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Vocational competence demands and organisation of vocational education and training in times of rapid change: Automotive education in Sweden 1950–1960

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Abstract

This article examines the relationship between vocational education and training (VET) and workforce demands in Sweden during a period of rapid change. Using the automotive industry as a case study, it explores how VET adapted to technological advances and an expanding private market in the 1950s. The study investigates how school-level VET responded to evolving sector demands and the factors that enabled or constrained these responses. Drawing on curriculum theory, it analyses how educational governance shaped organisation and content. Empirical data from VET schools in three municipalities (1950–1960) show that local adaptations were frequent, enabled by school autonomy. Differences between schools reflected local market conditions, ranging from small workshops to large-scale industries. Close collaboration between employers and schools was essential in aligning training with labour needs. Overall, curriculum and organisational changes in this period illustrate a process of differentiation linking education to working life.

Keywords: automotive education and training, history of vocational education and training, post-war education, labour market, trade and industry

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Introduction

The differentiation and specialisation of working life and vocational competence during the 20th century is a well-known phenomenon. These subjects have been empirically studied and theorised to understand societal change, labour market development, and the need for new knowledge and competencies in many (new) areas and sectors where the structure of work changes continually (e.g., Andersson & af Geijerstam, 2002; Braverman, 1985; Hylén, 2018; Reich, 2003). Over the past few decades, the landscape of automotive technology has undergone a profound transformation. From the 1950s to the present day, the field has evolved in response to advancements in vehicle design, diagnostic tools, and the integration of electronic systems. In the 1950s, becoming an automotive worker often required a strong foundation of knowledge in mechanical systems, with an emphasis on hands-on experience and intuitive problem-solving. Mechanics were expected to possess a deep understanding of traditional engines, transmissions, and brake systems, relying on their tactile skills and experience garnered through apprenticeships, as well as their theoretical understandings (Giertz, 1991; Kallerdal, 1995).

In the contemporary era, the automotive sector is characterised by the digital age and the increasing number of computerised vehicles. The competencies required to excel as an autoworker have undergone a significant shift since the 1980s (Giertz, 1991; Östling, 2021). The training paradigm has expanded to encompass a broader skill set, including proficiency in computer diagnostics, electronic control systems, and software interfaces. From the 1950s, technology and rational work methods allowed for rapid quantitative development, with a growing private sector and infrastructure for transport adding a quantitative demand to VET as well. This raises the question: How has the training of autoworkers evolved in relation to rapid development? This article aims to delve into the historical progression of autoworker training and investigate how formal vocational education and training responded to the rapid transformation of the market and automotive technology during the 1950s and 1960s when the automotive sector grew rapidly as cars became integral to private consumerism, and the transport infrastructure expanded. The development resulted not only in increased car production but also in an expanding number of repair shops for maintenance. A greater and more up-to-date workforce of autoworkers was required for large industries as well as for smaller businesses catering to the growing numbers of car owners and the increasing needs of the transport sector (Giertz, 1991; Östling, 2021). This article investigates the response to that demand by the Swedish national vocational education and training (VET) system as it was organised in the 1950s when Swedish industry and the economy expanded rapidly.

Research has contributed to an understanding of system changes in Swedish vocational education and training (e.g., Clark & Winch, 2007; A. Nilsson, 2010; L. Nilsson, 1981) as well as shifts in pedagogical ideas and practices (Broberg, 2014, 2016, 2020). The shifts have been investigated and understood in relation to developments in trade and industry as well as in relation to national education system development, and attention has been mainly on the period before and after 1971 when vocational education and training was incorporated into upper secondary education and the organisation of gymnasiums (non-compulsory education age 16–18). This article pays particular attention to this process in the automotive industry from an educational perspective by examining government-funded vocational schools in Sweden in the 1950s and 1960s. The aim is to show how VET responded to rapid changes in competence requirements as well as a rapid growth in demand for skilled autoworkers, through changes in curricula and in the organisation of VET at school level. The research questions this article addresses are:

- What were the perceived vocational competence requirements from trade and industry as well as societal needs?
- What educational responses to technical development and the changing demands of working life in the automotive industry can be traced in curricula and the local organisation of car mechanics' education?
- How were these responses conditioned by the particular system of VET at the time?

The contribution of this investigation is to broaden the understanding of the scope of action at school level to adapt curricula and the organisation of education to the rapid development of sectors such as the automotive industry.

Previous research

The relationship between VET provisions in relation to structural and technological changes and how these shifts have impacted vocational education and training has received limited attention in Sweden and internationally. This view is supported by the conclusion drawn in an in-depth literature review by a group of Swedish researchers (Rosvall et al., 2019). In industrialised societies, the educational system, particularly VET, has long been perceived as a critical institution for reliably providing a qualified and skilled workforce to meet the changing demands of the labour market.

The role of VET has been the subject of various European Council declarations, such as the Lisbon European Council Meeting and Declaration 2020, and the Stockholm European Council 2023 meeting. International cooperative bodies have emphasised the important role of education as an integral part of economic

and social policies and as an instrument for strengthening Europe's competitive power worldwide, thereby ensuring the cohesion of its societies and the advancement of its citizens. This role is emphasised by research in the field of VET from a variety of perspectives and vantage points, such as, its social and economic returns, productivity effects at the company level, the promotion of social cohesion, and as a remedy for youth unemployment (Kuczerai & Jeoni, 2019; Lindell, 2004; Rauner & Maclean, 2008; Richardson & Van den Berg, 2002; Silver, 1994).

Thus, the importance of VET for economic and social development in society is clearly acknowledged in both research and politics, but in the proposals and claims, VET is commonly referred to as a general concept and general demands are made on the function of VET. Organising VET to meet competence demands as well as civic demands is a challenge for every nation, and it requires a highly agile system to do so. However, the complexity of demands at VET and its systemic abilities to adapt have not received as much attention in research and on policy level. As the work of Chankseliani and James Relly (2015) using the example of British VET policy suggests, demands on VET often compete and depend on a vast variety of factors but the policies often favour a one-size-fits-all solution. Given the diverse and partly conflicting societal demands placed on VET, uniform, system-wide solutions pose challenges, particularly in ensuring equitable and appropriate developmental conditions for the various occupational fields encompassed by the system. To further understand these challenges VET research would benefit from new approaches that focus on the differences of the inner workings of a system and compare what conditions mechanisms rather than systems themselves (Adolfsson & Alvunger 2020; Busemeyer & Trampusch, 2012; Markowitsch & Hefler, 2018). This study aligns with these approaches by focusing on the responsiveness in a VET system and the ability for change and development in relation to the frameworks set by the system organisation.

As noted above, while there is some research about structural changes and their relation to the development of the labour market in Sweden and in international comparative research there is still a scarcity of research that examines structural changes in relation to specific vocations and their changing educational needs. Studies from a historical perspective that have looked at the development of VET in different periods vary in their focus but generally describe shifts and developments on systemic level and over a long period of time (Broberg, 2014; Michelsen & Stenström, 2018; Olofsson, 2005; Olofsson & Panican, 2019). I argue that historical case studies can also provide an in-depth perspective on how systems cater to diversity, not only in terms of general demands but also in response to changing vocational-specific competence demands.

The general criticism of VET always seems to be the same, and one of the more or less eternal questions is how it can keep pace with developments in the industries to which it is supposed to deliver skills. A common way of both substantiating criticism and trying to find new ways to better organise VET, is to make international comparisons with other VET systems (Clarke & Winch, 2007; Greinert, 2005; SOU 1954:11). Another way to critically analyse persisting issues in VET is to compare historically how the education and training for one profession is shaped within the framework of a particular system. This enables understanding of how steering conditions the ability of VET to meet qualitative as well as quantitative demands from employers, the labour market, and society and at the same time reveals the complexity that hides behind the general conceptualisation of VET as one homogeneous institution. Since a large number of professions are trained and qualified within the same system, that is, with the same governance in the form of funding and rules, it is also important, in relation to the issue of skills supply, to compare training in sectors with different rates of modernisation. The automotive industry, compared to other industries, has experienced and is experiencing accelerated technological development.

This societal development of differentiation and specialisation in working life, has, as mentioned above, been historically investigated and theorised. The process is closely related to educational development and has been thoroughly studied within the history of education but mostly in relation to general education (e.g., Dahlstedt & Olson, 2013; Lindensjö & Lundgren, 2014; Marklund, 1985). For vocational education and training, this process is less studied and mostly on a structural level, that is, how the state acts and how large organisations and stakeholders are involved (Lundahl, 1989, 1993, 1994). But the process is also traceable at the school level in archive material and narratives from people caught up in the changes and involved in education. This kind of material reveals information about the practical measures required to meet the demands for further specialisation when having to work within given educational frames. This study investigates the actions of people involved in adjusting VET, and what measures were taken and why, according to perceived needs and with the means at hand. The focus is on changes in the content and organisation of VET at the school level for automotive workers.

Accordingly, this study examine the Swedish national vocational training system as a framework for conditioning autoworkers' training in the 1950s and 1960s with particular attention to the implementation level. It shows how the training changed at the school level to meet the demands and needs of the industry and market, and identifies examples of responsiveness, or flexibility enabled or restrained by the system of VET at the time.

Theory, method, and material

The purpose of examining the VET response at the school level, and the research questions about the kind of responses in relation to the conditioning by the system, are informed by a curriculum theory perspective. Curriculum theory emphasises how the governance of education shapes the conditions for organising education, as well as the selection and realisation of content in teaching. This is conceptualised through the notions of frames, steering, and arenas, and the analysis focuses on the dynamics of formulating policy and the realisation of it. Education is constituted and enacted at the school level – or the realisation arena – through actors' navigation of economic, legal, and ideological frameworks. The frames function as steering tools (to implement what is politically decided in the formulation arena) and mechanisms (when steering is more indirect and sometimes unintended). Rather than a linear process, policy implementation is understood as contingent upon the specific configurations of actors involved and the scope for action available within the institutional context. (e.g., Englund, 2005; Lindensjö & Lundgren, 2014; Nordin & Sundberg, 2018). In the case of vocational education and training, there are several institutions to which a specific education relates. Besides the government authorities and bodies there are also the organisations and institutions of employers and unions related to the specific trade. In different VET systems, these institutions are organised in different ways (Markowitsch & Hefler, 2018). Their means and influence are conditioned by the frameworks of the systems that also allow them access to different arenas. In the mid-1900s, the Swedish VET system positioned local school boards, led by the school director, as key actors in the implementation arena. Their scope of action was conditioned by the juridical, economic, and ideological frames of the system in place. The national vocational education school charter stipulated that the local school board should include an equal number of representatives from employers and unions, hence, labour market representatives were directly involved in school level organisation.

The empirical material representing the school level consists mainly of archive material from the local school boards in Stockholm, Gothenburg, Örebro, and Södertälje. The four municipalities had autoworker training in various forms, provided in close cooperation with local companies of different kinds. Operating in the regions of Stockholm, Södertälje, and Gothenburg were the large car and lorry industry manufacturers Scania and Volvo. Örebro is a medium-sized town, with many small businesses. But throughout Sweden, the private market for cars rapidly expanded from the 1950s and so did the need for car repair shops, which also impacted the demand for skilled workers in smaller businesses. Board minutes, teaching plans, internal investigations, and proposals make up most of the material used in this study. The school level is also reflected in anniversary and commemorative publications published by associations that wanted to

preserve the memory of various vocational schools. The material includes commemorative publications from Gothenburg vocational schools, Södertälje vocational schools, and Stockholm vocational schools.

To answer the research questions the source material is analysed thematically. Focus is on discussions, decisions, and negotiations relating to the organisation and content of car mechanics training and related vocations. The statements and actions represented in the material are then analysed, firstly, in relation to how different actors perceived the industry's skills needs and demands in the labour market. Secondly, in relation to the possibilities that governance provided for different proposals to be considered feasible (what made them feasible in relation to the frames of the system) and for decisions to be implemented (what resources could be used/activated within the frames of the system). The data was then analysed comparatively in relation to differences and similarities of the schools to understand how these were conditioned by the mid-20th century Swedish VET organisation. The references and quotes from the empirical material used in the article are translated from Swedish by the author.

Changing competence requirements and the labour market in the post-war era

In accordance with this study's curriculum theory approach, this section outlines the context of education of autoworkers, including a brief description of the national VET system of the period, and relevant societal aspects such as labour market conditions. It is important to note that the VET system in the 1950s and 1960s was structurally the same as when it was first implemented by government reforms in 1918 and 1921. In the 1940s, some changes were made, adding organisational features like regional schools, and a government authority only for VET was established. However, no comprehensive structural changes were made until 1971 when VET was integrated into the upper secondary school organisation along with academic tracks (A. Nilsson, 2010; L. Nilsson, 1981).

The so-called Swedish model structured relations between the parties of the labour market based on collaboration, negotiations, and collective agreements with limited government involvement (Andersson, 2000; Giertz, 1991). In the 1950s and 1960s, the conditions for economic growth changed and the welfare state was substantially expanded (Andersson et al., 2005). This period also represented a crucial turning point for the VET system. In the 1950s, changes in the organisation of the vocational education and training system were deemed necessary. The prevailing perception was that the existing system had become outdated in relation to technological developments. There was also a need to expand because of the growing number of applicants. The perceptions of the aims

and functions of VET also developed in relation to an ongoing massive reform of the general, national education system.

The VET system was to align with the planned changes in the educational system in general. Furthermore, vocational education and training was regarded as needing to adapt to the ever-accelerating changes in the production landscape. It was argued that this adaptation was essential for vocational education and training to fulfil a significant role socially and economically (SOU 1954:11; SOU 1966:3). Central to the perception of the need for new competencies were ideas on theoretical knowledge and flexibility. Hence, arguments for change focused on modernising educational content. The modernisation did not pertain only to the vocational aspects but to civic education as well, responding to the general idea of democratisation that underpinned the major reforms of the national education system. More time was allocated to general subjects such as modern languages, Swedish, and social science. One dimension of the content aspect that did relate to vocational education and training was the dimension of broadening the content and moving away from specialisation. Broadening the content and shifting the focus from vocational readiness to vocational preparation would create flexibility, thereby enabling workers to be mobile and adapt to different kinds of workplaces within a sector (Broberg, 2014; L. Nilsson, 1981).

The structure of the education system was also targeted, but this had more to do with aligning it to changes planned for restructuring the national education system as a whole from a parallel to a comprehensive system with democratic aims. It also meant making all VET programmes accessible everywhere in the country and moving away from the local character of VET offered. This idea put the student's choice in focus rather than the local trade and industries' needs (Broberg, 2014).

During the 1950s, government funding increased significantly and a new government act stressed the close cooperation between VET and trade and industry as well as regulation of VET, mainly in the form of deals between parties rather than legislation (Håkansson & Nilsson, 2013). However, at the same time that the new general education system was developed, legislation placed local vocational school boards under the authority of the centralised municipal school system, marking a step towards integrating VET with general education. Implementation at the municipal level was completed in 1960. This development did not go uncriticised by the local VET school boards as they feared a loss of connection with the local businesses (Broberg, 2014). In 1964, the national government body, the Royal Board of Vocational Education, was closed down and VET became a section within the National Board of Education. In 1971, all forms of vocational education and training were reorganised within upper secondary education along with academic tracks and centralised under the same government authority. All forms of VET became two-year programmes with no

preparation for higher education, and the academic tracks became three- or four-year programmes preparing for higher education. With this rearrangement, more than 300 VET schools were closed down around the country and large VET school complexes were localised to so-called 'G-orter', Gymnasium towns. The reform also entailed a new funding system that meant less or no support for the larger industries' own VET schools.

Vocational education and training system frameworks in the mid-1900s

Throughout history, VET has responded to shifts in competence demands by changing curricula and redefining the relationships between educators, students, and industry partners. Since VET systems comprise all kinds of vocations, organisational changes impact different for different vocational education programmes in different ways. The automotive industry is broad and is a sector subject to rapid adaptations to market conditions, technological developments, and stiff competition, which makes it an interesting case for analysing the VET response to changing conditions. This sector includes the car/lorry workshops of different makes of vehicles and privately owned car workshops, and a number of vocational and professional categories are connected to it, encompassing work tasks from low-skill to high-skill levels. In this article, these groups are referred to as autoworkers, meaning vocations that in some respect involve hands-on work with vehicles.

At the beginning of the 20th century, state involvement in vocational education and training was a way of strengthening the supply of skills to industry and crafts through control and responsibility at a time when the development of industrialism was beginning to take off in Sweden (Marjanen, 2019). The system that began to emerge after the 1918 practical secondary school reform was organised at the government authority level into three departments: craft and industry, commerce, and domestic education. Schools could be set up by different providers, could provide education in one or more of the department areas, and could be financed with state funds if the school undertook to comply with the state-developed vocational school charter. The vocational school charter provided a framework that included requirements for the preparation of curricula for the education to be provided. Curricula were mandatory documents for obtaining state funding but their content was not specified, other than a few required headlines. The charter provided a general plan for the content but not in any detail. This left substantial room for each school to decide on the particulars of the content for each form of education and also to change it according to perceived needs. Such actions were the responsibility of the VET school boards and associated committees. Thus, in the cases discussed in this

article, autoworkers' education was overseen by dedicated committees responsible for various education programmes related to automotive work.

The system was organised (in addition to the division into departments) into school forms and levels. The 1921 supplementary reform broadly covered (the number of variants developed over time was extensive) workshop schools, apprenticeship and vocational schools, industrial schools, and integrated schools.

In workshop schools, the same provider was responsible for both practical and theoretical education and the education was carried out in the schools' own workshops, often with production for sale to local companies or private customers. In apprenticeship and vocational schools (corresponding to basic and advanced levels respectively), the pupil was employed as an apprentice in a company to receive practical training, and only the theoretical training was provided by a school under some type of provider, municipal or private (from 1941 also regional authorities). For integrated schools, all vocational work within the framework of the training was outsourced by the provider to a company with which the school had an agreement. The model would mean that the company would provide premises or a specific location for practical teaching, equipment, and instructors with the qualifications of the Royal Board of Vocational Education and Training. The school was responsible for theoretical instruction and in some cases even teachers for the practical education in the company if the company did not have qualified personnel. State subsidies were paid on a fixed basis for both the company and the school. The pupils were enrolled at the school but paid by the company, which also received the margin on what the pupils produced (Broberg, 2014, 2016).

This plurality of organisational options left room for adapting to patterns of the local trade and industry. In the following sections, empirical examples of adaptations are presented and analysed.

The organisation of autoworkers' vocational education and training: Examples from the 1950s and 1960s

The manufacturing and maintenance of cars was based on skills traditionally found in tin smithing and general motor mechanics, building and servicing engines for industry, as well as motors for boats and the young car manufacturing industry in the early 20th century. Education for all the groups involved in making cars was provided at least in the larger communities by the 1940s, but with no specialisation targeting the automotive sector specifically. The earliest evidence found in the material for this article, pertaining to specialisation for automotive workers, comes from Örebro where the municipal VET school provided education for 'car assembly' (Örebro skolor för yrkesutbildning [ÖS],

F1:1 1918–1962). In the first decade of the century, not even a hundred cars were manufactured in Sweden. The early development of the industry relied on the transport sector for its customers, and it was not until the 1950s that the car became popular and affordable for the general public (Giertz, 1991). This was also when training specifically for car mechanics began. In the 1950s, vocational schools increasingly began offering specialised programmes in areas such as car mechanics, car assembly, tyre work, and automotive electrical systems.

Adjusting curricula and teaching methods

In the municipal VET schools of Stockholm, Södertälje, and Gothenburg the training of mechanics was divided into (general) mechanics and car mechanics in the mid-1950s; in Örebro this began as early as the 1940s. A sign of differentiation and expansion of the automotive sector was the establishment of new committees under the main school board for car mechanics and related vocations. Commenting on this change and decision by Stockholm VET, the school board saw it as essential because the car mechanic was turning into a 'more specialised repair worker that increasingly bases his work on the manufacturer's own ready-made spare parts' (Lärlings- och yrkesskolstyrelsen [LYS], A2A:30 1955). Later, changes in car manufacturing led to the emergence of the more brand-specific spare parts and along with this development education and training for the vocation of 'spare part specialist' was initiated in Södertälje (Yrkesskolan Södertälje [YS], 429:1, Protokoll 1946–1969).

To realise the shift from general mechanics to car mechanics, the headmaster of the Stockholm VET schools initiated an enquiry comparing the existing educational content and 'changes in the local workshops' to address both quantitative and qualitative needs of education for the automotive sector (LYS, A2A:30 1956).

An engineer named Walles was appointed to carry out the investigation and he presented his conclusions in a report in 1956. The conclusions concerned the length of education, the content of curricula, teaching methods, as well as the organisational effectiveness based on school-company cooperation. He based his conclusions on observations and interviews with vocational teachers, workshop owners, and car company representatives. In the other towns the same issues were discussed by the school board and subordinate committees and sometimes investigated in locally initiated enquiries on specific issues (e.g., YS, 429:1, Protokoll 1946–1969)

According to Walles' enquiry, there was no reason for changing the duration of the education, which was two years in Stockholm VET schools (others, such as Gothenburg, had up to three years) but he saw a need to improve efficiency, particularly in the first year. Practical education/teaching needed to adapt to

specialisation. He argued that it was no longer possible to learn car repair by doing general mechanical work. First-year training in filing, welding, drilling, and similar skills needed to focus on car engines, with a shift in emphasis from general mechanics work to car-specific mechanical tasks. The current proportion was 950 hours of general mechanics and 460 hours of training on tasks directly relevant to car mechanics. Walles proposed that students should come into contact with a car engine, and also the specific tools used for car engines, from week two or three in the first year. He suggested building first-year education around a used engine, more precisely one engine per three students. They should start with cleaning and deconstruction, followed by renovation (including all accessories of an engine), assembly, and a test run.

In sum, the enquiry proposed faster specialisation and more specialised training tasks and Walles concluded that: 'By the end of the first year, the students should have had time for a complete review and renovation of the car engine, clutch, gearbox, reverse gear, etc.' (LYS, A2A:30 1956)

In addition to training general skills such as filing and drilling with a focus on car parts as a specialisation, the amount of time allocated to certain tasks was also reconsidered. In minutes from both Stockholm and Gothenburg the amount of welding training was reassessed in relation to car work as opposed to general mechanical work (Göteborgs yrkesskolor [GS] 320-1, A3:2 1932–1963; LYS, A2A:30 1950–1963). In Stockholm, it was estimated that in current mechanics education, welding accounted for 14.5% of the training, which was argued to be 'almost complete training for welders' and completely unnecessary for the welding requirements that a car mechanic has' (LYS, A2A:30 1950–1963). In Södertälje, welding was also questioned and taken away entirely during the 1950s but by 1962 it had been reassessed on account of statements from the vocational teachers who argued that representatives of the automotive sector 'remarked that […] a car mechanic that can't weld has a major handicap' (YS, 429:1, Protokoll 1946–1969). Also, in Örebro requests from companies about welding education were again taken up by the board and organised in 1965 (ÖS, A2:1 1939–1965). This indicates difficulties in defining vocational competence within a highly differentiated sector, subject to changing demands over time due to ongoing diversification. There are no references in the Södertälje material as to why the perception of welding skills changed 12 years after it was viewed as unnecessary. But education for car tinsmiths was specifically referred to in the Södertälje material during the 1960s which suggested a branched-off educational pathway, with welding potentially integrated into this specific programme as part of ongoing specialisation efforts. However, in 1964 the question re-emerged, and the director of studies was given instructions to enquire among the local businesses about the need for welding skills as a car mechanic. In 1965, the enquiry was presented and the director was given instructions to further

investigate the possibility of creating a short welding education programme for car mechanics.

In 1956, the curriculum for apprentice education in Örebro stated in the introduction that the students would be named 'bilmontörlärling' [car assembler apprentice] and defined this as: 'someone who, during the apprenticeship period […], trains in a vocational school and car workshop according to a defined plan in car mechanical and electrical workshop work and assembly work' (ÖS, F3:3 1945–1964). This suggests a more all-round education, contrary to, for example, the specialisation in Stockholm. On the other hand, the education was extended from three to four years. Curricula were detailed, and all subjects or areas of knowledge and training were directed towards working with cars. A more general subject, such as tool forging and hardening, was specified with the addendum that: 'In order to support the apprentice's specialisation in the automotive mechanics profession, automotive tools and parts for engines, clutches, gearboxes, etc. are manufactured as needed.' (ÖS, F3:3 1945–1964) However, analysing the content descriptions under headlines like 'Filing', also shows training of generic craft skills, like the ability to sharpen tools through filing. In addition, the content encompassed an understanding of materials, including not only their technical and physical properties but also the 'history of metals,' reflecting a traditional crafts-based *Bildung* approach to developing the required competencies. The importance of the history of metals should, of course, not be overstated, but it is interesting in relation to the traditional apprenticeship education that Örebro VET schools chose and as a counterbalance in a process of increasing efficiency – one that might otherwise have seemed focused only on the immediate needs of the workshop floor. In addition, all VET curricula during the 1950s (and many even earlier) contained civic education through the subject 'vocational hygiene' and social science, although adapted to relate to the worker conditions and vocational specifics (Broberg, 2014; F3:3 1945–1964). The four years of education were divided into periods of in-school workshop and apprenticeship time in a company, and 39 of 45 hours per week were dedicated to practical education (F3:3 1945–1964).

According to a minute from 1955 from Gothenburg VET, specialisation demands were not always unanimous within the committees or between committees and boards. One board member expressed his excitement with a decision to expand car mechanics education with new classes at new and old sites, but remarked that the education was not sufficiently specialised. Another member compared it with Volvo's education but thought that the conditions were not comparable to the municipal schools and the deputy headmaster agreed with the argument that young students (around 15) should not specialise but rather should have a broad study base in the beginning, with specialisation taking place in the third and final year. In Örebro, the added fourth year had the

same purpose. The deputy headmaster also referred to the development of general education and the need to adapt to eventual changes when the nine-year compulsory education was implemented. However, this had more to do with giving students options within the growing sector than any civic educational intention for young men (GS 320-1 A3:2 1932–1963). The different views within school boards indicate a complex situation where perceptions of skills need depend partly on the sector representative's own experience but also on ideas about education in general in relation to the ongoing development of primary education.

New pedagogical approaches catered to the need for specialisation, but also represented a means to meet quantitative demands from both the automotive sector and potential students.

Adjusting the organisation of education to meet qualitative and quantitative demands

Increased effectiveness of education was needed to meet the quantitative demands of skilled workers in the growing automotive sector. In 1963 the committee of car mechanics in Stockholm VET schools and representatives of the companies decided to work together in applying new pedagogical methods including the so-called 'station-teaching'. It was decided that they would collaborate in 'creating audio instructions, suggestions for training stations, curricula and producing all equipment required for the education' (LYS, A2A:30 1950–1963).

The new didactical approaches were seen as a way of shortening the period of education and thus being able to offer more of it. From different reports during the 1960s, it is evident that the VET schools' capacities were far from able to provide for the increase in both labour demand and youth interest. To cope with the demand, not only were pedagogical methods adjusted, but also the organisation and delivery of VET for automotive work were adapted.

During the 1950s and 1960s, there was a constant shortage of education opportunities within the automotive sector. The need for car mechanics was probably as great as the interest in car mechanics education but the schools had trouble providing training posts, mainly because of a lack of facilities. In the larger cities of Stockholm and Gothenburg plans for vocational school buildings were already being made in the 1940s, and when more government money was allocated to the whole VET system, the schools increasingly built their own facilities with large areas for workshops of different kinds as well as traditional classrooms.

By the time of the Stockholm investigation by Walles, there were three schools with car mechanic education in the organisation comprising Stockholm VET

schools. During this period there was a higher demand for car mechanics than motor mechanics. A spike in union membership among car mechanics was noted by the board. In Stockholm alone, there were 2000 car mechanics union members, and this number rose to about 2500 when including the estimated number of non-members. The Royal Road and Water Board (Kungl. Väg- och vattenbyggnads-styrelsen) estimated the increase in motor-driven vehicles by 1961 at 10–12% yearly. The board came to the conclusion that the demand for car mechanics was around 8% of the current workforce every year during this period, resulting in the need to train 300–325 students per year for the next five years and 200 thereafter. Based on these numbers, the board agreed on rearrangements of schools to meet demand (LYS, A2A:30 1950–1963).

The board suggested making one of the schools for (general) motor mechanics into a car mechanics' vocational school. Similarly, Gothenburg reorganised some of their existing mechanics education into specialised car mechanics education and planned to open more schools when issues concerning facilities could be resolved (GS 320-1, A3:2 1932–1963).

Södertälje municipal VET started a three-year car mechanics education programme in 1953 with five or six students admitted per year, and by 1959 the capacity had expanded to 16. In 1962, the board noted that this was not enough. The reason was that car companies in the area were considering starting their own education programme to solve the problem of skills shortages. Södertälje VET school decided to expand by reorganisation. To double the capacity the board decided to organise the education programme with only the first year in school and both the second and third years with an 'in-built-workshop' (training outsourced to a local company's workshop but with teaching provided by the school) as opposed to only the third year. Thereby, space in school was freed up to admit more first-year students (YS, 429:1, Protokoll 1946–1969, 1961–1969). The demand for automotive workers for heavy vehicles posed a problem for Södertälje VET schools, and again it was mainly due to a lack of facilities, and the solution was to let the companies take on responsibility for this kind of automotive education (YS, 429:1, Protokoll 1946–1969, 1961–1969).

In Örebro, new specialised education programmes were also started, merged, and reorganised to meet demands. Along with car mechanics, there were also dedicated sections for spare parts, rubber- or tyre and wheel workshops, and car electricians. Depending on the number of applicants, the needs of local companies and the school budget, courses were branched off or adjusted in different ways. The school boards frequently handled requests for students from local companies. In the minutes from Örebro vocational schools in 1965, the headmaster stated that 'the companies had reported the need for 23 car mechanic students and 10 spare part specialist students'. Since the number of applicants for car mechanics was 31 the school opted for exchange education (having some

students in school and some at companies, switching periodically) and the method of station education when in school. In that way they could both provide for the local companies and admit all students.

In 1953, the board of Gothenburg VET anticipated a 25% increase in the demand for car electricians in the coming years. The lack of facilities made it hard to start a day school. A temporary solution was to have evening classes as further education for workers in the sector but at the same time, it was recognised as a problem to attract youths and cater for future needs. Courses for experienced workers represented a form of education open to employed workers so they could develop skills within their field. It was the equivalent of adult education. The board's efforts to acquire facilities finally paid off in 1955. The problem of acquiring facilities was common in all four schools. In a report from the school in Örebro, it was identified as the most important obstacle for expanding VET (ÖS, A2:1 Övriga protokoll 1939–1965).

Acquiring facilities to expand education was one solution, while another involved organising programmes that relied on close collaboration with local companies. The previously mentioned car assembly education that started in Örebro during the 1940s was mentioned again in 1954. According to the minutes of the school board, this education had been dormant for some years but representatives of the workshops in town still saw the need for education and proposed it to be organised as a special course 'within the car electrics field' (ÖS, A1:2 1940–1955).

In 1944, the central workshop school with the county council as the provider had taken over the early car mechanics training. This was not entirely welcomed by the municipality, probably due to competitive reasons, both in terms of students for the courses and in terms of cooperation with local businesses.

In 1965, Örebro opted to start an apprentice school. From the details of the proposal, it is clear that this reorganisation demanded close cooperation with multiple actors from local trades and industry. Seven local companies were engaged in creating content and providing training and collaboration in a special committee with the school board. This special committee then proceeded to meet regularly to oversee the education (ÖS, A2:1 1939–1965).

As school providers could organise the same vocational education in different ways Örebro also had integrated schools for car mechanics. Like the apprentice school, this also called for close collaboration between schools and local companies. In 1965, an imbalance arose as the number of applicants to integrated car mechanics schools exceeded the capacity of companies to accommodate them. To address this, the school implemented 'exchange education,' where some students trained in company settings while others received training in the school's workshops. In this way, they did not have to turn down applicants,

which was in the interest of both the school and the sector's future needs (ÖS, A2:1 1939–1965).

Like Örebro, Stockholm and Gothenburg provided car mechanics education in different forms, depending on collaboration with the region's companies. In 1956, nine integrated schools were reported to have started in Stockholm (LYS, A2A:30 1956). In total, 115 students were enrolled in this form of education for car mechanics during the spring of 1956.

In all cases, school and local trade and industry worked closely, and the school board meetings as well as other meetings and specially initiated committees were regularly attended by representatives of companies with an interest in the potential workforce. But representatives and actors from the employer side were not the only ones concerned with the education; in fact, the national vocational charter demanded equal representation in the school boards from trade and industry and workers. Moreover, as exemplified in the Stockholm VET school case, requests and enquiries regarding suggestions for organising education went out to local divisions of concerned unions. In minutes from the early 1960s of Stockholm VET schools, it is evident that the board collaborated not only with the companies but also with the union in matching education to needs. For decisions concerning the reorganisation of forms of car mechanics education, the union was asked to contribute their opinion (LYS, A2A:30 1962).

Not only did automotive education of different kinds branch off from mechanics, education for car painters branched off from painters' VET, and education for car electricians from general electricians' VET. From the minutes of Södertälje and Gothenburg VET school boards it is possible to identify a pattern of branching off, merging, and reorganising using the assets within the school. In Södertälje, car mechanics, car painters, and car bodywork specialists were separated from the original education programmes, then specialised and consolidated within the same area, creating a hub of automotive education (YS, 429:1, Protokoll 1946–1969, 1961–1969). Having automotive courses operating in close proximity was advantageous for educational as well as productive reasons as customers had access to a full-service centre. In Gothenburg, car electricians, car mechanics, and tyre workers were located in the same area (GS, 320-1, A3:2 1932–1963).

Another way of connecting courses was through curricula and co-education. In 1963, the board of Stockholm VET schools decided to organise a special education programme for car electricians, featuring a foundational year alongside car mechanics, followed by a two-year specialised programme in an integrated school. This structure effectively connected or created educational tracks from basic training to specialisation (LYS, A2A:30 1963).

Concluding remarks and a tentative discussion on shifting conditions when reforming a system

During the 1950s and 1960s, local VET school boards investigated and discussed the perceived need for increased efficiency, specialization, and differentiation. Traditional courses in areas of mechanics, electrics, painting, and even working with vulcanised rubber were tailored for the automotive sector. Named with prefixes indicating the automotive specialisation, new courses with new curricula were created and organised in various ways. Old content was rearranged in terms of focus and time allocation, the order of learning tasks was shifted, and new pedagogical methods such as the 'station method' were implemented. Although examples of these changes are found in the four schools, their extent and timing varied to conform to local needs and conditions.

The skills described in the material during this period can be characterised as hands-on mechanical skills but the suggested changes, for example at Stockholm VET schools, focused on learning about specific car parts rather than any piece or part, in order to develop skills in cleaning, filing, drilling, and screw driving when taking apart and reassembling a motor and in problem localisation. The examples suggest an initial step towards specialisation: a kind of 'product-based specialisation,' such as car assembly (focused solely on car and car part assembly) and car painting (dedicated exclusively to painting cars).

According to the national vocational school charter in the mid-20th century, the board of a vocational school was to consist of equal numbers of representatives of the employer and employees. Both categories brought with them extensive connections with the local market through personal relations and networks. This is evident in how actors outside school were engaged in monitoring and reporting the needs of the sector. In towns like the ones in this study, municipal VET encompassed a large number of vocations and the organisation was therefore divided into smaller units referred to as committees: for example, a car mechanic committee, and a car electrician committee. Forming committees was a way to branch off and to specialise and tailor the content, teaching, and cooperation with local trade and industry, leveraging the resources of the members' contacts. The 1954 reform merging VET school boards into the municipalities' general school boards was met with opposition from the VET schools of Stockholm and Södertälje. Earlier, some discontent with regional authorities taking over some car mechanics education can be noted in the Örebro school minutes. The arguments were the same as those against any centralisation; opponents feared losing the close relations with the local companies.

On the whole, examining the minutes of the schools in this case, cooperation with local trade and industry was not without problems but it was extensive and enabled swift adaptations of education both in content and organisation. All of

these initiatives were taken and carried out by the local school board and committees.

Organisational adaptations of education were also implemented to meet application pressure and meet the workforce demand from the local trades and industry. In some cases, the boards opted to turn workshop schools into apprentice schools or integrated workshop schools. This meant closer forms of trade and industry education where costs were shared with the local trades and industry. Although government funding for VET increased during the 1950s and plans were implemented for VET school buildings enabling in-school education, the financial framework and lack of appropriate facilities at this time still encouraged cooperative solutions. However, there were also still pedagogical arguments upholding the forms of education located at workplaces (Broberg, 2014). Also, based on the argument that workshop schools (school-based training with production) were perceived as less attractive to students, education was reorganised into integrated schools, or apprentice schools in the case of Örebro.

Crucial to these organisational activities was that decisions could be made at the local level according to supply and demand from students and local trade and industry alike. The juridical steering of the vocational school charter decentralised decision making, by empowering actors with sector-specific competence and local networks that could be utilised for developing courses and expanding VET in the region.

System changes and reorganisation of actors in the realisation arena

Developments in the 1950s and 1960s remained in the 1970s such as a large private market for cars and continued expansion of infrastructure and transport while an ongoing and growing centralisation in society transformed many sectors.

In 1971, the national education system was not only responding to changing competence demands in vocations, it also aimed to develop society in a more democratic and equal way. The influence of general education on VET implied more general subjects for more civic education. Although the perception in the educational debates seemed to be that there was no civic education in VET at all, the general curricula of the former VET included subjects such as vocational hygiene and social science and the 'history of metals'. By the 1950s, physical education was also included.

A shift in the automotive sectors development came in the 1970s. Automation and the use of industry robots became more frequent, and this shift implied that, for example, the skills of drilling accurately and sharpening a drill were still in demand but not needed everywhere in the sector. However, being able to programme and operate the robot to do the drilling was a new requirement. The new skills for computerised work were taught in more academic tracks but

automotive work still required vocational education and training for assembly and repair workshops. Perhaps it is this kind of asymmetry over time and space that is represented in the issue of welding that was so differently perceived and handled by the schools in this investigation.

In creating education there will always be conflicting demands and ideas about what education is and should achieve (Evett, 1978) because a curriculum is a limited space. The aim of the 1971 reform to create better vocational education (adapted to both the modern labour market and civic education requirements) in less time resulted in rationalisation and centralisation. The diversity of curricula in VET was perceived as a problem, as were the local adaptations (Broberg, 2014; L. Nilsson, 1981).

Democratisation meant the possibility for the individual to be able to attend the same course anywhere in the country. Rationalisation meant that curricula should align with national sectors rather than be adapted locally. New subjects responding to the demand for more civic education reduced the vocational content. Thus, on the one hand, it seemed that the state took on the whole responsibility for VET, but on the other hand, it became less vocational. The responsibility to meet demands from differentiation and specialisation was passed over to the trades and industry without the platform of close cooperation with the schools in the area. The local boards had gradually been subordinated to the educational authorities of the general municipality, and in that process, many board members connected to the local trades and industry lost influence over education, and the close personal contacts between schools and companies were weakened (Broberg, 2014). By the 1971 reform, labour market representatives' participation was reorganised in line with the centralisation of education and located closer to the formulation arena than the realisation arena.

The ability to adjust to demands within a sector by changing the organisation of education was limited by the centralisation in 1971. The arguments for centralisation, broadening and shortening vocational programmes tended to favour the production of flexible workers rather than promoting flexible vocational education. Even though the decentralisation of the 1990s and the marketisation of the 21st century in some ways have transferred decision-making down to the local level and schools are marketing themselves with specific orientations of national programmes, the frameworks of VET are considerably different from the 1950s and 1960s and recent research points to the emergence of a re-centralisation challenging the scope of action for the local school authorities in new ways (Adolfsson & Alvunger, 2020). Since the process of specialisation in vocational areas is ongoing and a mismatch between labour market demand and education is a growing problem, aiming for plurality in a standardised model may be difficult. In light of the results from this study, Chankseliani and James Relly's (2015) call for complex cooperation and new

ways of sharing responsibilities for VET, may be informed by historical cases that illustrate how complexity has manifested – especially in the methods and conditions used to align VET with shifting competence requirements.

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