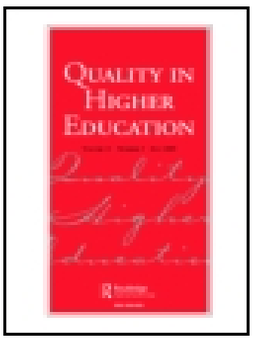

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Digitalisation in higher education: mapping institutional approaches for teaching and learning

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Digitalisation in higher education: mapping institutional approaches for teaching and learning

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ABSTRACT

This paper explores the digitalisation of teaching and learning understood as external processes, influenced by government and international trends and as internal processes within the institutions, in Denmark and Norway. These are countries with similarities regarding digitalisation and educational systems. In the internal processes, there was some use of digital technology in teaching and learning when initiated from administration including IT-staff, in collaboration with academic leaders. There was little or only limited reported use of technology for teaching and learning, when the processes were initiated by administration together with enthusiasts among faculty staff, who did not have leadership roles or influence on change. There was more reported use of technology in teaching and learning in Denmark than Norway. The paper discusses possible explanations for these findings and thus illuminates how processes of digitalisation are influenced by broader governance arrangements, institutional maturity and academic and administration staffs.

KEYWORDS

Digitalisation; educational leaders; governance; policy; teaching and learning; higher education; Denmark; Norway

Introduction

Denmark and Norway have been at the frontline in developing digital solutions for the public sector, and citizens are at the forefront in relation to using information and communication technology (ICT) in everyday life. Digitalisation concerns the use of technology to renew, simplify and improve processes, tasks and products (St. meld. nr. 27 (2015–2016), 2016). Digitalisation of education involves various aspects of quality, ranging from organisational issues, technological infrastructure to pedagogical approaches (Bates, 2015; Selwyn, 2016) and influences internationalisation by offering online and flexible educational programmes (Conole, 2014; O'Connor, 2014). Moreover, it enables administrative solutions, systems for data security, systems to detect cheating, plagiarism, storage of research data, library services and diverse learning resources, as well as opportunities for better collaboration across campuses (Khalid *et al*., 2018). Furthermore, digitalisation also requires

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adequate competencies for those involved (Rienties *et al*., 2013). Most scholars have primarily studied digitalisation either as external processes (Fevolden & Tømte, 2015; Zawachi-Richter & Naidu, 2016) or as internal processes (Zawaki-Richter & Latchem, 2018). The key findings are that the external processes are influenced by overall institutional strategies, often driven by governmental initiatives (Stensaker *et al*., 2007) or by international initiatives (Schuwer *et al*., 2015). In this article, these processes were framed as 'top-down' processes (Nworie *et al*., 2012). The key findings related to internal processes are that these are most likely recognised as 'bottom-up' initiatives from academic staff and agencies with specialists in ICT and technology and often addressed by individual enthusiasts among staff or other bottom-up initiatives (Price & Kirkwood, 2014; Selwyn, 2016).

The division into external or internal processes is also recognised by Harvey and Williams (2010) in their review of studies on quality work. Nonetheless, the authors do not frame these processes as 'top-down' or 'bottom-up' initiatives and only a limited number of the studies reviewed address 'digitalisation' in quality work. One reason might be that digitalisation as such encompasses so many different research areas that have their own aims and scopes, which again makes it challenging to address digitalisation as a distinct research area across, or within, external and internal processes. Nonetheless, as digitalisation is moving forward as a key concept in higher education institutions, it also spans quality issues in many ways. The present paper thus aims to contribute to the research community by exploring digitalisation in higher education institutions by looking at how it emerges and influences as external and internal processes in teaching and learning. In so doing, the article includes two countries with similarities in their education systems and in the national digitalisation processes, Denmark and Norway. Moreover, the research raises the following research question: how to understand the differences regarding digitalisation in teaching and learning within Norwegian and Danish higher education institutions?

The paper is organised into five sections. The first presents previous studies that address digitalisation for teaching and learning as external processes most likely to be understood as governance and as internal processes, such as, staff development and educational leadership. The second introduces the research design, methods and data sources that underpin the paper. The third section presents and discusses the governance processes on digitalisation in Denmark and Norway, as these are presented in steering documents and in the grey literature (see the section on method). The fourth presents findings on the awareness of digitalisation among educational leaders in Denmark and Norway. The final section further explores and discusses variations in digitalisation across the two countries and how these may connect to the two processes of digitalisation. Moreover, the section discusses how it is possible to understand differences within the internal and external processes (top-down and bottom-up) and present possible limitations and suggestions for future studies.

Previous studies and conceptual framework

The following sections include an overview of previous studies that have addressed external and internal processes regarding digitalisation in higher education institutions and unpack concepts of various levels of top-down and bottom-up initiatives, which also serve as a basis for outlining the concepts that underpin the paper.

External processes: digitalisation driven by policy

Governments may influence how higher education institutions handle technology, for example via funding, by requirements for quality and by supporting the development of adequate technological infrastructure. Higher education institutions may cope with these overall policy-driven requirements through strategies, curricular reforms and re-organisations (Bates, 2015; Selwyn, 2016). Previous studies report that overall strategies that address digitalisation for teaching and learning purposes are still missing, scarce, or incomplete within higher education institutions (Bates, 2015; Selwyn, 2016). One example in this respect relates to the adoption of online learning in institutions of higher education. The findings suggest that, even if most higher education institutions have policies and strategies for online courses, most lack policies for support, course development and assessment (Siemens *et al*., 2015). Moreover, the development of overall strategies within higher education institutions for online learning and development is still a new area compared with e-learning/online learning activities driven by individual departments and individual academics, where the latter is more widespread (Alvarez *et al*., 2009; Gaebel *et al*., 2014).

Studies have also contributed with diagnoses of the 'digital state' of the higher education institutions and with suggestions on how to proceed with the digitalisation of institutions. Such suggestions are most often addressed as top-down initiatives and without discipline-specific issues (Grajek, 2016; Norgesuniversitetet, 2015). Furthermore, initiatives on digitalisation have primarily been initiated and effectuated by administrators without including academic staff (Rienties *et al*., 2013). For example, the digitalisation of systems for the administration of examinations, for communication and for providing media and library services and learning management platforms has often been initiated by administration staff and their leaders (Tømte *et al*., 2016). This contrasts with internal processes that address the pedagogical use of technology, which again seem to be driven by enthusiasts among academic staff within the disciplines (Gaebel *et al*., 2014; Fossland, 2015). The absence of academic staff in the development of new strategies, plans or efforts to enhance teaching and learning might explain why few higher education institutions report transformation of teaching and learning with the support of technology (Bates & Sangra, 2011).

As demonstrated, several studies point to the idea that attempts to enhance digitalisation derive from top-down approaches, which, only to a limited extent, connect to disciplines and subjects.

Internal processes: digitalisation driven by leadership and staff development

A systematic approach to strengthen teaching and learning within higher education institutions, including online teaching environments, involves developing existing practice and leadership involvement within staff development programmes (Gibbs *et al*., 2008). Austin (2006) suggested that the increasing use and expectations of ICT to support student learning in traditional universities are leading to a greater need for different kinds of team-based approaches to support learners. This also requires a more active educational leadership to develop the institutions. Russell (2012) showed the benefit of bringing leadership practices into staff development programmes to improve the overall online teaching environment. The involvement and engagement of online academic administrators also provide the opportunity to utilise the practice and to improve the overall online academic experience.

Most higher education institutions have a department, agency or unit that offers technological support for teaching and learning purposes for academic staff. These units are responsible for managing the instructional technology in which the institutions have invested and direct the application of the technology for academic staff (Nworie *et al*., 2012). Moreover, staff working within these units are most likely to hold diverse sets of competencies, such as pedagogics and technology skills. Following this, Rienties *et al*. (2013) claimed that the stimuli for professional development of academics in higher education has been administration-led and not teacher-led (Hanson, 2009; Knapper & Cropley, 2000), which has again resulted in 'programmes that reflect institutional goals rather than actually enhancing teachers' competencies in HEIs [higher education institutions]' (Rienties *et al*., 2013, p. 3). Still, as Rienties and colleagues suggested, even if these units are important, as they may assist and train academics to adopt technology in their pedagogical work, they are most likely to offer generic skills rather than technological skills that relate to specific disciplines (Rienties *et al*., 2013). Following this, Damsa *et al*. (2015) suggested that the understanding of technology-rich environments and their possible impact on learning must be understood in relation to the actual model of higher education that is studied, as well as the academic and pedagogic goals in every distinct course design. In line with this, Bates and Sangrá demonstrated that few administrators and instructors have had a clear perspective on the potential of technology for teaching and learning when planning study programmes. Consequently, decisions regarding content, method of teaching and deliverance models (online, campus, blended) have not been embraced by technological perspectives.

In summary, previous studies demonstrate that even if there are some exceptions with individual enthusiasts who are proponents of educational technology among academic staff, they have provided limited impact on the overall approaches that address digitalisation for teaching and learning.

The key findings from the literature review are that external processes, here understood as top-down approaches driven by policy and overall institutional bodies, have had only limited influence on digitalisation within higher education institutions. Moreover, most internal processes regarding digitalisation might be recognised as top-down initiatives, and most likely administration-led rather than influenced by academic staff. These findings can be summarised as shown in Table 1.

Table 1 will serve as a conceptual framework, which underpins the rationale of the paper as it illustrates the diversity of stakeholders and drivers that may influence digitalisation.

Methodology and data

The scope of the present paper is to map and discuss digitalisation in teaching and learning in higher education institutions, understood as external and internal processes and as top-down and bottom-up initiatives, in Norwegian and Danish higher education institutions. These two countries may serve as useful cases since they have largely similar political and cultural traditions as well as higher education systems but, at the same time, there are differences in steering and reform implementation. Denmark represents a stronger top-down steering model than Norway, which may be related to differences in the digitalisation processes. The research design that underpins the paper is illustrated in Table 2 and is informed by two types of data, namely qualitative (document analysis) and quantitative (statistical analysis). Differences regarding external and internal processes in Denmark and Norway are informed by reviews of various publications that have addressed and reported on top-down and bottom-up initiatives regarding digitalisation for teaching and learning purposes in higher education institutions. Such publications were identified by web-based searches at governmental and institutional websites to map relevant reports and documents. These kinds of publications are often framed as 'grey literature' and are less visible within academic databases but are considered as highly relevant for the paper. To organise the findings, a qualitative content analysis approach was adopted (Krippendorf, 2004), where the documents were read with the aim of identifying various keywords that could be linked to digitalisation. The keywords were

Table 1. Conceptualising processes of digitalisation.

Types of processes	Top-down	Bottom-up
External	International, governmental	
Internal	Administrative leadership	Institutional units IT and pedagogics
	Academic leadership	Individual academic enthusiasts

Table 2. Types of data.

Types of processes	Top-down	Bottom-up
External	International, governmental • data: journals, grey literature	
Internal	Administrative leadership Academic leadership • data: journals, grey literature, survey	Institutional units IT and pedagogics • data: journals, grey literature Individual academic enthusiasts • data: journals, grey literature

identified through a previous discussion among the authors of the paper and included digitalisation, ICT, strategies, administrative and academic leadership, staff development, infrastructure, overall plans, internal and external processes, top-down and bottom-up initiatives. Based on this reading, several categories that emerged as relevant to this paper's overall aims and scope and in line with the conceptual framework were developed.

When looking at internal processes regarding digitalisation for teaching and learning in higher education institutions in Denmark and Norway, educational leaders were chosen as an analytical focus primarily due to their role as having the overall perspectives and responsibilities for teaching and learning issues in their own department or unit. Data derived from a survey to study programme leaders in Denmark and Norway were analysed to examine internal processes, in addition to the document study described above. The survey was conducted in 2016 (Norway) and in 2017 (Denmark) and included several topics regarding the role and task of the educational leaders (Aamodt *et al.*, 2016; Graversen *et al.*, 2017). In Norway, the target group consisted of 1010 people, of whom 551 (54.6%) responded. In Denmark, 596 questionnaires were distributed, of which 24 were excluded since they did not function as study programme leaders, and 220 (46.6%) responded. Since these respondents had a central role in running the quality development of the programmes, their perspectives and input to the study are important. The surveys were deliverables within the project Quality of Norwegian Higher Education: Pathways, Practices and Performances 2014–2017. Even if the survey data contribute to understanding digitalisation processes, some limitations can be observed. Previous knowledge of the topic addressed in the survey was limited and the survey thereby had a primarily explorative purpose. Furthermore, digitalisation was only a minor part of the questionnaire, which was intended to cover leadership. Therefore, the data analyses are mainly descriptive. The aim of the present paper, however, is not to present rigorous testing of specific correlations between, for example, policy initiatives and degrees of digitalisation but rather to explore and discuss possible explanations to the differences found in the data material, to pave the way for more nuanced studies of digitalisation in higher education in the future. Table 2 illustrates how the various types of data were adopted in the paper.

There might be pitfalls in adopting various types of data to illuminate the two perspectives of external and internal processes as done in this paper. However,

even if the survey data are limited, it is possible to argue that the diversity of empirical sources itself will be useful and may provide a comprehensive picture of the diversity in digitalisation processes in higher education institutions across countries, as here demonstrated in the case of Denmark and Norway.

The institutional landscape in Denmark and Norway

The Danish higher education system has been fundamentally reformed over the past two decades, beginning with the comprehensive university reform in 2003. This reform established the universities as self-owning entities with a contract-based relationship with the central administration. At the same time, the internal management structures were professionalised and boards with an external majority were installed. This reformation was followed by a large-scale merger process in 2007, where universities, university colleges, government research institutions were merged, creating a more centralised higher education system. The university sector went from 12 universities to eight and, in several cases, this centralisation meant the establishment of multiple campuses and highly heterogeneous and multi-disciplinary institutions.

The Norwegian higher education system has, in the same way, undergone radical transformation since the Quality Reform in 2003. The institutions were awarded increased economic and administrative autonomy and a new incentive-based funding system was introduced. However, the status of the institutions was less dramatically changed than in Denmark. Since 2003, the public higher education sector has gone from a landscape of four universities, seven specialised universities and 25 university colleges (somewhat parallel to the Danish university colleges) to, due to upgrading of university colleges and mergers, eight universities, five specialised universities, and only eight university colleges by 2017 (after 2017, the system was changed, and the number of university colleges has been reduced yet further). The system has changed from a relatively distinct binary system towards a more unitary institutional pattern and the mergers resulted in increasing internal heterogeneity.

The Norwegian university colleges, established in 1994, are dominated by undergraduate professional programmes (teaching, nursing, engineering) but they also offer a wide range of disciplinary programmes in humanities, social sciences and natural sciences, as well as master's and PhD degrees. Even if they are far less research-intensive than the 'old' universities, their research activities have expanded, as has the proportion of teaching staff with doctoral degrees and professorships.

The university colleges in Denmark are, in comparison, a relatively new construction, established through the merger of smaller, regional centres into more centralised units, known as university colleges. The university colleges primarily offer professional bachelor's programmes, such as nursing and other health education, teaching, pedagogy, engineering and a wide range of creative

programmes. A reform in 2014 led to a new responsibility of the university colleges to perform practice-oriented research, which has encouraged the institutions to focus on enhancing the research capacity of the institutions. The university colleges do not, however, have doctoral training and cannot award PhDs but instead they need collaboration with universities. As demonstrated in the descriptions above, in general, the universities in Denmark and the 'old' universities in Norway are relatively similar, whereas the college sector is more dissimilar in nature, primarily due to a higher degree of 'academisation' in Norway.

Systemic and institutional commonalities and differences

The changes to the higher education landscape of Denmark and Norway described above are by no means singular but rather versions of a story being told across Europe. Several studies have pointed to common tendencies in governance reforms, for example, towards increasing contractualisation (Gornitzka *et al*., 2004), autonomisation and strengthening of the internal management structures (Bleiklie & Kogan, 2007; de Boer & File, 2009; Amaral *et al*., 2003; Maassen, 2008) and a rise in the number and scale of merger processes between higher education institutions (Pinheiro *et al*., 2016). It is in precisely these dimensions that differences between Denmark and Norway are observed, which might shed light on some of the variations in digitalisation in higher education institutions.

Contractualisation is a key element in the governance arrangement between the state and the individual higher education institution in Denmark. As mentioned above, development contracts were implemented in 2003 as the central governing instrument, which set out the performance goal for each institution in a three-year period. The contracts comprise both goals that are set by the Ministry and individual goals set by the institution (and approved by the Ministry). These development contracts are, as mentioned, a core element of the state's influence on the strategy of the institutions (Degn & Sørensen, 2015). In Norway, development contracts have only recently been introduced. Regarding the internal management structures, there is also a difference between the Danish and the Norwegian higher education institutions. The collegial structure was abolished in Denmark in 2003 and replaced by a more 'managerial' and corporate-inspired model, which focuses on professional and efficient management (Degn & Sørensen, 2015). In Norway, the development has proceeded in the same direction but collegiate bodies still exist at the departmental level. A final 'structural' dimension, which could potentially help explain some of the variation in digitalisation between Denmark and Norway are the merger processes, which have been seen in both countries. First, there is a time dimension, which should be taken into account. In Denmark, the mergers were realised in 2007, after a process of negotiation lasting for around a year (Hansen, 2012). In Norway, the mergers started later and the most radical changes took place in 2016 and 2017; and the process has probably not yet come to an end.

A second aspect of the mergers relates to the drivers behind the processes, which are both external and internal. Pinheiro and colleagues claim that, overall, there are two different drivers of higher education merger processes: (1) the state, by instigating mergers with the aim of, for example, boosting performance or enhancing quality; (2) the higher education institutions themselves can drive merger processes forward, for example, to position themselves in the increasingly fierce competition for funding and status (Pinheiro *et al*., 2016).

Denmark and Norway can, to some extent, be seen to represent examples of these two drivers. In Denmark, the merger process was to a high degree driven by the state, even if the actual process was framed as a voluntary one. In Norway as well, the structural reform was pushed forward by the government but it was left to the institutions to decide about the concrete mergers. Hence, the Norwegian mergers have taken place as a considerably more inclusive and bottom-up process than in Denmark. The merger processes in the two countries may also be understood as an indicator of the state–institution relationship; in Denmark, a significantly more instructional relationship can be seen, while, in Norway, the relation is more characterised by bargaining. The current Norwegian institutional landscape is only to a limited degree a result of state planning and decision but rather influenced by institutional strategies.

Educational leadership and digitalisation in Norway and Denmark

In Norway, recent studies confirm that educational leaders have scarcely been involved in aspects related to digitalisation in teaching and learning (Tømte *et al*., 2016). This means that there seems to be a gap between the educational leaders' awareness and responsibility for digitalisation and their involvement in these matters.

To nuance this picture, one might look more closely at a recent survey that compared perceptions on technology for academic leaders responsible for study programmes at higher education institutions in Denmark and Norway (Aamodt *et al*., 2016). The findings from this survey demonstrated differences both between the two countries and between types of institutions and fields of study regarding technology for teaching and learning. Educational leaders responsible for educational programmes are in this study referred to as academic staff responsible for full-time educational programmes (MA, BA) within public universities and university colleges (Aamodt *et al*., 2016). Results were compared from Denmark and Norway and variations across types of institutions were analysed. Differences between universities and colleges were found together with potential differences related to subjects within these institutions. These findings provided a balanced picture of the major differences of the findings observed between and within the two countries. While educational leaders responsible for study programmes in Denmark report fairly widespread use and uptake of ICT, the Norwegian educational leaders in similar positions merely report limited use

and this latter corresponds to findings from the recent grey literature (Tømte *et al.*, 2016; Norgesuniversitetet, 2015). For example, almost all study programme leaders in the present survey stated that ICT is important but the majority respond 'to some degree' rather than 'to a strong degree'. In both countries, the importance of ICT is stronger in the college sector than in the university sector and the difference is considerably larger in Denmark than in Norway. The difference between the two countries is moderate and, within the university sector, the response pattern is nearly identical (Table 3).

The importance of ICT does not vary by field of study to any great extent but, in Norway, technology stands out, with 50% responding 'to a large degree'. The differences between Denmark and Norway varied by field of study. The perceived importance is slightly stronger in Denmark within humanities, social sciences and natural sciences, whereas in Norway higher scores on technology and medicine or health are observed. Moreover, when asked about the importance of technology for improving teaching and learning, almost all study programme leaders in both countries and types of institution reported the use of technology for teaching and learning in their study programme.

The surveys included data on types of ICT support in teaching and learning that are implemented in the study programme (Table 1). For this question, the respondents could mark more alternatives and a more diverse and detailed picture on the use of ICT emerged. The most frequent kind of ICT implementation used for teaching is videos but with differences between countries and types of institution.

Video is considerably more frequently used in colleges than in universities in both countries and more frequently used in Denmark than in Norway. Learning management systems are frequently in use, slightly more within the colleges and in Denmark. On the other hand, virtual teaching is only weakly developed, with a certain exception for the Danish colleges. Two general patterns are shown in Table 3. First, the differences between Denmark and Norway are larger within the college sector and, second, that ICT-supported teaching and learning is much more frequently used in Denmark.

The findings from the survey on educational leaders in Denmark and Norway thus reveal differences in their perceptions regarding the spread and

Table 3. What kinds of ICT-supported teaching and learning are used in the study programme? By type of institution (percentage of replies).

	Universities		Colleges	
	Norway	Denmark	Norway	Denmark
Online teaching	30	56	40	62
The use of videos in teaching	56	81	70	98
Simulator training	12	14	15	33
Laboratory training	29	43	34	48
Use of social media	23	31	33	60
Use of learning management system	63	71	69	80
Development of virtual teaching	6	7	7	25
N = 100%	187	162	250	60

uptake of technology for teaching and learning. The most significant difference between the two countries emerges when the educational leaders report on types of technology or format for teaching: study programme leaders in Denmark report significantly more use of online teaching and use of videos for teaching than their Norwegian colleagues.

Furthermore, the spread and uptake of technology for teaching and learning are more developed in the college sector than in the university sector, while the disciplinary differences are not clear. The institutional differences are more visible in Denmark than in Norway. This may indicate that the main dividing line is between professional and general study programmes and that the college sector in Norway is not dominated by professional programmes to the same extent as in Denmark. Possibly, this pattern may reflect that the implementation of technology varies between different study cultures and hence may be associated with a bottom-up process.

This observation is interesting in the light of the dilemmas outlined in the article so far; that digitalisation processes have been highly influenced by various top-down efforts and that some of those are recognised as external processes. Staff development that involves gaining new types of competences, such as digital competences, will be more likely to succeed when supported by their leaders. Moreover, as demonstrated, the *academic* leaders play a key role in the process of academic staff development. However, research has revealed that most efforts on digitalisation for teaching and learning have been administrative-led and with little influence by academic staff. Moreover, there is little institutional or overall impact that derives directly from individual technology enthusiasts among academic staff. With this as a backdrop, the next section aims to explore these differences in the framing of the two development processes of external and internal and, within the latter, top-down and bottom-up.

National variations on digitalisation in higher education institutions

When looking to external processes, as previously stated, mergers between institutions of higher education are observed in Denmark, Norway and around the globe. These mergers also depend on adequate technological infrastructure for success in future work; technically, administratively and academically. Expectations of what government can and should offer as initiatives to facilitate the use of digital technology to improve teaching and learning, and what institutions do themselves, may vary within countries. Moreover, differences within countries on these matters also relate to the size of institutions and their maturity in the use of technology, particularly as concerns what kinds of expertise, services and infrastructure that already exist.

As initially demonstrated in the paper, Denmark and Norway have been at the frontline in developing digital solutions. These efforts relate to long-term work and processes on digitalisation initiated by the governments and, to

some extent, to international trends and initiatives. For example, in 2003, the OECD launched the so-called 'e-Government Imperative', one key message was to address the possibilities that came with so-called e-government initiatives (OECD, 2005). Thus, external drivers may have influenced governments on how to proceed with technology and digitalisation processes.

Is Denmark more 'Mature' than Norway in digitalisation of higher education?

The introduction of ICT has been prioritised more highly in Denmark: politically, strategically and economically. The use of ICT in higher education was placed at the centre of the political agenda as early as 2007, where a 'more ambitious' use of IT was made an explicit goal for the government of the time. In particular, digitalisation of the administrative structures and, for example, examinations in higher education, were made a key priority (Regeringsgrundlag, 2007). The ambition was furthered, as digitalisation was introduced into the university development contracts in 2015, which is, as mentioned, the main steering instrument regulating the relationship between the state and the institutions (Uddannelses og Forskningsministeriet, 2014). Digitalisation and the use of ICT have thus been promoted by the government over the past decade and have been institutionalised into the contractual relation between higher education institutions and the state.

Norway has also had digitalisation on the agenda for higher education institutions for several years. However, the Norwegian approach has been slightly different to that of the Danish. In Norway, several governmental organisations have had responsibilities for supporting teaching and learning with ICT within institutions since early 2000 (such as the Norwegian Agency for Digital Learning in Higher Education, UNINETT). While one of these has had the responsibility of providing institutions' overall technology infrastructure, another has monitored the digital state of higher education institutions and funded initiatives from institutions on innovative ways of teaching and learning with the support of technology. A key issue of the latter is that many of these projects were initiated by local enthusiasts among academic staff and seldom linked to an overall institutional strategy or to an existing educational programme (Norgesuniversitetet, 2015; Fossland, 2015). Moreover, these agencies primarily serve as advisory agents rather than contractual agents between institutions and the state.

A key difference between Denmark and Norway in this regard would be how the government is involved in digitalisation processes. While Denmark has included digitalisation in the steering instruments between the governments and the institutions, in Norway, on the other hand, digitalisation is mentioned for the first time in similar documents in 2017, and the formulations addressing digitalisation only cover administrative areas, such as, facilitation of collaboration and security (Regjeringen, 2015).

Internal processes: institutional characteristics and the uptake of technology for teaching and learning

Within the two countries, some higher education institutions report a greater use of technology for teaching and learning purposes than others. At least for Norway, this finding may be linked to geographical aspects; institutions situated in regions outside city centres are more likely to adopt technologies that support online distance learning. In Denmark, the situation appears to be more noticeable, even across institutions independent of geographical diversity. However, as shown, most Danish institutions are now multi-campus due to previous mergers.

The main picture is that the use of ICT in higher education shows considerable differences between colleges and the universities in both Denmark and Norway. This suggests that institutional characteristics are important for the implementation of ICT in higher education and that the differences in ICT use are greater between Danish and Norwegian colleges than between Danish and Norwegian universities.

Students' expectations of flexibility in study formats

Students are a heterogeneous group spanning a diversity of needs and expectations of study formats and various forms of flexibility (Allen & Seaman, 2017; Bates *et al*., 2017). Even if there are considerable differences regarding the spread and uptake of online study formats around the world, an increasing trend is that most students expect to have online access to their higher education institution independent of their status as campus students or online distance students (Henderson *et al*., 2015). In the Nordic countries, the introduction of modern technologies has not diminished the number of campus students but the way the campus areas are used has changed (Ministeriet for videnskap, 2009). Another observation is the increase of blended learning formats.

Final remarks and suggestions for future research

A key contribution from this study has been to provide the research community with new insights into digitalisation within higher education institutions. The paper looks at various sources of data, spanning from previous studies to new empirical contributions. Initially, the article suggested that digitalisation processes within higher education institutions have developed along two processes; one external or top-down, which has been influenced by governmental agencies, and one internal, which includes both internal top-down, administration-led initiatives and bottom-up initiatives, primarily brought forward by enthusiasts and individual stakeholders from the academic staff with little or limited institutional impact. A key finding from the present study would be to demonstrate the complexity of stakeholders and drivers such as top-down and bottom-up differences within these internal and external processes and how they emerge differently across countries. When comparing Denmark and Norway and their overall organisations of higher education,

a key finding was that the digitalisation processes have been put forward differently. Danish higher education institutions seem to be more closely steered by the government compared with Norwegian ones. In Denmark, governmental influences and support regarding digitalisation are recognised in steering documents, financial support and overall national policies on digitalisation. The digitalisation processes in the Norwegian higher education institutions have experienced less governmental influence. Here, the autonomy of institutions has dominated the processes on how institutions are expected to handle aspects of digitalisation.

One explanation as to why Danish higher education institutions are apparently more aware of, and apply various solutions for, teaching and learning with technology than Norwegian higher education institutions, could be that there has been a targeted focus on this from the government. Another explanation could be the consequence of merging processes that has resulted in multi-campuses across the country. This again might have raised the awareness of educational leaders responsible for study programmes regarding the exploitation of online and flexible solutions for teaching and learning. Following this line of argument, it is possible to consider this development as being a top-down approach involving academic leaders. As previously stated, staff development and awareness-raising depend on support from leaders and, in Denmark, there are indicators that might point to the possibility that the educational leaders have been involved in such processes, as demonstrated in the surveys. Still, one has to keep in mind that the empirical data from the survey covered several topics and do not provide in-depth knowledge on digitalisation as such on these matters. Thus, further exploration in future studies is recommended. Looking to Norwegian higher education institutions, the merging processes are still quite new and only time will tell if similar developments to those in Denmark will happen. Nonetheless, as demonstrated here, the overall digitalisation processes depend on overall plans, strategies and funding.

A key finding in the review by Harvey and Williams (2010) was the tensions observed between external and internal processes regarding quality work. Even if such tensions are not studied directly, one could interpret some of the findings in this regard. For example, when bottom-up initiatives are not recognised by leaders or when digitalisation processes exclude academic staff from processes that will affect their future work, this may cause several types of resistance and tension.

The contribution from this paper has been to illuminate how external and internal processes of digitalisation might influence teaching and learning in higher education institutions. Following this, the aim of this article would also be to raise awareness on how educational leadership might address issues related to the digitalisation of higher education institutions, along with raising the awareness of digitalisation by academic leaders responsible for educational programmes and staff development programmes. In the Nordic countries, this is a new perspective, although it relates to existing research on organisation in

academic leadership in many ways. Moreover, findings from this article will illuminate how political processes and governmental decisions might influence governance within higher education institutions as regards digitalisation.

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