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Academic drift and metabolic alienation in vocational education

Anja Heikkinen
Tampere University, Finland
(anja.heikkinen@tuni.fi)

Abstract

The article aims to initiate rereading the history of vocational education from the perspective of its contribution to the emergence of the planetary crisis. I hypothesise that this connection relates to the academisation of vocational education and the concurrent changes in the concepts of occupation, vocational education, and academic education. Drawing on studies in the history of vocational education and a few historical documents, I demonstrate my attempt by tracing shifts in the governance of vocational education in Finland from the early 19th century to recent years. In this article, my focus is on the sectoral aspect of this process. I argue it proceeded from the sectoral promotion of industries during primitive capital accumulation towards a comprehensive education cluster in fossil fuel-supported welfare capitalism. According to my preliminary interpretation, academisation connects during these periods with the increasing alienation of social metabolism from biophysical metabolism. Tackling alienation would require revisiting how it has been promoted through (vocational) education in industrial sectors and their global metabolic chains.

Keywords: academisation, vocational education, metabolic alienation, historicisation, Finland

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Introduction

Academic drift – or academisation – in vocational education has become a major topic in European political and research discourses. While these mainly focus on re-positioning institutions at 'levels' of education systems or on the inclusion of 'academic' subjects and contents to curricula, they seldom specify how the educational meanings of vocational and academic are changing in these processes. Yet, this is essential for understanding how they contribute to the escalating planetary crisis, which intertwines environmental degradation, economic and social inequalities, and diverse forms of forced migration. Underlying my exercise is an assumption that to show the meaning of academisation in vocational education requires revisiting its history from the perspective of social metabolism.

In the next section, I describe the conceptual and methodological rationale of my analysis of academisation in vocational education, explicating my interpretations of the 'social metabolism' and 'historicising and contextualising' approach. Because of my familiarity with the context and earlier research, the analysis in the following sections consists of a rereading of findings from studies on the history of vocational and academic education in Finland, contrasting academisation with changes in social metabolism. While disturbed metabolic relations between human and nonhuman biophysical systems are currently – and rightly – addressed to the colonial capitalogenic history controlled by the Global North, I argue that similar and connected processes have occurred inside the Global North. While places such as Finland are exemplary for local adjustment to globalising industrial clusters, and sectoral production and commodity chains (Hjerppe, 1985; Kuisma, 1993), the article narrows the focus to the sectoral aspect of vocational education. Due to the topic's spatial, temporary, and substantial complexity, my synopsis is intended as an introduction for more detailed future studies.

Mainly by following shifts in the governance of vocational education, I discuss the 'industrial-sector dominated' period of vocational education from the early 19th century and the 'comprehensive' period from the 1960s onwards. My preliminary suggestion is that academisation in vocational education can be interpreted as 'metabolic alienation'. More substantial statements would require relating it to the transformation of other forms of education, such as civic (folk/comprehensive) and popular adult (folk) education, but are beyond the scope of this article. Since the enhancement of metabolic alienation took off during the period with the close linkage of vocational education to the sectoral promotion of industries, the argument concludes that tackling the current planetary crisis would require a sectoral response across vocational and academic education.

Conceptual and methodological rationale

Academisation of vocational education – often characterised as academic drift – or vocationalisation of general or academic education are typically discussed from an institutional perspective (e.g., Holmberg & Hallonsten, 2015; Markowitsch et al, 2022). The transformations in education policies, curriculum contents, or pedagogical principles are identified in the frameworks of static, obvious national 'systems.' Due to standardised conceptualisations, institutionalist approaches provide powerful statements for comparative political and research discourse. However, the indisputable entry of the Earth into a new geographical epoch, the Anthropocene, has triggered widening cross- or supra-disciplinary concerns about how it links with human history. This suggests a vital revision of spatial and temporal framework for analysing education that cannot be achieved by ahistorical, anachronistic, abstract, and decontextualised institutionalist approaches.

To problematise the distinction between vocational and academic education, I am utilising the concept of social metabolism, which has been almost unanimously adopted in the cross- or supra-disciplinary discourse triggered by the Anthropocene and environmental crisis (Rockström et al., 2024; Saito, 2022). My approach is influenced by Jason Moore's request to researchers to focus on the world-ecological historical counterpart of the geological era of the Anthropocene, that is, the formation of the Capitalocene. It refers to the capitalist world system that has 'progressed' through the accumulation of capital by appropriating and exploiting four Cheaps of Nature: energy, raw materials, labour-power, and food. The Capitalocene proceeds by extending commodification and capitalisation of unpaid human and nonhuman resources and dustbins, altering nature (in itself) to Nature as a commodity (e.g., Moore, 2017, 2022). Concerning planetary crisis, it is vital to recognise that the local and global flows of human labour and energy and their reproduction are integral parts of the world-ecological process. Moore's interpretation can be extended by Jason Hickel's (2022) empirical analysis of the history of flowing energy, material, labour, and capital, causing economic and environmental inequalities across the Earth. Furthermore, previous approaches should be compensated by Alf Hornborg's (2020) warnings about ignoring the analytical distinction between the asymmetric exchanges of biophysical resources on the world market and their monetary valuing in the capitalist world system (e.g., 'Cheaps'). However, previous theorisations tend to remain abstract and general if they ignore the 'internal colonisation' inside the Global North and South, intertwined with the 'external colonisation' of the Global South by North.

Social metabolism provides a framework for analysing the conceptualisation and institutionalisation of different forms of education based on their transforming contribution to the local and planetary organisation and division of

– human and nonhuman – work in intertwined local and planetary economic formations. To move in such a direction, I have started to reread critically historical studies on Finnish vocational education by contrasting academisation with changes in social metabolism. From the perspective of economic, social, and political history, a quote from economic historian Markku Kuisma, who has studied the transformation of the Finnish forest industry as part of the global economy since the 17th century, is exemplary for my attempt. Following him, to understand the contribution of vocational and academic education in the making of industrial capitalism, research should seek 'to integrate the slow changes of weighty structures with individual decisions, goals and identities of persons, groups, communities, and organisations operating under the pressures and circumstances of their historical context' (Kuisma, 1993, p. 559; also Kuisma, 1999). In addition, in a historical analysis of vocational and academic education, 'it is perfectly clear that ecological and environmental dimensions are to be included in the picture' (Kuisma, 1999, p. 560). Yet, there is hardly any historical research on the environmental dimensions of academic and vocational education to compare my attempt. Although historical studies analysing industrial and economic transformation from environmental perspectives are increasing (e.g., *Environmental History* Journal; Zentrum fur Umweltgeschichte) they remain largely ignored. Therefore, I have utilised findings and interpretations from a pioneering study of Finnish environmental history (Ruuskanen et al., 2021).

Therefore, to understand the transforming relations between academic and vocational education concerning their contribution to (disturbed) social metabolism, I start rereading a selection from the few existing historical studies on Finnish vocational education. They are primarily accomplished by me, some with colleagues, and are mentioned in the References list (Heikkinen, 1995, 2011, 2016, 2018, 2020; Heikkinen et al., 1999, 2002, 2019) and backed by research in economic, political, and environmental history. To illustrate some key interpretations and disputes, I use a few samples from representative figures and official documents. In the following sections, I discuss the transforming relations between academic and vocational education and how they contribute to what can be called 'metabolic alienation', during the 'industrial-sector dominated' period from the early 19th century and the 'comprehensive' period from the 1960s onwards.[1] Tentatively, 'metabolic alienation' indicates a lack of awareness of and engagement with flows of energy and matter in individual and collective work.

To gain recognition, researchers of vocational education have widely adopted dominant conceptions and theories of education, which build on traditions of academic education and do not recognise the diversity and competing functions and interpretations of 'education'. In addition, the standardised approaches in social and educational sciences require adopting English as the *lingua franca* in

the global academic competition. This forces researchers to apply anachronistic concepts of academic and vocational education that do not necessarily match historical and contextual realities. As sociologist and ethnographic economist Susana Narotzky argues: 'Through their ordinary participation in the political struggles of their day, social scientists' commonsense views of their lived experience get entangled in the production of scientific concepts, with the result that the categories used for description and analysis become part of different political projects that treat abstraction and causality in particular oriented ways' (Narotzky, 2007, p. 403). Since the categories of academic and vocational education are politically controversial and affected by conceptual colonisation, phenomena and concepts should connect in rereading the history of vocational education. In the Finnish context, lessons for historicising and contextualising analysis can be drawn from Reinhard Koselleck-inspired research on transforming political concepts in Finland (Saastamoinen et al., 2003).

The institutional history of vocational and academic education in Finland may show similarities to other Nordic countries and Europe. It is common to interpret the academisation of vocational education as a search for recognition among diverse collective actors, while previous elites were using the academic route to maintain their hegemonic status and position in society. Yet, understanding their contribution to the Capitalocene requires analysing them in the intersection of local and global political, economic, and educational relations and struggles. For this, it is vital to notice that the word 'academic' is hardly used in the Finnish language discourse but rather referred to as 'opillinen' (~scholarly) or 'tiedollinen/tieteellinen' (~theoretical/scientific). Equally, the word 'vocational' has had a wide meaning referring to all kinds of occupations and is not limited to institutional and administrational definitions. Despite accepting the use of 'academic' and 'vocational' as generic concepts in this thematic issue, I problematise their universalising usage by drawing attention to their native meanings.

The attempt to contextualise and historicise the contribution of vocational and academic education to the capitalist world system does not mean that comparative studies on institutionalisation and transformation of vocational and academic education institutions would not be relevant. Yet, instead of taking them as given, ahistorical entities, institutions can be viewed from an 'oikological' perspective as emerging organisations of social metabolism, embedded in the earthly economy (oikos). A commonly recognised process towards the planetary metabolic imbalance (or rift) is colonising the Global South by the North, including resources, ways of life, cultures, and minds but its link to the 'internal colonisation' inside the Global North and South tends to be ignored. Studies on changing interpretations of vocational and academic education across contexts and cultures could highlight how conceptions about

work, occupations and industry, and metabolic interaction between humans and nonhumans have transformed and institutionalised.

Primitive capital accumulation exploiting self-sustainability: The turn of the 19th century–the 1960s[2]

Since the 12th century, Swedish economic, political, and religious rule expanded in the Finnish territory until the takeover by the Russian empire in 1808. Yet, while the previous elites maintained their positions, the Swedish language remained hegemonic in political, economic, and educational governance until the end of the 19th century, and in academia even later. To maintain political and economic autonomy under Russian rule and address the growing pressure of movements promoting the political and economic rights of the Finnish-speaking majority, the governing elites gradually started to recognise the Finnish language. Consequently, the vocabulary about education and work was moulded between Swedish and Finnish, as a vernacular and literary language in making. The period between the 19th century and the 1960s was characterised by struggles about ownership and utilisation of human and nonhuman material and energy, and Finland's place in their division in expanding global capitalism. The transforming conceptions of vocational and academic education, work, and occupations reflected the growing metabolic rift between human and nonhuman nature.

Engagement with global capitalism

The links of academic and vocational education to the 'progress' of industrial capitalism and to changing political and social relations are visible in shifts of central governance, which can be contrasted with simultaneous changes in the interaction between human and nonhuman nature. The crucial role of sectoral governance was understandable after Finland's separation from Sweden and becoming an autonomous Grand Duchy of the Russian Empire in 1809. The political, social, and economic infrastructure had to be rebuilt on Finnish soil, but by caring for the maintenance of previous structures, principles, and practices, and resisting their Russification. This included the heritage of a wide peasant economy with local governance, minor burgher towns with trade, craft and manufacture privileges, and state-led promotion of national industries by 'industrially enlightened civil servants' (Heikkinen, 1995; Kyöstiö, 1955; Rasila et al., 2003).

Figure 1 may be complicated, but it should indicate that the institutionalisation of vocational education started in sectoral ministries. It was first targeted as higher education for managers, supervisors, and experts in key industries and public administration, only gradually expanding to lower levels in occupational

hierarchies. The guild system was tiny and did not affect the formation of occupations and industrial relations. The leaders in sectoral administration, industries, and education formed governing networks to promote national industries and economic autonomy and competitiveness, linked to political independence and social coherence. The officers auscultated in state departments or trained abroad, and graduates from the Cadet School and state institutes of agriculture, technology, and forestry were expected to control the effective use of natural resources and labour. Until the 1970s, interpretations, practices, and institutions of vocational education were shaped separately in different industrial sectors. They were negotiated between proponents of sectoral ministries and departments, industries, and educational institutions, typically with similar backgrounds and shifting positions. The gradual expansion of sectoral vocational education 'downwards' was primarily conditioned and framed by the proponents of the higher occupational and educational levels (Heikkinen, 1995; Heikkinen et al., 1999).

The shifts in governance are related to transforming interpretations of occupation and vocational education. Among the Finnish-speaking population, occupation and industry were traditionally subsumed to 'elanto' (~livelihood), referring to the holistic utilisation of human and nonhuman resources required for maintaining life, primarily in rural households. It included hunting, fishing, collecting nourishment and materials from forests, meadows, and marshes, agriculture, animal husbandry, construction, and preparing household items. During the Swedish rule until the early 19th century, the word 'ammatti' (~occupation) has been used as a translation from Swedish and German (~'ämbete', 'Amt') in the marginal guild system but also used for office in civil service. The word 'elinkeino' (~means of livelihood) was used for activities in the peasantry, clergy, gentry, office in civil service and the army, or ownership and management of estates, factories, and big farms. Since the Russian rule, these started to be called 'elinkeinoammatti' (~occupation as a means of livelihood), while 'ammatti' referred to specific, rather individual craft and trade. A critical issue for transforming the interpretations of occupation – and consequently to occupation-oriented education – was 'isojako' (~Great Partition/storskiftet), initiated in Sweden–Finland in the late 18th century to promote a more profitable use of land and forest. The prime time for implementation in Finland was during the mid-19th century, continuing to most remote areas until the 1960s. With the legal division, enclosure, and privatisation of land and the rapid increase of the landless population, the notion of 'ammatti' expanded to anyone who had to gain a living through more specific work, increasingly against salary. Still, as indicated in Figure 2, the dominant employment in rural and largely self-sustaining industries pertained until the 1960s (Heikkinen, 2016; Huhtamies, 2008; Kyöstiö, 1955; Tilastollinen toimisto, 1870, 1874).

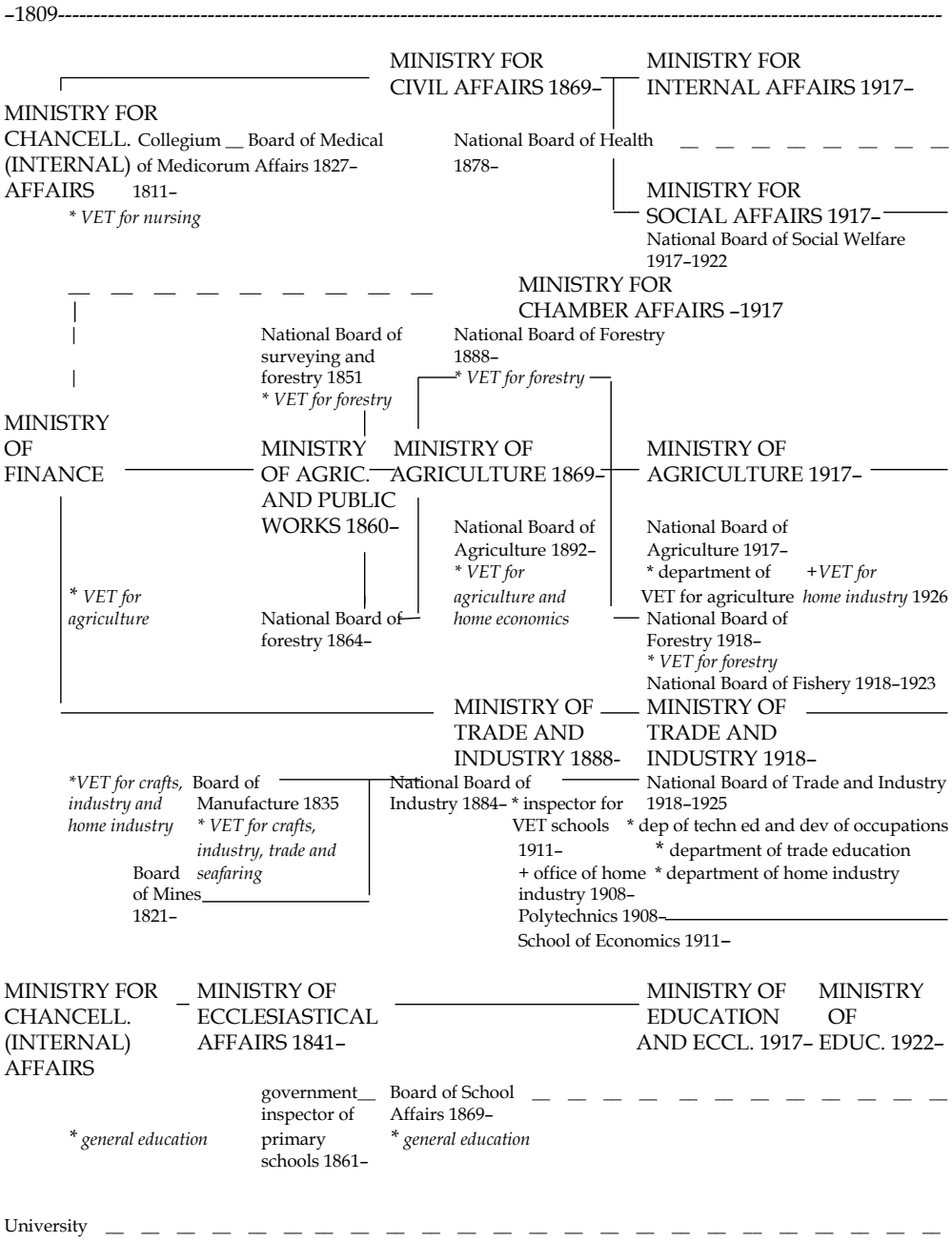

Figure 1. Vocational education in central governance 1809–1999 (Heikkinen et al., 1999).

(Figure 1 continued.)

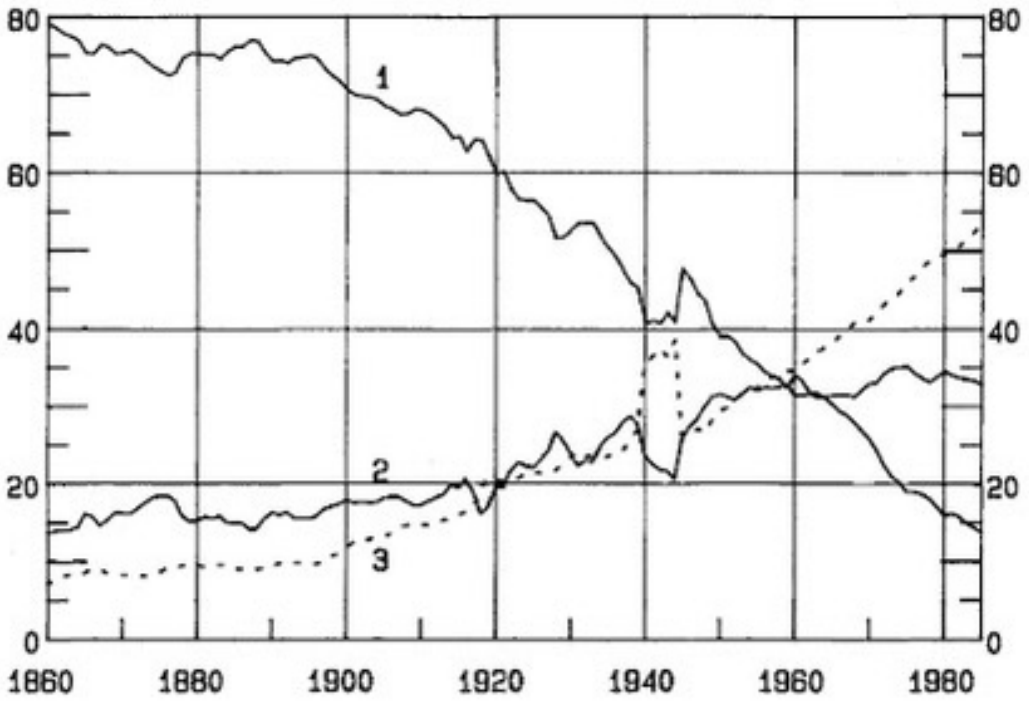

Chart 8. Distribution of Employment, 1860–1985, %

1 Primary production
2 Secondary production
3 Services

Figure 2. Distribution of employment 1860–1985 (Hjerppe, 1989, p. 63).

There is no reason to glorify the attitudes and practices of the rural population towards interaction with nonhuman nature. The use of nonhuman resources was necessary for survival, but still, they were not considered separate objects in life and livelihood. Since production and consumption cycles were largely intertwined, people had to understand the local connection between social and earth metabolism. Especially poorer households practised 'circular economy' long until the 20th century, avoiding wasting anything that could be useful in production and consumption. However, primitive capital accumulation, boosted by cheap wood, water, and self-sustaining labour, made the connection between local and global metabolism invisible to the rural population. During the period, the tar and timber traders, later the forest 'robber' barons, exploited cheap human and nonhuman nature. Extractive and commercial methods started to replace traditional, low-metabolic ways of using forests and waters and reach even the most remote parts of the country, engaging small farmers, landless people, and rural workers as lumberjacks and sawmill workers. In addition, until

independence in 1917, the Russian government and the Senate promoted the textile industry, which utilised imported technology and experts and replaced domestic materials with cotton, primarily for export to Russian markets. Due to reliance on imported expertise and ignorance of domestic traditions and skills, the female excess population from rural areas was preferred instead of children as cheap 'unskilled' labour (Kuisma, 1993; Kuisma et al., 1999; Heikkinen, 1995; Heikkinen et al., 1999; Peltonen, 2004; Rasila et al., 2003; Ruuskanen et al., 2021).

Until the turn of the 20th century, political and economic elites promoted two competing agendas of social metabolism. The successors of Swedish rule trusted Swedish-speaking civil servants, officers, and leaders in the army to enable the Finnish economy to compete with industrialising countries internationally. They degraded the capacity of the majority of the population, whose language they did not understand, and which relied primarily on self-sustaining rural industries. They emphasised the value and importance of a 'practical mindset and thinking', and 'industrial spirit' for developing an economy based on machine-driven production. Instead of referring to 'academisation' they launched natural and practical sciences and scholarship as an alternative to 'sivistys' (~edification/Bildung), the dominant literary, theological, and humanist concept. The holistic initiatives for science-based education for all industrial sectors led only to the establishment of a separate government agency, the Board of Manufacture, in 1834. Its task was to design and coordinate 'lower' and 'higher' technical education together. The first (secular) Act of Vocational Education in 1842 obliged towns to establish 'Sunday schools' for craftsmen and manufacturers but did not satisfy the ambitions of proponents of industrial Finland. Yet, this led to the distinction between technical and vocational education and between them and 'opaline' (~scholarly, theoretical) education, which was considered their required foundation.

The protagonists of the Finnish-speaking majority found agriculture the most important industrial sector, safeguarding political and economic independence, and spiritual and moral integrity. They were looking for examples in rural industries of Denmark and German-speaking countries. They prioritised education for civil service, the promotion of nationhood, and the advancement of rural industries. They criticised the agenda of industrial Finland for supporting the dominance of the Swedish-speaking elites and for preparing staff for the Russian factories, economy, and agriculture. Philosopher and scholar J. V. Snellman, who was a senator and leader of the Fennoman movement during the 1830s–1880s, questioned:

> What is the use of all such agronomists, technologists, bergmen [~'miners'], mechanists, engineers and architects for our country? How can they be used and how can they gain their living? Can even a dozen of these categories find occupation, work, and livelihood? Anyone should understand that the technological and higher agricultural institutes can only educate managers for the factories and estates in

> Russia. [The same with 'bergmen' and architects – AH] […] Illustrative for the plans [for higher vocational institutes – AH] is that the Finnish language does not exist for them at all. Such schools and institutes disregard Finns and assume that industrialists in Finland have nothing to do with the Finnish language. (Snellman, 1858)

On the other side, proponents of the Swedish-speaking industrial elites were also looking at German-speaking countries but referring to the scientific-technological exploitation of natural resources. An opponent to Snellman, A. F. Soldan, a teacher of chemistry in Technical Real School/Institute (est. 1847) and a graduate from the Cadet School, complained that

> The reasons for our backwardness in so many areas are the one-sided scientific education […] We talk about hundreds of years of edification work, but excluding newspapers, which under difficult printing conditions have tried to disseminate something other than religious and reflective enlightenment, what has been the spiritual nourishment of this folk? Only catechism and the bible, supplemented by poems and fairy tales… True, we have highly educated and skilful manufacturers, merchants, businessmen, and theorists of the national economy, who admit the importance of material endeavours. Unfortunately, they are exceptions to the rule […] Also, chemistry and physics, which are the indispensable foundation for understanding the real structure of the world, and which in the edified countries of Europe have contributed strongly to the promotion of industry and edification in general, have here been engaged only theoretically, while their impact on practical life has remained minor. (Soldan, 1862, in Wuolle 1949, pp. 86–87)

Yet, neither proponents of industrial nor agricultural Finland found it meaningful to learn from native practices, methods, or techniques in coping and interaction between human and nonhuman nature in vocational education. On the contrary, traditional ways of life and livelihood were considered obsolete, ineffective, and even harmful compared with solutions in more advanced, productive, and competitive countries. The scale and intensity of utilising nonhuman nature grew dramatically when capitalist production progressed by the end of the 19th century. Land, water, and forests were reserves and waste bins for the growing export industry and national economy. Although universities, including theological studies, had also promoted rationalisation and enlightenment of rural industries, the new vocational establishments deliberately educated leaders and experts to promote technologically and commercially advanced activities. By initiating industrial and economic associations and societies, they also moulded mentalities and practices among the wider population towards 'modernisation' which would support their agendas (Heikkinen et al., 1999; Kuisma et al., 1999; Kyöstiö, 1955; Ruuskanen et al., 2021; Wuolle, 1949).

Still, academic routes – gymnasium and universities – maintained their hegemonic status in justification for societal hierarchies and elite positions. Therefore, also in vocational education occupational and social groups struggled for power, upward mobility, and equality through recognition according to

standards set by academic education. Their importance for proponents of agricultural Finland became visible in upgrading agriculture, then forestry as an academic subject at the University of Helsinki in the 1890s.[3] The concept of academic education became increasingly challenged, when higher vocational institutes of technology and commerce, and later nursing and social work, were also upgraded to the university level. They were not considered to need a faculty of philosophy or humanist subjects, and they gained their status in the hierarchies of sectoral vocational schooling. Academic education started to refer to general or generic, instrumental knowledge and skills, and a mechanism for climbing educational and career ladders.

Towards occupational citizenship in national industry

The meanings between the notions of 'elinkeino/toimiala' (~industry, industrial sector), 'ammatti' (~occupation, occupational sector), 'sosioekonominen asema/sääty' (~socio-economic status/estate) started gradually to separate in the political and economic discourse due to general suffrage and abolishing the estate system in early 20th century. 'Ammatti' became increasingly understood as an individual, though shared, and 'elinkeino' as an organisational activity and means of livelihood. After independence and the Civil War of 1918, social and economic conflicts were solved by liberating tenants and by state-regulated distribution of land to the landless. Consequently, small farms increased, urbanisation was delayed, and self-sustained and multitasking ways of life continued. After the Russian Revolution, vocational education was affected by the turn of the Finnish economy to the West and globalising monetised capitalism, enforcing competing agendas about using natural resources and labour. While big farmers preferred using nature for commercial, rationalised agriculture in vocational institutes for rural industries, the expanding cooperative and rural movements and associations promoted self-education and ambulating schools and advisors for holistic and collective livelihood among small farmers. Despite the rise of the household industry, it remained ignored in vocational education for craft and technical occupations. Proponents of forest, metal, and textile industries favoured cheap export products in big factories, exploiting cheap forests, waterpower, and rural labour force. Thus, besides engineers and foremen, they required vocational schools only to educate politically reliable and skilled workers as machine operators. At the same time, female workers in emerging health, social, and household services asked for recognition of the 'welfare sector'[4] and occupationalisation of their work through schoolish education (Heikkinen et al., 1999).

In vocational education, the mounting ideals of engineers, foresters, and nurses as masters and mistresses of the nation aligned with figures of an independent farmer or member of an industrial worker collective, owning their

work, as opposed to capitalist employers or owners of factories and businesses. From the perspective of the national economy, it was vital to distinguish non-productive groups without occupation. In reality, farmers and factory workers were increasingly subsumed to capitalist industrial relations and monetised interpretations of human and nonhuman work and resources. Thus, the challenges of effectiveness, loyalty, and motivation of 'human machinery' gained major interest in vocational education in schools, management of companies, and households. The principles of psychotechnical education integrated the success of the company and industrial sector, prosperity and independence of the national economy, and performativity and pride as individual workers, increasingly breaking their ties to local communities and traditional livelihoods (Heikkinen, 1996, 2016, 2018; Heikkinen & Henriksson, 2002; Heikkinen et al., 2019; Kettunen, 1997; Tilastollinen päätoimisto, 1934).

Yet, Small Farmers Finland remained a priority in state and mostly rural municipality politics until the 1950s. Consequently, despite the dominance of technology and commerce, distinctive interpretations of vocational education – born in agriculture, home industry, household economy, fishery, forestry, health and social work, which all had their special educational institutions – expanded and deepened between actors of sectoral boards, work life, and vocational institutes. However, during World War II, the proponents of technocratic Finland gained leadership in the economy, politics, and all vocational education sectors. The Department of Vocational Education, in the Ministry of Trade and Industry, envisioned becoming the designer and coordinator of national industries, and allocation and development of the labour force. They emphasised the equal value of economic and vocational edification and culture with spiritual edification and culture. One of the most influential figures in vocational education policy during 1940s–1970s, the head of the Department and later the director of the National Board of Vocational Education, Aarno Niini stated:

> The aim of Finnish education must always be to develop personalities who will and can deliberately build Finnish culture. Since the definition should emphasise as much ability as determination, which implies that culture should besides spiritual cultivation equally include societal and economic activities, prerequisites for spiritual cultivation, education should, besides general, also promote vocational edification. Concerning edification in general, we can demand every citizen to learn a certain minimum of knowledge and acquire shared manners and habits. Instead, vocational edification should be divided into parallel and consecutive school forms, according to the diversity in ways of life. (Niini, 1945)

In post-war Finland, the diversity of interpretations of occupation and vocational education continued, and the connection between sectoral administration, institutes, and industries was strengthened until the 1970s. This was secured by the sectoral organisation of vocational teacher training governed by sectoral ministries and departments. In the schoolish organisation, workers had a minor

direct influence on their education (compared to academic professions). Therefore, teachers with occupational backgrounds became prominent in shaping occupational identities and justifying metabolic relations in occupational work.

Fossil fuels and welfare capitalism, since the 1960s

Until the 1960s, the reconstruction and reparations and the settlement of half a million Karelian refugees after World War II still increased the number of small farms and the continuation of self-sustaining, low-metabolic ways of life. Yet, a radical shift was happening in Finnish politics and economy when a class compromise was established between the social-democratic workers' movement and the export industry. The midwife for the emerging welfare state-capitalism was the replacement of domestic labour, energy, and raw materials – besides humans, plants, animals, wood, and water energy – with imported cheap fossil fuels, fertilisers, and pesticides. While proponents of industrial and welfare Finland shared the belief in scientific-technological progress, mechanisation proceeded in all industries, including the growing export of textile, garment, and shoe products to the Soviet Union. To intensify and rationalise the forest industry, marshes and wetlands were drained massively while increasing waste, pesticides, and fertilisers polluted waters. The few initiatives to conserve samples of 'pristine' nature and improve waste management remained marginal and had a minor effect on industrial sectors or vocational education. Furthermore, state-supported closures of labour-intensive, unproductive small farming led to forced migration to Sweden and industrial regions and increasing suburbanisation (Heikkinen et al., 1999; Koivunen et al., 2001; Kuisma et al., 1999; Peltonen, 2004; Rasila et al., 2003; Ruuskanen et al., 2021).

The principle of 'equality of opportunity', adopted in national planning, promoted centralised, technocratic governance of all areas and stages of education. It started by integrating the folk school and lower gymnasium into a comprehensive school. However, vocationally oriented institutes, including universities of technology, commerce, and veterinary medicine, were governed by sectoral ministries until the 1970s and maintained links to industrial sectors. Implementing unified education policies had to wait until their transfer into the Ministry of Education (Heikkinen & Henriksson, 2002; Heikkinen et al., 1999).

Parallel movements and agendas paved the way to reform vocational and academic education, aimed at democratising society and work life. The 1971 reform committee replaced the concepts of 'academic/scholarly' and 'vocational' education with 'general' and 'vocational' schooling. The schooling system should follow social and economic political goals and facilitate the advancement of a personality structure favourable to them. This should be expressed in concrete,

measurable features and behaviour. General and vocational schooling should penetrate each other and make a continuum from early childhood to higher and adult education. Both should include general and vocational edification; the former refers to abilities useful for all and the whole society, and the latter to abilities useful for certain sectors of society and industry or distinctive occupations (Komiteanmietintö [KM], 1973).

Similar visions were present in university reform discourse, emphasising democratising university structures and educating students for democratic professional practice. In both visions, progress in economy and production and democratisation of society should build on science and technology. The visions still emphasised the sectoral approach, which should construct a progressive pathway from comprehensive school to vocational and university degrees. Though the aim was to liberate humans from hard, routine, and restrictive work and social life, holistic socio-economic planning was expected to anticipate and control potential harmful impacts on nature. The conservation of nature approach was challenged by environmental pollution and led to general agendas and legislation at the state level but not concretised in education. Instead of specifying the protection of nature and the environment in sectoral education, the 1971 reform suggested the creation of a separate sector for environmental protection (Heikkinen et al., 1999; KM, 1973; Ruuskanen et al., 2021).

The reform was implemented only in vocational institutions during the 1980s by creating sectoral strands that shared basic studies, focusing on general (~academic) subjects. National curricula, staff development and vocational teacher training enhanced standardising conceptions of work and occupation. The individualist concept of 'koulutusammatti' (~schooling occupation) was launched as an alternative to concrete tasks and occupations in work life. It emphasises the potential of graduates to express their personality and shape work life, besides increasing understanding across educational and occupational hierarchies. In practice, reform focused on offering general studies as an instrument for progressing along the academic route at upper secondary and tertiary levels. Instead of realising visions of academic education democratising society through professional practices, the parallel university reforms remained as the implementation of standardised degree structures and tripartite internal governance. Simultaneously, all universities transformed into state universities under the Ministry of Education (Heikkinen et al., 1999; Räty, 1987).

The sectoral connections between administration, industries, and vocational institutions started to break during the 1970s when the governance of vocational education was gradually transferred from the sectoral ministries and departments into the National Board of Vocational Education in the Ministry of Education, as indicated in Figure 1. To enhance the unification of the education system, the ministry started standardising vocational teacher training and

bringing it closer to subject teachers' education in academia. After launching a decree on 'general studies of vocational pedagogy' and higher qualification requirements, the category 'teacher of occupational work' was abolished. Since the 1980s, teachers in vocational subjects no longer represented the occupation of their students because they were expected to have the 'highest possible' qualifications in curriculum subjects. The resistance among teachers against increasing standardisation, reduction of occupational practice, and occupation-integrated general subjects in the curricula was gradually silenced (Heikkinen et al., 1999, 2019).

The evolution towards a comprehensive educational cluster, serving other industrial clusters, continued during the 1990s through 'international' streamlining into primary, secondary, and tertiary levels and upgrading higher vocational institutes to polytechnics. On the one hand, the dominant (social-democratic) educational policy emphasised education as an individual opportunity to become a free and equal citizen, worker, and consumer. On the other hand, it aligned the market capitalist view of individuals as generic human resources, responsible for the profitable exploitation of human and nonhuman material and energy. This should promote the competitiveness of industries in Finland, claimed as the condition for maintaining the universalist welfare state. The political governance by the Ministry of Education strengthened after gathering all tertiary education and teacher training in the ministry and replacing the National Boards of Vocational Education and Schools with a National Board of Education with limited competence in primary, secondary, and popular adult education. Despite criticism among vocational teachers, 'lower' and 'higher' vocational education in industrial sectors were institutionally separated, and a standardised certificate of general pedagogical studies was introduced and offered in a few polytechnics and university teacher education departments. The sectoral linkages across occupational hierarchies were increasingly broken (Heikkinen & Henriksson, 2002; Kettunen, 1997; Koivunen et al., 2021).

Vocational teacher education became vital in separating interpretations of occupation and education between polytechnics, 'lower' vocational, and university education. Instead of 'ammatti', linked to concrete tasks and division of work, the basis of polytechnic pedagogy is individual 'asiantuntijuus' (~expertise), combining applying disciplinary knowledge, reflecting work practice, and developing and innovating work life through practice-relevant research. Instead of sectoral industries and organisation of work, polytechnics emphasise close relations and responsiveness to work life in general, compared to abstract and rigid academic education. The individualist concepts of occupation and expertise abolished the ideals of 'ammatti' as participation and belonging to occupational collectives in interconnected industrial sectors and being a citizen. The 'academisation' of vocational education through polytechnics

and vocational teacher education furthered its detachment from concrete metabolic processes and failure to address environmental impacts from local and global production and consumption chains (Ekola, 1992; Heikkinen & Henriksson, 2002; Helakorpi & Olkinuora, 1997; Ruuskanen et al., 2021).

When implementing the latest reforms of universities, universities of applied sciences and vocational education have turned into multi-sectoral conglomerates providing more broad and generic qualification profiles. The concepts 'occupation' and 'vocational' have returned to political and practical discourse with new impetus. The vocational competencies and expertise of individual graduates should directly respond to the needs of industries and promote their competitiveness, and general/academic competencies should satisfy students' personal needs and qualify them for continuing studies. In universities, expertise is defined as part of a Research, Development and Innovation hub for economic competitiveness. However, vocational and academic education are both servants of technologisation, (sub)urbanisation from forced migration from rural areas, and increasing extraction and degradation of the environment. Simultaneously, the erosion of connections to sectoral industries conceals their links to the promotion of competitiveness of businesses and the competitiveness of the national economy. Educational reform policies are increasingly shaping vocational and academic education, including cross-cutting rhetoric of sustainable development. The digitalised, urbanised, internationally competitive welfare society should persist through high-tech solutions of green/pure transition, replacing fossil fuels with wind, solar, water, nuclear, and bioenergy. However, the sustainability measures of vocational and academic education remain silent about outsourcing cheap labour, energy, raw materials, and dependence on fossil fuels and extractive industries to workers and industries in the 'less developed' world. It is questionable if this supports solving local self-caused historical problems of metabolic disruption and alienation (Hickel et al., 2022; Randell, 2017).

Academisation as metabolic alienation in vocational education

The previous sections did not aim to show a causal relation but rather suggest a parallel between academisation in vocational education and distorted social metabolism and metabolic alienation. The Finnish social and economic history is commonly described as a success story: a small, peripheral, and poor country progresses to the forefront of Western welfare capitalism with a highly advanced scientific-technological industry and a well-functioning society. The advantages experienced by most of the population in opportunities for consumption, lifestyle, education, and careers, cannot be denied. However, the other side of the coin is becoming entirely dependent on complex global production, circulation,

and consumption chains and comprehensively alienated from the metabolic processes that such ways of life and livelihood build on.

To simplify, I hypothesise that in vocational education, the transforming ideas of 'academic' education justified the primitive capital accumulation by cheap labour, energy, and raw materials and its extension into welfare capitalism by fossil fuels. Supported by the governing networks in administration, industry, vocational institutes, and academia, they moulded mentalities and mindsets to downgrade traditional and experiential means of livelihood and adopt monetarised, capitalogenic attitudes towards metabolic interaction between human and nonhuman nature. I assume analogous 'internal colonisation', intertwined with 'external colonisation', has happened elsewhere. Since my reflections are preliminary, making diverse controversies, frictions, and oppositions more visible would require more detailed studies and discussion in the future.

Understanding how the 'academisation of vocational education' contributes to the Capitalocene, requires integrating human- and socially-centred and biophysical conceptions of work. Following Hornborg (2020), human work and economy should be biophysically contextualised instead of extending economic and monetised interpretations to nonhuman nature. As an alternative, I suggest an 'oikological' perspective – management and caring of planetary 'household'/ integrated social and biophysical processes – for understanding work as a mediator of social metabolism, embedded in the earth's metabolism. In Finland, metabolic alienation was shaped by sectoral networks of governance, academic, and economic elites. However, in the progressing Capitalocene, their power over the definition and organisation of the 'sector' in industry and occupations has merged with global capitalist networks. Yet, paradoxically, the concepts 'elinkeino' and 'elinkeinoelämä' (~means of livelihood, 'means of livelihood life') are still used for industries and work life in Finnish.

The current disruption of the earth system, accompanied by planetary economic, political, and social crises, is caused by the capitalogenic process, which has made economies and societies dependent on scientific-technological 'progress.' The declarations to 'restore' nature sound hypocritical when the self-inflicted crises are intended to be managed with the same methods as they were caused, relying on the ever-more intensive use of science, technology, and artefacts. From the perspective of the Capitalocene and metabolic alienation, disturbance between social and earth metabolism and human and nonhuman nature, this is a most dishonest response. Although it is impossible to 'restore nature' without restoring the relation between social and earth metabolism, there is no discussion about what kind of means of livelihood should be created to match the 'restored nature'. Yet, any education that shapes them and the local

and planetary organisation of work and industries is crucial in searching for alternative ways of life and livelihoods.

The nationalist institutional focus of policy and research discourse obscures the substantial and analytical distinction between functions and institutions of academic and vocational education. In the framework of social metabolism, any educational activities shaping the organisation of human and nonhuman work, their local and global division, and integration, can be interpreted to have a vocational function. Despite their other functions, such as promoting participation in bodies of and creation of knowledge, shaping social interaction, and enhancing personal self-actualisation, they always also channel people into distinctive positions in primarily occupationally divided work in industrial clusters. The institutional separation of the educational and industrial worlds leads to the illusion of autonomy of education, dominating current individualistic sustainability measures in both vocational and academic education. Addressing the legacy of the sectoral capitalist accumulation and appropriation of human and nonhuman nature embedded in planetary social metabolism requires sectoral, self-critical reflection across academic and vocational institutions and industries, locally and across localities.

Endnotes

[1] The translations from Finnish or Swedish to English in this article are mine.

[2] Since the research literature used for individual notions is wide and repetitive, most references are collected at the end of paragraphs.

[3] Though economics had been an important component of different university subjects earlier, as a discipline, it was established in the Department of Agriculture and Economy as 'Folk economy' (~ political economy), referring primarily to rural industries.

[4] It may be important to recognise the difference between the English expression 'welfare state/society' and the Finnish (and other Nordic) 'well-being state/society'.

Notes on contributor

Anja Heikkinen is an emeritus professor of Education at Tampere University (TAU). Her research, teaching, and publications focus on relations between education, work, and politics, from historical, cultural, and gender perspectives. She has been active in national and international research networks, associations, and projects in vocational and adult education, and history of education, as well as leading the research group Equality and Planetary Justice in Vocational, Adult, and Higher Education in TAU.

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