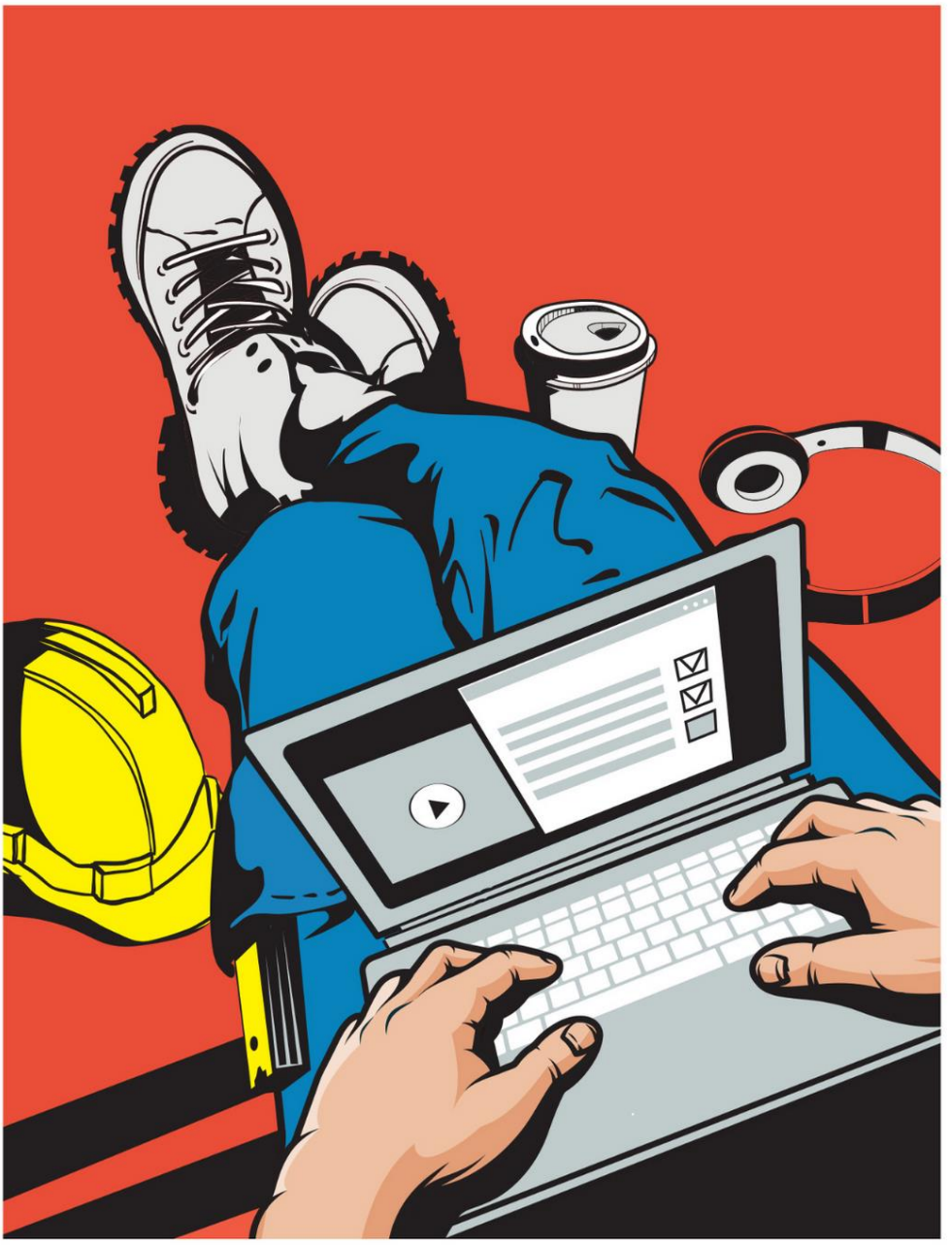

A STREAMING SERVICE FOR LEARNING

New visions for lifelong learning in Norway

Teknologirådet

A STREAMING SERVICE FOR LEARNING

NEW VISIONS FOR LIFELONG LEARNING IN NORWAY

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FOREWORD

In the coming years, more than 800,000 jobs in Norway are expected to undergo radical changes due to new technology. It is therefore essential that workers and job seekers can reorient themselves.

To be able to achieve this, we must make use of the possibilities that technology affords. With the coronavirus crisis, flexible online learning on an unprecedented scale became the new normal – and all in a matter of just a few weeks. This has given us a good starting point for the next step: establishing a Norwegian streaming service for professional development, where we can learn what we need, where we are, when we need it.

The expert group for the project has consisted of the following members:

- Marit Aursand, Research Director in the Department of Process Technology at SINTEF Ocean and member of the Norwegian Board of Technology
- June M. Breivik, Department Head for Arts, Culture and Schools at Kulturtanken
- Karsten Bråthen, Chief Researcher at the Norwegian Defence Research Establishment
- Reidun Høllesli, Senior Vice President of Orkla IT and member of the Norwegian Board of Technology
- Trond Ingebretsen, Director of Digitalisation at the Norwegian Directorate for Education and Training
- Johan Røed Steen, researcher at Fafo
- Elisabeth Ramstad, Head of Personnel at the Norwegian Government Agency for Financial Management (DFØ)

The project has been headed by the Norwegian Board of Technology's project director Marianne Barland.

The Norwegian Board of Technology is an independent body that advises the Norwegian Parliament and the government on new technology and promotes

an open, public debate. We hope this report will contribute to a forward-looking discussion about lifelong learning in Norway.

Tore Tennøe
Director, the Norwegian Board of Technology

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SUMMARY

According to the OECD, new technology will lead to radical changes in the work tasks of a third of all Norwegians and a large need for new skills. Norway ought to organise lifelong learning as a streaming service, accessible via a national learning platform.

In recent years, lifelong learning has become an important topic for decision-makers all over the world. Digitalisation, automation and artificial intelligence are transforming jobs, and a third of Norwegian workers are likely to experience radical changes in their work tasks in the coming years. These changes will affect many people in many sectors and most occupational groups.

For workers to be relevant and attractive in tomorrow's labour market, they must have the opportunity to update and improve their skills to bring them into line with needs. The current system for lifelong learning was designed against a completely different backdrop to the needs we see today, and participation must be increased for many different groups of workers. It is therefore necessary to think again, both about how learning programmes can be developed and delivered, and how the entire national system for lifelong learning can be organised.

TECHNOLOGY PROVIDES NEW OPPORTUNITIES

The same technology that is changing jobs can also be used to organise learning in new ways. Online learning provides greater flexibility, can be scaled up much more quickly than analogue solutions, and allows workers to participate in learning when and where it suits them. There is already wide variation in the different types of teaching available online, ranging from university courses to small micro-courses that can be completed in minutes.

The prevalence of online learning had been fairly modest until the Covid-19 pandemic in spring 2020, which triggered a huge increase in activity. Schools and universities closed, and digital and flexible learning suddenly became part of everyday life. Educational institutions that had previously had little online teaching became fully digital over the course of a weekend. This demonstrates the potential for change.

Personalisation has already been adopted by many online services, such as Netflix and Facebook. When it comes to learning, personalisation can help make the teaching more relevant, both for the individual learner and for businesses. Personalisation can take the form of recommendations about relevant courses based on information about previous education and professional experience. In addition, the learning and rate of progress can be adapted to the individual's educational level and development.

Techniques borrowed from simulations and games can increase motivation for learning, and tailor it so it relates to the learner's real work situations and tasks.

An analysis from the EU concludes that the learning technology used in the workplace is mature, and that the European market for online learning will have grown to EUR 281 billion in 2025.

NEW VISIONS FOR LIFELONG LEARNING

New methods and digital learning tools are lowering the threshold for participation in lifelong learning. In the same way that streaming services for music, film or literature provide users with access to large volumes of content

whenever they want and wherever they are, education and training can also be offered in a stream throughout people's entire working life.

The Norwegian Board of Technology's expert group is therefore proposing a new, ambitious vision for lifelong learning, focusing on four main principles:

- That there are **opportunities for everyone,** because many people will be affected and participation is currently low and appears to be skewed.
- That learning should be **work-related and needs-driven,** so that it is perceived as useful for the individual and the business, and can be linked to real work situations.
- That learning should be **flexible,** so that all enterprises, small and large, are able to participate in terms of time and resources.
- That the skills acquired are documented and **have value** for the individual, so that competencies from people's entire working life can be collated and seen in context.

LIFELONG LEARNING IN NORWAY

THE LARGEST GROWTH IN SUPPLY MUST BE DIGITAL

The landscape of providers of further and continuing education in Norway is diverse and complex. It is difficult to navigate – both for individuals who want to learn, and for businesses that want to provide training for their employees.

Many Norwegian universities and university colleges lag far behind in areas such as creating open online courses, which has become common around the world. In the current educational system, barriers related to funding, among other things, provide institutions with a greater incentive to develop degree-based programmes than further and continuing education. For example, the statutory provision that states that universities and university colleges may not claim fees from students on degree courses (the "free principle") impedes the use of content from existing courses in courses with participation fees.

In addition to universities, university colleges and private course providers, new players are appearing on the market: Norwegian technology companies that

have specialised in learning technologies and large international platform companies like Facebook and LinkedIn.

Learning technology – or *EdTech* – companies are naturally well equipped to contribute to a digital boost on the supply side. At the same time, they are relatively new to the market and do not have established channels out to industry. This makes it difficult for them to know what the needs are and what offerings there will be demand for.

SMALL BUSINESSES HAVE THE GREATEST NEEDS

More than 40 per cent of Norwegian companies have unmet skills needs, and surveys show that it is difficult to meet these needs, both through hiring new staff and internal upskilling. Despite growing interest in technology-based learning, it is still not widely used.

Larger businesses are better able to develop their own learning resources or buy training from external providers. Small and medium-sized businesses often have to accept lower quality training, because it is too expensive to buy tailor-made teaching programmes.

The Norwegian labour market is dominated by many small and medium-sized enterprises. In addition, Norway has a large public sector, with approximately 860,000 employees. Education and training of employees is an important investment for most businesses, but requires sizable resources. In addition to direct expenses related to course fees, materials and travel, the time the training takes is resource-intensive, in that the employees are not performing their ordinary work.

Access to digital learning solutions makes learning more flexible, thereby making it easier for small businesses to participate. In addition, a digital platform and marketplace can make it easier for providers of learning activities and businesses to find each other, thereby improving access to relevant education and learning.

MANY PARTICIPATE – BUT NUMBERS MUST INCREASE

Many Norwegians are already experiencing that their jobs are changing as a result of digitalisation and are therefore motivated and want to participate in education and training. Norway has long had a tradition of relatively high

participation in further and continuing education compared with many other countries, but is currently losing its lead in level of skills in the population.

Participation in further and continuing education is socio-economically skewed, and people with a low level of education participate to a lesser degree than people with a high level of education. In addition, participation is higher among young people than older people, among full-time employees than part-time employees, and among public-sector employees than the private sector. These skews are also found in other countries.

Although upskilling is usually related to needs a person has in their current job, it is important that new skills and competencies are also recognised later on in their career or if they change job. A lack of documentation of professional development activities outside the formal education system can lead to a mismatch between actual and documented competencies.

The individual's motivation is central to increasing the proportion of people who participate in education and learning. For many, the main motivation for participating in education and learning is to be able to perform their current job. It is also important that they can see what significance the learning may have for achieving better conditions of employment or new opportunities in the labour market.

Technology can contribute to this in several ways. Increased flexibility allows the individual to plan their training themself; simulations and games can ensure learning closely related to their work; and social forums such as chat groups and virtual study groups enable exchange and discussion of experiences.

A STREAMING SERVICE FOR LEARNING

Lifelong learning is high on the political agenda in Norway. The main objective of the government's competence reform "Learn your whole life" is that no-one should become unemployable due to a lack of skills, and that the labour market should have access to the skills and competencies it needs. In order to achieve these goals, the government will develop several industry-specific programmes for upskilling, give vocational colleges a more important role in the system of further and continuing education, and adapt the Norwegian State Educational Loan Fund's schemes for adult students.

In summary, most of the measures in the competence reform could be said to be analogue and are aimed at vocational colleges, university colleges and universities.

In this report, we argue that a system for lifelong learning must provide opportunities for all, be closely related to work and needs-driven, have flexible offerings and provide value to the individual through good documentation. To achieve these goals, a digital boost is needed – a streaming service for learning.

A national learning platform will provide a single point of entry to offerings from a number of different providers. Just as Spotify provides easy access to a wide variety of different music, the platform will make it easier for the individual and businesses to find offerings that are relevant to them. Online courses and educational programmes will contribute to increased flexibility, meaning more people can participate.

The authorities must therefore take steps to ensure that all providers are offered good terms, employers can meet their needs for training and new skills, and that the individual gets the opportunity, sees the value of, and is motivated to participate in education and learning.

RECOMMENDATIONS

A digital platform for lifelong learning

The government ought to establish a digital platform for lifelong learning. The platform must provide an overview of the offerings that are available and publish learning programmes from various different providers. Providers both inside and outside the formal education system must have the opportunity to publish and communicate their learning programmes on the platform.

Several countries have established these kinds of national learning platforms for their citizens and businesses. The French platform FUN-MOOC currently has nearly 550 open online courses, from 135 different providers. In addition, businesses can pay to have an internal area on the platform, where they can collaborate with providers on customised learning programmes tailored to their needs. Access to this kind of infrastructure will be particularly useful for small and medium-sized enterprises that would not otherwise have the resources to develop this kind of offering internally.

Quality assurance of content

One goal for a national learning platform must be that learning programmes can be published relatively quickly without having to wait to pass through extensive, bureaucratic approval systems.

The content published on the national learning platform ought therefore to be quality assured in several ways: through user feedback and ratings, and through requirements to the providers on good academic quality of the content, use of teaching methods that are adapted to online learning and a scalable format, and good learning experiences for students.

Personal learning account

All citizens ought to have a personal learning account to strengthen ownership of their own skills and qualifications. Documentation of learning both inside and outside the education system is gathered in this account. In this way, certificates and diplomas will follow the individual – across employers and providers.

A streaming service for learning

The Norwegian authorities must fund the development and operation of the national learning platform. There are already a number of courses and learning programmes that are available free of charge online, such as the courses on the learning platform for the central government run by the Norwegian Government Agency for Financial Management (DFØ), and a number of online courses developed by universities and university colleges. These courses should be available free of charge on the national platform.

For businesses and private individuals, the authorities ought to facilitate a streaming service for learning, where several different learning resources are available.

Testing of various funding models, such as training funds, application-based support for development and operation, and giving vouchers to residents should be investigated and tested through the competence reform.

Personalised digital advisory service

Through the learning account, all citizens ought to have access to a personalised digital advisory service. Using data analysis, this service can provide recommendations on which courses and educational offerings may be relevant to each individual. It ought also to provide information on relevant financial support schemes from, for example, the Norwegian State Educational Loan Fund or trade unions.

Digital certificates

The national learning platform ought to require that all providers issue a digital certificate, enabling individuals to build up a varied skills profile, which can then be shared with relevant employers or others, as required. These certificates will not be a substitute for the current system of diplomas and certificates, but can provide a better description of knowledge accumulated outside the traditional education system.

It must be ensured that all documentation of learning and education is valid, correct and securely stored, and that individuals are themselves in control of and have ownership of the documentation.

Norwegian EdTech companies ought to be strengthened

Development of needs-driven offerings will require good knowledge of and proximity to Norwegian society and business. There will therefore be good opportunities for Norwegian providers to take a leading and important role in this development, especially for companies that are already good at digitalisation and learning technology.

Access to data from the learning platform can help providers improve their offerings and accelerate digitalisation, thereby lowering the threshold for the creation of new companies and offerings.

Clear guidelines on the ownership and use of data

A Norwegian learning platform must formulate clear guidelines on the ownership and use of data, in order to safeguard the individual's rights and autonomy.

This includes users owning their own data and deciding who is to be granted access to them. In addition, the individual's digital profile should not be able to be used to limit their opportunities.

The purpose and delimitation of the use of the data, both on the platform and elsewhere, must be clearly defined. The data models used must not be skewed, and users must be allowed insight into how personalisation is achieved.

Both the platform and the providers must be transparent about data collection and give each individual the opportunity to update their own data on a regular basis.

DIGITALISATION OF WORKING LIFE

Digitalisation and automation will change our jobs radically. In the long term, technological progress will create more and better jobs, but in the short term it may lead to increased inequality and social, political and economic unrest.

THE FUTURE OF WORK ON THE AGENDA

In recent years, the role technology will play in working life in the future has been on the political agenda around the world, with a particular focus on how technology is changing demand for labour, and which skills and competencies will be required. Many people fear that machines will soon be able to perform so many tasks that there will be no jobs left for humans.

History indicates that technological progress increases prosperity for all groups in society – in the long term. However, it can take time to adapt to new technology; and in the mean time, we may experience increased social, economic and political unrest.

EVERYONE BENEFITS IN THE LONG TERM

Throughout most of human history, there was little growth in prosperity. The industrial revolution that started around 1800 changed everything.

Technological progress led to increases in productivity unlike anything the world had ever seen before. This laid the foundation for a level of material prosperity that ordinary people in earlier times could only have dreamt of.

Working life has changed constantly throughout modern history. Only 70 years ago, most people in Norway still worked in agriculture.[1] Today, the number of people who work directly in agriculture is a fraction of what it was back then, and yet more food is being produced than ever before. Technology has increased efficiency radically and has largely replaced humans in the production of food.

However, the loss of jobs in agriculture has not led to mass unemployment – instead new industries have absorbed the surplus labour. At first, the workers moved to industry, before the development of the service industry, especially within health and care work. History thus proves that technological improvements in efficiency do not necessarily lead to unemployment. On the contrary, today we have far more and much better jobs than was the case when most people worked in food production.

THE GAINS ARE NOT EVENLY DISTRIBUTED

Although the growth has benefited everyone in the long run, the disparities can be marked in certain periods. In recent decades, there has been a trend towards widening inequalities in many countries.[2]

At present, most of the new jobs are in the service sector, while jobs are disappearing in traditional manufacturing. Needless to say, it is not given that each individual worker can easily switch from an old industry to a new one. The new jobs often require different skills to those that are disappearing. Many countries have also experienced a polarisation of the labour market, with middle-paying jobs disappearing, while the number of worst-paying and best-paying jobs is increasing. This may help explain some of the increased economic differences.[3]

The disparities are also increasing between different places. Large cities with a knowledge-intensive business sector are experiencing growth and prosperity, while cities and areas that have been characterised by more traditional and manual industry are seeing a decline in jobs, prosperity and population.

[1] Skoglund (2013)
[2] OECD (2018)
[3] OECD (2017)

ARTIFICIAL INTELLIGENCE IS TRANSFORMING JOBS

Technological advances are leading to machines being able to perform ever more tasks, both physical and cognitive, that we previously thought only humans could do. Machine learning is a set of techniques that have come to play a central role in artificial intelligence since their breakthrough in 2012.[4] This means that machines can now learn strategies and find patterns, based on examples in historical data. In this way, machines can now solve problems on their own, without all the rules and correlations having been programmed by humans.

ROBOTS OUT OF THE CAGE

In recent years, we have seen the emergence of a new generation of robots that are so safe they no longer need to be separated from humans, but can work alongside and with them.[5] This is because they are now equipped with new and better sensors, which, combined with artificial intelligence, enable them to react to what is happening around them. In addition to robots now being able to be used in more production tasks, they are also increasingly being used outside factories. Examples of this include automated warehouses, robot porters in hospitals, and drones that inspect power lines.

ROBOTS MOVING INTO OFFICES

In recent decades, a wide range of routine manual tasks have been digitalised. Now these routine digital tasks are being automated. This is often called "robotic process automation" (RPA). Computer programs mimic humans' behavioural patterns and are able to perform repetitive, rule-based, and often time-consuming processes. One example is chatbots, which have become prevalent in customer service and can now answer about 80 per cent of standard questions from users.[6] In several companies, computerised systems are now also making important financial and strategic decisions. For example, they can control the work day[7] or determine pricing strategies.[8] Computers also account for much of the trading on the stock markets around the world.[9]

[4] House (2019)
[5] Marr (2018)
[6] Jovic (2020)
[7] Jørgenrud, Marius (2019)
[8] Martin, Nicole (2019)
[9] The Economist (2019)

WHAT IS HAPPENING TO JOBS NOW?

SOME JOBS ARE DISAPPEARING

A 2013 report on the future of jobs made headlines with its calculation that 47 per cent of jobs in the USA had the potential to be automated.[10] The calculation was based on the tasks that the jobs consisted of, and whether there is technology that already can, or in the near future would be able to, perform these tasks. When the same method was applied to Norwegian occupational data, it was found that one in three Norwegian jobs is at high risk of becoming fully automated.[11] Many of the occupations at high risk of automation have low formal competence requirements. Shop assistant is an example of one of the most common occupations that might disappear. At the same time, a number of occupations that generally require a high level of education and pay well are also at risk, such as auditing and accountancy. This is a natural consequence of developments in artificial intelligence.

It is not possible to say exactly how many jobs will be lost to automation, or when. The report mentioned above is just one example; other attempts at calculations have resulted in much lower estimates of the number of jobs at risk.[12] A study from 2016 found that 14 per cent of jobs in the OECD area are at risk of automation, compared with six per cent in Norway.[13] Factors such as culture and politics will also affect the rate of change. Nevertheless, it is indisputable that some occupations and many work tasks will disappear over the next ten years.

NEW JOBS

At the same time as some jobs will disappear, others will appear. The digital economy will continue to grow. Developing new solutions requires not only people with IT expertise, but also people with in-depth knowledge of the areas in which the solutions are to be used. Brand new occupational groups that did not exist before are also emerging, ranging from experts in green growth and restructuring to animal groomers.

[10] Frey, Carl B. and M. A. Osborne (2013)
[11] Pajarinen, Mika, P. Rouvinen and A. Ekeland (2015)
[12] Winick, Erin (2018)
[13] Nedelkoska, Ljubica and G. Quintini (2018)

The fastest growing occupational category, however, is health and care services. The ageing population will lead to a massive need for health-care services. There will be an increased need for home-care services, nursing, physiotherapy, medical consultations, etc. Developing new health technologies will help increase supply and create jobs in the more technology-dependent parts of the industry, such as diagnosis and personalised medication and treatment; but for the time being, the need for people is calculated to be far greater than what the technology can replace.

RADICAL CHANGE AND IMBALANCE

Even if the majority of jobs do not disappear in the near future, many people will still experience major changes in their work. According to the OECD, 32 per cent of jobs in Norway are likely to see radical changes in content.[14] This may lead to imbalances between the skills that are needed and the skills people have.

Both the changes in the content of jobs and shifts between occupational groups can create these kinds of imbalances. In Norway, for example, there is great competition for jobs in retail and sales work, but a lack of qualified workers in ICT-related areas and construction.[15] In addition, there is a strongly growing need in health, nursing and care work.

Imbalances in the labour market are negative for individuals and the economy as a whole. This can lead to high unemployment, at the same time as the country misses out on opportunities for value creation, because businesses cannot find the workers they need. It is precisely this development that we must seek to avoid, by providing relevant training and education throughout people's entire careers.

[14] Nedelkoska, Ljubica and G. Quintini (2018)
[15] Official Norwegian Report (NOU) 2018:2

NEW VISIONS FOR LIFELONG LEARNING

A national vision for lifelong learning ought to include opportunities for all, needs-driven and flexible offerings, and documentation for the individual. Technology can facilitate learning in new ways, giving more people the opportunity to participate.

LEARNING CHANGES WITH NEW TECHNOLOGY

The same technology that leads to changes in working life can also provide new opportunities for learning. In order to able to deliver lifelong learning and continuing professional development at the same pace as jobs are changing, it is essential to change both the content and the organisation of learning activities.

Technology has created optimistic visions of the future of education and learning for many years, and television and radio have both played an important role in the introduction of distance learning. The proliferation of the internet, personal computers and smartphones has led to a new wave of optimism in recent years. The internet and digitalisation provide a whole new space for learning. Flexibility is no longer only connected to location (as is the case with television and radio), but also time – now we can learn almost anywhere and at any time. In addition, there are now opportunities for interactivity and immediate

feedback. Collection and analysis of data provide new insight into how learning occurs, and thereby an opportunity for personalisation.

An analysis from the EU concludes that the learning technology used in the workplace is mature, and that the European market for online learning will have grown to EUR 281 billion in 2025. Despite growing interest in technology-based learning, it is still not widely used. Small and medium-sized enterprises in particular report that there are many barriers to being able to take full advantage of the opportunities the technology affords.[16]

Today, classroom-based teaching still dominates further and continuing education, although the development of more flexible online offerings is increasing. The demand for online offerings is high, partly due to the increased flexibility for participants, and because businesses find it less resource-intensive than traditional teaching.[17]

Digital learning tools enable learning to be adapted in three ways in particular: independent of time and place, personalisation, and based on simulations and games.[18]

INDEPENDENT OF TIME AND PLACE

The internet and the widespread proliferation of personal computers and smartphones have contributed to the ability to provide many services that were previously location-bound in completely new ways. We can pay bills using online banking, buy goods from online retailers, and work remotely from home. There has also been a similar development in education and learning, and in recent years digital teaching materials have become increasingly common.

A particular characteristic of these kinds of teaching materials is their increased flexibility, compared with traditional classroom teaching. People can work their way through exercises and instructional videos at home, on the bus or at school. They can take a break when they need one, fast forward and rewind in a video lecture, and repeat exercises until they have mastered the subject matter.

Online learning thus makes it possible to learn anywhere and at any time, and to determine the speed of progression. As a result, many different formats for

[16] European Commission (2018)
[17] Oxford Research (2019)
[18] The Norwegian Board of Technology (2018)

learning have been developed, from daily learning "spurts" of a few minutes, to longer university courses that can be taken online.

One of the most famous examples of these kinds of online courses is Professor Andrew Ng's course in machine learning. Ng has taught this course at Stanford University for many years, but in 2011 he published the entire course online. In the first semester, some 160,000 students from all over the world participated. In 2012, Stanford University established Coursera, a digital learning platform for MOOCs (Massive, Open Online Courses). University courses that had previously been reserved for students on campus were now published openly and free of charge online, attracting large numbers of students from all over the world. Andrew Ng's first course is still available on Coursera, and today nearly three million people have enrolled for this course.[19]

Many universities have followed Stanford's lead, and at the end of 2018 there were nearly 11,500 different courses from over 900 universities available across different platforms.[20] There are still few online courses from Norway, but figures from the platforms edX and Coursera show that almost 100,000 Norwegians have an account on these platforms.[21]

In addition, some large businesses have created their own internal platforms for learning. The US telecommunications company AT&T has developed an internal platform in collaboration with the learning platform Udacity, where employees can take courses and even degrees in order to stay up to date as their job changes and requires new skills.

TAILORED TO THE INDIVIDUAL

As learning materials are digitalised, it becomes possible to collect and analyse data about users and their activities, which can help us understand and improve the processes involved in learning. Although this kind of learning analysis has already been introduced in teaching, the major internet companies can teach us a lot about the various applications of individual personalisation.

Services like Netflix analyse large volumes of data about the users' activities and purchasing history. They are then able to provide users with personalised recommendations, based on data about films or serials that are similar to the ones you have already watched or that other customers similar to you have watched.

[19] https://www.coursera.org/learn/machine-learning#about
[20] Shah, Dhawal (2018)
[21] Figures based on an e-mail exchange with edX and Coursera in February 2019

LinkedIn Learning uses these kinds of techniques to recommend courses to its users. Using information about your education, career and network, the platform can provide personalised recommendations about relevant courses.

Similarly, learning analysis can provide the individual student with tasks with a personalised level of difficulty.[22] After an initial test that maps the students' level of knowledge, a learning pathway is set up with a syllabus that is adapted to the individual's academic development and level of mastery. Career learning could be based on analyses of academic and occupational background, current job, and information obtained from the digital tools used at work. This could lead to personalised recommendations for courses or programmes based on the individual's educational background and job, and the periods when the person has some free time.

At the same time as this provides new possibilities for customising content on the individual level, it also creates new challenges related to data privacy and access to data. Knewton is one of the world's leading companies in adaptive learning and learning analysis. They state that they collect up to ten million data points about each student – every single day.[23] How detailed information an employer should have access to, and how this is allowed to be used, is another challenge that needs to be resolved.

SIMULATION AND GAMES

Digital simulation can create tailored, work-related learning programmes that are closely linked to real work tasks and situations. This includes 2D and 3D models for use on a PC or smartphone, and simulations using virtual, augmented or mixed reality. Flight simulators are one of the best-known examples and have been used to train pilots for many years. Simulations make it possible to practise skills in situations that are new or complex, or that are time-consuming, dangerous or expensive to use for training purposes.[24]

Augmented reality is technology that provides the user with an extra layer of information or graphics and first became widely known through the game Pokémon GO. In a job context, augmented reality can be used to impart information and guidance in real time. For example, the aircraft manufacturer Boeing uses

[22] Bulger (2016)
[23] Simon, Stephanie (2014)
[24] Lateef, Fatimah (2010)

smartglasses that give factory employees step-by-step instructions on how to assemble components.[25]

Game-based learning adopts design elements and principles from computer games, such as the use of graphics and level sharing, and rewards in the form of points or virtual prizes. Several studies show that game-based learning is highly effective in terms of both motivation and the outcome of the learning activity.[26] The learning is perceived as fun, and the exercises can be repeated so that the knowledge sticks.

A training game developed by the Norwegian company Attensi provides employees in the home textiles chain Kid Interiør with training in the chain's range of products through, among other things, quizzes and simulated customer calls. The participants receive rewards in the form of points, with competitions among colleagues and different branches to get the highest ranking. Knowledge about products traditionally involves a lot of rote memorisation, and it can be difficult for employees to get motivated to memorise entire product ranges. The company found that the game increased learning motivation. Although the employees were only paid for one hour of training, each individual played for an average of ten hours. In some shops, average playing time was 17 hours. The training is also reported to have had a noticeable effect on additional sales.[27]

A STREAMING SERVICE FOR LEARNING

Education is an activity that most people undertake early on in life – from when they start at primary school until they have completed upper secondary school and, in some cases, higher education – before heading out into the world of work. This builds on the assumption that we know what skills are needed in the labour market and that the existing educational programmes reflect this. The current system for further and continuing education is based on updating existing knowledge or providing small boosts in expertise in specific areas.

In the coming years, the skills workplaces require will change more quickly. This means that workers will have to constantly update their skills and reorient

[25] The Economist (2017)
[26] Hamari, Juho, Koivisto, J. & Sarsa, H. (2014)
[27] Lilleby, Jan (2016)

themselves towards new tasks and jobs – in other words, people will never be done with learning.

Increased bandwidth, greater storage capacity and better file transfer possibilities over the internet have led to the development of a variety of streaming services. These are services that transmit media content in real time, without the user having to download the content locally to their device.[28] Streaming allows users to access large quantities of digital content (such as films, music or books), often through subscription services. Streaming services have become particularly common for media content, and this has had a huge impact on the market and transformed business models within music and video.

Analyses of Americans' music consumption show that they listen to far more music than ever before.[29] Both the business models and digitalisation in general affect people's listening habits. Streaming services allow people to access music wherever they are, and digitalisation of music allows people to listen on their smartphone, computer, smart TV or in their car.

In the same way that streaming services for music, film or literature provide the users with access to large volumes of content whenever they want and wherever they are, education and training can also be offered in a stream throughout people's working life. New methods and learning tools made possible by new technology can lower the threshold for participation in lifelong learning.

In order for this to be possible, the organisation of education and learning must be re-envisaged. The quantity of offerings needs to be increased, while access must be made easier – both practically and financially. In addition, the training must be of a high quality and be documentable, so that it is recognised and used in working life. This will require ability and willingness to change from the individual, providers of education, employers and companies.

VISION

In order for this kind of approach to be successful and contribute to increased upskilling, it is useful to formulate a goal for how technology should be used

[28] Hagen, Anja Nylund (2020)
[29] Nielsen (2017)

and what we want to achieve. A vision for lifelong learning ought to contain the following elements:

- That it provides **opportunities for all**
- That learning is **work-related and needs-driven**
- That learning is **flexible**
- That the skills acquired **provide value** to the individual

OPPORTUNITIES FOR ALL

In the future, far more people will need training to upgrade their skills. The digitalisation that is changing the labour market is all-encompassing and will entail changing needs in virtually all sectors and jobs. This means that everyone will need to update their knowledge from time to time, not just particularly vulnerable industries or groups of workers.

The current rate of participation in further and continuing education is high in Norway compared with many other countries, but must be increased further to meet the changing needs for skills and competencies in the labour market. At the same time, participation is skewed – it tends to be people who already have a high level of education who participate the most, and public-sector workers participate more than those in the private sector.[30]

There are also differences in participation among different companies. Norwegian trade and industry is dominated by small and medium-sized enterprises, which often have fewer resources to allocate to continuing professional development. Sending employees away for courses or training can be quite expensive, due to participation fees and lost working hours while the employee is away.

The fact that their job is the main arena for learning for many people means that people with only a weak connection to the labour market are not only not working, they are also without access to an important arena for learning and skills development. It is also difficult to combine training with other measures for unemployed people.

[30] Berge, Thea (2018)

A new system for lifelong learning must address all of these challenges. Technology can contribute to increased flexibility, enabling more people to participate and making knowledge sharing between different actors easier.

WORK-RELATED AND NEEDS-DRIVEN

Further and continuing education must be useful both for the individual taking it and for the companies that invest in the training. The motivation for the individual will be greater if they can immediately see the relevance for their own work situation and for the business's needs, and if the learning can be linked to current or future work tasks.

This will require closer collaboration between the parties offering training and those requesting it, and that there is easily accessible information about existing offerings. For employees, it will also be important that they can quickly acquire new knowledge, as they need it. Digitalisation enables "on demand" learning to a much greater extent than before.

FLEXIBLE

Since the changes in the labour market are affecting all sectors, there will be broad diversity among employees who need to upgrade and renew their skills. There will be differences in level of education and background, work experience and motivation for learning. There will also be variations in terms of whether the learning activities take place during the individual's working hours or free time.

Adapted teaching has been a mantra in the Norwegian school system for many years, but it has been difficult to achieve when an entire class of pupils is taught together. Digital learning materials and platforms make it possible to personalise teaching to a far greater degree than previously. Individuals also tend to have a limited amount of time that they can spend on further and continuing education. In addition, if you have to travel elsewhere in order to participate, it costs the individual and the company even more in terms of lost time. When teaching takes place via the internet, it is detached from both specific times and locations, meaning training can take place more flexibly and on the individual's own terms.

The market for further and continuing education is vast, and it can be difficult to find the most appropriate form of training. Personalisation can also involve receiving targeted recommendations about content, indicating which courses

are best suited to the individual, given their background and wishes for their future career. Developments in the European market for online education reflect this: there has been a decline in general courses, and growth in courses that can be personalised in different ways and give workers greater co-determination.

Shorter module-based learning will also increase flexibility. Instead of embarking on long-term, predefined courses of education, people will be able to build up an individual skills profile consisting of multiple separate components. This will lower the threshold for participation, while increasing relevance, because employees can choose not to take modules that are not relevant to their own or their employer's needs.

VALUE FOR THE INDIVIDUAL

When training takes place outside the traditional educational pathways and is broken down into smaller parts, learning must be documented in new ways, so that the individual can easily transfer their skills and expertise between different workplaces. Today, a course certificate has relatively little value, compared with a university degree. New forms of documentation and certificates will lend greater value to skills and competencies gained outside the formal education system. They will also be able to provide employers with valuable information in recruitment processes and when mapping internal competencies.

If education and learning are broken down into smaller modules, it is important that these can be combined into a whole and viewed together. The ability to combine modules to form a degree, or gather various certificates together in one place to form an individual skills profile will make it easier for individuals to present their skills and competencies to current and future employers.

THE SUPPLY SIDE

Digitalisation enables teaching and training to take place in new ways. With growing needs for continuing professional development, this will be a rapidly growing and changing market in the coming years.

In 2015, the Nordic Institute for Studies in Innovation, Research and Education (NIFU) mapped the providers of further and continuing education in Norway. The results showed an established group of actors from the formal education system and a diverse range of private actors.[31] Virtually all the universities and university colleges offer further and continuing education, and a number of private actors offer further and continuing education and various courses aimed at workers. In addition, municipal and county authorities, industrial organisations and trade unions are also important players. The high number of providers and different offerings form a large, complex market that can be difficult to navigate for businesses seeking training for their employees to navigate.

Although educational institutions and other established players will continue to play an important role, the technological changes will allow them to change their role and pave the way for new actors.

[31] Tømte, Cathrine et al. (2015)

Providers can be broadly divided into four groups:

- Public and private institutions from the established education system, such as universities, university colleges and vocational colleges
- Public and private enterprises that offer courses and education. These may be industrial organisations, adult education associations or course providers
- EdTech companies, such as Kahoot and Attensi
- Major international platform companies, such as Facebook, Google and LinkedIn

THE ESTABLISHED EDUCATIONAL INSTITUTIONS

The current education system consists of a number of different players. In addition to education, universities and university colleges contribute to knowledge production through research and development. They are therefore linked to a large, established knowledge system and play an important role in ensuring that the population has the skills that society needs. However, these actors' strength in terms of education and learning is strongly linked to traditional educational pathways, such as bachelor's, master's and PhD degrees.

Virtually all universities and university colleges offer further and continuing education, and around eight per cent of the population has participated in formal further education in the past year.[32] However, the offerings are defined differently from institution to institution, and it is therefore difficult to get a clear overview across the institutions.[33]

FURTHER EDUCATION – IN THE CLASSROOM

An important principle for ensuring participation in lifelong learning is that it can be combined with work. Flexibility in the design of offerings is therefore important for employers and employees alike. The further education offerings from the formal educational institutions are mostly designed as traditional teaching, with physical gatherings as their main activity. The offerings are also

[32] Ulstein, Joakim Hertzberg (2019b)
[33] See for example Tømte et al. (2015) and BDO (2019)

fairly extensive, with an average weight of 30 credits (equivalent to one semester of full-time study). Most further education programmes can be taken part-time and therefore do not require continuous absence from work for an extended period.[34] However, compared with other providers, the offerings from formal educational institutions are not particularly flexible. Although the proportion of online offerings is increasing, physical gatherings are still the main rule.

Vocational colleges offer short, work-related educational programmes, often developed in close collaboration with local businesses. This ensures that the programmes are best aligned with the employers' needs. The vocational colleges' offerings are somewhat more flexible than those of the universities and university colleges, but 75 per cent of offerings are still location-based. Only eight per cent of offerings are purely online.[35]

As part of the government's competence reform, there has been a focus on the development of flexible further education programmes within digital competencies. Providers have been able to apply for support to develop new, more flexible teaching arrangements. There have been several calls for applications, but although one of the requirements to be eligible for support was flexibility, the majority of the offerings that were granted support were gathering-based.[36]

FEW OPEN ONLINE COURSES

The rise of MOOCs originated in the USA, and although the trend has spread around the world, American universities continue to dominate. The higher education sector in the USA identified several signs of the beginning of a crisis in the early 2000s. The number of Americans who start studying but do not complete a degree has risen, while the costs linked to studying have increased significantly. This development has widely been highlighted as one of the reasons why these kinds of open online courses became so popular in the USA: more people could access education at a lower cost, with an added innovation boost in the education sector.[37]

The commission behind the Official Norwegian Report "MOOCs to Norway. New digital forms of learning in higher education"[38] from 2014 highlighted a

[34] BDO (2019)
[35] BDO (2019)
[36] Official Norwegian Report (NOU) 2019:12
[37] Official Norwegian Report (NOU) 2014:5
[38] Official Norwegian Report (NOU) 2014:5

number of changes that could contribute to greater use of MOOCs in Norway. Among other things, the commission proposed specific initiatives and incentives for the development of open online courses, both nationally and within the institutions.

In 2013, the government decided to invest in further education for teachers, which led to the launch of a 30-credit MOOC in mathematics 2 in 2015. Around 300 teachers participated, making it the largest further education programme in Norway at the time. The following year, a MOOC was also developed for further education in mathematics 1. Evaluations of these courses showed that the students were satisfied and found the content relevant to their work situation. Nevertheless, the possibilities afforded by the technology were not fully exploited. Group work and supervision resulted in less flexibility, because the students had to coordinate with their fellow students and teachers and thus adapt to a set schedule.[39]

There are examples of open online courses being used in Norway, both in traditional education and as an offering in further and continuing education, but the supply is still very limited. The website mooc.no, a platform for MOOCs from Norwegian providers, currently has only 37 courses.[40] There has been no national initiative to promote the development of MOOCs, nor have any of the major educational institutions done much in this area, despite the MOOC commission's recommendations.

There are several documents mapping out how to digitalise higher education. The digitalisation strategy for higher education in Norway states that digitalisation of this sector must always support the sector goals for research and higher education.[41] The action plan[42] intended to realise the objectives of the digitalisation strategy have "tomorrow's learning processes" as one of its priorities. However, none of these documents directly addresses lifelong learning and the need to scale up digital offerings in the coming years.

BARRIERS TO SCALING UP

There are a number of regulatory and structural barriers that impede the development of offerings aimed at working life in the higher education sector. The universities' funding systems for education are largely linked to completed

[39] Tømte, Cathrine, Sjaastad, J. and Aanstad, S. (2017)
[40] https://www.mooc.no/ - the figures were retrieved in March 2020
[41] The Norwegian Government (2017)
[42] Unit (2019)

degrees and the number of credits awarded. Spending major resources on developing flexible, shorter offerings that do not result in a degree therefore makes little financial sense. However, there are various bodies in working life that want these kinds of offerings, such as Tekna, the Norwegian Association for Adult Learning and the Federation of Norwegian Professional Associations (*Akademikerne*).[43]

The statutory provision that universities and university colleges may not claim fees from students who participate in ordinary courses that lead to a degree (the "free principle") laid down in the University and University Colleges Act is an important element of Norwegian education policy. There are some exceptions, such as courses and subjects that are not part of a programme of study, experience-based master's degrees or places on contract-funded subjects. Since further and continuing education do not "pay" in the form of a completed degree, it would be natural to charge a user fee to fund these offerings. However, the free principle makes this difficult, in part because the institutions cannot reuse content that is already used in courses that lead to a degree. Even if the content of traditional educational pathways is relevant to working life, it must differ significantly from the courses offered as part of a degree programme in order for the institution to be able to charge a user fee. In order to be able to access the most relevant content, there are examples of workers, who have no intention of completing a degree, enrolling in traditional programmes of study with the sole purpose of taking individual courses as further education,[44] for example, in the Department of Informatics at the University of Oslo.

PRIVATE, PUBLIC AND NOT-FOR-PROFIT COURSE PROVIDERS

The vast majority of the learning activities in Norwegian working life are courses, seminars or learning activities under the auspices of actors other than the traditional educational institutions.[45]

There are several different types of course providers that have been involved in upskilling in Norwegian companies for many years, including private companies and not-for-profit enterprises that offer courses, adult education associations, industrial organisations and trade unions. Some of these collaborate with

[43] Official Norwegian Report (NOU) 2019:12
[44] Kristensen, Solveig and M. Dæhlen (2018)
[45] Ulstein, Joakim Hertzberg (2019a)

educational institutions (for example, trade unions that offer further education to their members), while others offer self-produced courses or seminars. In 2015, there were 1,200 providers of teaching that were not part of the formal education sector.[46]

ONLINE COURSES

While the educational institutions have research-based education as their starting point, this group of actors is much better positioned to offer courses that are adapted to the skills needs of the individual business. Although there is wide variation between the different actors, a mapping conducted by the Nordic Institute for Studies in Innovation, Research and Education (NIFU) in 2015 showed that the private actors had come further with digitalisation of their offerings than the educational institutions.[47]

An analysis from 2019 identified 83 providers of online training aimed at workplaces.[48] The majority of these are private actors, but there are also some public actors, such as the Norwegian Government Agency for Financial Management (DFØ) – formerly the Norwegian Agency for Public Management and eGovernment (Difi) – that facilitate professional development for state-owned enterprises.[49] As in the case of the Norwegian Government Agency for Financial Management (DFØ), most of the 83 private providers state that online learning is a sideline activity.

The providers deliver many different products to customers, ranging from ready-made courses, via real-time online seminars, to digital platforms and infrastructure.[50] These services are probably closely linked – some customers buy infrastructure and then fill it with their own content, while others buy both infrastructure and content from the same provider.

An overview of the providers of online learning in Norway[51] reveals a trend that can also be seen on the European market. In recent years, there has been a shift away from traditional e-learning (e-books or digital learning programmes that require guidance from an instructor), in favour of more interactive,

[46] Tømte et al. (2015)
[47] Tømte et al. (2015)
[48] Oxford Research (2019)
[49] From 2020, the responsibility for training and skills development was moved to the Norwegian Government Agency for Financial Management (DFØ)
[50] Oxford Research (2019)
[51] Oxford Research (2019)

personalised, game-based solutions.[52] This development also shows that businesses are becoming used to learning to a greater extent taking place digitally and in new formats.

This group of providers has extensive experience with continuing professional development and offers a wide range of services. Most learning takes place using these providers, and they will continue to have a large market share going forwards. Although digitalisation of the offerings has come quite a long way, they will also notice more competition in the future, especially from new, technology-heavy players. It will therefore become even more important to continue digitalisation, and at the same time find ways to make the offerings as needs-driven as possible.

EDTECH – A GROWING INDUSTRY

Digitalisation and the proliferation of the internet and smartphones has led to rapid development of new ways of learning, and in Norway there are several companies that are doing very well in learning technology (or "EdTech"). This includes software, learning games and infrastructure for digital learning programmes.

Many of these companies are developing teaching programmes aimed at primary and lower secondary schools; but in recent years, more companies have started targeting the world of work. In the European market for online learning, the Nordic countries are doing extremely well and have net exports of learning technology.[53] The UK is the world leader in learning technology and expects the sector to grow to a value of GBP 3.4 billion by 2021.[54]

Oslo EdTech Cluster is a network with over 60 member companies, which together have over 140 million users globally.[55] One of the best known members, Kahoot!, was launched in 2013 and is a quiz game that can be used in both schools and working life. The company has had great success and is used all over the world. In 2019, Kahoot! bought two other Norwegian companies:[56]

[52] European Commission (2018)
[53] European Commission (2018)
[54] Department for Education, UK (2019)
[55] http://osloedtech.no/en/om-oss/
[56] https://kahoot.com/breaking-news/

Dragonbox, which has developed several mathematics games, and Poio, which makes games to teach reading.

Attensi[57] is another example of a Norwegian company that is developing game-based learning for the workplace. Among other things, they have developed solutions for companies in commerce, industry and psychiatry, where simulation of real work situations provides work-related, relevant learning. PointMedia develops learning programmes that use digital simulations through augmented and virtual reality.[58]

The EdTech companies enter the market for education and learning with a different perspective than educational institutions and course providers. Led by technology, they are in a good position to create flexible, engaging learning programmes. Learning technology is also a sector with good opportunities for business development, and Norway already has a large cluster of EdTech companies. The EU has highlighted the Nordic countries as a leader in this area.[59]

However, they are less established in the market than other players, and many probably lack the necessary contact with the labour market to be able to develop needs-driven learning programmes.

INTERNATIONAL PLATFORM COMPANIES

Data is becoming an increasingly important ingredient in the development of digital learning programmes, and companies that already possess large volumes of data recognise good opportunities in the market for education and learning. Several of the major online platforms have already started moving into the learning market. At the same time, the market is becoming increasingly international, and many Norwegians and Norwegian companies are already taking advantage of international providers.

The platform companies have several advantages as they start establishing themselves in this market. Many people and businesses in Norway are already users, and they are known for delivering good, user-friendly services. They have

[57] https://attensi.com/
[58] https://www.pointmedia.no/
[59] European Commission (2018)

scalable infrastructure and can serve many new users. In addition, they already possess a lot of data that can be used to develop customised services.

LinkedIn knows a lot about our professional lives. With over 610 million users,[60] the company possesses a great deal of information about workers and markets in many countries. In 2015, LinkedIn bought Lynda.com, an online learning company, for USD 1.5 billion.[61] LinkedIn Learning now offers over 13,000 courses, and provides personalised recommendations on content to users, based on data about their jobs and career. They also offer tools for employers so that they can map the company's skills profile, follow their employees' development, and get tips about learning programmes that can complement the current situation.[62]

Over time, **Facebook** has gradually expanded its business area from social networking to providing intranet solutions for workplaces and now also online courses. In 2018, Facebook launched "Learn with Facebook", which offers modular courses in areas such as social media marketing and digital storytelling.[63] Facebook also has a mentoring scheme, where experienced leaders in an area are paired with younger employees who want guidance and advice. In combination with Workplace by Facebook, the company's intranet solution, Facebook has really moved into the corporate market and probably has large volumes of data about employees, businesses and their skills needs, including in Norway.

Google is investing in the development of technical equipment for use in learning, as well as open online courses. In 2015, Google discontinued Google Glass as a consumer product. Since then, however, the glasses have been remarketed as a useful tool for learning, especially in industry. The US company AGCO uses the glasses to give employees immediate access to information about processes used in the production of tractor engines. The glasses are equipped with a camera that can identify which engine part is being worked on, in order to provide the user with specific information about how to install a part.[64] This kind of "right-on-time" learning saves valuable time for both the company and the employees.

Through the programme "Grow with Google", the company also offers a number of free online courses.[65] The courses target different groups such as students

[60] https://about.linkedin.com/
[61] Kosoff, Maya (2015)
[62] Srinivasan, Hari (2018)
[63] https://learn.fb.com/
[64] Levy, Steven (2017)
[65] https://grow.google/

and job seekers, small local business owners, developers and start-up companies. Through collaboration with local libraries across the USA, people can also attend free workshops in their local community. This offering is also available in Denmark.[66]

One challenge for the international platform companies will be that they lack proximity to local labour markets and needs. Even if they have a lot of content that is relevant to many businesses and individuals, it is not likely to be profitable for them to tailor content to smaller markets, such as the Norwegian market. For Norway, growing use of international players will mean tougher competition for Norwegian and local players.

THE LARGEST GROWTH MUST BE DIGITAL

The market for further and continuing education has to date been dominated by two different groups of players: on the one hand, universities, university colleges and vocational colleges that provide formal further education; and on the other, a number of different actors that offer a variety of different types of courses and seminars. Eight per cent of the population participates in further and continuing education through the formal education system, while 40 per cent use other providers.[67] As developments in technology enable learning in new ways, we have also seen more new players moving into the field. EdTech companies have entered the schools market in Norway, followed by the workplace. Several of the major internet platforms are investing in lifelong learning and offer a variety of online courses.

The market has already seen major changes and is likely to continue to change in the future, as skills needs, technology and political priorities evolve. If lifelong learning is to get the boost the labour market needs, the greatest growth must be digital, and at the same time be adapted to the specific needs of the Norwegian labour market. The providers have different strengths and weaknesses, and different points of departure to be able to contribute to this growth. Compared with the vision outlined in the report, a number of different barriers can be identified.

[66] https://googlesuccesonline.dk/det-digitale-laeringshus
[67] Ulstein, Joakim Hertzberg (2019b)

The traditional educational institutions are among the most important players in education and learning today and will continue to play an important role in the future. They have established knowledge environments, researchers who are constantly advancing the knowledge front, and offer research-based education that is of great value to the students.

The system is built up around the degree system, creating barriers to a more flexible, scalable system for lifelong learning. For example, the prohibition against charging fees (the "free principle") is an important element in Norwegian education policy, but makes it difficult for players to establish offerings aimed at the labour market.

Nor have there been any clear commitments to digitalisation of the offerings; instead the digitalisation strategy for the university and university college sector stresses that digitalisation and ICT should support the applicable sector goals for research and higher education.[68] There are no clear plans or incentives to develop open online courses.

When schools and universities were closed in response to the coronavirus pandemic in spring 2020, many had to move their classes online, resulting in a boom in digital offerings. Whether this will provide a permanent boost, or whether the teaching will return to normal once the risk of infection is lower remains to be seen, but the possibilities that digital technology can afford have been amply demonstrated. The lessons learned during the pandemic may also lay the foundation for the further development of digital teaching offerings.

The institutions' societal mission also requires a focus on research and development and the traditional educational pathways. There are therefore few employees in this sector who work exclusively on teaching and developing further and continuing education. Although the educational institutions have leading expertise and are established providers of education, it is therefore unrealistic to expect that they will provide a major boost to education and learning in the workplace, given the current funding and political priorities. The demand for open online courses from solid academic environments will not decrease, but this will require more systematic work than the sector has undertaken to date.

Course providers are a very diverse group of players. This group includes large and small businesses, which offer courses and training in both general and very specific areas, or tailored to the customer's needs and specifications. The

[68] The Norwegian Government (2017)

actors can be public, private or not-for-profit, and it is variable how much technology and digitalisation characterise their offerings.

It is precisely this wide variety that poses one of the challenges – it can be difficult for companies to find a provider that can meet their needs. Similarly, it is also not always easy for the providers to get a foothold in the market, in part due to the strong competition and because it can be difficult to find out about individual companies' skills needs. However, it is these providers that have traditionally accounted for the largest part of the professional development that occurs in the workplace, and they will continue to be an important group going forwards, although they are likely to experience tougher competition in the market, especially from new entrants.

EdTech companies have previously had primary and lower schools as their main target group, but we are increasingly seeing that these companies are now also targeting the world of work. They are good at technology, games and creating learning programmes tailored to the customers' needs. This tailoring can be expensive for the customer and make it difficult for small businesses to buy these kinds of services. Even if elements in a programme can be transferred and reused, it is still very resource-intensive to develop courses for new customers. Another challenge may be that neither the provider nor the customer have the subject knowledge required. It may therefore be necessary to bring in an external centre of expertise to ensure that the quality of learning content is good enough.

The large **internet platforms** have some advantages that make them a good starting point for creating high-quality courses and programmes. They create very user-friendly solutions that many people in Norway already use. They have a familiar name and can promote their solutions among their existing users. In addition, they have assets that will be an important ingredient in creating smart digital learning materials – large volumes of data about individuals and enterprises.

For example, LinkedIn already knows a lot about Norwegian workers, vacancies on the Norwegian job market, and our personal networks. This means that they are well equipped to offer solutions that are particularly well suited to the Norwegian market, and can offer personalised solutions to individuals.

However, the offerings that currently exist are quite narrow and tend to be focused on digital skills within marketing, design and project management. Another challenge for these players is that they tend not to have the same degree

of contact with Norwegian employers as Norwegian providers do. The companies are very large and have few, if any, employees in Norway. This will make it difficult for them to develop work-related offerings, especially if they want to attract small and medium-sized businesses.

THE WORKPLACE AS A PLACE OF LEARNING

All enterprises are dependent on employees with the right skills and expertise. *What* the right skills and expertise are, however, has become increasingly difficult to describe. When a large proportion of jobs are changing, ensuring continuing professional development will be an important task for all employers.

The Norwegian labour market is dominated by many small and medium-sized enterprises. Almost 50 per cent of people who work in the private sector work in an enterprise with fewer than 100 employees.[69] In addition, Norway has a large public sector, with more than 860,000 employees.[70]

Education and training of employees is an important investment for most businesses, but requires sizable resources. In addition to direct expenses related to course fees, materials and travel, the time the training takes is resource-intensive, in that the employees are not performing their ordinary work. Qualified, updated workers will nevertheless be valuable, both for the individual business and for society as a whole.

[69] The Confederation of Norwegian Enterprise (NHO)
[70] Statistics Norway

BUY, BUILD, BORROW, BOT?

There are several ways businesses can meet their needs for specific skills: they can train the people they already employ, hire in people with specific skills for a delimited period and as needed, or recruit new people with the right skills. In addition, technology can increasingly take over tasks and thus help to meet certain needs.

As tasks are automated, businesses may find that the tasks their employees perform also change because a machine does all or parts of the job. In addition, investments in technology and automation will lead to businesses needing more technological expertise. As some work processes are automated, demand for employees with expertise in those parts of the production or service that it is not possible to automate may increase. For example, the introduction of cash-points (ATMs) made it cheaper to run local branches of banks, meaning more were opened.

Technology can contribute to upskilling in several ways. Platforms that mediate workers and demand make it easier to find people to hire in to meet short-term needs. In the long term, technology and automation may meet certain needs by taking over specific tasks. As described earlier in the report, technology can also help make learning and education more flexible and easier to access. In order to meet tomorrow's skills needs, it is primarily this latter part that must be strengthened significantly. Ensuring that businesses can work continuously on upskilling will be a key task for all employers.

SKILLS MANAGEMENT IN ENTERPRISES

Some industries have already undergone major transformations as a result of digitalisation and new technology. One example is the financial industry, which has gone from over-the-counter banking services, to atms, to online banking. This has entailed major changes in the skills employees in the industry have and need. A survey conducted by Finance Norway shows that traditional areas of expertise, such as finance and economics are now less in demand in connection with recruitments, while expertise in data analysis and business development are becoming increasingly important.[71] Finance and

[71] Finance Norway (2018)

insurance are currently the sector where most employees report that there are requirements regarding learning and updating of knowledge.[72]

A number of studies show that many businesses have recruitment problems – they are unable to find people with the skills they need. Nursing is the profession where recruitment is most difficult, but there are also challenges in construction, teaching, information and communication.[73]

HUGE NEED FOR UPSKILLING

Skills Norway's barometer of enterprises shows that 41 per cent of Norwegian companies have unmet skills needs.[74] This challenge has been increasing, and the numbers have risen four percentage points since 2018 alone.

In the Confederation of Norwegian Enterprise (NHO)'s barometer on Norwegian industry (which mostly covers private companies), 61 per cent of businesses report that they have unmet skills needs.[75] Companies generally adopt several strategies to resolve these challenges, the most common being to employ someone with the required skills, at the same time as they want to develop and train their current employees. Both strategies are challenging. The current education system is slow to change, and the content of programmes does not always match the skills needs of businesses.

In the public sector, the need for continuing professional development will be largest in the health and care industry and education.[76] There has already been a strong focus on upskilling here, including through further education of teachers and school administrators as part of the national strategy "Competence for quality".[77]

A majority of the companies in the Confederation of Norwegian Enterprise (NHO)'s barometer survey that want upskilling want this to happen within the company. This means that few companies invest in formal further education of their employees at universities or university colleges. This varies with the size of the business – large companies tend to have a higher level of activity linked to continuing professional development, and the employees participate to a greater extent in formal further and continuing education; for example, by

[72] Ulstein, Joakim Hertzberg (2019a)
[73] Official Norwegian Report (NOU) 2018:2
[74] Berg, Linda, A. M. Bjønness and O. Tkachenko (2020)
[75] Rørstad, Kristoffer et al. (2019)
[76] Official Norwegian Report (NOU) 2018:2
[77] The Norwegian Government (2015)

taking a master's degree parallel to working. However, the most common approaches to upskilling are exchange of experience among colleagues, and courses and training within the company.

PARTICULARLY CHALLENGING FOR SMALL BUSINESSES

The size of the business is an important factor in whether or not the employees participate in training. Employees in small companies participate less than employees in large corporations, and employees in private enterprises participate less than public-sector employees.[78] Small businesses also have greater problems finding relevant offerings to upgrade their employees' skills.[79] While larger enterprises (including the public sector) may have the resources to build up their own learning resources, or buy training from external providers, this is often less feasible for smaller businesses.

Small and medium-sized businesses often have to accept lower quality training offerings, because it is too expensive to buy tailor-made programmes. The businesses end up having to participate in more general training, which does not necessarily meet the company's actual skills needs.[80] This can be challenging, as many small businesses are entirely reliant on their employees having the right skills.

There are many barriers to effective upskilling, and most of these are accentuated for small businesses, be it money, time or market failure.

THE WORKPLACE IS AN IMPORTANT ARENA FOR LEARNING

The vast majority of people who receive training participate in connection with their job; only three per cent of learning takes place separately from work.[81] Due to the close link between work and learning, it is also generally the employer who pays for education and training. In other countries, self-payment is more common, while in Norway less than two per cent of people who have received training have paid for tuition or training themselves.[82]

[78] Ulstein, Joakim Hertzberg (2019a)
[79] Berg, Linda, A. M. Bjønness and O. Tkachenko (2020)
[80] European Commission (2018)
[81] Ulstein, Joakim Hertzberg (2019a)
[82] Tømte, Cathrine et al. (2015)

Since the workplace has become one of the main arenas for learning, this can make it even more difficult for people who do not work: it is difficult to get a job without the right skills, and people who do not have a job do not get the right training.

As described in the previous chapter, the market for teaching and training is large and diverse, comprising many different players. In many cases, the employer acts as a provider of learning. Disregarding education provided by universities and university colleges, the employer is the provider of almost 70 per cent of the training that takes place during working life.[83] This may be because the employer is unable to find a suitable provider on the market, or because the employer has the most insight and the opportunity to develop the most suitable offering internally.

USE OF DIGITAL LEARNING PROGRAMMES

Several large Norwegian companies have developed internal learning platforms for their employees. One example is Telenor Campus, with a range of customised courses from various providers, such as the MOOC platform Coursera and LinkedIn Learning. Employees are encouraged to spend at least 40 hours a year on upgrading their skills and competencies.[84]

The commerce sector is known for having good learning opportunities for its employees and has also been an early adopter of digital learning programmes. The supermarket chain Meny's digital learning arena "Meny Masters" sets up individual learning pathways for each employee, based on the department they work in and how much experience they have.[85]

The public sector has also adopted digital learning. The Norwegian Government Agency for Financial Management (DFØ) is responsible for an e-learning platform with courses for central-government employees.[86] The platform includes courses within procurements, HR and management. The Norwegian Association of Local and Regional Authorities (KS) has a similar platform for municipal enterprises – KS Læring.[87] In addition, the Norwegian Government Agency for

[83] Ulstein, Joakim Hertzberg (2019a)
[84] Telenor (2018)
[85] https://meny.no/Om-MENY/Jobbe-i-MENY/MENY-Masters/
[86] https://laeringsplattformen.difi.no/
[87] https://www.kslaring.no/local/catalogue/index.php

Financial Management (DFØ) has a digital solution where state-owned enterprises are assigned internal areas on an enterprise platform, where they can publish courses they produce themselves.[88]

We know little about how small and medium-sized enterprises have adopted online learning. Figures from the EU show that the Nordic countries are leaders in this area, but that there are large national variations between businesses. Companies working in technology-intensive industries use online learning to a greater extent than others. In addition, the size of the business is decisive, even within the categories small and medium-sized enterprises.[89]

CONTINUED LARGE NEEDS – AND BARRIERS

Most companies work extensively on upskilling, and the workplace is the most important arena for learning. At the same time, surveys show that it is difficult to meet all the needs for skills and competencies, both through hiring new staff and internal upskilling.

Two main barriers predominate. The first is linked to a failure in the market. It is difficult for businesses to identify relevant offerings or find providers that can help develop the learning they need. The second barrier is resources – both money and time. It is draining for businesses when employees take time out from their day-to-day work to participate in education and training. This is an even bigger challenge if the employees also have to spend time travelling and need overnight accommodation because the teaching is inflexible.

In addition, education and training cost money, either participation fees if an external provider is used, or costs associated with getting teaching customised to the business's needs.

The smaller the business is, the more these barriers are accentuated. Small and medium-sized enterprises have smaller budgets, feel the absence of individual employees more keenly, and have difficulties finding offerings that match their needs.

[88] https://www.difi.no/fagomrader-og-tjenester/kompetanseutvikling/laering-pa-nett/virksomhetsplattformen
[89] European Commission (2018)

INDIVIDUAL LEARNING

Nowadays, we have easy access to vast amounts of information, education and learning. The internet and social media allow us to easily access resources from all over the world, and Norwegians can participate in university courses from Harvard for free, use apps to hone their language skills, and learn new practical skills from tutorials on YouTube.

The population of Norway generally has a high level of education, and unemployment is low. Many other countries have invested heavily in education and upskilling in recent years, and Norway is now starting to lose some of the lead we had in terms of the level of skill in the population.[90] Norway also has a high degree of participation in further and continuing education, compared with many other countries. Upskilling is an important measure to remain relevant in the labour market, and many people probably find participation has its own intrinsic value, beyond the employer's specific needs. Up-to-date expertise and willingness to learn will also create good opportunities for mobility in a changing labour market in the years ahead.

[90] Official Norwegian Report (NOU) 2016:3

CHANGING TASKS

In a survey conducted by the Norwegian Board of Technology, almost half of the respondents say they think computers and robots are quite likely or highly likely to perform most jobs within the next 20–30 years. At the same time, over half think that it is quite or highly *unlikely* that this will apply to their own job. In other words, most people think that it is much less likely that *their* job can be automated than *everyone else's* job.[91]

For several years now, the Confederation of Vocational Unions (YS) has monitored how workers themselves experience the digitalisation of their work in its working life barometer.[92] Overall, the survey indicates optimism associated with the developments. Only a small minority think that their work tasks can be performed by a machine, but a growing proportion believe that some parts of their work tasks can be automated.

Increased digitalisation can have many different consequences. Few people think that they will lose tasks, but two thirds expect that they will be given new tasks as a result of digitalisation. Most people also think that they will have to strengthen their digital skills, and that the proportion of the tasks they perform that require special skills or expertise will increase.[93]

Technology-related occupational groups, such as engineers, are also seeing changes in their daily work tasks. In a survey conducted by the Norwegian Society of Engineers and Technologists (NITO), the majority of the respondents stated that their main motivation for participating in education and learning is to be able to perform their current job. Only one in ten see the improvement in their skills and competencies as an opportunity for promotion or changing jobs.[94]

[91] The Norwegian Board of Technology (2020)
[92] Ingelsrud, Mari Holm and A. H. Steen (2019)
[93] Ingelsrud, Mari Holm and A. H. Steen (2019)
[94] The Association of Nordic Engineers (ANE) (2018)

MANY PARTICIPATE IN LEARNING AND EDUCATION

Almost 50 per cent of Norwegians report that they have participated in further or continuing education or some form of training in the past year.[95] There is broad variation in the type of activities, but a common denominator is that almost all learning is work-related. Eight per cent of these respondents have participated in formal education, while 40 per cent have undergone upskilling through courses, seminars or similar. Of the eight per cent who are participating in formal further education, programmes at universities and university colleges are the most common, followed by vocational colleges.

Upskilling is also used to get people into work, with the Norwegian Labour and Welfare Administration (NAV) playing an important role in this context. There are various schemes where NAV buys places on courses or organises training itself with a view to helping people get into work.[96]

Of the people who have participated in training activities outside the formal education system, 38 per cent have participated in online training. Almost as many (36 per cent) have participated in training based on physical gatherings.[97]

SKEWED PARTICIPATION

Participation in further and continuing education is socio-economically skewed and has followed distinct trends for several years. There are only small differences related to gender, with slightly more women participating than men.

By contrast, there are larger differences related to age, educational background and type of job. People who already have a high level of education tend to participate most in education and training throughout their working life. This means that people with a low level of education, who arguably have the greatest need for training and skills development, participate to a lesser extent than people who already have a high level of skills and competencies. In addition, participation is higher among young people than older people, among full-time employees than part-time employees, and among public-sector employees than the private sector.[98]

[95] Ulstein, Joakim Hertzberg (2019b)
[96] Expert Committee on Further and Continuing Education (EVU) (2018)
[97] Ulstein, Joakim Hertzberg (2019b)
[98] Ulstein, Joakim Hertzberg (2019a)

These differences between public and private enterprises, educational level, etc. recur as clear dividing lines in most parameters for education and learning. Several other countries have these same trends in terms of participation in learning at work, and figures from the Netherlands[99] and Singapore[100] reflect the same patterns as in Norway.

In respect of the extent to which employees are expected to take part in learning activities, the determining factor seems to be the industry they work in. Employees in the finance and insurance sector report the most learning requirements at work, followed by the public administration and teaching.

PEOPLE WHO DO NOT PARTICIPATE

Although participation in learning and education is high, there is still a significant number of people who do not participate. People who do not participate can be divided into two main groups: those who turn down offers from their employer, and those who would like to participate but do not get the opportunity. Around 13 per cent of the people who do not participate in learning and education are in the first group – they have been given the opportunity to take some form of training, but turned it down. By contrast, around 10 per cent say they have asked for training or education, but their employer said no.[101] These two groups are roughly the same size in the private sector, whereas in the public sector a far higher proportion have been offered training from the employer, but chose not to take it.

RECOGNITION AND DOCUMENTATION

Although upskilling is usually related to needs a person has in their current job, it is important that new skills and competencies are also recognised later on in their career or if they change job. Lack of documentation can also lead to a mismatch between actual and perceived skills and competencies.[102]

For education taken through the formal education system, diplomas and certificates are a well-known form of documentation that are of value to the individual. For other forms of upskilling, it is very variable what kind of documentation

[99] CEDEFOP – European Centre for the Development of Vocational Training (2018)
[100] Ministry of Manpower (2020)
[101] Ulstein, Joakim Hertzberg (2019a)
[102] Walbækken, Mikkel Myhre and R. Røtnes (2018)

participants receive and whether the documentation is recognised by others. A form of documentation that recognises all aspects of a person's skills and competencies is therefore likely to contribute to increased motivation for participation.

Some educational institutions are working on breaking down traditional courses into smaller parts; for example, in connection with developing open online courses. Short modules are easier to adapt to digital and flexible formats. In addition, they can be combined, eventually culminating in a traditional degree.

At the same time, it is not a goal in itself that all forms of certificates should be incorporated in the same system as diplomas and certificates from formal education. This would be a cumbersome bureaucratic exercise, and would not necessarily add value to the skills gained outside the formal education system. Instead, it will be more important that providers, individuals and employers work to ensure that other forms of documentation are also recognised and ascribed value.

TECHNOLOGY FOR INCREASED MOTIVATION

In Norway, education and learning are closely linked to the workplace. The vast majority have the costs covered by their employer and can participate in upskilling activities during their working hours.[103] Because this is the norm, it may demotivate people to take responsibility for their own continuing professional development, using their own resources, and on their own time. Nevertheless, we see that many Norwegians take advantage of digital offerings that exist outside the Norwegian market. For example, in 2019 the MOOC platform edX had nearly 30,000 Norwegian users, while over 60,000 Norwegians have used Coursera.[104] Users are also increasingly looking for shorter, more personalised content, in order to avoid spending time and resources on learning that is not relevant.

The individual's motivation is important to be able to increase the proportion of people who participate in education and learning. For adults, it is also important that they can see what significance the learning may have for achieving

[103] Tømte, Cathrine et al. (2015)
[104] Figures from an e-mail exchange with edX and Coursera in February 2019

better conditions of employment or new opportunities in the labour market.[105] Within adult education pedagogy, researchers have sought to identify how adult learning differs from children's learning:[106]

- Adults are independent learners – they ought therefore to be involved in the planning of the teaching and syllabus
- Adults' experiences are a learning resource – teaching should therefore to be based on and allow for discussion of their personal experiences
- Adults' motivation for learning is often triggered by a concrete need – teaching should therefore to be perceived as immediately relevant to their life or work
- Adults are problem-oriented learners – teaching ought therefore to be focused on specific issues rather than general topics

In order to create a culture of learning, where even more people participate, these will be important principles to include when developing learning programmes for adults. Learning that takes place in small steps, continuously throughout a person's career, will also help lower the threshold for participating.

Technology can help promote these principles in several ways.[107] Increased flexibility allows the individual to plan their training themself; simulations and games can ensure learning closely related to their work; and social forums such as chat groups and virtual study groups enable exchange and discussion of experiences.

MANY PARTICIPATE – BUT NUMBERS MUST INCREASE

Many Norwegians are already experiencing that their jobs are changing as a result of digitalisation and are therefore motivated and want to participate in education and training. However, many people feel that they do not have enough time, or that it is difficult to get their employer to sponsor the training activity.

[105] White paper Report no. 16 to the Storting (2015–2016) chap 3.1, p. 29
[106] Blondy, Laurie C. (2007)
[107] The Norwegian Board of Technology (2018)

In the years ahead, it will be important to give all workers a boost – as opposed to improving the offerings for people who would participate anyway.

The possibilities inherent in the technology are well suited to the principles that underpin adult education pedagogy – where the learner's motivation is largely linked to work-related, relevant learning activities. This is closely related to the desire to see the value of the learning activity being participated in. It will therefore also be important to provide good documentation of learning that takes place outside the formal education system. If the learning that takes place at the current job has no value later on in their career, people may be less likely to participate.

A STREAMING SERVICE FOR LEARNING

Learning is essential to meet the needs for new skills in the labour market. The current system needs a digital boost to increase the volume and provide flexible offerings for individuals.

Upskilling is an investment that can have major positive effects, beyond just for the individual company or learner.[108] Society as a whole will always benefit from its citizens having a high level of expertise and relevant skills, and the authorities ought therefore to contribute by ensuring that education and learning can be made available to as many people as possible.

The demand for lifelong learning will continue to increase in the coming years. The current system for education and learning is not equipped to meet this need. On the contrary, Norway is actually slowing down compared with other countries. There are several challenges that need to be resolved. The market for education and learning is large and diverse, and there is inadequate communication between parties on the supply and demand sides. As a result, companies and individuals do not find relevant courses, and providers do not know enough about the needs to be able to create customised learning programmes.

For small and medium-sized enterprises, structural barriers in the current educational system and a lack of resources are a problem. The threshold becomes

[108] Official Norwegian Report (NOU) 2019:2

too high when workers must be taken out of normal operations for a long period of time, and especially if the offering does not even entirely meet the need.

In addition, learning that takes place outside the traditional education system is not documented in a systematic way, and it can therefore be difficult for people to prove their skills and expertise; for example when applying for a new job.

THE COMPETENCE REFORM NEEDS A DIGITAL BOOST

In April 2020, the Norwegian government launched a new competence reform called "Learn your whole life". The reform has two main goals: that no-one should become unemployable due to a lack of skills, and that the labour market should have access to the skills and competencies it needs.[109]

The reform describes three focus areas to achieve these goals:

- Stimulate individuals and businesses to invest in expertise
- Open the formal education system for lifelong learning
- Improve the balance between supply and demand for upskilling

The measures in the reform are particularly aimed at vocational colleges, university colleges and universities. For example, the role and relevance of vocational colleges is to be strengthened by virtue of the fact that they can offer short courses. Clear expectations are also formulated that the educational institutions must make better use of the existing opportunities to provide flexible offerings that correspond to industry's needs.

Both providers and businesses can receive support for development of flexible further education programmes through application-based schemes. Through the tripartite collaboration between employers, unions, and the authorities, sector programmes will be expanded, especially for the industries that have been hardest hit by the coronavirus crisis.

The competence reform and this report both paint a similar picture of the challenges and barriers that stand in the way of a more flexible, needs-driven system for lifelong learning. In terms of measures that can resolve the challenges, the

[109] White paper Report no. 14 to the Storting (2019–2020)

competence reform points to vocational colleges, universities and university colleges as the most suitable providers of offerings.[110]

There are few concrete measures in the reform that stimulate the digitalisation of the offerings. The government will take the initiative to develop a digital learning platform, but with few indications of what tasks it aims to resolve or who is to be involved.

Earlier in this report, we described how a system for lifelong learning must provide opportunities for all, be closely related to work and needs-driven, have flexible offerings and provide value to the individual through good documentation. To achieve these goals, a digital boost is needed – towards what we describe as a streaming service for learning.

A national learning platform will provide a single point of entry to offerings from several different providers. Just as Spotify provides easy access to a wide variety of different music, the platform will make it easier for the individual and businesses to find offerings that are relevant to them. Online courses and educational programmes will contribute to increased flexibility, meaning more people can participate. In order to reach the required volume of offerings and increase participation, we must take advantage of the opportunities the technology affords.

A NATIONAL LEARNING PLATFORM

A national platform for learning will make the market more transparent and help to increase the rate of development and use of digital learning offerings. A digital platform will provide a coordinated point of entry to the offerings, while bridging the gap between public and private offerings, businesses and individuals. In addition to gathering information about the offerings in one place, the platform must be the home for the publication and use of learning programmes (like the platforms of providers such as Coursera or LinkedIn Learning).

The Norwegian Government Agency for Financial Management (DFØ) – formerly the Norwegian Agency for Public Management and eGovernment (Difi) – and the Norwegian Association of Local and Regional Authorities (KS) have developed digital learning platforms aimed at central-government and

[110] White paper Report no. 14 to the Storting (2019–2020), p. 7

municipal enterprises respectively. These platforms contain a number of different courses and have many users. The content is free and open to everyone, and they have users from both public and private enterprises.[111] Although these kinds of sector-based initiatives are good, the very fact that a platform is national will be important to get critical mass in terms of both users and offerings.

Several countries have already introduced national learning platforms. In 2013, the French authorities launched a plan for digitalisation of learning and education. One of the measures was the development of a national MOOC platform – France Université Numérique (FUN).[112] One of the goals was that all French students should have access to online courses within the next few years.[113] Today, the platform contains nearly 550 different courses from 135 different universities and colleges.

France has also established a dedicated platform for lifelong learning, in which companies (against payment) are assigned their own areas. Here they can collaborate with providers on tailor-made learning programmes and access data about employee participation.[114] The French learning platform has also collaborated with several industrial organisations to develop learning programmes for specific industries. In this way, many different businesses can access customised training, based on actual needs in the industry.[115]

In Singapore, the government has established MySkillsFuture, an online platform that provides access to over 26,000 courses, both online and location-based.[116] The courses are provided by both universities and private actors. The course fee can be paid through the national voucher system or by the participant themself. A committee appointed to evaluate the country's financial strategies recommended in 2017 that more of the offerings ought to be available as modules and online, so that people can more easily combine learning with work.[117]

The examples above show how the authorities in various countries have taken active steps to improve access to education and learning. The Norwegian authorities ought to do the same. At the same time, it is important that the current providers are not pushed aside. Arrangements should therefore to be made to facilitate the publication of new learning programmes, integration of existing

[111] https://laeringsplattformen.difi.no/side/om-plattformen
[112] https://www.fun-mooc.fr/
[113] Official Norwegian Report (NOU) 2014:5
[114] https://www.fun-corporate.fr/
[115] Mongenet, Catherine (2016)
[116] https://www.myskillsfuture.sg/content/portal/en/index.html
[117] The Committee on the Future Economy (CFE) (2017)

learning programmes where possible, and promotion of learning on external pages with direct links. The main task initially will be to get the providers to share information about their offerings to enable access to them from the national platform.

It is essential that the market be driven by the actual needs in the world of work.[118] A digital ecosystem around the platform will allow the various parties to communicate and interact with each other on a common, standardised platform. This should help close the gap between supply and demand, as well as boost innovation and development. For example, the French platform FUN-MOOC created an active development environment linked to its platform from the outset. They arrange gatherings and hackathons where providers, developers, start-ups, students and teachers can share their experiences and contribute to innovation.[119]

Recommendation: *The authorities should establish a national platform for lifelong learning. The platform must provide an overview of the offerings that are available and publish learning programmes from various providers. Providers both inside and outside the formal education system must have the opportunity to publish and communicate their learning programmes on the platform.*

QUALITY ASSURANCE OF CONTENT

One goal for a national learning platform must be that learning programmes can be published relatively quickly without having to wait to pass through extensive, bureaucratic approval systems. At the same time, the quality of the content must be assured.

The Norwegian Agency for Quality Assurance in Education (NOKUT) is currently responsible for accrediting and approving Norwegian education, assessed against the requirements in the Regulations concerning Supervision of the Educational Quality in Higher Education. Universities and some university

[118] Official Norwegian Report (NOU) 2019:12
[119] Mongenet, Catherine (2016)

colleges can establish new study programmes themselves, while other university colleges must apply for accreditation of all new study programmes.[120]

This system works well in higher education, but will not be able to meet the need for quality assurance in a market with a much larger number of providers and individual courses. There is currently no formal approval or quality assurance of learning offerings outside the established education system.

The quality of learning offerings must always be assessed in the context in which they are intended to be used.[121] A national learning platform will include many different courses, intended for very different users and learning situations. It will therefore be difficult to define universal criteria for assessment of all learning programmes.

Quality assurance of the content ought therefore to be based on two different forms of assessment. The first element is rating and feedback systems from users (both individuals and employers). These assessments must be reflected on the platform by low-rated programmes being pushed back down the system, while programmes with good feedback move up and are promoted.

Challenges linked to these kinds of user-generated assessments include the fact that these are subjective assessments that do not necessarily provide any information about the objective quality of the content, and that fake reviews can be published – both positive and negative.

Additional formal requirements ought therefore to be set for the players that publish learning programmes on the platform. Providers must be able to confirm that they meet requirements related to good academic quality of the content, use of teaching methods that are adapted to online learning and a scalable format, and good learning experiences for students. Courses that give credits must still be linked to the Norwegian Agency for Quality Assurance in Education (NOKUT)'s approval system, while shorter training courses can follow the principle of a self-declaration from the provider.

The French online learning platform FUN is based on this kind of principle through a charter.[122] Guidelines have been developed for providers that need

[120] The Norwegian Agency for Quality Assurance in Education (NOKUT)
[121] Hood, Nina and Allison Littlejohn (2016)
[122] The European Association of Distance Teaching Universities (EADTU) (2016)

help on how to meet the requirements and how to make best use of the technology's potential.

Recommendation: *The content published on the national learning platform ought to be quality assured in two ways: through feedback and rating from users, and requirements to the providers linked to good academic quality of the content, use of teaching methods that are adapted to online learning and a scalable format, and good learning experiences for students.*

PERSONAL LEARNING ACCOUNT

In recent years, the authorities in several countries have developed individual learning accounts for their citizens. The design of these accounts varies somewhat, but they generally all aim to achieve some of the same goals: to provide a coordinated overview of the individual's competencies and education, and in some cases provide financial incentives to citizens.

Most people participate in various courses and programmes of education during the course of their career. Many people only have paper copies of their certificates and diplomas from the formal education system, and certificates from other activities are generally stored in a variety of different places. In many ways, the educational institutions have been the owners of the certificates and diplomas they issue, as opposed to the individual who successfully completed the programme. This must be changed so that individuals are given control and ownership of their own information. In this way, certificates and diplomas will follow the individual – across employers and providers. This will also make it easier for individuals to gain ownership of skills and expertise acquired in the workplace and take this with them when they change jobs.

The Diploma Registry ("Vitnemålsportalen") portal is a prime example of a digital service that now makes it easy to share proof of education with others; for example, in connection with recruitment and employment processes.[123] This service ought to be included in the national learning accounts.

Several countries have learning account systems, with varying incentives. In both Singapore and France, financial incentives are given directly to individuals. Singapore's MySkillsFuture initiative includes an annual voucher of NOK

[123] https://www.vitnemalsportalen.no/

3,700 that individuals can spend on professional development activities.[124] The voucher can cover participation fees on courses available via the MySkillsFuture digital platform.[125] In September 2019, the platform had some 26,000 different courses.

There is wide variety in the content of the courses, from studying to get a taxi permit, via data analysis, to cake baking and flower arranging. Although many people take courses that are relevant to their work, one of the overarching goals is to stimulate a general culture of learning.[126] The main thing is that people participate and learn new things, not *what* they learn.

France has had individual activity accounts for education and learning for several years. From January 2019, this means that everyone working in a 50 per cent position or more receives EUR 500 a year that can be spent on courses and education.[127] There is a list of approved providers that is updated regularly. Workers with low skills or who work in particularly vulnerable industries receive a higher annual sum so that they can prepare for a career change. A similar scheme was recently proposed in Canada.[128]

The learning account system proposed in this report does not include financial incentives for individuals, but rather is a system that highlights the opportunities that exist, both for participation and financial support.

Recommendation: *All citizens ought to have a personal learning account to strengthen ownership of their own skills and qualifications. Documentation of learning both inside and outside the education system must be gathered in this account.*

A STREAMING SERVICE FOR LEARNING

A national learning platform ought to be primarily funded by the central government. The large need for lifelong learning in the years to come indicates that this will become a far more important part of the national system for education and learning. Such a system would also entail positive external effects for

[124] https://www.skillsfuture.sg/Credit
[125] https://www.myskillsfuture.sg/content/portal/en/index.html#
[126] Tan, Charlene (2016)
[127] The Government of Canada (2018)
[128] Robson, Jennifer (2019)

society as a whole through the population constantly participating in education and learning activities. It would therefore be natural for the central government to provide funding for a national infrastructure for lifelong learning. This may also help to rectify the current shortcomings in the market, where the supply is not aligned with the demand.

There are already a number of courses and learning programmes that are available free of charge online. Examples of this are the courses on the Norwegian Government Agency for Financial Management (DFØ)'s learning platform for the central government, and a number of online courses developed by universities and university colleges.[129] These courses ought to be available free of charge on the national platform.

In Norway, businesses generally pay for the upskilling of their employees. At the same time, it is not inconceivable that we, as individuals, must also assume a greater responsibility for our own professional development. In a market where businesses make up the largest customer group, the offerings are likely to be priced accordingly. Although there will be free offerings available to everyone, the authorities ought to assess implementing a separate payment model for private individuals on the learning platform.

For example, a streaming service for learning could entail that a business or individual can pay a small monthly fee that provides access to a variety of courses and learning programmes. Modular-based courses, combined with a subscription model, would enable users to take several short courses, before embarking on a longer course of learning.

LinkedIn Learning[130] is an example of this kind of streaming service, where NOK 250 a month provides access to more than 15,000 courses, personalised recommendations, certificates of participation, and exercises and quizzes.

Several countries have developed schemes where citizens receive financial incentives directly. These kinds of schemes, which have been introduced in France and Singapore, have garnered a lot of attention, and many countries are now looking into implementing similar schemes.

However, it is uncertain whether these kinds of financial incentives will help resolve the most pressing challenges associated with participation.[131] Financial

[129] For example, all the courses referred to on mooc.no are free
[130] https://www.linkedin.com/learning/subscription/products
[131] OECD (2019)

incentives for individuals are often very general. Evaluations (for example, in France[132]) show that they do not serve to even out skews in participation, and instead lead to the people who would have participated anyway paying less. In addition, the annual sum allocated is relatively low and not enough to make a major difference to individuals.

More targeted support schemes for specific groups of people would probably help even out differences to a greater extent, but would also involve more administration and documentation, creating a new barrier.

Experience from other countries also shows that when individuals receive incentives directly, employers assume less responsibility for upgrading their employees' skills and competencies.[133] This can create uncertainty about the employer's duties (for example, requirements for learning related to safety at the workplace) and what aspects of continuing professional development are the employees' own responsibility.

One of the measures in the government's competence reform involves testing various incentives for lifelong learning. There are several different funding models that may be relevant, all of which have a broader catchment area than the university and university college sector.

Systems with vouchers, as described above, are being tested in several countries. Although there is little concrete evidence that incentives given directly to individuals lead to increased participation, it can have other positive effects. In Singapore, for example, it is a defined goal that the voucher people receive will contribute to an increased culture of learning. It is also possible to make payments more targeted to reach specific target groups.

The Expert Committee on Further and Continuing Education (EVU) recommended an application-based support scheme that will cover the identification of the competence needs in businesses, and the development and operation of new learning programmes.[134] Combined with self-payment from participants, this will reduce the risk for providers in connection with developing offerings, while ensuring that the new offerings are aligned with businesses' needs. The Expert Committee also stressed that the schemes must include providers from within and outside the formal education system.

[132] Normans, Grégoire (2020)
[133] OECD (2019)
[134] Official Norwegian Report (NOU) 2019:12

A third possible incentive scheme is bipartite or tripartite training funds. There are various different models for these kinds of funds; for example, based on whether the funding comes from the trade union members, employers or both through co-financing.[135] Experience from, for example, the Norwegian Engineers and Managers Association (FLT) shows positive effects in terms of both participation in learning and better organisation of learning.[136]

Recommendation: *The Norwegian authorities must fund the development and operation of the national learning platform. The authorities must pave the way for a streaming service for learning, where businesses and private individuals can access a number of different learning resources. Testing of various funding models, such as training funds, application-based support for development and operation, and giving vouchers to residents ought to be investigated and tested through the competence reform.*

PERSONALISED, DIGITAL ADVISORY SERVICE

In Norway, most continuing professional development takes place in connection with work. Going forwards, there will be a growing need for upskilling, and it ought therefore to be easier for individuals to assume greater responsibility for this themselves. A national learning platform will provide a single point of entry to the learning offerings. However, there will still be many different options to choose between, and it will not necessarily be easy for individuals to find out what is relevant content and the right level for them.

In the same way that LinkedIn Learning recommends relevant courses to its users, data from the learning platform combined with information about the individual's previous education and work experience can be used to provide personalised advice and guidance.

Skills Norway is already working on developing a digital careers advice service.[137] This is a good start, but we need to think more ambitiously to really take advantage of the opportunities afforded by new technology. AuroraAI is a Finnish project to implement artificial intelligence in public services to better meet citizens' needs. Artificial intelligence will be used to recommend relevant

[135] Olberg, Dag, J. Røed Steen and A. H. Tønder (2017)
[136] Underthun, Anders, I. Drange and E. Borg (2017)
[137] Skills Norway (2018)

offerings to each individual, based on information about which public services they have used in the past, among other things.[138] In the pilot phase, the developers have studied how personalised advice can contribute to increased participation and better relevance in lifelong learning. By analysing data about people's previous education and work experience, personalised "learning pathways" are proposed to citizens.[139]

A personalised advisory service ought to provide recommendations on which courses and educational offerings may be relevant to each individual. It ought also to provide information on relevant financial support schemes from, for example, the Norwegian State Educational Loan Fund or trade unions.

Recommendation: *Through the learning account, all citizens ought to have access to a personalised advisory service. Based on data analysis, the service can propose relevant learning offerings and provide information about possible financial support schemes.*

DIGITAL CERTIFICATES

All aspects of a person's skills and competencies must be recognised. This applies regardless of whether the competencies were gained in or outside the formal education system, in their spare time or through work. For many years, diplomas and certificates from formal education have been the main proof of a person's competencies. This documentation has great value, for both the individual and employers, and is often be an important element in the recruitment and employment process.

However, most of the education and training people receive during their working life takes place outside the established institutions of education, and there is wide variation in the kind of documentation participants in learning here receive. For individuals, better documentation will increase the value of the learning, so that skills and competencies acquired through work will be visible outside their current job. For employers, better documentation will be a useful tool when employing new members of staff, and will provide a comprehensive overview of their employees' skills and expertise. Digital certificates indicate both

[138] Ministry of Finance (2019)
[139] Delcher, Janosch (2019)

which skills and competencies a person has[140] and how they acquired this knowledge.[141]

In the early days, technological competencies were documented with digital "badges", proving that the individual was a certified user of a specific piece of software. Google, IBM and Oracle all use digital certificates in their training.[142] IBM uses digital certificates on its internal learning platform, and believes the introduction of this system has increased employees' motivation, with the result that more people take part in and complete courses. In addition, the company uses data about the certificates to identify competence gaps in the business and plan staffing.[143] It has thus become an important tool for both the employees and the management. In Norway, the online school NooA (Nordic open online Academy) was early to adopt digital certificates and awards for its courses.[144]

Digital certificates will enable each individual to build up a varied skills profile, which can then be shared with relevant employers or others, as required. These certificates will not be a substitute for the current system of diplomas and certificates, but can provide a better description of knowledge accumulated outside the traditional education system.

Documentation of learning and continuing professional development is an important element in the future system for lifelong learning. In the past, this has been closely linked to the education sector, which has made it difficult to develop alternative solutions. Digital solutions and new technologies can be used to gather digital certificates in a neutral infrastructure, where storage is secure and the validity of the certificates can be easily verified.

[140] Chakroun, Borhene and James Keevy (2018)
[141] International Council for Open and Distance Education (ICDE) (2019)
[142] International Council for Open and Distance Education (ICDE) (2019)
[143] Leaser, David (2019)
[144] NOOA (2015)

A blockchain for secure certificates and verification
Several institutions, including universities and others, already use blockchain technology to issue diplomas and certificates.[145] In Singapore, all educational institutions use blockchain technology to issue diplomas. This was introduced to prevent fraud using forged diplomas.[146] Blockchain allows employers to easily check whether a job seeker's diplomas and certificates are valid.

Recommendation: *The national learning platform ought to require that all providers issue a digital certificate, so that all courses and educational programmes yield good documentation. These should to be collected in each citizen's learning account. It must be ensured that all documentation of learning and education is valid, correct and securely stored, and that individuals are themselves in control and have ownership of the documentation.*

NORWEGIAN EDTECH COMPANIES SHOULD TO BE STRENGTHENED

Development of needs-driven offerings will require good knowledge of and proximity to Norwegian society and business. There will therefore be good opportunities for Norwegian providers to be able to take a leading and important role in this development, especially for those players that are already good at digitalisation and learning technology.

A national investment in lifelong learning ought therefore also to include strengthening Norwegian providers. One element in this kind of approach would be to grant providers outside the education system the same access to the market and the national learning platform as providers from the formal education sector.

Another element would be to make anonymised and aggregated learning data available for use in business development and innovation. When establishing a national learning platform, the authorities ought therefore to set requirements that data must be collected and made available to the providers in order for them to be able to develop their services. A number of people and businesses in

[145] International Council for Open and Distance Education (ICDE) (2019)
[146] Third, Allan et al. (2019)

Norway already use services from international providers, such as LinkedIn Learning, edX and Coursera. By using data to support the development of Norwegian technology companies in the field of learning, data about Norwegian users will be used to promote national innovation and business development.

A report from the analysis agency Menon on the value of Norwegian data points to two main ways in which data can be used to create value.[147] The first is use of data to improve and upgrade existing services, by improving the efficiency or the quality of the service. The second way that use of data can create value is by increasing the opportunities for innovation and creation of new services. Both of these areas are relevant in connection with learning technology. The EU's new data strategy describes a common European *skills data space*, where the Commission wants to gather data from all the member states related to needs for skills, learning and change in working life.[148] The data will be used to develop new services that can reduce the skills mismatch between education and training systems on the one hand and the needs of the labour market on the other.

In Denmark, the new tripartite agreement on adult and continuing learning states that relevant data from public providers will be collected in a dedicated data warehouse. The data will be open and accessible, and analyses will be carried out to see what works to ensure continuous quality assurance and further development.[149] A national learning platform ought to adhere to this principle, but include data from all providers on the platform, not just the public institutions.

Recommendation: *Norwegian providers and companies within learning technology should be strengthened, providing good opportunities for Norwegian business development. Access to data from the learning platform can help providers improve their offerings and accelerate digitalisation, thereby lowering the threshold for the creation of new companies and offerings.*

[147] Skogli, Erland et al. (2019)
[148] European Commission (2020)
[149] Danish Ministry of Children and Education (2017)

OWNERSHIP AND USE OF LEARNING DATA

A digital learning platform will enable data to be collected about the use of the services. This information can be used for several purposes:

- to personalise the training and suggest courses that are relevant for the individual
- to give the providers valuable insight into how learning programmes are used
- to provide employers with an overview of their employees' learning activities
- to provide the authorities with statistics on the population's learning and enterprises' skills needs

This will be valuable information for a number of different actors, and it is therefore important that there are clear guidelines regarding who owns the data, sharing and use of the data, and ensuring the privacy and data security of the users.

Data from digital learning materials and information about individuals' skills and competencies can reveal quite a lot about individuals, their abilities, goals, interests and preferences. The same also applies to businesses – information about their skills needs can disclose their strategies for the future, for example. At the same time, it may be useful for employers to know as much as possible about their employees' skills and competencies, or about their competitors' professional development activities.

In 2018, the MOOC platform Udacity launched its analytics platform for employers, with data about their employees' learning activities – what courses they take, how much time they spend on them, how well they complete assignments, etc. Using machine learning, employers receive analyses that compare their own employees with competing businesses, and tips on what courses employees ought to take in order for the company to be at the forefront.[150]

Several groups of providers are already aware of the challenges linked to data use. Jisc is a UK organisation for companies that develop learning technology. They have developed their own guidelines describing the responsibilities that

[150] Woyke, Elisabeth (2018)

educational institutions and providers have to ensure that data analysis is used responsibly, appropriately and efficiently.[151]

The UK's Open University (OU) uses data analysis actively to give students a better chance of success. The University has a dedicated *Policy on Ethical use of Student Data for Learning,*[152] which clarifies various issues related to data ownership and privacy. The Open University uses both demographic data that the students enter when they enrol, and behavioural data generated from the students' use of the digital learning platforms.

Because the technology and its potential uses will change over time, it is difficult to formulate specific guidelines on what data can be used by whom and for what purposes. The guidelines ought therefore to be formulated as general principles concerning the use of data that protect the integrity and privacy of citizens, employees and employers, in the same way as the Open University has done in its guidelines.

Recommendation: *A Norwegian learning platform must formulate clear guidelines on the ownership and use of data, in order to safeguard the individual's rights and autonomy. Important principles include:*

- *Users own their own data and can decide who is to be granted access to them.*
- *The individual's digital profile must not be used to limit their opportunities.*
- *The purpose and delimitation of the use of the data, both on the platform and elsewhere, must be clearly defined.*
- *The data models used must not be skewed. Users must be allowed insight into how personalisation is achieved.*
- *Both the platform and the providers must be transparent about data collection and give each individual the opportunity to update their own data on a regular basis.*

[151] Sclater, Niall and Paul Bailey (2015)
[152] Open University (2014)

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