[Western Sydney] Currently, systems for staff administration (Concept) and student administration (in-house SRS) are only minimally and variously integrated with current LMS systems in use. Callista will be implemented mid-2002 with the goal of gradual development of interoperability within an integrated system.

Student Management Systems

There seems to be much more national coordination or governmental coercion with regard to choice of SMS systems in Scandinavia than in Australia. Many of the student management systems in Australia seem to be North American developed systems such as for example PeopleSoft (CQU, GU), Banner (CSU), and Student One (UTS). However, some universities such as for example UW and JCU have developed in-house systems. One reason for this is that changing to a commercial system seems to be a major economic obstacle.

A NCODE-FLA survey (2002) conducted early 2002 provides information about the SMS-systems used by 21 of the 34 Australian universities. The survey indicates that PeopleSoft is the most used commercial SMS system in Australia. It also shows that Callista is much used and that a number of institutions plan to change, or are in the process of changing, to Callista. The survey also supports the impression that several universities choose to develop their systems in-house. In addition, a relatively large range of other systems is mentioned in the survey.

Table 4. Instances of SMS systems in the 34 Australian Universities (NCODE-FLA, 2002)

SMS	Number of Instances
PeopleSoft	8
Callista	6
In-house developed system	5

In Norway, two student management systems totally dominate in higher education. The Norwegian universities and some colleges use FS (Felles System) (<http://www.fs.usit.uio.no/>) and most of the Norwegian colleges use MSTAS (www.enet.no/). The two largest private colleges have chosen alternative solutions. The Norwegian School of Management BI has experiences with Banner and NKI has developed an in-house system called STAS.

The following short presentation of FS was published at www.fs.usit.uio.no/fs-english.html on February 15, 2002:

FS is a computer based student administrative system developed for universities and colleges in Norway. The following institutions are using FS today: The year when they started to use it is in brackets:

- Universities: NTNU (1997), UiB (1996), UiO (1996), UiTø (1996)

- University colleges: AHO (1997), NHH (1997), NLH(1997)
- State colleges: HiA (1999), HiB (1998), HiBu (1999), HiO (1999), HiS (1998), HiST (1999), HiTø (1998), HSH (1999), MF (1998), NMH (2001), KHiB (2001)

The development was financed by Ministry of Education and Research. All public financed educational institutions that want to use FS have access to it. The cost of maintenance and further development are shared among the user institutions.

- Persons (applicants, students, faculty members, lecturers, and letter and address solutions)
- Application and admission procedure
- Courses, subjects, study programs, requirements and regulations
- Right of Admission, classes, leave of absence
- Term registration
- Payments (fees for study and exams, reports to financial systems)
- Lecture (planning, publishing, student administration)
- Exam (planning and student administration)
- Qualification (awarding of degrees and diplomas)
- Master and PhD (admission and student administration)
- Further and continuing education
- Application for recognition of foreign or external credentials
- Scholarships (application and awarding)
- Mobility students
- Reports to Ministry of Education and Research, State Educational Loan Fund, Statistics Norway and others. (www.fs.usit.uio.no/fs-english.html)

All Swedish Universities are using LADOK or LADOK NOVAU that are owned by a consortium of 37 institutions in higher education in Sweden. The LADOK consortium (<http://www.ladok.umu.se/>) provides the following information at its web site:

LADOK is a computer based student admission and documentation system for a university or university college. It focuses on administration of undergraduate and graduate students. The system is locally deployed and managed by the institutions.

The LADOK system has a mutual core, identical for all LADOK system installations in Sweden. The core consists of a structure of database tables and computer programs. Every institution decides what parts of the core to be used at the institution and it is also possible to use locally developed addendums. The LADOK-system can therefore be viewed upon as a large "smorgasbord" where the institution can choose which parts to use.

The LADOK-system consists of two major parts, the admission system and the documentation system. They are integrated and share data, e.g. name, address and other facts about applicants and students. A third part, handling documentation of graduate students, is newly added to the LADOK system core. Undergraduate studies are handled within two major concepts, courses and study programs. The first has its focus on students and single courses and the second of students following a specified study program, normally 3- 4 years study.

The system files contain information for student identification, general eligibility for university studies, admission to courses and study programs, registration on courses per semester, course data, credit points from courses, awarded degrees and international studies.

The LADOK system mainly focuses on student admission and documentation, planning and follow-up. The system is designed to be used by all Swedish state financed institutions of higher education and has its focus on the departmental level. Users of the LADOK system at an institution can be found at all levels:

- university board and administration
- faculty or school heads
- departments
- students

Data from LADOK are exported to the ministry of education and other agencies for follow-up purposes. An important objective of LADOK is to prepare the annual invoice to the government for studies on the undergraduate level at an institution.

The LADOK system is owned by a consortium of 37 institutions in higher education in Sweden. Software maintenance for the LADOK system core is conducted by a maintenance group at the university of Umeå. Local system usage is the responsibility of the institution, which pays for servers, networking, terminal equipment and local support.

(www.ladok.umu.se/opendok/LADOK_short.html)

Integration between LMS, SMS and AS systems

Most institutions have relied on their accounting systems for many years. These systems are important for the institutions and they were not developed for integrations with LMS systems. They are however often part of, or integrated with, the SMS systems. So far, the integration between the LMS and AS systems does not seem to attract much attention. One may however predict that this integration will be more and more important as online education generates more income for the institutions.

Some institutions already accept online enrollment, online payment, and online student credit account information. Other institutions provide online tutors with their updated salary account information. This functionality requires some integration between the systems.

Accounting Systems

Australia has a longer tradition and a greater focus on paying students than Norway and Sweden. Sweden does not accept any tuition fees from individual students at all. Norwegian universities and colleges have however for some years charged tuition fees to individual students who enroll in further- and continuing education courses. These national differences are important both as

incentives for development of online education and as an incentive to integrate the accounting systems with the SMS and LMS systems.

The accounting systems used in Australian systems seem to be handled by functionality in the SMS or LMS systems. This seems to be the situation for the SMS systems PeopleSoft and Student One. Similarly, Banner is an integrated accounting system in the LMS system BlackBoard. In comparison, a separate accounting system named Agresso (www.agresso.com) seems to be dominant in both Norway and Sweden.

Discussion and Conclusions

Here are some issues of importance that emerge when one compare online education systems in Australia, Norway, and Sweden:

There seems to be a general lack of integration between content creation tools, learning management systems, student management systems, and accounting systems in all three countries. The awareness of these shortages seems however to be growing and many institutions have initiated work to improve the systems integration. This is an important observation, and one may hypothesize that the institutions that implement the best integrated systems will have the best chances to succeed as large-scale online education providers.

Further, there seems to be little focus on standards specifications such as IMS and SCORM in higher education in all three countries. This could be a result of limited knowledge about the specifications, a sound skepticism against the sustainability of the specifications, of a general reluctance against standards that limits individual freedom, or of a conscious decision that the specifications are not really important enough to spend resources on. Some of these issues are discussed further in the article *Standards: The Vision and the Hype* by Tom Barron (2001).

Norway and Sweden seem to value the importance of nationally developed learning management systems and student management systems. This does not seem to be the case in Australia. One may expect that this partly is due to language issues, but it may also relate to pedagogical traditions, and other cultural factors.

Australian universities have a much clearer focus on online education as a source of income than Norwegian and Swedish universities. This probably results in an Australian need for better integration between the accounting systems, the learning management systems, and the student management systems.

The most striking difference between the three countries with regard to online education is related to economic policy. In Australia, education is one of the country's most important export industries. In an education and training action plan for the information economy from the Commonwealth Government (DEST 2000) it is clearly stated that: "Education in Australia is a multi-billion dollar export industry of vital importance to our economy". In Scandinavia, export of education does not even seem to be an issue for public discussion.

Australia can benefit from having English as the country's first language; Norway and Sweden are minority language countries. This may be one of the reasons that higher education institutions

in the Scandinavian countries seem to be much less interested in exporting online education than their Australian counterparts.

In Scandinavia, education is generally and traditionally perceived as a public service that should be available free of charge. Even though there is some increasing acceptance for commercialization of education, Swedish universities are still not allowed to charge any tuition fees to individual students. In comparison, Norwegian universities and colleges are now obliged to charge tuition fees for further and continuing education. In the author's opinion, this has made further and continuing education the most dynamic and innovative sector of education in Norway. Since Sweden lack this economic incentive for change, Sweden will have significant problems competing with online education in other countries.

It is the author's impression that online education in general could be less developed in Sweden than it is in Australia and Norway. This may be partly due to lacking economic incentives to offer online programs as an extra source of income. It may also be due to the possibility that governmental online education initiatives tend to be imposed on the universities and that these impositions could lack the necessary local support in the institutions. One example is the three Swedish distance education consortia that have received considerable governmental funding since 1993-94. (Hillefors et al, 22 and Ranebo 2001). At most, the three consortia offered 40-50 courses to 5000-6000 students (Hillefors et al, 26). After nearly ten years of operation, their results are not impressive and their funding will be discontinued. In stead, the government has recently established *Nätuniversitetet* (<http://www.netuniversity.se>) as a new national body to fund and coordinate the activities. In 2002, *Nätuniversitetet* will provide financial funding for the equivalent of 2 350 full-time students at 30 Swedish higher institutions.

Norwegian institutions typically charge students 3-4000 euros for online courses equivalent to one-year full-time study. This year, Swedish universities receive about 12000 euros in governmental funds from *Nätuniversitetet* when they offer an online course equivalent to one-year full-time study. This is about three times more than they receive for an ordinary full-time student. This lavish funding is probably a seminal phenomenon that intends to increase the development of online courses, but it could easily set a standard for future cost of online education courses. In the author's opinion, the Swedish approach is unwise, obviously not cost effective, and could set a very unhealthy standard for future overspending.

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