

Summary

This report presents a survey and analysis of digital transformation in Swedish higher education conducted with the aim of forming a basis for recommendations to the Swedish Government and proposals for initiatives that may facilitate continued efforts to harness the opportunities of digital technologies in higher education and address the challenges it gives rise to. The survey and analysis have been carried out based on the following questions.

1. What opportunities has digital transformation created to increase the quality of higher education, improve its efficiency and recruit new groups of students to higher education?
2. How far have Sweden's higher education institutions come in their quest to harness the opportunities of digital transformation, and what obstacles have they encountered?
3. What problems and pitfalls are posed by digital transformation, and how can these be managed?
4. What international examples of more advanced digital systems can Sweden learn from?
5. What can the Government do to facilitate the continued work of higher education institutions to harness the opportunities and manage the challenges that digital transformation poses?

The data needed for answering these questions have been collected through a literature review, three questionnaires sent to the country's higher education institutions, a time series analysis based on Statistics Sweden's higher education and employment registers, and some thirty interviews with representatives of central government agencies and twelve higher education institutions. The main

conclusions, expressed in the form of answers to the above questions, can be summarised as follows.

What opportunities have been created?

Ever since the first personal computers were introduced into higher education almost four decades ago, the digital transformation has gradually created more and more opportunities to develop higher education teaching methods in a way that improves both the quality and efficiency of education, while also facilitating the recruitment of new groups of students. A large number of digital tools have been developed that higher education teachers have been given the opportunity to explore in their teaching. These include hardware, such as computers, video equipment and mobile phones, which have become increasingly convenient to use, as well as software, such as learning management systems and plagiarism prevention tools, digital exam systems, and word processing and spreadsheet programs. In addition, the conditions in higher education have fundamentally changed, as more and more information and knowledge is made available online. This applies not least to research results, which most people can easily access via the internet today.

This change that has taken place has significantly improved the opportunities to create activity-based blended learning environments with thoughtful blends of teaching activities based on digital resources and more traditional face-to-face methods. This may, for example, take the form of a flipped classroom, where students take part in introductory online tutorials to free up time for more interactive and in-depth teaching when the class meets. The initial tutorials are generally designed by the teachers themselves, but the large increase in open educational resources (OERs), massive open online courses (MOOCs) and other digital teaching materials shared by universities around the world have increased the range of resources that teachers can choose from when designing their courses.

The development of more blended learning environments has also reduced the differences between on-campus education and distance learning. Video recordings, discussion forums and learning platforms, which were initially used primarily in distance learning,

are now increasingly used on campus as well, while distance education is increasingly being seamlessly combined with meetings on campus and sometimes even at municipal learning centres. This has resulted in more students being able to complete entire programmes remotely. The wide range of digital tools and teaching methods has also made it easier to recruit previously under-represented groups to higher education, e.g. communities with long travel distances to the nearest campus and professional academics in need of continuing education. Digital resources have played a significant role for many people by making it easier to design more flexible ways of teaching.

In addition, there have been many developments within the EdTech industry. New digital tools based on virtual and augmented reality, as well as artificial intelligence, are being developed, resulting in many exciting opportunities. But most of this development work is still in its infancy, making it difficult to know what significance it may have for higher education. However, developments in this area should definitely be monitored, both in terms of future opportunities and difficult challenges that may arise.

How far have higher education institutions come?

In many respects, Sweden's higher education institutions have come a long way in their efforts to harness the opportunities described above and manage the challenges posed by digital transformation. Technical equipment has been installed at a rapid pace; more and more higher education institutions are introducing learning management systems around which most of their teaching revolves; and six out of ten professional programmes are already using digital equipment for examinations, albeit to a limited extent. Nine out of ten higher education institutions have some form of central function with special responsibility for supporting teachers in their quest to harness the opportunities of digital transformation and manage any problems that arise. At the same time, the experience, knowledge and skills required to make use of the opportunities created by digital transformation in a well-thought-out way are unevenly distributed in the teaching profession. The resources available via the support functions are often insufficient and higher education staff

testify to the difficulty in reaching out to those teachers likely to be best served by their support. According to the literature review, survey responses and interviews conducted, the three most common explanations for this appear to be that higher education teaching is bound by tradition, it is under time constraints and it is affected by the status differences between research and teaching.

Awareness of OERs and other digital resources that have been made available online by universities around the world since the turn of the millennium, and that can help to improve both the quality and efficiency of the teaching conducted, is still low in Sweden despite the initiatives taken by the National Library of Sweden and the Swedish Cyber University more than fifteen years ago. Similarly, few teachers at Swedish higher educational institutions share the teaching material that they produce. This occurs in only one out of every ten professional programmes. Moreover, the systems developed to validate the knowledge and real skills that students have acquired through e.g. OERs and MOOCs, are inadequate, and the increased technical opportunities for developing common courses are being used less frequently by Swedish higher education institutions.

The opportunities created by digital tools to reach out to sparsely populated regions with higher education programmes have not yet resulted in a reduction of the difference in study participation between densely populated and sparsely populated areas of Sweden. The differences have instead increased over the last ten years. The importance of distance education in Sweden's sparsely populated regions has certainly increased, but its development has not been strong enough to counteract the general trend towards reduced participation overall. Nor has the expectation been fulfilled that digital tools will enhance lifelong learning. Over the past two decades, the proportion of all active students aged 35–64 has decreased.

Many students, both over and under the age of 35, also need to combine studies with gainful employment. According to three out of four higher education institutions, digital resources are very important to this group. The proportion of students combining full-time studies with gainful employment increased in all age groups between 2002 and 2018. The increase was greatest for independent courses and professional programmes – such as preschool teacher,

compulsory school teacher, nursing and social work programmes – where a large proportion of the students' parents lack post-secondary education.

What are the problems and pitfalls?

One of the biggest pitfalls of digital transformation in higher education seems to be the belief that these new technologies can solve educational problems in all aspects of teaching. Digital transformation must never become an end in itself in this respect. It is, and should only ever be, a tool for developing higher education pedagogy – a tool that should be used only when it is beneficial, and then in a way that provides the most benefit.

Another pitfall is the difficulty in interpreting the applicable legal regulations when new technology is introduced. For example, this may apply to the General Data Protection Regulation, the Accessibility Act, the principle of public access to information and intellectual property law. Consequently, there is a clear risk that teachers will play it safe and refrain from making use of the opportunities available to develop their teaching with the help of new digital technologies.

A third pitfall is a lack of awareness of the importance of considering the consequences of the vast digital footprints students and teachers generate when using cloud-based digital services of various kinds. This includes when educational institutions develop MOOCs on external platforms and when cloud-based learning management systems are used. Although these educational institutions, under an agreement, own the right to these digital footprints, the large multinational education companies providing these services have access to this Big Data and use it primarily to develop new commercially viable business models. This is a development that no Swedish government agency or joint European organisation has any control over.

What international examples can Sweden learn from?

Several other countries have come further than Sweden in their endeavours to harness the opportunities that have been created for

extended collaboration between educational institutions in matters relating to higher education and digital transformation. In Norway, France, the Netherlands and the United Kingdom, for example, there are government agencies or other central institutions with the task of coordinating higher education institutions' work on broader recruitment, educational development and online distance education. Until 2008, there was also a government agency in Sweden with a similar role, but coordination of these and related issues has subsequently been handled by networks without funding or offices. This has made coordination more difficult, while at the same time the national arenas for exchanging experiences on higher education pedagogical issues, and the significance that digital resources have in this context, are insufficient.

Recommendations

In order to facilitate higher education institutions' ability to address the above-mentioned obstacles and challenges, the Government should take a series of measures, of which the following appear to be particularly urgent to implement:

1. Create opportunities for a permanent boost to higher education pedagogy through setting new priorities between research and teaching by transferring 2 per cent of the State's research funding grants to the funding available for special funding to universities and higher education institutions.
2. Task the Swedish Council for Higher Education with drawing up a proposal for state aid totalling SEK 15 million per year to the networks for cooperation between higher education institutions that have been built up in order to shoulder the responsibility that the Government had previously placed on the now closed Swedish Agency for Networks and Cooperation in Higher Education.
3. Appoint a government inquiry with the task of clarifying how applicable legal regulations should be interpreted when new technology is introduced in higher education and, if necessary, propose changes to the relevant legislative texts.

4. Develop a plan for the implementation of the Recommendation on Open Educational Resources that Sweden endorsed at the UNESCO General Conference in November 2019.
5. Reform the administrative management of all validation in higher education. This should be done by transferring responsibility for the information on the right to validation and the receipt of applications to an appropriate central government agency, which should also be responsible for providing compensation of SEK 15 000 per validation to higher education institutions.
6. Encourage participation in higher education in the most sparsely populated parts of the country through a targeted contribution to municipal learning centres amounting to SEK 500 for each higher education credit (ECTS) earned at Swedish educational institutions by students participating in a centre's activities.
7. Task Vinnova, Sweden's innovation agency, to deepen the analysis of rapid educational technology developments. This should include assessments of the consequences arising from advances in EdTech and Learning Analytics and the generation of Big Data in the field of education.

The recommendations are described in more detail in section 7.2.