



# Integrating MOOCs in Regular Higher Education: Challenges and Opportunities from a Scandinavian Perspective

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**Abstract.** MOOCs are increasingly being considered by universities as an integral part of their curriculum. Nevertheless, there are several challenges that to some extent slow this process, where the most important one is the accreditation challenges and financing. These challenges are particularly important in the context of universities in Scandinavian countries where education is mostly free. In order to gain more insights on the status of proliferation of MOOCs in Scandinavian universities and understand any specific challenges, we conducted a study by analyzing two sources of data: research publications and university websites. Further on, these data have been analyzed using a framework that differentiates and categorizes MOOCs in terms of accreditation and scalability. As a result of this analysis, we have identified the remaining challenges as well as a number of opportunities regarding the full integration of MOOCs in the educational system of the Scandinavian Higher Education Institutions.

**Keywords:** MOOCs · Higher education · Online learning · Scandinavia  
Challenges · Opportunities · Sweden · Norway · Denmark

## 1 Introduction

Universities are considered as key institutions for societal development and change. An important part of the societal role of such institutions is to provide knowledge and education but also to promote lifelong learning, regardless of age, place of residence, and life situation.

The current dynamics of our society increases the demand for flexible education and intends to bridge the educational journey from theory to practice. Such flexible education can be carried out regardless of time and place, and consequently is not anymore limited to campuses only. In such provisions, technology serves as a facilitating tool and component in the organization and implementation of education.

The technological innovations and their applicability in the education settings have had a tremendous impact in the way universities and other educational institutions engage in the learning practices. Nowadays, one of the most important educational

innovations is the use of MOOCs (Massive Open Online Courses), which present a potential to fundamentally revolutionize the higher education. Although MOOCs face some challenges when it comes to determining the best pedagogical approaches to be based on [1, 2], they still represent a new wave of innovation for teaching and learning. Particularly, because MOOCs introduce attributes that are entirely new in higher education: cheaper, high quality content, and more accessible, both in time and space.

In general, Scandinavian countries are characterized by having a well-established higher education sector, free higher education and good educational support systems, and easy access to higher education. Besides free higher education, the Scandinavian universities are offering a vast selection of online (distance) courses, both as a single subject courses or a full study program. Despite this experience with online courses offered as part of a distance education initiative, Scandinavian universities have so far been rather moderate in the adoption of MOOCs. However, nowadays there is an increased interest and research effort on developing and promoting MOOC-supported education for many reasons: to spread knowledge and education to developing countries, for market and recruitment purposes, to support lifelong learning, or to maintain and increase the global presence [3–5].

Considering these developments in the educational landscape in Scandinavia, the focus of this paper revolves around the following questions:

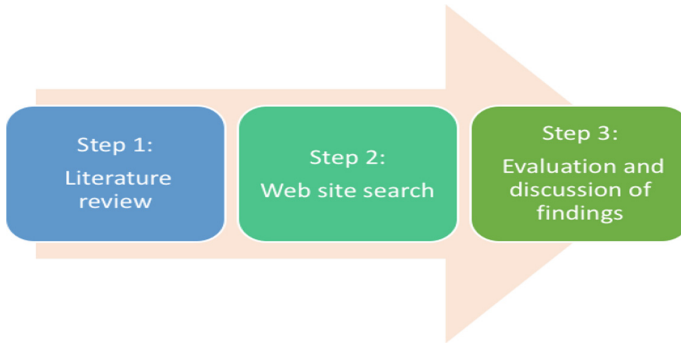
- To what extent MOOCs are integrated in the Scandinavian higher education landscape?
- What are the challenges the Scandinavian universities face regarding the MOOC phenomenon?
- What are the opportunities that MOOCs can bring to the Scandinavian higher education?

To answer these questions, we have investigated existing published articles describing MOOCs in Scandinavian countries. In addition, we investigated each university website in Sweden, Norway and Denmark to see if and how many MOOC courses do they offer. The outcome is to present a detailed overview of MOOCs offerings in Scandinavian universities, with reference to instructional design, language, accreditation, and field of study. Furthermore, we highlight the challenges documented and discuss the opportunities that they provide.

This paper is structured as follows: In the next section, the research methodology is described. The third section outlines the current development of MOOCs in Scandinavian HEIs, followed by the fourth section where we discuss challenges and opportunities. The last section concludes this article.

## 2 Methodology

For this study, a combined methodology of literature review and web site search is used, which is partly inspired by the research strategy employed by [6]. The research strategy consists of the following three steps: (1) search for published scientific



**Fig. 1.** Steps of methodology applied in the study.

literature discussing MOOCs development and adoption by the Scandinavian HEIs (Higher Education Institutions); (2) search for relevant information from the web sites of Scandinavian HEIs and MOOC platforms; and (3) review, evaluate and discuss the findings. In Fig. 1, we present the three steps of the strategy.

To gain a complete overview of research published within this topic, we found relevant articles using Google Scholar because of its inclusivity with major publication channels compared to specific digital libraries, e.g., ACM Digital Library, IEEEExplore. When searching, we did not consider any filtering in terms of publishing periods, but retrieved all papers that discussed MOOCs in Scandinavian countries. The list of articles retrieved and used included 26 papers in total: ten for Sweden, six for Norway, six for Denmark, and four papers discussed all three countries. The second data source comprised the detailed search of university websites, aiming to directly check whether certain HEIs offer or have produced MOOCs in national or international platforms.

In order to systematically structure, categorize and understand MOOC initiatives and developments in Scandinavian HEIs, we apply and adapt the framework for MOOCs typology proposed by [7], shown in Fig. 2. This framework is also partly grounded on many other relevant research contributions, such as [8, 9].

The typology framework describes the MOOC courses offered by the various HEIs in terms of accreditation and the target group. The model is very useful when describing and differentiating between the national mediation approach (niche-market MOOCs) and the international disruption approach (mass-market MOOCs). Thus, the national approach, i.e., the niche-market MOOCs can be associated with (i) the formal approach, when geographically targeting a narrow group of learners and occupational backgrounds and formally recognizing the obtained course certificate within one or few countries; and (ii) the informal approach, when geographically targeting a narrow group of learners and the national accreditation of the courses is not provided.

The same applies for the international approach, i.e., mass-market MOOCs, with the difference that it involves broader group of learners in terms of geographical and occupational background.

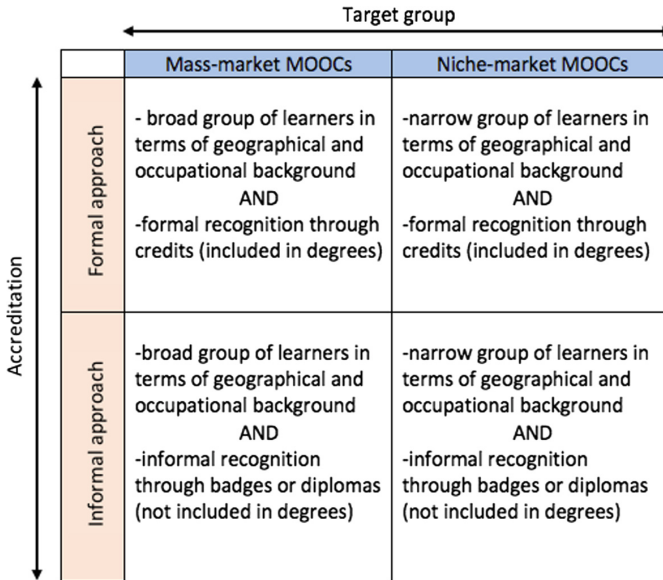


Fig. 2. MOOCs typology framework, adapted from [7].

### 3 The Development of MOOCs in Scandinavia

Our investigation revealed that the pace of acceptance of MOOCs in Scandinavia is slow, indicated by the low number of universities offering MOOCs across recent years. Perhaps because most of universities do not have regular funding for such initiatives, which is particularly the case in Sweden.

For the present time, the most obvious challenge is that MOOCs are not compatible with the current structural setup of the educational system (i.e., there are lack of procedures and processes that would enable a student that has finished a course in MOOC platform to include that in their regular curricula). On one hand, there is no clear guidelines on how the examination (assessment of learning outcomes) of the MOOCs should be done. On the other hand, there are difficulties in assessing the appropriate level of MOOCs to match the university basic (bachelor) and advanced (master) level courses.

There are also student admission issues in MOOCs, since in order for the university to generate governmental funding, students need to be formally enrolled at a Swedish University. Consequently, this presents a sustainability challenge from the financial point of view. This, however, is slowly changing as some of the top ranking Swedish institutions, such as Karolinska Institute and Lund University, are now providing MOOCs [10]. More recently, Chalmers University of Technology, Royal Institute of Technology, Uppsala University, Mid Sweden University, Karlstad University, Halmstad University and other young universities have adopted or have plans to run MOOCs. They are offering courses mainly from the field of engineering, medicine, and natural sciences.

Similar trends are seen in other Scandinavian countries. In Norway, the first MOOC was offered by NTNU (Norwegian University of Science and Technology) back in 2013. Since then, several other MOOCs have been established, most of them being offered in Norwegian language as they are typically linked to existing courses for Norwegian students [4].

In Denmark, even though many established educational institutions are aware of MOOCs, only few have entered the field. In addition, three universities have become partners in the Coursera platform, i.e., University of Copenhagen, Technical University of Denmark, and Copenhagen Business School [11].

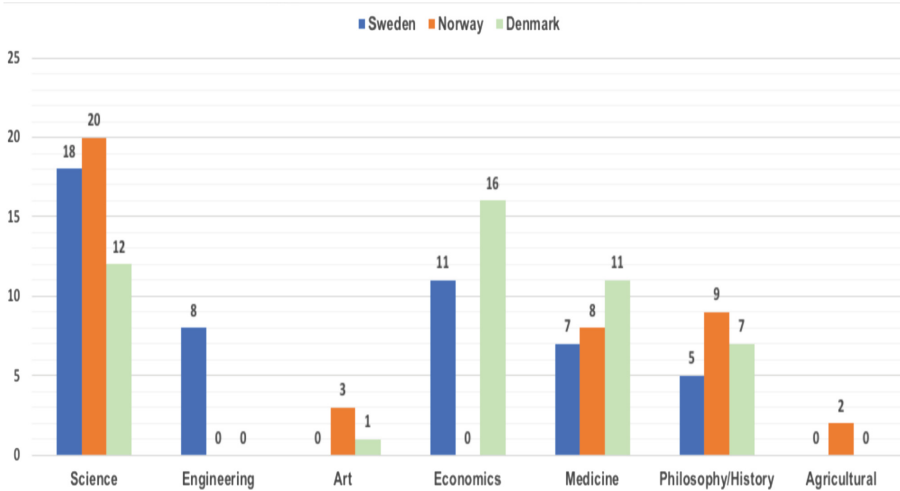
To provide a general overview, in Table 1 we show MOOCs presence at Scandinavian HEIs. Detailed numbers are given for each country in terms of the number of universities offering MOOCs along with the number of courses and which platform.

**Table 1.** MOOCs presence at Scandinavian HEIs.

Country	MOOC platform	Number of university	Number of courses
Sweden	edX	3	31
	Coursera	1	8
	FutureLearn	1	3
	Another platform	5	7
	Total	10	49
Norway	edX	0	0
	Coursera	0	0
	FutureLearn	3	6
	Another platform	12	36
	Total	15	42
Denmark	edX	2	3
	Coursera	3	41
	FutureLearn	0	0
	Another platform	1	3
	Total	6	47

In terms of universities, Norway is leading with fifteen universities, however, in terms of courses, Sweden is leading with 49 courses in total. Denmark has a similar position with 47 courses offered, but involving only six universities.

Further details about the fields in which the courses are given are shown in Fig. 3. Courses in the field of Science comprise most of the MOOCs in Sweden and Norway, while in Denmark dominate courses in the field of Economics. Sweden is the only country offering courses in Engineering, while only Norway offers courses in Agriculture. Norway also has courses in the field of Art. In the fields of Medicine, Philosophy and History all countries offer similar number of courses.



**Fig. 3.** Distribution of MOOCs across various disciplines at Scandinavian HEIs.

## 4 Challenges and Opportunities

By analyzing the collected data and the scientific literature available, we identified a number of challenges and opportunities for HEIs when it comes to embracing MOOCs in their educational settings. These challenges are mainly related to the awareness levels for MOOC integration, accreditation issues, impacts to labor market as well as legal issues. As far as the opportunities are concerned, we mainly highlight the ones dealing with possibilities for lifelong learning, educational affordance, flexibility and branding.

### 4.1 Challenges

**Awareness.** Little awareness exists among experts from educational sector and public agencies on how to integrate MOOCs in HEIs. Also, many university educators seem to lack knowledge about new learning technologies and how to produce MOOCs [12, 13]. Recently, however, MOOCs have been the topic of unprecedented discussion among researchers, educators and policy makers about their potential to transform higher education and revitalize online learning. As a result, the Swedish Higher Education Authority proposed that Swedish HEIs should, like their counterparts in other countries, be given the possibility of arranging open online courses (MOOCs) [14]. In addition, the Norwegian Government, by appointing a MOOC Commission, initiated a process aimed at establishing a knowledge base for policy decisions related to MOOCs. The main objective of this commission is to enhance the digitalization of HEIs and facilitate the strategic use of MOOCs [15]. Furthermore, in the Nordic

countries, except Sweden, MOOCs are connected to existing administrative procedures for organizing continuing education (lifelong learning) within HEIs [7].

Nevertheless, when it comes to credit recognition and validation of MOOCs in the regular educational programs, no action is being taken so far in any Scandinavian country. We explain in more details such accreditation challenges in a special section below.

**Labor Market Reaction.** Another challenge is the reaction of the labor market towards the integration of MOOCs. For instance, in Sweden labor market is less focused on formal education, but rather on the proper skill set of the selected candidate. This is also manifested with the fact that a university graduate with a bachelor or master degree gets the same starting salary.

Furthermore, the competency development plans within companies are typically more aligned towards professional educational providers that focus very much on specific skills rather than academic level knowledge. Therefore, the introduction of MOOCs risks of being “branded” as more academic oriented, thus potentially risks of gaining sufficient attraction within the labor market. Also, MOOCs as a technology for educational content delivery has been around for a while in the professional training providers, thus it does not necessarily represent an innovation for the labor market. But in the same time, it offers the needed flexibility to the HEIs, thus providing them with opportunities of utilizing MOOCs for more professional education competence provisioning combined with flexible pedagogical approaches.

**Accreditation.** According to current higher education legislations of the Scandinavian countries, MOOCs do not represent a regular higher education, since participants are not legally students as they are not admitted according to the admission requirements. Therefore, the MOOC obtained credits cannot be officially recognized in the regular higher education programs or to be included in a qualification (academic degree). Thus, courses passed via MOOC platforms cannot count towards degrees.

Moreover, referring to the MOOC typology framework, which is demonstrated in Table 2, none of the Scandinavian MOOCs can be related to a formal and mass-market approach, meaning that there are no MOOCs targeted for a broad group of international students and which provide formal recognition through course credits.

**Legal Challenges.** Despite the fact that current legislation, for instance in Sweden, allows and promotes the use of MOOCs, there are still some undefined aspects that makes the issue of their integration in the educational offer of HEIs a bit more complicated. As a consequence, most of the universities treat these courses as distance courses, and the process of student registration goes through a standardized national portal. As a result, this to some extent reduces the flexibility of the educational offer.

Moreover, if students are not admitted and processed through the national portal and respective university admission office, they might not have the same status as other regular students in the university. This fact complicates the procedure for examination and credit award for the students, which impacts the university’s ability to obtain funding from the government.

**Table 2.** MOOCs typology framework in Sweden, Norway and Denmark.

	Mass-market MOOCs	Niche-market MOOCs
Formal approach	S -	S <i>KU</i> : 3 courses, own platform <i>UiO</i> : 3 courses, mooc.no <i>NTNU</i> : 3 courses, mooc.no <i>UiS</i> : 2 courses, mooc.no
	N -	N <i>NMBU</i> : 1 course, mooc.no <i>HiØ</i> : 1 course, mooc.no <i>HiV</i> : 2 courses, mooc.no <i>UiB</i> : 1 course, mooc.no <i>HiL</i> : 1 course, mooc.no <i>UiT/NTNU</i> : 1 course, mooc.no
	D -	D <i>UCZ</i> : 3 courses, own platform
Informal approach	S <i>BTH</i> : 1 course, Canvas <i>CUTs</i> : 16 courses, edX <i>KTH</i> : 9 courses, edX <i>LU</i> : 8 courses, Coursera <i>UU</i> : 3 courses, FutureLearn <i>KI</i> : 6 courses, edX <i>HU</i> : 1 course, Canvas <i>LnU</i> : 1 course, Canvas <i>MSU</i> : 1 course, Canvas	S <i>KU</i> : 3 courses, own platform
	N <i>UiO</i> : 3 courses, FutureLearn <i>UiB</i> : 3 courses, FutureLearn <i>UiA</i> : 1 course, Canvas <i>NTNU</i> : 1 course, mooc.no	N <i>UiO</i> : 3 courses, mooc.no <i>NTNU</i> : 3 courses, mooc.no <i>UiS</i> : 2 courses, mooc.no <i>NMBU</i> : 1 course, mooc.no <i>HiØ</i> : 1 course, mooc.no <i>HiV</i> : 2 courses, mooc.no <i>UiB</i> : 1 course, mooc.no <i>HiL</i> : 1 course, mooc.no <i>UiT/NTNU</i> : 1 course, mooc.no <i>WSC</i> , 2 courses, mooc.no
	D <i>CBS</i> : 15 courses, Coursera <i>TUD</i> : 9 courses, Coursera; 1 course edX <i>UC</i> : 16 courses, Coursera; 2 courses edX	D <i>UCZ</i> : 3 courses, own platform

For the typology framework, we use the following abbreviations: Sweden (S), Norway (N), Denmark (D), Karlstad University (*KU*), Blekinge Institute of Technology (*BTH*), Chalmers University of Technology (*CUT*), Royal Institute of Technology (*KTH*), Lund University (*LU*), Uppsala University (*UU*), Karolinska Institute (*KI*), Halmstad University (*HU*), Linnaeus University (*LnU*), Mid Sweden University (*MSU*), University of Oslo (*UiO*), Norwegian University of Science and Technology (*NTNU*), University of Stavanger (*UiS*), Norwegian University of Life Sciences (*NMBU*), University College of Ostfold (*HiØ*), University College of Volda (*HiV*), University of Bergen (*UiB*), University College of Lillehammer (*HiL*), University of Tromsø (*UiT*), Westerdals School of Communication (*WSC*), Copenhagen Business School (*CBS*), Technical University of Denmark (*TUD*), University of Copenhagen (*UC*), University College Zealand (*UCZ*).



## 4.2 MOOC Opportunities

**Lifelong Learning - Professional Development.** We live in an age of abundant opportunities for acquiring new knowledge and skills through innovative learning technologies. But also, the constant technological development requires stronger and permanent connections between education and employment, thus making lifelong learning an economic imperative in our modern society. Therefore, the ongoing skill development is essential to survive in the ever-changing technological landscape.

MOOCs could be a source of lifelong learning and contribute to raising the level of knowledge in the society, by enabling people of different ages and backgrounds to engage in learning. In this way, HEIs will not only provide continuing education to strengthen workforce, but also offer opportunities to access the higher education with flexible pathways.

The Scandinavian countries are characterized by having well developed higher education sector, free higher education, and good schemes for education support. However, these are high-cost countries, and global competition means that professional life must become progressively knowledge intensive and also experience continual development and adaptation. Consequently, it is important to have opportunities for lifelong learning, where MOOCs will make knowledge and education more accessible and affordable for employees through their lives.

**Educational Affordance.** In large countries with small population, such as Sweden and Norway, there are areas with very sparse population, especially in the northern parts. These inland areas have lack of educational resources as most of the universities are by the coast.

In order to slow the process of brain drain, a typical issue for such areas, MOOCs can be used to help people gain knowledge and skills that the local education has difficulties to provide [10]. People needing such education could be those with extensive experience in certain field but that need new skills when new jobs emerge, and also, youth and people with disabilities who aim to enter the job market. Recently, a new target population could be helped using MOOCs; the immigrants, who need to be ready to contribute to the community. These people are also mostly sent to inland places with poor educational resources.

**Supplementary Courses - Flipped Classroom.** MOOCs can be instrumental in enhancing the teaching quality without increasing the number of lectures, while simultaneously supporting students in obtaining higher degrees of independence in study activities. Moreover, the utilization of MOOCs as a content delivery platform in a flipped classroom setting can free face-to-face sessions for meaningful conversations and interactive problem-solving activities that achieve deeper understanding and integrate knowing with doing [16, 17]. In this way, MOOCs can play a supplementary role in maintaining or even improving the educational standards.

Two successful experiments in a Danish university are conducted; one is concerning the usage of MOOCs for blended learning in face-to-face teaching [16], and the other is regarding a master program in “ICT-based educational design”, which is offered as a MOOC to students/learners outside the university [18]. These experiments

reveal that integrating MOOCs elements into a traditional face-to-face learning can significantly help teachers to efficiently use their classroom time, by using MOOCs as a resource and not spending time in producing them.

It is worth mentioning that several research works report that MOOC paradigm is appropriate for flexible learning situations, such as flipped classroom pedagogy. These studies demonstrate that student satisfaction and performance using MOOCs was high, even slightly better, compared to students in only face-to-face environments. Additionally, there were good levels of interaction reported between teachers and students [19–22].

Nonetheless, apart from the witnessed (observed) opportunities that MOOCs provide in this perspective, still more research and experiments are needed to find the balance of combining MOOCs with flipped classroom pedagogy to create far more dynamic learning environment. This will enable teachers to invest more time on planning classroom activities and bridge MOOC courses closer to the actual industry needs.

**Institution Branding – Openness.** Through developing MOOCs, Scandinavian HEIs have the opportunity to extend reachability and accessibility of their teaching activities, both nationally and globally. MOOCs can benefit them to develop a more strategic and flexible approach to online learning and to enhance reputation by offering innovative classroom teaching practices and developing new revenue models.

As indicated in Table 1, some of the largest and most prestigious Scandinavian HEIs already have a presence and are offering MOOCs in international platforms such as Coursera, edX, and FutureLearn. Such presence will contribute to further increase the visibility of Scandinavian HEIs and contribute to the internationalization of education.

## 5 Conclusions

This paper has addressed the identification of current trends of MOOCs expansion in the Scandinavian higher education landscape. It highlighted important challenges Scandinavian HEIs face today when it comes to integrating MOOCs in the regular higher education programs. Additionally, it provides several opportunities in this direction.

This study carried out an analysis using the MOOC typology framework to systematically differentiate and categorize Scandinavian MOOCs in terms of accreditation and scalability. Our investigation yielded that a considerable number of Scandinavian MOOCs have already been developed and are offered by many prestigious and top ranked HEIs. The majority of these MOOCs serve an international audience of learners, particularly those offered by Swedish and Danish HEIs. However, none of the MOOCs can be associated with a formal and mass-market approach, and by having said that, most of the Scandinavian MOOCs do not offer recognition through credits, but provide informal recognition through badges or diplomas.

The challenges included in this study provide an overview of obstacles that MOOCs face in Scandinavian countries. Despite these challenges, there are strong

indications that the process of MOOC integration is moving forward and the list of opportunities included in this paper should provide a basis for discussion and inspiration.

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