

From apprenticeship to higher vocational education in Denmark

building bridges while the gap is widening

Jørgensen, Christian Helms

Published in:

Journal of Vocational Education and Training

DOI:

[10.1080/13636820.2016.1275030](https://doi.org/10.1080/13636820.2016.1275030)

Publication date:

2017

Document Version

Peer reviewed version

Citation for published version (APA):

Jørgensen, C. H. (2017). From apprenticeship to higher vocational education in Denmark: building bridges while the gap is widening. *Journal of Vocational Education and Training*, 69(1), 64-80.
<https://doi.org/10.1080/13636820.2016.1275030>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

Take down policy

If you believe that this document breaches copyright please contact rucforsk@kb.dk providing details, and we will remove access to the work immediately and investigate your claim.

POST-PRINT

To cite:

Jørgensen, C. H. (2017). From apprenticeships to higher vocational education in Denmark – building bridges while the gap is widening. *Journal of Vocational Education & Training*, 69(1), 64-80.

The Version of Record of this manuscript has been published and is available in: Journal of Vocational Education & Training, Published online: 23 Mar 2017.

doi.org/10.1080/13636820.2016.1275030 <http://www.tandfonline.com/loi/rjve20>

From apprenticeships to higher vocational education in Denmark

- building bridges while the gap is widening

Christian Helms Jørgensen

Upper secondary vocational education in Denmark is based on the apprenticeship model, which is recognised as a valuable route to employment for young people, who are not aiming for higher education. However, the apprenticeship model has a major weakness: it does not provide eligibility for higher education. The purpose of this article is to examine this problem in a historical perspective. The article builds on a combination of policy studies, statistical cohort studies and interview studies. First, the article explores why progression from apprenticeship to higher education has become a major policy problem in Denmark. Secondly, it explores political initiatives taken to 'build bridges' to higher education. Thirdly, it examines the development of technical higher vocational education, which has been a main destination for the former apprentices. Lastly, it examines changes in the transition patterns from apprenticeships to higher education in recent decades and examines why the transition rate has declined. Explanations for the decline are identified at the structural, the institutional and the individual levels. It concludes by pointing at a dilemma behind the policies pursued: Trying to strengthen the links from apprenticeship to higher education involves a risk of weakening the current strong links to the labour market.

Keywords: apprenticeship, Denmark, transition, progression, higher vocational education.

Introduction

The Danish system of upper secondary vocational education and training (VET) is based on a modernised form of apprenticeship, which has many similarities with the German apprenticeship system (Baethge and Wolter 2015). This system is often termed a dual system of VET, as work-based learning in a training company alternates with school-based learning. Work-based learning makes up two thirds of the total training, which usually lasts four years, and the apprentices receive wages paid by the employer. The employers are strongly involved in the governing of the apprenticeship system, and this is one of the reasons why this system is organised separately from the state-led system of academic education. Around one third of each youth cohort in Denmark completes an apprenticeship in the dual system of VET, although this share has been declining during the last decade. Apprenticeship systems are generally known to provide a smooth and direct transition to employment, and this quality can explain why youth unemployment and the size of the NEET group in Denmark are among the lowest in Europe (Biavaschi et al. 2012). The apprenticeship system is recognised for providing an attractive alternative for young people who do not pursue an academic career.

However, the apprenticeship system has a major weakness: as most of the training takes place within a company, the students do not achieve eligibility for higher education (Powell and Solga 2010). This weakness has been a concern for Danish policy-makers for decades, but in recent years it has become a more urgent policy problem, because it is believed to lower the esteem of and enrolment in apprenticeships.

The purpose of this article is to examine the transition from apprenticeships to higher education in Denmark in a historical perspective. First, it will use policy studies to explore why this transition has become a key policy problem in Denmark. Secondly, it will examine the initiatives taken to solve the problem by building bridges from apprenticeships to higher education. Thirdly, it will explore the development of higher technical vocational education, which is the main target for students, who progress from apprenticeships to higher education. The aim is to explore the reasons for the low progression rates from apprenticeships to higher vocational education (HVE). A process of ‘academisation’ of HVE is identified as one of the reasons for the low progression rate. To illustrate this process, an analysis of the historical shift of the position of the applied engineering programme, the Teknikum (engineering degree), is included. In the last section, the article analyses data from interviews with students, teachers and counsellors to explore the dynamics in progression routes from apprenticeships to higher education. To explain the low progression rate, it identifies barriers for progression as well as advantages of apprenticeships, and points at a dilemma for policies that seek to raise the progression to higher education.

Methods and sources of empirical data

The analyses of the transition from apprenticeships to HVE involves a combination of approaches and data. Firstly, it includes a study of the institutional architecture of the relations between apprenticeships and HVE as part of the Danish transition system (Raffe 2008; Dumas et al. 2013). Theo-

retically, it draws on socio-historical analysis of the growth and dynamics of modern education systems involving concepts of systematisation, integration, segmentation and academisation (Archer 1979; Müller et al 1987). This part includes a study of the evolution of the Teknikum engineering programme. Empirically, this part builds on earlier research, government reports, documents of major stakeholders and official statistics. The empirical examination of the links between apprenticeships and HVE in Denmark builds on two recent comparative research projects that have studied this question, and in which the author has been involved: the Hybrid Qualifications project (Deissinger et al. 2013) and the Nord-VET project (Jørgensen 2014).

Secondly, the article is based on policy analysis (Ball 2012) that examines how and why transition to higher education became a political problem, and what measures have been initiated to solve it. This involved a review of policy documents and official reports from the period between the 1970s and today. The selection of documents was the result of a systematic search, where documents were selected and analysed with a special focus on two questions. Firstly, how were the links between apprenticeships and HVE considered as a policy problem, and secondly, what policy measures were proposed to manage the problem?

Thirdly, the article is based on statistical data and interviews with students, teachers, managers and study counsellors in vocational schools and institutions of HVE. These empirical data were generated in two research projects dealing with the links between apprenticeships and higher education in Denmark. The first was the Danish part of the European hybrid qualifications project (Deissinger et al. 2013;), which involved 23 personal interviews with stakeholders in the field, including 2 from the Ministry of Education, 5 from the social partners, 10 from vocational schools and HVE institutions and 4 students. The second research project (Frederiksen et al. 2012) was a statistical examination of the rates of progression from apprenticeships to higher education of 4 youth cohorts from 1991 until 20 years after completion. The project was funded by the Danish Ministry of Education. This project also involved interviews with 11 study counsellors and managers at vocational schools and institutions of HVE, and four group interviews were made with students, with 4-5 students in each group. The interviewees were selected in order to achieve a broad coverage of the key agents and stakeholders in relation to the research question. All interviews in the two projects were transcribed, anonymised and analysed openly to disclose the views of interviewees. The participation of the interviewees was based on the principles of informed consent and voluntary participation. This article primarily uses the results and conclusions from these two projects.

Low progression rates as a political problem

In Denmark, young people who complete an apprenticeship do not acquire eligibility for higher education. Consequently, the share of students who continue to higher education after completing an apprenticeship is quite low (Dansk Erhverv 2012), and has even decreased over the last two decades (see section four). As a consequence, apprenticeships increasingly appear as a ‘dead end’ in the education system. The Danish apprenticeship system shares this weakness with countries with a similar system, especially the German speaking countries (Deissinger et al. 2013; Bosch and Charest 2008). In these countries, the weak linkage between apprenticeships and higher education has been identified as a key challenge for the dual system of VET (Powell and Solga 2010; Baethge and

Wolter 2015), and promising new measures, like the ‘Dual Study’ programme, have been introduced (Nikolai and Ebner 2012). In Denmark, the weak connection from apprenticeships to higher education has been recognised as a policy problem since the 1970s (see section two). However, during the last ten years it has been a source of increasing political concern for a number of reasons.

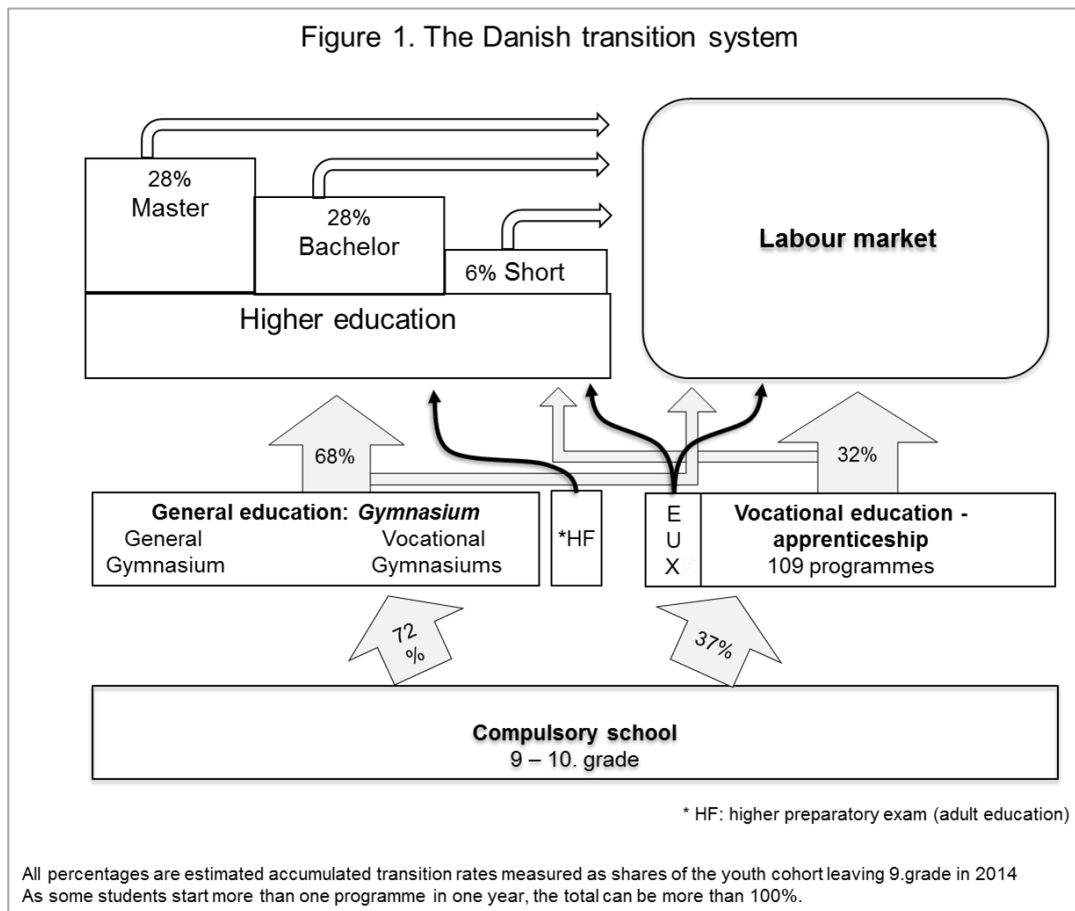
The first reason is that the image of apprenticeships as a ‘dead end’ is seen as a major cause of the decreasing enrolment in apprenticeships. Figure 2 illustrates the growth in the three programmes that prepare for higher education (gymnasium, vocational gymnasium and higher preparatory exam), while apprenticeship is decreasing. In the last ten years, the share of students who have an apprenticeship as their first choice after completing compulsory school (grade 9 or 10) has declined from 30% to 19%. This was considered an acute crisis for the apprenticeship system according to the broad political coalition, which initiated a major reform of apprenticeships in 2014 (Government 2014, 2). One reason for the political concern about the declining level of recruitment to apprenticeships is that labour market forecasts predict a serious shortage of skilled labour in the next ten years (AE 2016). The decreasing popularity of apprenticeships among young people is mainly explained by the image of apprenticeships as a ‘dead end’, which provides access to a specific occupation, but at the same time it closes the opportunities for progression to higher education. At least, this is what many young people give as the reason for choosing general upper secondary schools (called gymnasiums) instead of an apprenticeship, when leaving compulsory school (Fredriksen, et al. 2012).

Another reason for the political concern for the low permeability from apprenticeships to higher education is the desire of the stakeholders in apprenticeships to attract more ambitious and academically strong students to apprenticeships. Since the 1990s, the apprenticeship system has enrolled an increasing number of disadvantaged students, who have been directed into vocational education due to the strict youth activation policy in Denmark. This policy has resulted in a high dropout rate of around 50% from apprenticeships, especially from the first school-based course. While this dropout rate is not very different from the other Nordic countries, it has lowered the esteem of apprenticeships and frightened away many high performing students. Policy-makers believe that some of these ‘strong’ students would consider an apprenticeship, if they are offered better opportunities for progression to higher education.

Besides these acute reasons for turning the low progression rates into a policy problem, two other reasons relate to the basic values and aims of Danish and Nordic welfare regimes: social equality in education and transparency and permeability in education. Social equality in education has historically been a central value in the universal welfare regimes. The Social Democratic Party has regarded education as the most important measure against the class-based society. The aim was to replace the socially selective school system with a comprehensive and non-selective school (Wiiborg 2009). Most of the other Nordic countries have abandoned apprenticeships as a result of the policy to extend the comprehensive school from the primary to the upper secondary level. In contrast, Denmark has maintained a highly selective school system at upper secondary level with two distinct tracks: vocational and academic education. Apprenticeships are organised separately from the academic track of upper secondary education, called the gymnasiums. Academic education is organised according to an ‘education logic’ (Iannelli and Raffe 2007), whose main purpose is to

prepare for studies at the tertiary level. Vocational education is organised according to an ‘employment logic’, intended to develop skills that are recognised in the labour market, and provide access to skilled employment. The apprenticeship system is associated with early tracking and stronger social and gender selection in upper secondary education compared to unified systems (Hanushek and Wößmann 2006; Bosch and Charest 2008). Compared to the students in the vocational schools, four times more students in the gymnasiums have parents who have graduated from higher education (Jæger & Holm 2007).

Another central value in the universal Danish welfare system has been a free and public school system that provides easy progression from lower to higher levels of education (Wiborg 2009). Achieving transparency and permeability in education has been seen as a key means of reducing inequalities, not only in education but also in society as a whole. The ideal of a fully transparent and permeable education system is based on two arguments. First, the principles of social equality and social justice, and secondly, the interest of society in developing the full potential of young people (Undervisningsministeriet, 1973). This ideal is one of the reasons for the continuous efforts of Governments to build bridges across the gap between the upper secondary and the tertiary level of education, as will be demonstrated in this article. In the next sections, the article begins by examining the connections between apprenticeships and HVE in a historical perspective. Next, it examines four political initiatives to increase the progression from apprenticeships to higher education: the unification strategy, the vocational gymnasiums, adult education as a ‘second chance’, and additional qualifications.



Links from apprenticeships to higher education

From the late 19th century, apprenticeships have had a strong position in the Danish transition system. In the mid-1960s, 45 % of a youth cohort took up an apprenticeship, while less than 10% entered the gymnasium (Albæk 2004). Since the first Apprenticeship Act in 1898, it has been mandatory for apprentices to attend vocational evening schools. The vocational schools in Denmark have offered further education for master craftsmen and journeymen, as well as providing evening and day courses for apprentices. The expansion and diversification of industry after World War II increased the demand for higher technical qualifications, and the vocational schools introduced a variety of specialised programmes of 1-3 years' duration, with direct access for journeymen. Danish industry was a 'late-developer', relying mainly on craft-based forms of production, and journeymen with an additional higher vocational degree were highly valued for managerial positions (Kristensen and Sabel 1997). Until this period, the higher vocational programmes were closely linked to apprenticeships and were provided by the same schools. This changed in the following decades.

From the mid-1960s, general upper secondary education, the gymnasiums, began a long period of continuous expansion (figure 2). The relative esteem of apprenticeships was declining, and students completing the gymnasiums started to compete with the young journeymen for access to HVE. Consequently, HVE came under pressure to grant access for young people without a journeyman's certificate. Simultaneously, the entrance requirements for HVE were raised, due to increasing demand for theoretical qualifications in industry, and an increasing competition for academic prestige among the educational institutions (Boje et al. 2011). As a result of these changes, the apprenticeship system faced a serious risk of being cut off from its links to higher education. In this new situation from the 1970s and onwards, it became a vital aim for policy-makers to secure opportunities for progression from apprenticeships to higher education. The next section will examine the political initiatives to pursue this goal and their success.

Political measures to 'build bridges' to higher education

The unification strategy

Enrolment in apprenticeships fell by half in the period 1965-75 (figure 2), and the political problem of apprenticeships becoming a 'dead end' was articulated for the first time (Christensen 1985). In the early 1970s, the first response to the crisis of apprenticeships was a proposal from the Social Democratic Party for a unified system of upper secondary education that would offer access to higher education for everyone. The objectives of the proposed reform, according to the Ministry of Education, were:

A comprehensive educational system like this for everyone (...) will contribute to dissolving the boundaries between the diverse forms of programmes available after compulsory education, and will thereby contribute to making recruitment to occupations and higher education a result of young people's interests and personal qualifications, rather than of their social background. (Undervisningsministeriet 1973, p.3).

This quotation demonstrates that a main objective of the reform proposal was to reduce social inequality in participation in higher education. The intention of detracking upper secondary education ran parallel with the abolishment of tracking in lower secondary education, which had been adopted in 1969. While a comprehensive lower secondary school was implemented with wide political support, the vision of a unified upper secondary school met strong opposition from both the Right wing in Parliament and from the influential labour market organisations.

The reform plans in Denmark had parallels to the education policy reforms in Norway and Sweden, both of which introduced the unified upper secondary school in the 1970s, which was later extended in the 1990s (Jørgensen 2015). In Denmark, the unification strategy failed. The apprenticeship system was maintained as a distinct system, separate from the gymnasiums and with a particular form of governance and a distinct learning culture. Tracking was maintained, so that apprenticeships had a clear focus on the labour market, while the gymnasiums was focused on higher education. After the defeat of the unification strategy, the political aim in the following decades was to '*build bridges*' (Lasonen and Manning 2000) from apprenticeships to higher education. One of these bridges was provided by adult education.

Adult education: *a second chance?*

While students (apprentices) in Danish upper secondary vocational education do not achieve entrance qualifications for higher education, these qualifications can be achieved later through adult education. Since the 1960s, the opportunities for adults to access continuing and further education and training have been extended continuously. The Higher Preparatory Examination (hf), which started in 1966, is often described as a 'second chance' for those who took an early vocational career choice, and later want to continue studying. This is because the courses for the higher preparatory examination are offered during the evening, as single subjects and in an adult learning environment.

However, only around 5% of the students on higher preparatory examination courses have a vocational education background (DST 2015). This can be explained by the history and role of the higher preparatory examination in the education system. The higher preparatory examination was established to achieve a broader recruitment to the higher vocational programmes for the welfare professions (teachers, pre-school teachers, nurses, etc.), when enrolment in these programmes was raised to the level of the upper secondary school leaving examination (gymnasium). Therefore, the higher preparatory examination (hf) courses were dominated by women for many years. In recent years, they have become dominated by young people who have dropped out of the gymnasium. It has therefore been difficult for the learning environment at the higher preparatory examination courses to attract the typical male, skilled workers who wished to pursue higher education. Consequently, the higher preparatory examination has had limited success as a bridge from apprenticeships to higher education.

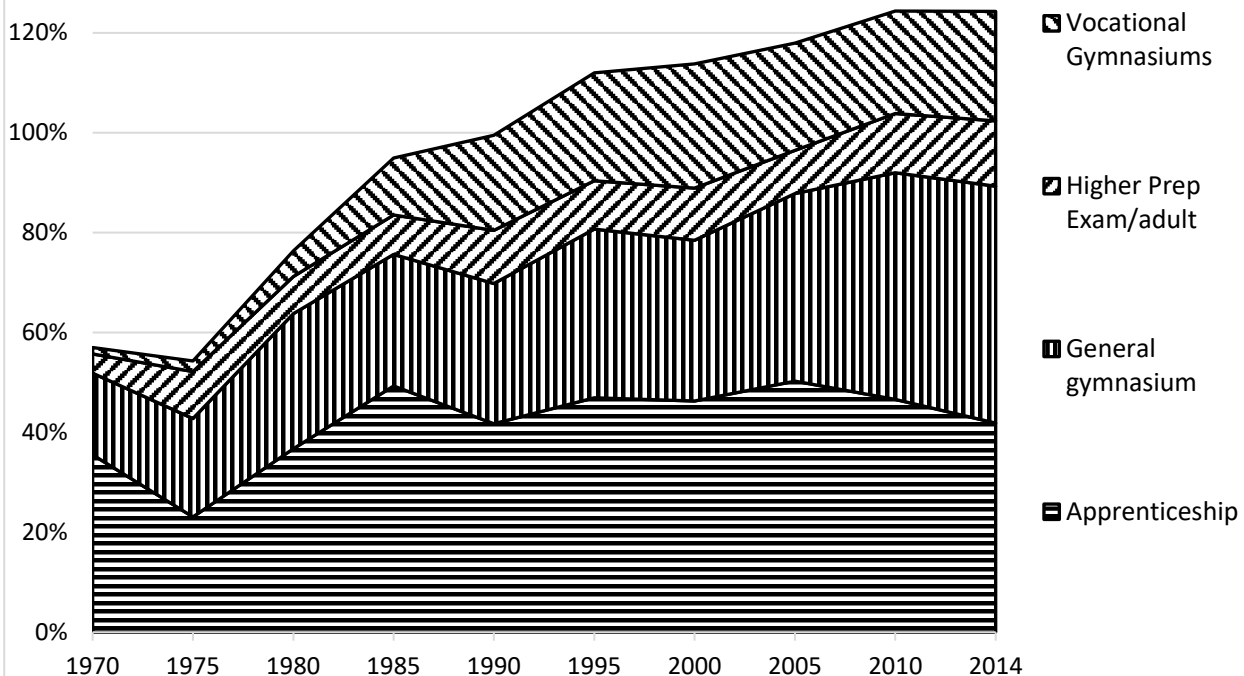
The vocational gymnasiums: a new progression route?

The traditional gymnasiums recruited mainly from the middle and upper classes, and this contributed to significant social inequality in participation in higher education. The introduction of an alternative vocational pathway to higher education was intended to reduce this inequality. The technical gymnasium was established in 1982 as a two-year continuing education following a one-

year vocational basic course, which was common for all students in the apprenticeship system. The dual system of VET and the vocational gymnasiums thus had a common entrance year, and the vocational gymnasiums were located in the vocational schools. The objective was to create more bridges across the two educational tracks and to remove dead-ends.

The vocational gymnasiums became a remarkable success and since the 1980s they have expanded so that today they recruit 17% of a youth cohort. They have also succeeded in recruiting from less privileged social groups (Andersen 2005). However, their role in offering a progression route from apprenticeships to higher education did not succeed. The vocational gymnasiums are full-time school-based and do not include any work-based learning. They do not provide certification for the skilled labour market, as they are mainly intended to prepare participants for studies at the tertiary level of education. Moreover, the vocational gymnasiums have gradually become separated from the apprenticeship system and, particularly with the 2005 reform, they have achieved equal standing with the academic gymnasium. The effect of the introduction of the vocational gymnasiums has run counter to the political objectives of these programmes (Sørensen 1987). They have diverted the most academically ambitious students away from the apprenticeship programmes and into the vocational gymnasiums. They have not raised the rate of progression from apprenticeships to higher education, but have more likely reduced it, due to the diversion effect.

Figure 2. Enrolment in upper sec education in Danmark 1970-2014
share of a youth cohort



As students can enrol in more than one programme in a year, the total enrolment sum up to more than 100%.
Data sources: Albæk 2004, Danmarks Statistik,

Double or hybrid qualifications in the apprenticeship system

In the first half of the 1900s, the short-cycle programmes of HVE were located under the auspices of the technical schools. They were an extension of a vocational education in the technical field and offered direct access for applicants with a journeyman's certificate. Increasingly, direct enrolment became more difficult for students from an apprenticeship programme, due to the rising levels of requirements for theoretical knowledge in the post-war period (Betænkning 238, 1959). In order to overcome this barrier for progression to higher education, policy-makers have emphasised that students in the apprenticeship programmes should be offered additional academic subjects to attain eligibility for higher education. The vocational schools have been entrusted with this task, and they have given it a low priority. Consequently, this has not become a recognised progression route for students in an apprenticeship.

When apprenticeships were reformed in 1991, the preceding Government report found that: *'Generally, the real opportunities for higher education immediately after completing initial vocational education and training are rather limited.'* (Betænkning 1112, 1987, p. 16). The Ministry described the intentions of the reform of apprenticeships in 1991 in this way: *'The route from initial vocational education to higher technical and engineering programmes will become simple and attractive'*. (Undervisningsministeriet 1989, p. 3). However, by the next reform, ten years later, the progression rate had not improved. Consequently, in connection with the reform of apprenticeships in 2000, emphasis was placed on providing better opportunities to continue in higher education. Presenting the law, the Minister of Education explained the objective:

'... the more academically strong students will have the opportunity to supplement their education with courses that improve their entrance qualifications for higher education. ... with an opportunity for students to acquire double qualifications, i.e. both vocational qualifications and entrance qualifications for higher education'. (Vestager 1998).

Today, sixteen years after the reform, it is clear that almost no students have taken advantage of this opportunity to acquire additional academic qualifications. In part, this is because these qualifications are not offered as part of an integrated curriculum, but as academic subjects taught separately from the vocational subjects (Jørgensen 2013).

This weakness was eliminated in the *new eux-programme* for hybrid qualifications that was introduced in the vocational schools in 2011. In contrast to the full-time school-based vocational gymnasiums, the eux is based on the apprenticeship model and provides a journeyman's certificate. It also includes longer periods of school-based learning that give eligibility for higher education. These qualifications are provided in an integrated form, as hybrid qualifications (Deissinger et al. 2013). As the new eux programme is considerably more demanding than the ordinary apprenticeship programmes, there is a risk that it will become an elite programme for a limited group of students. In 2014, the enrolment in the eux-programme comprised less than 2% of all students in apprenticeship (DST 2015). The introduction of the eux-programme might also repeat the effects of the vocational gymnasiums and contribute to the vertical stratification of upper secondary education, where technical apprenticeships rank lowest.

It can be concluded that none of these three initiatives to build bridges from apprenticeships to higher education have been successful. This can explain why the actual progression rate has remained at a low level for decades. However, structural changes in HVE can also help to explain why few journeymen enrol in higher education. While higher education in Denmark is generally socially inclusive, because it is public, free and offers generous state grants, some structural changes have made higher education less accessible from initial VET.

Higher vocational education in Denmark

In Denmark, higher education has a binary structure with a horizontal division between an academic and a vocational sector. Moreover, the vocational sector is divided between the university colleges, which mainly offer Bachelor degrees aiming at the public sector, and the vocational academies, which offer a combination of further education, short cycle and Bachelor programmes of HVE aiming at the private sector. These last programmes are the focus of this article, as they have been the main target for journeymen's educational progression. In order to explain the current weak links between apprenticeships and HVE, this section outlines some key points in the historical evolution of higher technical vocational education. The two main sectors of higher education (vocational and academic) have traditionally recruited from the two different tracks of upper secondary education respectively, the apprenticeships and the Gymnasiums (Boje et al. 2011; Wagner 1999). However, this has been changing the last decades as will be explained. The historical evolution of HVE in Denmark can be divided in three main periods (Kyvik, 2009). The first period started in the 1950s and the main trends were fragmented growth and differentiation. In this period, a diverse range of post-secondary programmes emerged and expanded rapidly due to growing requirements for advanced skills from the booming industrial sector. The growth was mainly driven by the specific requirements of individual industries in a process characterised by little coordination or standardisation. Most of the technical programmes were of 1 – 3 years duration and aiming at journeymen. They were not considered part of higher education, and were delivered by the vocational schools that also organised the school-based part of apprentices' training. In 1956, the Government set up a 'Technician Commission' to increase the supply of "Technical and Scientific Labour Power". In its report, it declared the aims of transparency and permeability, (mentioned in section 1):

"It is a leading opinion of the Commission that a stepwise and flexible education system should be created with free chances for gradual advancement through each step for those who are well suited and interested" (Teknikerkommissionen 1959, 84).

The commission argued that mobility in the labour market was hampered by the fragmented structure of HVE, which was covered by five different Ministries and had different entrance requirements.

The second period started in the 1960s and the main trends were horizontal integration, systematisation and academic upgrading. While the enrolment continued to grow, the programmes were concentrated in fewer schools as the number of vocational schools were reduced from 350 to 52 schools during the 1960s (Rasmussen, 1987). Subsequently, these diverse programmes were

standardised and gathered under one Ministry in a process of systematisation and structural elaboration (Müller et al. 1989; Archer 1979). A coherent system of HVE was taking shape. The functional location of the HVE programmes in the vocational schools and in other specific vocational institutions (nursing schools, teacher training colleges, etc.) shifted to a regional location in centres for HVE. In this process, they were recognised as part higher education and fitted into the Bologna structure of higher education. The ‘welfare professions’ (nurses, kindergarten teachers, etc.) were in 2000 integrated in ‘Centres for Higher Education’ and later renamed ‘University Colleges’. A reform in 1997 standardised and broadened the short-cycle technical programmes of higher education, which were reduced from 75 to 15 programmes. Another reform in 2009 established the vocational academies, which offer a combination of further training courses and higher vocational programmes. The lengthiest of these post-secondary programmes were upgraded to the Bachelor level. One of the main drivers for this process was the struggle for recognition and academic status (Christensen, 2012; Ball 2012). The vocational academies were separated from the vocational schools and promoted as a strengthened and independent institution of higher education. These changes have reduced the permeability between the apprenticeship system and HVE and have changed the recruitment to HVE.

An emerging third period tends to reverse the vertical stratification of higher education, which has been a consequence of the structural adjustment to the Bologna model (Kyvik, 2009). This is driven by a political aim of vertical integration of all levels of higher education. Though this trend is weaker in Denmark than in the other Nordic countries, it is visible in policy measures to improve vertical permeability from initial VET to HVE and beyond (Undervisningsministeriet, 2008).

The historical development outlined above can be illustrated by the changes of HVE in the field of engineering. Here, the binary structure emerged early with a long, theoretical engineering education and a shorter applied engineering education. The university-based academic engineering education was established on the initiative of the state in 1829, and it was only accessible through the academic Gymnasium. The 3-year Teknikum engineering education was established in the vocational schools on the initiative of industry in 1905, after the industrial breakthrough. It imitated the German practice-oriented Teknikum engineering programme, and admission to the Teknikum programme required a journeyman’s certificate. It was assumed that going through four years of apprenticeship would provide an *‘understanding of the workers’ problems and an identification with the spirit of the workplace’* (Teknikerkommissionen 1959, 44). The Teknikum was pervaded by the culture of the skilled worker, and it offered an opportunity for social ascension for the sons of skilled workers and artisans (Boje et al. 2004).

Following the shortage of advanced technical labour in the 1950s, the Teknikum came under pressure to grant access for students other than journeymen (Teknikerkommissionen 1959). Although this was resisted by many stakeholders, the Teknikum was divorced from the vocational schools and became an independent institution. At the same time, the Teknikum was categorised as a ‘higher education’ programme (Betænkning 238, 1959). The entrance requirements to the Teknikum were gradually raised and an admission test, which was introduced in 1944, was made more demanding in 1965. Journeymen would now have to complete a one-year preparatory course before they could start at the Teknikum (Betænkning 502, 1968).

In the same period, the share of young people who enrolled in the gymnasiums and attained eligibility for higher education rose from 10% of a youth cohort in 1965 to more than 50% by the turn of the century (DST 2015). An ever-increasing share of students at the Teknikum was recruited from the gymnasiums. By 1980, more than half of the students in the Teknikum programme came from the gymnasium, and only 40% had a background as apprentices (Betænkning 1074, 61). The introduction of the technical gymnasium in the 1980s further diverted the most ambitious young people from the apprenticeship system by offering a direct route to HVE. In 1993, the Teknikum programme was merged with the Academy Engineering education, and since then, six of the seven Teknikum engineering colleges have been merged into universities, where they have been subjected to the theoretical and research-based culture of the universities (Christensen et al. 2012).

To conclude, from their introduction in 1905, the Teknikum programmes were closely linked to the apprenticeship system and belonged to the technical schools. Since the early 1960s, they have undergone a process of ‘academic drift’, where the recruitment has shifted from apprentices to students from the gymnasiums. The Teknikum education has been disconnected from the technical schools and has become incorporated into the universities. Increasingly, practice-based knowledge has yielded to theoretical knowledge and the embracing of academic values (Christensen and Erno-Kjølhed 2011). A variety of drivers behind this development can be identified: one is the competition for academic esteem and for students by the educational institutions in connection with the increased marketisation of education. Other drivers are the rising levels of qualifications required by industry and business, and the ‘academic drift’ of young people’s educational choices. In addition, the state’s demand for governability and the Bologna process from 1999 has promoted a vertical hierarchisation, which has reduced the vertical permeability from apprenticeships to HVE.

Declining rates of progression from apprenticeships to higher education

All of the major reforms of vocational education from the 1970s until today have included a declared political interest in building bridges from vocational education to higher education. However, it is clear today that these initiatives have not succeeded. The gap between apprenticeships and HVE has widened. Short-cycle HVE has been reformed several times in recent decades with the aim of increasing their esteem and position, but with little success.

Table 1. Higher education attainment of the youth cohorts 1980-2014.

Percentages	1980	1990	1995	2000	2005	2010	2014
Master	4.9	10.9	11.0	13.7	16.9	24.5	28.2
Bachelor	14.5	19.9	24.3	23.4	25.0	27.1	28.1
Short-cycle	4.1	4.9	5.8	8.7	5.8	5.2	5.5
Data source: DST 2015							

Table 1 illustrates the weak position of the short-cycle programmes of higher education in Denmark over the last three decades. The numbers of graduates at master and bachelor levels have multiplied five times and two times respectively, but the number of graduates from the short-cycle programmes has stagnated. Part of the explanation is that some short-cycle programmes have been upgraded and re-categorised from the short-cycle to the bachelor level. This ‘academisation’ has taken

place in connection with the standardisation and systematisation of this educational subsystem and the establishment of the new vocational academies.

The reforms have succeeded in raising the enrolment in the vocational academies. However, the reforms in 1997 and 2009 have failed to increase the number of students progressing from the apprenticeship system to the vocational academies (Jensen et al. 2012:7; Dansk Erhverv 2012). One of the studies found that only 14% of the entrants to the vocational academies were recruited from the apprenticeship system. It concluded on the limited recruitment: *‘What was thought to be a ‘highway’ represents only a relatively small part of the total enrolment in the full-time programmes of the vocational academies.’* (Dansk Erhverv 2012, 5).

Our own study comparing the rates of progression from apprenticeships to higher education of four cohorts of apprentices from 1991 to 2006 (table 2) reveals the decreasing progression rates, especially in the craft and industrial occupations (Frederiksen et al. 2012). Increasing progression was seen only from two programmes: from the business programmes, where many students have eligibility for higher education, and from the health programmes that have an established progression route to nurse education. It can be concluded that despite repeated political initiatives, the progression from apprenticeships to higher education has not increased.

Table 2. Progression to higher education within 5 years of completion of an apprenticeship

Apprenticeship programmes	Cohort 1991	Cohort 1996	Cohort 2001	Cohort 2006
Business & Retail	4.5%	8.5%	11.0%	10.7%
Construction	9.0%	7.1%	4.8%	3.0%
Metal & Mechanical	6.3%	4.5%	3.4%	1.9%
Media & Graphics	2.9%	4.6%	2.4%	3.3%
Technical & Industry	12.3%	7.5%	4.9%	4.7%
Social services	2.7%	3.7%	2.7%	2.0%
Restaurant & Catering	4.5%	3.0%	2.6%	2.0%
Transport	7.1%	3.8%	2.2%	4.8%
Health	2.6%	2.7%	3.0%	3.8%
Total progression rate	7.7%	7.9%	7.7%	6.4%
Number of students progressing	2918	3259	3053	2104
Total cohort size (N)	37.848	41.304	39.459	32.870
Source: Frederiksen et al. 2012				

An interesting finding from our cohort study was that an increasing share of the students do not progress upwards along a vertical vocational ladder, but also shift horizontally into another sector (Frederiksen et al. 2012). Most often, this is a shift into a public sector ‘welfare-profession’ (nurse, kindergarten teacher and primary school teacher) that are at the bachelor level. This can explain why more students from apprenticeships today progress to a bachelor programme (5.4%) than to a short-cycle programme (3.4%) (Jensen et al. 2012). This can also explain some of the contrast between the stagnation of the short-cycle and the growth of the bachelor programmes, shown in table 1. The next section will consider why decades of political initiatives to increase progression from apprenticeships to higher education have not succeeded.

How to explain the low rate of progression to higher education

The low and decreasing rate of progression to higher education can be explained at the structural, the institutional and the individual level. A key factor at the structural level is the early tracking that diverts students in the vocational track (apprenticeship) away from higher education. In addition, the apprenticeship system is dominated by an ‘employment logic’, and it offers few opportunities to gain eligibility for higher education (until the introduction of the *eux* in 2011). In an apprenticeship, two thirds of the total time is spent in work-based training, and during the short school-based periods it is not possible to reach the academic level required to gain access to higher education. A similar pattern of low permeability from the apprenticeship system to higher education is found in Germany (Deissinger 2013; Baethge and Wolter 2015).

At the level of vocational schools, some explanations were mentioned in connection with the analysis of the unsuccessful political reforms. In addition, our interviews with the teachers and students indicate that teachers are important role models for the students’ development of a vocational identity. Less than half of the technical vocational teachers have a higher education degree, and the teachers’ authority is primarily based on their skills as capable craftsmen (Frederiksen et al. 2012). In addition, academic subjects have a weak position in the apprenticeship programmes, as the labour market partners have given priority to vocational skills. They have pursued an enhancement strategy to improve the apprenticeship as a separate track and emphasized the distinct vocational qualities of apprenticeships (Jørgensen 2015).

At the individual level, young people who enrol in an apprenticeship on average have significantly lower grades in compulsory school than students in the gymnasiums. In the interviews, they often identify themselves as tired of school. Especially in the traditional male crafts, the learning culture in the apprenticeships places greater value on being ‘street smart’ than on being ‘book smart’. The students prefer practical skills and manual work to academic qualifications (Jensen et al. 2011). Consequently, policies to provide eligibility for higher education in apprenticeships by increasing the volume of academic content could be counterproductive, because they would most likely increase the drop-out rates of these students from apprenticeships. Our interviews with journeymen show that they find other favourable career alternatives than going into higher education. They generally find that they have good opportunities for both horizontal and vertical careers through a combination of workplace learning and state funded continuing VET (Jørgensen et al. 2009). For journeymen, a work-based career is often a more favourable alternative than a career based on higher education. Among the barriers mentioned by the journeyman were their uncertainty about their abilities to succeed in the academic programmes after working some years as journeymen. They also lacked information about their actual opportunities, the content of the HVE programmes and the admission requirements. Another barrier was financial. Pursuing higher education involves a considerable reduction in income during the study period. They can not expect any major increase of their income after completing a higher education, because the wage structure in Denmark is quite compressed. In some occupations, the life earnings of journeymen equals that of bachelor graduates (nurses, primary school teachers) (Dalskov 2009). In addition, journeymen have a right to participate in the comprehensive system of state funded continuing VET courses while receiving their normal earnings. The unemployment rate for newly educated journeymen is lower than

for graduates from any other educational groups (Jørgensen 2015). The current situation with persistently high unemployment rates and underemployment of higher education graduates reminds us that even though the Danish apprenticeship system offers no easy access to higher education, it does provide a smooth pathway to skilled employment.

Discussion and Conclusion

Apprenticeship systems are known to be better at providing social inclusion and opportunities for employment than school-based VET-systems (Baethge and Wolter 2015). However, the apprenticeship system is associated with early tracking and higher levels of social inequality (Hanushek and Wößmann 2006). This is because early tracking increases social selection in education, and because apprenticeships do not offer eligibility for higher education, and thus divert young people away from higher education. The strength of this diversion effect, however, depends on the position of apprenticeship in the institutional architecture of the national education system and the links between the secondary and tertiary levels (Dumas et al. 2013). The diversion effect can be reduced by providing apprentices with opportunities to progress to higher vocational programmes, which recognise the value of vocational qualifications for admission. The negative effects of the weak *horizontal* integration at upper secondary level between vocational and academic education can be neutralised by a strong *vertical* integration between vocational education at the upper secondary and the post-secondary levels (Archer 1979). The Dual Study programmes in Germany is a good example of this integration (Nikolai and Ebner 2012).

In Denmark, most technical post-secondary vocational programmes were earlier located in the technical schools side by side with apprenticeships, and aiming at the graduated apprentices. Since the 1960s, these educations have been upgraded to become part of HVE, mostly in the vocational academies and some in the universities. The Teknikum engineering education is an example of how this process has taken place. The Teknikum were separated from the vocational schools, and all, except one, have been integrated into the universities. Due to this vertical segmentation, the recruitment base of the Teknikum (now 'Diploma engineers') has shifted from the apprenticeship system to the gymnasiums, and the learning environment has become characterised by the academic culture. In the Danish transition system, the value of vocational qualifications has been reduced, and academic qualifications have become the main currency for vertical mobility in the education system.

As a result of these processes, the gap between apprenticeships and HVE has been widening. The gap has also been widening from the other side, because students in the apprenticeship system have become academically weaker. This is a consequence of the policy for social inclusion in apprenticeship and the active labour market policy pursued from the mid-1990s. A growing proportion of the students who enter the vocational schools have been directed into education, and many have a disadvantaged background (Jørgensen 2015). This can explain why the dropout rate from apprenticeships has increased since the mid-1990s and the rate of progression to higher education has declined.

What kind of a problem is it that decreasing numbers of students progress from apprenticeships to higher education? The negative consequences have been mentioned: the reduced esteem of

apprenticeship that is seen as a ‘dead end’, and the higher levels of social inequality in education due to the diversion effect of tracking. However, the low progression rate is partly a result of the advantages of the apprenticeship system: the direct and fast transition to skilled employment, good opportunities for work-based careers and relatively good earnings. Consequently, the problem examined in this article involves a policy dilemma between social *equality* and social *inclusion*. Offering direct access to employment for all is hard to combine with offering all students eligibility for higher education. Making the system more academic, would most likely reduce the inclusiveness of the system for students not opting for higher education. The future will show whether new initiatives, such as the hybrid eux programme, can overcome this dilemma by combining access to employment and access to higher education without reducing the social inclusiveness of the apprenticeship system.

Literature

- AE 2016. *Danmark kommer til at mangle faglærte [Denmark will have shortage of skilled workers]*. Copenhagen, Arbejderbevægelsens Erhvervsråd. www.ae.dk
- Albæk, K. 2004: *Om lærepladsspørgsmålet [on the Question of Training Placements]*, Memo nr. 212, Copenhagen University, Institute of Economics.
- Andersen, D. 2005: *4 år efter grundskolen – 19-årige om valg og veje i ungdomsuddannelserne [Four Years after Basic School – Choices and Pathways in Upper Secondary Education]*, Copenhagen: AKF Forlaget.
- Archer, M.S. 1979 *Social Origins of Educational Systems*. London: Sage
- Baethge, M. and A. Wolter 2015. “The German skill Formation Model in Transition: from Dual System of VET to Higher Education?” *Journal for Labour Market Research*, 48(2), 97-112.
- Ball, S. J. 2012. *Politics and Policy Making in Education: Explorations in Sociology*. London: Routledge.
- Betænkning 238. 1959. *Uddannelsen på Teknikum [The Education at Teknikum]*. Copenhagen: H. Schultz.
- Betænkning 502. 1968. *Betænkning om ingeniøruddannelser i Danmark [Report on the Engineering Educations in Denmark]*. Copenhagen: S. L. Møllers Bogtrykkeri.
- Betænkning 1074. 1986: *Ingeniør- og teknikeruddannelsernes fremtid [the Future of Engineering and Technical Educations]*. Copenhagen: Undervisningsministeriet.
- Betænkning 1112. 1987. *Betænkning om grundlæggende erhvervsuddannelse [Report on the Initial VET]*. Volume 1, København: Statens Informationstjeneste.
- Biavaschi, C. et al. (2012) : *Youth unemployment and vocational training*, Discussion Paper Series, Forschungsinstitut zur Zukunft der Arbeit, No. 6890. Accessed 2016/4/11 at <http://hdl.handle.net/10419/67166>.
- Boje, Per, P. Fransen, H. Harnow and J. Wøllekær. 2011. *Industriens pionerer - teknik-umingeniørernes uddannelseskamp og betydning [Pioners of industry – Teknikum Engineers Educational Struggles and Significance]*. Copenhagen: IDA.
- Bosch, G., & Charest, J. (2008). Vocational training and the labour market in liberal and coordinated economies. *Industrial relations journal*, 39(5), 428-447.

- Christensen, E. 1985. *Konflikter mellem faglærte og ufaglærte arbejdere* [Conflicts between Skilled and Unskilled Workers]. Aalborg: Aalborg University Press.
- Christensen, S. H. 2012. "Academic Drift in European Professional Engineering Education: The End of Alternatives to the University?" pp. 145-167 in *International Perspectives on Engineering Education*. Edited by Christensen, S. H., C. Didier, A. Jamison, M. Meganck, C. Mitcham and B. Newberry. 2015. Springer Netherlands.
- Christensen, S. H., and Erno-Kjølhed, E. 2011. Academic drift in Danish professional engineering education. Myth or reality? Opportunity or threat?. *European journal of engineering education*, 36(3), 285-299.
- Dalskov, M. 2009. Store forskelle i danskernes indkomst gennem livet [large disparities between Danes' incomes in life], *Samfundsøkonomen*, nr 3. Juni 2009.
- Dansk Erhverv 2012. *Fra EUD til videregående uddannelse på erhvervsakademierne* [From initial VET to higher education at the Vocational Academies]. København. Dansk Erhverv. www.dansk-erhverv.dk/
- Deissinger, T., J. Aff, A. Fuller and C. H. Jørgensen. (Eds.), *Hybrid Qualifications. Structures and problems in the context of European VET policy*. Bern: Peter Lang.
- DST, Denmark's Statistics. 2015. *Databanken*. <http://statweb.uni-c.dk/Databanken/>
- Dumas, A., Méhaut, P., and Olympio, N. 2013. "From Upper Secondary to Further Education: European Models of Post-Compulsory Learning". In *The Dynamics of Social Outcomes of Education Systems*, edited by J.G. Janmaat, M. Duru-Bellat, A. Green and P. Méhaut, 47-69. Basingstoke: Palgrave Macmillan.
- Frederiksen, J T & H.H. Jensen, and C.H. Jørgensen. 2012. *Muligheder og barrierer på erhvervsuddannede unges vej til videregående uddannelse* [Opportunities and Barriers for Journey-men's Pathway to Higher Education]. Roskilde: Roskilde Universitet. <http://rucforsk.ruc.dk>
- Government 2014. *Aftale om bedre og mere attraktive erhvervsuddannelser* [Agreement on better and more attractive vocational education], Copenhagen, The Government, www.uvm.dk
- Hanushek, E. A and L. Wößmann. 2006. "Does Early Tracking Affect Educational Inequality and Performance? Differences-in-Differences Evidence across Countries". *Economic Journal* 116 (510): C63–C76.
- Iannelli, C., and D. Raffe. 2007. "Vocational upper-secondary education and the transition from school." *European Sociological Review*, 23(1), 49-63.
- Jamison, A., and M. Heymann. 2012. "Historical tensions in engineering education: European perspectives," in *Engineering, development and philosophy: American, Chinese and European perspectives*. Edited by S. H. Christensen, C. Mitcham, B. Li, and Y. An. 183-196. Springer Netherlands.
- Jensen, T. P., V.T. Christensen, and B. Ø. Larsen. 2012. *Muligheder og barrierer for videregående uddannelse blandt unge med en erhvervsuddannelse (EUD)* [Opportunities and barriers for higher education among youth with a vocational education]. Copenhagen: AKF Forlaget.
- Jørgensen, C. H., Christensen, S. S. and Hansen H. H. 2009. *Faglighed i fremtidens tekniske erhvervsuddannelser* [The role of vocations in the technical VET of the future], Industriens Uddannelser and Roskilde University.

- Jørgensen, C. H. (2013). "Linking the dual system with higher education in Denmark: - when strength becomes weakness". In *Hybrid Qualifications: Structures and problems in the context of European VET policy*. edited by T. Deissinger, J. Aff, A. Fuller, and C. Helms Jørgensen. Bern: Peter Lang. 53 - 78.
- Jørgensen, C. H. 2014. *The current state of the challenges for VET in Denmark*. Research report. Roskilde University. <http://nord-VET.dk>
- Jørgensen, C. H. 2015. "Challenges for Work-Based Learning in Vocational Education and Training in the Nordic Countries". In *Working and Learning in Times of Uncertainty: Challenges to Adult, Professional and Vocational Education*, edited by S. Bohlinger, U. Haake, C.H. Jørgensen, H. Toiviainen, and A. Wallo, 159-171. Rotterdam: Sense Publishers.
- Kristensen, P. H. and C. Sabel. 1997. "The Small-Holder Economy in Denmark: The Exception as variation". In: *Worlds of Possibility: Flexibility and Mass Production in Western Industrialization*, edited by C. Sabel and J. Zeitlin, 344-78, Cambridge: Cambridge University Press.
- Kyvik, S. 2009. *The dynamics of change in higher education*. Dordrecht, Springer.
- Lasonen, J., and S. Manning. 2000. "Improving the standing of vocational as against general education in Europe: A conceptual framework". In *Strategies for reforming initial vocational education and training in Europe*, edited by J. Lasonen and M-L. Stenström, 316-325. Jyväskylä: University of Jyväskylä.
- Müller, D., Ringer, F., & Simon, B. (1989/1987). *The rise of the modern educational system: structural change and social reproduction 1870-1920*. Cambridge University Press.
- Nikolai, R., & Ebner, C. (2012). The link between vocational training and higher education in Switzerland, Austria, and Germany. In *The Political Economy of Collective Skill Formation*, edited by M. Busemeyer, and C. Trampusch, 234-258, Oxford University Press.
- Powell, J. J., & Solga, H. (2010). Analyzing the nexus of higher education and vocational training in Europe: a comparative-institutional framework. *Studies in Higher Education*, 35(6), 705-721.
- Raffe, D. (2008). The concept of transition system. *Journal of education and work*, 21(4), 277-296.
- Rasmussen, W. 1987. *Erhvervsuddannelsessystemet i Danmark [VET in Denmark]*. Berlin, CEDEFOP,
- Sørensen, J. H. 1987. *Arbejdsmarkedets parter rolle i ungdoms- og voksenerhvervsuddannelserne [the Role of the Social Partners in Initial VET and Adult Education]*. Tessalonika: Cedefop.
- Teknikerkommissionen [Technician Commission]. 1959. *Teknisk og naturvidenskabelig arbejdskraft* [Technical and Scientific Labour]. Betænkning nr. 229 [Report no. 229], Copenhagen: Statens Trykningskontor.
- Undervisningsministeriet [Ministry of Education] 1989. *Erhvervsuddannelsesreformen*, [the Reform of VET]. Supplement for Newsletter from the Ministry of Education, March 6.1989. Copenhagen. Undervisningsministeriet.
- Undervisningsministeriet [Ministry of Education] 1973. *Udkast fra en arbejdsgruppe om 12 års uddannelse til alle* [Draft from a working group on 12 years education for all]. Copenhagen. Undervisningsministeriet.
- Undervisningsministeriet [Ministry of Education] 2008. *Danmarks strategi for livslang læring* [Denmark's strategy for life-long learning]. Copenhagen. Undervisningsministeriet.

Vestager, M. 1998: Undervisningsministeren Skriftlig fremsættelse (13. november 1998) L 90, *For-
slag til lov om fornyelse af de tekniske erhvervsuddannelser* [*Renewal of Act on the technical voca-
tional education*]. www.retsinformation.dk

Wagner, Michael 1999. "Ingeniørens betydning for formningen af industrisamfundet Danmark
indtil 1920." [the Role of Engineers the Formation of Industrial Society in Denmark until 1920] In
Made in Denmark: nye studier i dansk teknologihistorie. 237 – 260, edited by H. Buhl and H. Niel-
sen. Århus: Klim.

Wiborg, S. (2009). *Education and Social Integration: Comprehensive Schooling in Europe*. Pal-
grave Macmillan.