

# Danish National Assessment System

## Summary

The economist intelligence unit e-readiness report for 2008 puts Denmark in the top 5 in the world (in the previous four years Denmark was top). With high levels of availability of technology and connectivity in schools and in homes, Denmark has seen a steady growth in the use of Information and Communication Technology (ICT) during exams. Until now, the Internet, frequently considered a catalyst for rising levels of plagiarism in education, has remained off limits. Working closely with subject-matter experts, a new pilot in Denmark is attempting to design assessments that better reflect the skills required at university and work and to take the focus off knowledge-recall and writing speed by allowing access to the Internet. The initiative asks us to think in new ways about the skills pupils really need for 21st century life and how we might assess them better.

## Location

Denmark

## Aims

The project aim is to work closely with upper secondary schools and students to develop use of full Internet access during high-stakes formal assessments in order to better reflect the skills required of learners in education and beyond.

By using the Internet in this way, it is intended to:

- Allow students to use the same technology that schools ask and expect students and teachers to use in their daily lives.
- Provide assessments that better and more closely reflect the skills required for university, for which upper secondary schools provide preparation.
- Develop exams that focus more on the complexity and sophistication of response than knowledge-recall and writing speed.

## Rationale

Since 1994, there has been a steady growth of ICT use in Danish upper secondary exams:

- Since 1994, students have been allowed to use ICT (without access to the Internet and “clean”—in other words primarily as a word processing tool) in all Danish, social sciences, biology, and a few foreign language written examinations.
- Since 1997, students in commercial and technical upper secondary schools have been allowed to use ICT in all written examinations with all aids permitted in paper form also permitted in electronic form.
- Since 2000, students in general upper secondary schools have been able to use computers with most types of software installed. Students can either use a school or personal computer. In 2000, 98 percent of students used a computer during the Danish written exam, the other 2 percent chose paper and pencil.
- By 2001, students at the commercial and technical upper secondary schools were sitting Danish language, Math and Business Economics exams based on CD-ROM with access to multimedia resources such as video interviews, press releases, account information, etc. (see example below) with the aim to test student’s understanding of the subjects and their ability to use theory instead of merely learning by heart.

Figures from "Benchmarking Access and Use of ICT in European Schools," 2006 report of Danish upper secondary schools:

- 100 percent of the schools have Learning Management Systems
- 100 percent of the schools have a website
- 87 percent of the teachers use the Internet when preparing for lessons
- 70 percent of the teachers use ICT for communication with students every week
- 98 percent of the teachers use ICT in class

In addition:

- Use of ICT is now mandatory throughout the curriculum. Frequency of use is not specified, however guidelines provide examples as to how ICT can be used in each discipline.
- Schools may offer up to 25 percent of all lessons as distance learning (attendance does not have to be in the classroom and may be in the library, at home, or other places). Most schools still use classroom teaching for the majority of the time.
- During a school year each student has to complete a certain amount of written homework. Written homework may be, amongst others, in a multimedia or PowerPoint presentation format.
- Computers are allowed in both written and oral exams; students are not allowed to use ICT for communication or access to the Internet, but that is the only limitation.

The use of technology outside education, the trend towards the use of ICT in exams, the ubiquity of high-speed Internet and computers in schools, and the high level of student and teacher ICT literacy provide a clear rationale for providing access to the Internet during exams in order to better evaluate the skills and activities required of 21st century learners. Recognition that top down change in schools could meet with resistance provided the rationale for a co-design approach to exam development and implementation.

### **Description**

The Ministry's approach has been to make the development as open and inclusive as possible. Annual conferences in particular subjects are used to review and to engage teachers and the wider public. For example, in Social Sciences, there are conferences in 2008, 2009, and 2010. The exam committee that is responsible for development of assessment is keen to engage as many contributions to development as possible and not just from traditional experts, with frequent collection of qualitative (exploratory) and quantitative (confirmatory and explanatory) evaluations and opportunities for feedback to ensure teachers, students, and school leaders are all involved.

All evaluation reports are published on the Danish Ministry of Education website with the purpose of involving the community further. In the first instance, exams have been developed for three subjects in the upper secondary general programs: math, civics, and Danish and three subjects in upper secondary commercial schools: business economic, marketing, and international economics. These are being piloted in seven upper secondary general and seven upper secondary commercial schools. The option to expand to all subjects or schools if and when appropriate is being actively considered. It is also possible that students will be given the choice between an exam with or without Internet access.

The project is in the pre-final exam stage of the pilot, with schools already having taken part in pre-tests in November 2008, and preparing to take further pre-tests in May 2009, November 2009, and March 2010 with the first official exams in June 2010. The pre-tests are being sent out to every school, so that they can choose to add them to their learning environment and every school can try them for themselves alongside their official test, and then report back.

At present the overall assessment process is partly paper based, however there are plans to update the whole process so that every aspect is digitized, from the work of the examinations committee, to the assignments and exam papers and the delivery of student results.

### **Scale**

The pilot project includes seven general upper secondary schools and seven commercial upper secondary schools and the assessments have now been made publicly available to all other schools across Denmark.

It has been reported that many more schools and teachers are keen to engage with the pilot, and it would seem that national adoption is likely to follow.

### **Staffing**

While engaging with schools has required a number of staff at the ministry, for schools themselves, no additional staff were required.

### **Cost**

Total cost for the three-year pilot is estimated to have been £900,000 which includes running annual teachers conferences, funding for the teachers involved to cover extra hours required to attend meetings, and the development of extra assessments by the examination committee.

### **Price**

- The assessments are free to the school, with no additional staffing costs, although the need for new materials has led to marginally higher copyright costs.
- The process of engagement considered additional, alternatively it could simply be considered good practice.

## **Leading Practice**

Few, if any, other European countries have the same flexible rules for the use of ICT in upper secondary schools. The further development of the use of access to the Internet during exams is a major change that should have significant implications for the nature and perception of assessment and of 21 century skills.

The co-design and co-construction approach adopted by the Danish Ministry is having a significant impact on the nature of engagement and participation of all stakeholders, including the teaching community, parents, and the learners themselves.

Allowing use of the Internet within high stakes examinations has potentially far reaching implications for education as a whole. With access to the Internet's resources, what is tested moves away from traditional recall towards skills of assimilation, validation, analysis, and synthesis of information into logical and reasoned arguments. Given that assessment is frequently described as one of the key levers for education and also the source of greatest inertia, this fundamental change may reach well beyond the bounds of assessment alone. The images below illustrate the look and nature of the Internet-enabled exams.

→ Link to new media

→ Links to facts for inspiration

## Eksempler på opgaver, dansk

### • Opgave A

**Laurits Munch-Petersen: "Tre på en motorcykel".**

Kortfilm, 2001.

Vist på DR1, august 2002.

Varighed: 7 min. 58 sek.

**Foretag en analyse og fortolkning af "Tre på en motorcykel".**

### • Opgave C

**Karen Bliven: "De blå øjne".**

Oprindelig en del af novellen "Peter og Rosa" fra "Vintereventyr", 1942.

**Edvard Munch: "Jalousi", 1894-95.**

Oliemaleri, 66,8 x 100 cm.

**Foretag en analyse, fortolkning og sammenligning af "De blå øjne" og "Jalousi".**

**Inspirationsmateriale:**

**Præsentation af "Vintereventyr".**

Fra "Kulturkanon", udgivet af Kulturministeriet og Politikens Forlag, 2006.

**Edvard Munch.**

Opslagsartikel fra "Den Store Danske Encyklopædi", bd. 13, 1999.

**Ekspressionisme.**

Uddrag fra Johannes Fibiger og Gerd Lütken: "Litteraturens veje", 1996.

**Fantastisk litteratur.**

Uddrag fra Lars Tonnesen og Andreas Tonnesen: "Litteraturens Begreber", 2004.

→ Links to data to support calculations

## Eksempel på opgave, fysik

### Opgave 1: Model af broklap

For at undersøge en planlagt bro er der blevet lavet en model, der skal vise hvor stærk og holdbar broen er. Den består blandt andet af en broklap, der kan hæves og sænkes. Først er det blevet undersøgt, hvordan broklappen bevæger sig, når den er blevet løftet, og falder ned igen uden modstand.



Figur 1

Broklap der er hævet (til venstre) og sænket (til højre)

Vedlagt er data fra en måling af broklappens fald, dels som **tekst fil** og dels i **Excel format**. Dataene består af 5 kolonner: Tid efter start på faldet, broens overflades med vændret både i radian og i grader, vinkelhastigheden og endelig tyngdekraftens kraftmoment på broklappen om broklappens hængsel.

All of the above are samples from the CD-ROM version of the assessment. The Internet version looks very similar, except links to materials are online rather than saved to CD. © Steen Lassen, 2009, used with permission.

## Impact

Students currently piloting the new assessments will not leave school until 2010 and it is too early to fully understand the impact these assessments will have on students, in terms of improvement in grades or entry to university (Lassen, 2009), however the new assessment questions have been kept as similar as possible to the original format in order to be better able to make a comparison.

The research group provides reports and findings twice a year. Results show:

- Both students and teachers consistently expressed satisfaction with the new exam.
  - » Students find visual and non-linear materials more motivational.
  - » Teachers and students enjoy the availability of new media: short films, websites, sound, etc.
  - » Teachers and students are enthusiastic about new ways of student working (e.g. cut and paste).
- The new format of assignments has increased the use of ICT and new media in the classroom.
- Providing access to the Internet does not in itself support non-traditional student needs, however exams that are more in tune with daily classroom situations improve the confidence of weaker students.
- There is now huge interest from subjects other than those included in the trial. The subject experts who work within the Ministry are pressing for extension of the pilot to their subjects and a lot of teachers are pushing for the approach to be extended to their areas.
- There has been a surprising level of engagement from teachers and lack of resistance to change, suggesting that teachers are ready for this further inclusion of technology and of its transformational impact to the nature of assessment, while students have probably been ready for some time.
- While Internet literacy is already a stated goal for each subject, it can now also be tested through the new assessments, with key activities such as searching, finding, presenting, and evaluating (critical analysis) all included.
- The assignments are beginning to have an impact on curriculum design.

### Lessons Learned

Adoption of good design practice including co-design and co-construction by the Ministry of Education appears to be generating considerable benefits and reducing barriers to change.

By allowing the use of technology within assessment, former reliance on recall and speed of writing are diminished while skills associated with critical reflection and synthesis have an opportunity to grow.

Assessment that reflects practice in learning at school and in wider life appears to be supported by teachers and learners.

### Technology

#### • Infrastructure

Broadband

#### • Hardware

Internet connected computers

No further information is available regarding the reliability and security of Internet access, however the economist intelligence unit e-readiness report for 2008 puts Denmark in the top 5 in the world, including a top score for Government Policy and Vision suggesting reliability and security is not an issue.

#### • Software/Applications

NA

#### • Media

2D Graphics, Video, Animation, Audio

### Conclusion

Co-design could be more widely adopted in development of education policy. The desire of experts in other subjects to become part of Denmark's pilot project for the use of the Internet in assessment, and teacher interest suggests that the project is reflecting an educational zeitgeist, and that traditional reluctance is being replaced by greater cooperation.

Assessment is often described as a key driver for education with, for example, teachers teaching to the test. If assessment is changed to allow use of technology and to encourage its use then this may prove to be a significant influence on technology's wider place within teaching and learning.

Read the Education Best Practices Whitepaper and other case studies at:

[www.cisco.com/web/strategy/docs/education/CiscoEdBestPracticesWhitePaper-D2\\_V1.pdf](http://www.cisco.com/web/strategy/docs/education/CiscoEdBestPracticesWhitePaper-D2_V1.pdf)

### Sources

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Economist Intelligence Unit, 2008, E-readiness rankings 2008 Maintaining momentum

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