Computing the Nordic Way: The Swedish Labour Movement, Computers and Educational Imaginaries from the Post-War Period to the Turn of the Millennium

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Abstract • Based on empirical material from Swedish reformist labour movement associations, this article illustrates how digital technology has been described as a problem (and sometimes a solution) at different points in time. Most significant, for this article, is the role that non-formal adult education has played in solving these problems. Computer education has repeatedly been described as a measure not only to increase technical knowledge, but also to construe desirable (digital) citizens for the future. Problematisations of the digital have changed over time, and these discursive reconceptualisations can be described as existing on a spectrum between techno-utopian visions, where adaptation of the human is seen as a task for education, and techno-dystopian forecasts, where education is needed to mobilise democratic control over threatening machines. As such, the goal for education has been one of political control—either to adapt people to machines, or to adapt machines to people.

Keywords • educational imaginaries; popular education history; labour movement history; computer history; workers' education history

Introduction

The societal desire for a computerised future intensified after the Second World War (and has effectively not diminished since). This desire, and the related imaginary, is often based on two principles: firstly, the idea that there is always already something historically significant happening *right now*, and secondly, that this moment will yield a fundamentally different future for all of us. The view that the present moment is unique also implies a distancing from the past, which simultaneously renders many technologies and concepts hopelessly outdated. Today, notions such as autonomous robots, deep machine learning, and artificial intelligence are described with equal measures of worry and fascination (often implying that "the future is finally here"). But the future is nothing new—it has been here before. The belief that we are in the midst of a digital revolution that will change the future forever often assumes autonomous markets and enclosed technologies, and obscures the social and political processes behind development and use.[1] Imaginations of the future have powerful consequences, and it is therefore important to put contemporary assumptions of the digital into a historical perspective, as this can help us understand how the past, the present, the future, and technological development are entangled. By

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1   Judy Wajcman, "Automation: Is It Really Different This Time?" *The British Journal of Sociology* 68, no. 1 (2017).

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trailing the Swedish reformist labour movement, one of the most important stake-holders in the Swedish chronicle of digitalisation, this article aims to historicise the digital citizen of today.

In present times, digital technology is conceived by policymakers and politi-cians, on both national and supranational levels, as a sociotechnical imaginary for increased welfare, wellbeing, and economic growth. For example, digital solutions are said to solve demographic challenges, create sustainable living conditions, and increase the health of the European population.[2]

Schools are increasingly seen as a means for solving any social problem (such as integration or wellbeing)—a global trend referred to as "educationalisation."[3] As this article will show, non-formal adult education is part of this logic and particularly il-lustrates how education has historically been seen as a means of controlling digital development. Non-formal education (*folkbildning*) is defined as organised learning activities that take place outside the formal education system and that do not lead to grades or degrees. However, there is still an instructor, a teacher, a supervisor, a producer and/or an organisation behind this education, and it is planned in advance, which also differentiates it from informal learning in everyday life

Even though there are no EU directives regulating how digital competency should be defined in national policies, digital skills are described as one of eight key compe-tences for lifelong learning. Digital skills, along with literacy and numeracy, is also one of the core competencies in adult education.[4] Arguably, then, digital skills, media literacy, digital literacy, or even AI literacy are today constructed as key solutions to contemporary global issues.

In the context of current digitalisation efforts, Sweden presents a particularly in-teresting case. The Swedish Government has long been engaged in significant polit-ical digitalisation programs and actions.[5] Arguably, the "Swedish tech wonder" be-gan with government initiatives to build computers. In Sweden, such initiatives have long coincided with Social Democratic governments. The current Swedish Social Democratic Prime Minister has asserted that Sweden will need more robots in order to compete with low-wage countries, stating that he wants "more people to be re-placed by robots" and that "we should not be afraid of new technology. We should be afraid of old technology."[6] As such, the best approach to secure the future is if "man and machine can work together."[7] The key to success is described as an increased level of education, as well as an open disposition towards technology. Currently, digital inclusion is tantamount to full citizenship. According to the annual study "Swedes

2   See for example European Commission, "Digital Agenda for Europe" (2014).

3   Edith Helena Hooge, Marlies Elisabeth Honingh and Berber Nadia Langelaan. "The Teaching Pro-fession Against the Background of Educationalisation: An Exploratory Study," *European Journal of Teacher Education* 23, no. 3 (2011): 297-315.

4   OECD, "Education at a Glance 2016: OECD Indicators" (Paris: OECD Publishing 2016).

5   Hans Glimell, Återerövra datapolitiken! En rapport om staten och informationsteknologin under fyra decennier, Tema T Rapport, 20 (Linköping: Linköping University, 1989).

6   Birgitta Forsberg, "Stefan Löfven: Vi måste ha mer av robotisering," interview in *Dagens Nyheter*, 2015.

7   Government Offices of Sweden, *För ett hållbart digitaliserat Sverige – en digitaliseringsstrategi* (Stock-holm: Regeringen 2017).

and the Internet" Swedish internet use is almost 100 percent.[8] This means that virtually the entire Swedish population uses the internet daily, on a computer or a smartphone. The few who do not are also described as being excluded from society.

Automation has always been charged with both utopian imaginaries of an improved world where man is liberated from labour, and a potential future where man becomes enslaved by machines. Historically, Swedish workers—and thereby the labour movement—have always had a close relationship with machines. Even in the early days of computerisation, the labour movement—through unions and adult education associations—became an important actor in conveying knowledge about computers, and in educating people about how computer systems should be designed in order to meet the needs of the future. The labour movement realised early on that new technology was connected with the power to make futures, and the issue of "who owns the future" was central to pushing society in the desired direction. The Swedish reformist labour movement is therefore an interesting case to study in relation to how sociotechnical imaginaries spread and stabilise over time. Even though technology is intimately intertwined with education, this is seldom made visible as an inherent aspect of sociotechnical imaginaries.[9]

As such, this article seeks to explore how the Swedish labour movement has construed overlaps between technical and what I call educational imaginaries. That is, what role has the education of citizens played in the imaginations of a sociotechnical future? Or, to put it slightly differently, how do preferred modes of education and new technological regimes (and potential advances) become fused in practice? To answer this question, the article focuses on problematisations of, and in, sociotechnical imaginaries.[10]

The article starts by providing a background to the Swedish labour movement and its relationship to computers. After this, the method and material are highlighted. There then follows an analysis focusing on five particularly vibrant time periods, and accompanying political-educational efforts aimed at educating adults about computers (and their societal implications).

Sweden, the Labour Movement, and Computers

The focus of this article is on computer politics as enacted by the Swedish broad political left. In this article, this refers to the Swedish Social Democratic Party (SAP), the Swedish Trade Union Confederation (LO), and the Workers' Educational Association

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8   Pamela Davidsson and Anders Thoresson, *Svenskarna och internet 2017: Undersökning om svenskarnas internetvanor* (Stockholm: IIS, Internetstiftelsen i Sverige 2017). The Swedish part of the World Internet Project.

9   Science and technology studies tackles questions about how society, culture and politics shape technologies (e.g. Bijker et al. 1987) and vice versa: how technology shapes society, cultures and politics (e.g. Latour 2005), and what kinds of power asymmetries emerge in such enactments (e.g. Winner 1986, 1980; Haraway 1997; Cockburn 1981). Several scholars have turned to STS approaches to understand enactments of technology in education. This study however aims to turn this around and use education as a starting point to investigate enactments of power and politics in digital technology.

10 See Carol Bacchi, *Analysing Policy: What's the Problem Represented to Be?* (Frenchs Forest, N.S.W.: Pearson, 2009) for the notion on problematizations and Sheila Jasanoff, "Future Imperfect: Science, Technology, and the Imaginations of Modernity," in *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, ed. Sheila Jasanoff and Sang-Hyun Kim (Chicago: University of Chicago Press, 2015) with regard to sociotechnical imaginaries.

(ABF). These three central figures in Sweden's reformist socialism[11] have histori-cally been highly influential political actors in the shaping of the Swedish welfare state. The Swedish Trade Union Confederation, formed in 1898, is an umbrella organisation of trade union organisations affiliated with the labour movement in Sweden. The Workers' Educational Association is Sweden's largest and oldest adult educational association, and is closely linked to the notion of a democratic society. The Swedish Social Democratic party remained in government without interruption for more than forty years following the Second World War, and Sweden is thereby often regarded as home to one of the strongest labour movements in the world. Al-though there are many overlaps between the three political actors, and they can be seen as elements of the same political body, there have also been some disagreements between these actors when it comes to Sweden's early technology policy (which will be exemplified in the analysis).

To broaden the context, the Swedish welfare model has been described as a middle way between capitalism and socialism. For example, the Swedish state has been com-paratively more interventionist and corporatist than other Scandinavian countries.[12] After the Second World War, Sweden was seen as one of the most modernised coun-tries in the world—an international role model in terms of politics and welfare. High employment, achieved through a compromise between capitalist and labour forces, equal access to—and distribution of—benefits, pronounced egalitarianism includ-ing a robust trust in authorities, and a high degree of political mobilisation based on social class are just some of the qualities often associated with Sweden.[13] The relative-ly high taxes, the large public sector, and the political dominance of social democracy are, in turn, often seen as underpinning this development. Today, the glory days of the Swedish model are arguably over, or at least heavily contested.[14] Social democra-cy in Sweden is significantly weakened, and inequality and segregation are relatively high. Marketisation and financial cutbacks have undermined redistribution politics. Taxes and public charges are now comparable to many other countries. It is fully pos-sible to claim that Sweden is a less generous and successful welfare state today than it has been in the past. Nowadays, Sweden does not stand out in any particular way in comparison to other countries. Still, Sweden is a particularly interesting historical case in terms of the overlap between computer policies and education.

Both today and historically, Sweden often comes out on top in national compar-isons of digital competencies. Participation in adult education is also high. This can be attributed to the Swedish Government's ambitions to eliminate formal obstacles to participation in adult education as such, and also to a general determination to

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11 Reformist socialism denotes a political ideology that seeks to change society through reforms, as opposed to the communist left.

12 Tim Knudsen and Bo Rothstein, "State Building in Scandinavia," *Comparative Politics* 26, no. 2 (1994).

13 Gøsta Esping-Andersen, *The three worlds of welfare capitalism* (Princeton, New Jersey: Princeton University Press, 1990).

14 For further discussion see Jenny Jansson "Class Formation in Sweden and Britain: Educating Work-ers," *International Labor and Working-Class History* 90, Fall (2016), 52–69 and Carl-Ulrik Schierup and Aleksandra Ålund, "The End of Swedish Exceptionalism? Citizenship, Neoliberalism and the Politics of Exclusion," *Race & Class* 53, no. 1 (2011), 45–64.

increase equality.[15] Non-formal adult education, as an umbrella term for the independent education endeavours conducted within libraries, adult education associations, lecture clubs, and public broadcasting companies, has a much broader and longer history than can be summarised in this article. Nevertheless, education, in the shape of voluntary non-formal adult education institutions, has been an important part of Swedish society for the past two hundred years. The underpinning justification for Swedish non-formal adult education relies on ideas that a society should be built by its citizens, but also that this building requires (certain) knowledge, values, and education in order for responsible choices to be made. The history of non-formal education is thus enmeshed with the emergence, history, and growth of a civil liberal-capitalist society in general. On the one hand, Swedish non-formal education has its roots in the self-education projects of the early 19th century middle class. At that point, non-formal adult education took the form of voluntary educational assemblies, libraries, and lectures, which, to some extent, brought people together across class boundaries, but with the main purpose of forming a political and civil middle-class identity. On the other hand, the same education effort also has its roots in education as a way of disciplining the "popular classes," which included peasants, the unemployed, the working class and sometimes the lower middle class. In this case, education was seen as a means to suppress, or even foreclose, social and societal concerns that might emerge from, or in relation to, these groups.[16] Berg and Edquist[17] have branded the construction of popular education, as part of the free and voluntary civil society, a process of "autonomisation." Using this concept, they refer to the idea that certain actors are positioned as autonomous, while still also executing government functions. Thus, autonomisation is to some extent an illusion—an ideological construct—which helps produce, and reproduce, the notion of civil society and the notion of free and autonomous citizens, who independently shape themselves through education.

This paradoxical mix of emancipation and regulation can be seen as a foundation of Swedish non-formal adult education, and this contradiction is important in terms of understanding the strong position and success of adult education historically. The Swedish Workers' Education Association (ABF) was formed in 1912, fortifying the bond between the labour movement and adult education. This paved the way for government support for night schools and lectures within a worker context.[18] Adult education, driven by the labour movement, has thus been constitutive in terms of class formation and identity. According to Jenny Jansson, the educational efforts of the Swedish labour movement have boiled down to two main purposes: to compensate

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15 Kjell Rubenson, "The Impact of Welfare State Regime on Barriers to Participation in Adult Education," *Adult Education Quarterly* 59, no. 3 (2009), 187–207.

16 For an enlarged discussion on the development of Swedish popular education see Anne Berg and Samuel Edquist, *The Capitalist State and the Construction of Civil Society. Public Funding and the Regulation of Popular Education in Sweden 1870–1991* (Cham: Palgrave Macmillan, 2017); Anne Berg and Samuel Edquist, "Folkbildning," in *Utbildningshistoria*, ed. Esbjörn Larsson and Johannes Westberg (Lund: Studentlitteratur, 2011), 209–25.

17 Berg and Edquist (2017).

18 Bernt Gustavsson, "The Idea of Democratic Bildung: Its Transformation in Space and Time," in *Popular Education, Power and Democracy*, ed. Anne-Marie Laginder, Henrik Nordvall and Jim Crowther (Leicester: NIACE, 2013), 35-49.

workers for their relatively low level of education (and thereby increase knowledge and skills), and to empower and enlighten workers in order to increase influence, agency, and power.[19] Nevertheless, a humanistic, rather than "polytechnical," norm of education has always characterised ABF.[20]

As mentioned, Sweden's relatively generous welfare model can be explained by the close relationship between the state and the labour movement. The reformist social democratic element of the Swedish labour movement has had a significant impact on society. In this close relationship, discourses of technology emerge as being particularly interesting to examine. Engineering and technology education has, for example, been described as an important tool for progressive education ideas in Sweden.[21] That is, the development of Swedish computer policies (as ways to control the computerisation of the welfare state) parallels the politics of the reformist labour movements.[22] Compared to other countries, the Swedish reformist labour movement has generally taken a positive attitude towards computerisation.[23] This reciprocal relationship between the Government, unions, and industry can be described as a foundation for a strong technological imperative, aiming towards rationalisation and efficiency, something which is also clearly reflected in the welfare politics of the Social Democrats. The Swedish labour movement has been a driving force in implementing technical solutions, ultimately with the goal of increasing living standards and wages.[24] As a consequence, unions have been confronted with the issues of striking a balance between the negative and positive aspects of computerisation, and winning social acceptance for computerisation, which has led to adult education and public information campaigns being proposed as the key solution.[25] The technological optimism (and enthusiasm) of the Swedish Social Democrats can be explained by its "systemic" character. That is, in the view of social democracy, large technological systems (such as the computerisation of work and society) require a strong state as a procurer and even a constructor. Thus, the construction of the modern welfare state also became a construction of a complex "systemic society"—which supported the idea that Social Democrats, rather than individualist and market-oriented politicians, should govern its development.[26] In summary, the relationship between the labour movement and computerisation is one of reciprocity and mutuality, influenced by a system of values, convictions and norms. It is also worth noting that, while government funding for non-formal adult education has been relatively stable over the

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19 See Jansson (2016), 52–69; Jenny Jansson "From Movement to Organization: Constructing Identity in Swedish Trade Unions," *Labor History* 53, no. 3 (2013), 301–20.

20 Thomas Ginner, *Den bildade arbetaren: Debatten om teknik, samhälle och bildning inom Arbetarnas Bildningsförbund 1945–1970* (Linköping: Linköping University, 1988).

21 Magnus Hultén, "Technology as the Language of Schooling: Utopian Visions of Technology in Swedish General Education in the 1960s," *International Journal of Technology and Design Education*, no. 23 (2013), 581–95; Boel Berner, "The Worker's Dream of Becoming an Engineer," *History and Technology,* no. 15 (1999), 281–314.

22 Anders Carlsson, "Tekniken – politikens frälsare?" *Arbetarhistoria* 4, no. 92 (1999), 23–30.

23 Jørgen Bansler, "Trade Unions and Alternative Technology in Scandinavia," *New Technology, Work and Employment* 4, no. 2 (1989), 92–99.

24 Roland Paulsen, *Arbetssamhället: Hur arbetet överlevde teknologin* (Malmö: Gleerups, 2010).

25 Bertil Rolandsson, *Facket, informationsteknologin och politiken: Strategier och perspektiv inom LO 1976–1996*, Göteborg Studies in Sociology 16 (Gothenburg: University of Gothenburg, 2003).

26 Pär Blomkvist, "Ny teknik som politisk ideologi," *Arbetarhistoria* 4, no. 92 (1999), 13–22.

last thirty years, specific educational efforts directed towards computers have coincided with social democratic governance.[27]

Thus, the universalist social democratic construction of the welfare state, from the 1950s onwards, also coincided with ambitions to computerise (by way of its emphasis on a data-driven bureaucratic social system). In practice, this took the form of extensive citizen registration. Debates about personal integrity and privacy therefore emerged relatively early on in Sweden, partly because of the enduring principle of public access to official records, but also because of a long-standing practice of population registration and statistically driven bureaucratisation (where each citizen was assigned a unique number). The Swedish Government was the first in the world to pass a law which regulated the establishment of computerised personal records.[28] As mentioned, education has been put forward as a primary form of governance to create a fruitful relationship between technology and citizens. At the same time, computer education projects were also described as providing public authorities with incentives for digitising citizens.[29] Government efforts to support, and educate about, computerisation have also been recognised as one of the key reasons for Sweden's high levels of computer integration and use, as well as the relatively high frequency of Swedish internet entrepreneurs.[30]

Public information campaigns and non-formal education have been crucial—but too often academically ignored—tools for governance in Swedish computer policies. Interestingly, education projects have rarely been concerned with the practical operation of computers (although such courses also existed). Rather, large-scale efforts were more often aimed at educating large groups of citizens about societal, ethical, political, and practical consequences of computerisation. As such, they are closer to social programs, or popular enlightenment projects—they are mostly not education *with* computers, but *about* computers. A significant part of these courses was devoted to the potential dangers of computerisation, and how these could be avoided for more fruitful and controlled development. Despite this, very little research has been directed towards the meaning and importance of these educational efforts in shaping the digital society and its citizens. Thus, very little research has been done which specifically connects non-formal education about computers, the labour movement, and the governed emergence of the digital citizen. This research gap is remarkable, especially seeing how massive these education efforts were. Their importance in the impending computerisation of society cannot be neglected. This article begins to address this research gap by providing a genealogy of the digital citizen, from the perspective of non-formal adult education and the Swedish labour movement.

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27 Andreas Fejes and Henrik Nordvall, "Vad händer med vuxenutbildningens medborgerliga och demokratiska funktion i marknadiseringens tidevarv?," in *Folkbildningens framtidsfrågor*, ed. Folkuniversitetet (Stockholm: Folkuniversitetet, 2016), 19–31.

28 See *Åsa Söderlind, Personlig integritet som informationspolitik: Debatt och diskussion i samband med tillkomsten av Datalag (1973:289)* (Borås: VALFRID, 2009); Sten Henriksson, "When Computers Became of Interest in Politics," *History of Nordic Computing* 174 (2005), 413–23.

29 *Åke Grönlund, IT, demokrati och medborgarnas deltagande* (Stockholm: Teldok och Vinnova, 2001).

30 Lisa Wiklund, "Circus Days: The 1990s as an Iconic Period of Time for Swedish Internet Entrepreneurs," *Akademisk kvarter/Academic Quarter* 10 (2015), 53–65; Kristina Höök, "Digitalisering av det Vardagliga," in SOU 2015:65, 165–94.

Research Approach

In order to analyse the overlap between education and computerisation, this article focuses on problematisations.[31]

Carol Bacchi builds on Michel Foucault and develops a method for policy analysis, which she refers to as "What's the Problem Represented to Be? (WPR)." In this method, policies are understood as culturally constructed, and dependent on their national or international context. Policies are seen as signs of how governance and order are maintained, and the analysis of the relationships between problems and solutions in these policies can reveal both presumptions and ideologies. The key idea that Bacchi proposes is that we are guided by *problematisations*, and that we need to analyse these problematisations (i.e. what is construed as a problem, how, and why) rather than the problems themselves. An important point following this assumption is that proposed political solutions are co-constructive of the problems they set out to solve. Problems and solutions exist in a reciprocal relationship, where they "configure" each other.[32]

During the time period covered in this article, computers have changed drastically in several respects. In the beginning, computers were the size of a room; today they are discreetly embedded in everyday objects. The changing functional capacities of computers, just like larger technical infrastructures (e.g. the internet), may of course have had an impact on the kinds of problems and solutions recognised. However, as will be seen in the upcoming analysis, the material capacities of technologies are by no means exclusively determinant. Rather, problematisations are heavily dependent on the *imagined social effects* of what computers may (or may not) be able to "achieve" in the future. Importantly, these prognostications, which are essentially guiding politics, impact on issues of inclusion and exclusion in the digital society of the future.

Material

I have elicited empirical material that is significant in connection with the debates during different periods of time. This includes sound recordings, video recordings, policies, course material, union magazines, and conference presentations, from three reformist labour movement associations: the Swedish Social Democratic Party (SAP), the Swedish Trade Union Confederation (LO), and the Workers' Educational Association (ABF). This material consists of 35 policy texts, eight speeches or presentations, 30 newspapers and six course books/films.

As a first step, I have turned to publicly available material, but I have also searched the Swedish Labour Movement's Archive and Library for material concerned with computerisation. As a second step, I have—via an extensive reading—identified texts where distinct disruptions, or key changes, could be identified. New technologies are often charged with both hopes and fears, which leads to quickly escalating debates. Once technologies are accepted and integrated into everyday society, they disappear from discussion equally quickly, and are effectively rendered invisible. This means that descriptions of computers as a problem and a solution do not appear systematically in the material (either regularly or delimited in time).

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31 Bacchi (2009).

32 Ibid.

The results presented in this article aim to problematise current times by making five swoops through history (the 1950s, 1960s, 1970s, 1980s and 1990s). The first is made into the debates of the mid-1950s, based on the fact that this is when the public debate on computers begins. The final swoop is motivated by indications that, since the turn of the millennium, major educational efforts have been both less common and less subject to shifts in political governance. Also, by the end of the 1990s, there is a shift whereby large-scale educational efforts are more often executed *through* computers than *about* computers. However, the analysed material is of such breadth that recurring patterns can be identified across several different sources at the same point in time. As such, the empirical material shines a light on a set of discourses, which in comparison with current discourses, tells us about radically different problematisations, as well as repetitions and similarities.

As a quick summary of the upcoming sections, it can be said that during the 1950s, mass education was seen as a solution to the problem of increasing leisure time (i.e. time off work). These hopes were not fulfilled during the 1960s, as it was mostly government offices that were computerised. In the 1970s, more critique was heard regarding computerisation, and education and public information campaigns were seen as a way to calm the debate and lay the foundations for a more democratic development of technology. The 1980s were characterised by an ambition to educate as many workers and citizens as possible about the implications of computerisation. Finally, in the 1990s, the labour movement procured a computer of its own, in order to increase dissemination of computers in workers' homes. In support of the larger analysis, selected quotations representative of the specific zeitgeist will be presented. Effectively, this article examines descriptions of computerisation from a labour movement perspective, and shows how problematisations have repeatedly turned to education as an imagined solution to hopes and fears relating to digital technology.

Results
The following sections discuss the results of the study. These results show the importance of historicising computerisation discussions, in order to get at the underlying meanings of what is conceptualised as "new," and thereby also parallel demands for new knowledge. Such a perspective can also identify how the artefacts, processes, and policies that we think of as historically ground-breaking may have longer and stranger histories than we first anticipate.

Next, beginning with the 1950s, I will provide a genealogy of the current situation, mapping out problematisations that have taken part in shaping the digital citizen.

Adapt Workers to the Leisure Time Explosion
Even in the 1950s, the question of computerisation was highly topical. The labour movement described the 1950s as being characterised by "a second industrial revolution."[33] Automation (a notion equivalent to computerisation) was described as being particularly central to this revolution.[34] The Swedish Social Democrat Party program "the Politics of Progress" predicted a radical societal change based on new

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33 Swedish Social Democratic Party (SAP), *Framstegens politik* (Malmö: AB Framtiden, 1956).

34 A. Strand, "Inledning," in *Tekniken och morgondagens samhälle*, ed. Swedish Social Democratic Party and the Swedish Trade Union Confederation (Stockholm: Tidens förlag, 1956).

technologies and scientific development. In the right hands, technological development was described as leading to increased (and equally distributed) welfare and a stronger socialist society.[35] Computers would, in the future, "unburden the human work force not only from monotonous and heavy physical labour, but also from exhausting psychological and cognitive activities."[36] Increased automation was also described as creating better conditions for a balanced labour market, with more diplomatic cooperation between various stakeholders.[37] The Swedish Social Democratic Party saw itself as particularly suitable for the task of organising and governing this society, based on the argument that the increased welfare would then benefit everyone. A pertinent risk was identified whereby (capitalist controlled) automation could separate the worker from his proprietorship of the tools. Further, it could also come to lessen his sense of commonality in relation to the means of production. Thus, Social Democrats believed that "[t]he meaning of work, for the individual in the age of automation, can only be saved through *socialism*."[38]

In relation to automation, the Swedish Trade Union Confederation expressed that it did not "feel […] a need to destroy the new machines," and that it was willing to participate in the necessary social planning.[39] The view taken was consequently that *people* needed to *adapt* to the new technologies, and the ensuing *adaptation problem* quickly became critical. This problem was also seen as important in addressing, for example, social care or national defence organisation.[40]

The adaptation problem was thereby soon reformulated as a problem of *education*. In the light of the upcoming automation, education was seen to address three specific issues: firstly, automation would require *more skilled workers* than ever before in order to supervise and maintain the complex machines; secondly, workers should be prepared to *handle an insecure future where the only certainty was constant change*; and thirdly, workers should be prepared to *handle a significant increase in free time*[41]. All these issues were seen as being best governed through citizen education.

So, one needed to be educated, not only to be skilled and flexible in the face of change, but also to endure an increase in spare time. In this process of preparing citizens for automation, ensuring that the human himself was not automated was seen as an important goal. After all, if workers were automated into "a technical beast—a robot," and thereby also reduced to a "sentient electronic brain," the nuclear bomb

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35 SAP (1956).

36 Edy Velander, "Automationen och rationaliseringen I," in *Tekniken och morgondagens samhälle*, ed. Swedish Social Democratic Party and the Swedish Trade Union Confederation (Stockholm: Tidens förlag, 1956), 63.

37 Å. Nilsson, "Fackföreningsrörelsen och automationen," in *Människan i dagens och morgondagens samhälle*, ed. the Workers' Educational Association (Stockholm: Tidens förlag, 1956), 178–86

38 S. Arvidsson, "Skolan och framtiden," in *Människan i dagens och morgondagens samhälle*, ed. the Workers' Educational Association (Stockholm: Tidens förlag, 1956), 91. My translation.

39 Strand (1956), 11. My translation.

40 Tage Erlander, "Samhället, anpassningen och opinionen (referat)," in *Människan i dagens och morgondagens samhälle*, ed. the Workers' Educational Association (Stockholm: Tidens förlag, 1956), 266–68.

41 In 1958, working hours were reduced by three hours a week. During the period studied, working hours in Sweden have been reduced in three stages: 45 hours (1958), 42.5 hours (1967) and 40 hours (1973).

would no longer be seen as the greatest threat to mankind, but man himself.[42] Education was thus seen as necessary to avoid humans, unlike machines, reacting without free will and spirit to important societal problems.

When it came to the issue of increased free time, the Swedish Prime Minister at the time stated: "Today, we are aware that free time is no longer just a complement to the rest of our lives. With the coming automation, spare time must be incorporated into our existence in new ways." The need for education was also described as a precondition for a more humane society: "[w]e cannot escape our responsibility to make the adaptation process as swift as possible, without losing any human values."[43] The suggested solution was that the state should finance cultural workers, artists and non-formal adult education.[44] In parallel with technological development, cultural education was seen by the labour movement as a necessary counterweight: "In a time when human innovation no longer knows any limit, imagination, fantasy and empathy will have a hard time gaining access to the corridors of power."[45] Education had an important function in not only preparing citizens for more free time, but also generating opinion about important societal and cultural issues. In practice, this was arguably also an effort to make people more favourable to technological development, because this would grant both the state and local councils more room to introduce changes.[46]

The increased share of leisure time was described by the labour movement as desirable. Nevertheless, it also involved risks. That is, the "good leisure time" was construed as something significantly different from just being off work: "Free time is often abused by both old and young, so that it is wasted instead of making life richer."[47] At the Swedish Trade Union Confederation conference in 1956, it was stated that:

> It is a well-known fact that the rapid material progress has not been followed by a corresponding cultural uplift. This fact has been at the centre of many debates within the labour movement. We seek comfort in the fact that cultural nurturing is a long-term effort, and that spiritual wellbeing is nevertheless increasing, meaning that there is no reason to despair. Still, we do feel the need to express disappointment at the lack of progress.[48]

As mentioned, education of all citizens was seen as the key solution to the problem of free time, but concurrently also as a way to foster a culturally aware citizen. Non-formal adult education was supposed to create rich and meaningful spare time, where workers were also activated and "cultivated" as citizens. In addition, education was seen as a counterforce to the potential influence from the market, in the shape of a

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42 G. Lundquist, "Människans problem i ett rationaliserat och automatiserat arbetsliv," in *Människan i dagens och morgondagens samhälle*, ed. the Workers' Educational Association (Stockholm: Tidens förlag, 1956), 147–57.

43 Erlander, (1956), 266–67. My translation.

44 S. Sjödin, "Kulturen i klämma," in *Människan i dagens och morgondagens samhälle*, ed. the Workers' Educational Association (Stockholm: Tidens förlag, 1956), 233.

45 G. Biörck, "Vetenskapens och morgondagens samhälle," in *Människan i dagens och morgondagens samhälle*, ed. the Workers' Educational Association (Stockholm: Tidens förlag, 1956), 254.

46 Erlander (1956).

47 Arvidsson (1956), 86.

48 Ibid., 85. My translation.

critical awareness in relation to commercials and requests for consumption. Further-more, the conviviality offered by adult education associations was predicted to be an important part of fostering a truly socialist human.

In terms of technological development, the empirical material from this time is dominated by descriptions claiming that it cannot be stopped, and that rapid pro-gress is the best way forward for Sweden.

The Absent Future

The automation revolution, as imagined in the 1950s, remained unrealised during the 1960s. Instead of robot factories and fully automated everyday lives, offices and governments were instead increasingly computerised. At one point automation was deemed to be progressing so slowly, and having an impact on such a limited part of the economy, that there was no overhanging risk of increased unemployment. In the mid-1960s, the Swedish Trade Union Confederation also pointed out that the com-puter revolution was highly exaggerated, and that there were no discernible causal relationships between technological change and levels of occupation. There are cer-tainly reports in the media about lay-offs resulting from industrial automation, but these are more of an anecdotal character than an appeal for union campaigning. For example, one article describes how a work supervisor at a sugar factory threw him-self in front of a train when the female workers he supervised were replaced by ma-chines. The supervisor was said to miss the afternoon tea, the radio, and the gossip.[49] So, instead of making work superfluous and making room for more spare time, com-puterisation was seen as rationalising work—mostly through its capacity to collect more data than any human is capable of.

In 1966, almost exactly ten years after the most intense debates about impending high-tech future, the Social Democratic Minister of Communications Olof Palme repeated that technological development should not be stopped, but that social de-mocracy must promote a different rationale than commercial companies.[50] This diplomatic stance presented several ambivalent concerns. For example, in order for educational efforts to make the most of the benefits of computers, close coopera-tion between the state and the business sector was called for. At the same time, the rationality of computers was questioned. That is, computers could never "capture" the dreams and hopes of humankind, but we should also not fall back on any "re-actionary retrospection, suggesting that we tie ourselves to the tracks of progress, trying to stop it." However, only three years later, as the 1970s approached, critical voices were raised for precisely this—to stop the machines and to put the brake on computerisation.

Master Computers!

In the late 1960s and the early 1970s, two important things happened. A crucial tip-ping point for the Swedish labour movement was the wildcat strike that erupted in 1969 at the state-owned mining company LKAB. The strike involved eight thousand miners and disrupted the coherence and alliance that had previously characterised

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49 Jörel Sahlgren Oswald, "Automationen och medelklassen," *Stockholms-Tidningen,* (1962).

50 Olof Palme, "Anförande [Public Statement]." Paper presented at the Gumaeliusträffen, Malmö, 1966.

the labour movement. The strike was also accompanied by vocal demonstrations at which placards announced "We are not machines!"[51] A central reason for the strike was the time measurement system that had been implemented at the mining company.[52] In the early 1970s, time measurement and time-based rationalisation were regarded as being firmly connected to computerised management, which in turn was coupled with unequal wages and piece work,[53] something the labour movement had fought long and hard against.

As early as the 1950s, computers had been described as tools for managing the workforce efficiently, but now this was increasingly seen as a problem. Computers were described as a form of updated Taylorism, based on computer-supported time measurements and separated tasks. That is, computers were seen as supporting the transfer of cognitive and administrative control from the worker to the management, which could then increase its power over the labour. Thus, those in control of computerisation were in control of future power. With the help of computers, information about how often an employee was ill or which tasks were performed slowly could easily be elicited and compared between workers. Computerisation would allow employers and management to compile a broad range of information about specific employees. In the future, it was feared that employers would know exactly where a specific employee was at any given time, or that workers would have to take orders from a computer about when and how certain tasks should be performed. Computers were seen as imposing authoritarian control over workers, something that clashed with workers' ambitions to democratise workplaces.[54]

The second significant event concerns public shock at how the Swedish authority responsible for population statistics had been selling information about citizens to commercial companies. This incident sparked a vibrant debate about government computer-supported surveillance of citizens.[55] The labour movement, in this case composed of the Social Democratic Government and the Swedish Trade Union Confederation, became targets of their own critique. Local unions declared that they refused to be "micro-managed" and intended to stop ongoing computerisation projects.[56] Other unions with the Swedish Trade Union Confederation developed their own technology treaties to make sure that computers were not abused or used for exploitation.[57] Citizens were encouraged to request records of their personal information from government databases, using pre-printed forms distributed via adult

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51 Swedish Trade Union Confederation, *Vi väljer vår framtid: Datorerna, makten och våra jobb* (Stockholm: Brevskolan och LO, 1983).

52 J. Fulcher, "Class conflict in Sweden," *Sociology* 7, no. 1 (1973), 49–70.

53 See M. Larsson, "Här står de tysta kontrollanterna…" *Aftonbladet*, March 18, 1978, for examples of the media debate.

54 Swedish Trade Union Confederation, *Datoranvändning* (Stockholm: Brevskolan, 1978).

55 Examples of viral debate books at the time include Kerstin Anér, *Datamakt* (Falköping: Gummessons, 1975); J. Annerstedt, L. Forssberg, S. Henriksson, and K. Nilsson, *Datorer och politik: Studier i en ny tekniks politiska effekter på det svenska samhället* (Stockholm: Tidskriften Zenit i samarbete med Bo Cavefors bokförlag, 1970).

56 Pelle Ehn, Barbro Erlander, and Rune Karlsson. *Vi vägrar låta detaljstyra oss! Rapport från samarbetet mellan Statsanställdas förbund, avdelning 1050 och Demos-projektet,* Demosrapport 10 (Stockholm: Arbetslivscentrum, 1978).

57 M. Jernewall, *Sprängpunkten: En bok om den tekniska utvecklingen, arbetarrörelsens roll och demokratins framtid* (Stockholm: Författarförlaget, 1980).

education associations.[58] One argument for this recommendation was that information, once digital, might very well be beyond human control and especially difficult to change, and it was therefore particularly important to know what data was being stored.

However, both the Swedish Trade Union Confederation and the Social Democrats pointed out that systemic administration of large amounts of data could also be of benefit to the welfare state. As an example, the administration of the public pension scheme and childcare and healthcare benefits was largely data-driven. The computer's capacity for handling large amounts of data, and extrapolating decisions from this, was seen as an important part of welfare state reforms. Unions could also benefit from this, since they could more easily obtain information about who had the right to certain benefits, or compile wage statistics as a basis for renegotiations.[59] The Social Democrats stated that the advantages of computers could hardly be overestimated.[60] Digital information, in the hands of the state, was regarded as powerful, as long as the integrity of citizens and the rights of workers were upheld.

Even though mistrust of technology grew during this period, there was also a firm belief in laws and reforms that could democratise the workplace. The Co-Determination in the Workplace Act was passed in the mid-1970s, giving workers the right to be informed about computer systems active in the workplace. The employer was also obliged to negotiate any changes in work tasks. Furthermore, the act gave workers the possibility to participate in education during work time, something that would become a crucial precondition when implementing large-scale computer courses. Night schools were already an important means for educating the worker, but the fact that one could now participate during the daytime contributed to the forthcoming massive participation in such efforts.[61] Adult education associations were now seen as extremely important for conveying knowledge about computerisation.

From the perspective of the Social Democratic Party, our general ways of thinking and being were described as a product of the material conditions of our lives, and since computers were seen to be altering those conditions, they would also have ideological and psychological consequences. Those in control of the means of production in a given society would thus also control the production of thoughts and patterns of action:

> Frightful scenarios of the future convey images of homes with computers and screens, providing us with never-ending, commercially produced, satellite-transferred fragments of information. Against such tendencies, we must deploy solutions that make people aware of their own agency in acquiring knowledge.[62]

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58 L-E Björk and J. Saving, *Datorer – på våra villkor* (Malmö: Liber Läromedel, 1975).

59 Swedish Trade Union Confederation, *Datoranvändning* (Stockholm: Brevskolan, 1978).

60 Swedish Social Democratic Party (SAP), *Datorer på människans villkor. Ett förslag till principprogram för datapolitiken* (Stockholm: Socialdemokraterna, 1978).

61 P. Lundin, ed., *Den skandinaviska skolan i systemutveckling under 1970- och 1980-talen: Exemplen DEMOS och UTOPIA – Transkript av ett vittnesseminarium vid Tekniska museet i Stockholm den 31 mars 2008* (Stockholm: KTH, Avdelningen för teknik- och vetenskapshistoria, 2008).

62 Swedish Social Democratic Party (SAP), *Datorer på människans villkor: Program för datapolitiken* (Stockholm: SAP, 1978), 65. My translation.

Furthermore, computerisation could also generate an "over-confidence in the meaning of quantifiable data."[63] Nevertheless, the benefits of computers were also stressed. The computer *could* have the potential to rebut these tendencies by providing a so-called "reversed computer," which instead of being a tool for surveillance would be a source of progressive exploration of society and a tool for answering all kinds of citizen-derived questions.

Thus, the material shows indications of a concern that the stakeholders in control of the means of production and financial capital would use technology for their own benefit. In this scenario, computerisation was described as an oppressive "computer force." To counteract the realisation of this scenario, the labour movement aimed to control computerisation democratically and use computers in the service of the people. Citizens (through joint struggle and *education*) were seen as the driving force in shaping this (potentially oppressive, but ideally liberating) technology in practical terms. Computers, as problematised in the 1970s, held a promise of being an emancipatory technology, promoting equality and solidarity. Perhaps more importantly, however, these benefits could only be realised in a *socialist and economic democracy*, and only if each and every citizen was educated about computerisation. Notably, a delay in reaping the benefits was foreseen as citizens would need time to assimilate knowledge and develop a social awareness. Nevertheless, this ambition to educate *everyone* gradually grew stronger and would reach its peak in the 1980s.

Educate Everyone!
By the end of the 1970s, the debate had undergone another shift. In the early 1980s, computerisation was (again) described as unstoppable progress, where Sweden should not "lag behind." During the economic recession of the early 1980s, there was significant unity among the political parties that Sweden must be computerised, and that education was the primary function that could make this happen.[64] In the early 1980s, the study associations received extra money to teach citizens about computers. The motto of the time was: Computing our way out of the crisis.[65] Technology was described as necessary and full of potential, but again only if controlled politically:

> Employees are made redundant by advanced machines and robots. The remaining workforce needs to produce even more. The profit made is invested in technologies that make workers even more redundant. They are forced to work for their own undoing. This is how a nightmarish world is developing right under our eyes.[66]

Again, computers must be actively shaped to benefit public welfare: "People think they need to learn how to program [a computer], and the result is precisely what

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63 Ibid., 70. My translation.

64 Ministry of Labour, *Datorer och arbetslivets förändring*, ed. Dataeffektutredningen, SOU 1984:20, Stockholm: Liber, 1984.

65 See for example the news article "Valspråk för LO, SAF och regeringen: Med datorn ur krisen," *Dagens Nyheter* March 29, 1983.

66 M. Jernewall, *Sprängpunkten: En bok om den tekniska utvecklingen, arbetarrörelsens roll och demokratins framtid* (Stockholm: Författarförlaget, 1980), 29. My translation.

the industry wants. People talk about programming languages, not about real solutions."[67] Politics must, again, control computerisation. Through proactive computer policies, the Government also anticipated less conflict between the computerisation of society and the goal of full employment.[68] Education and engagement were key in transferring power from employers to employees.[69] The Swedish Social Democratic Party expressed this ambition as follows: "We are not supposed to stop development, to work against it. Our duty—as citizens, as politicians—must instead be to control it."[70] The Social Democratic proposition of coherent computer policies was presented in June 1985, and concerned creating the "Good Computer Society," a society characterised by market competition, increased equality, and deepened democracy.[71] It could also be mentioned that the increasing unemployment rates in the early 1980s, particularly among young people, were seen as something radically new and worrying (although the rates were, in fact, lower than today). This contributed to a view of "the threats of computers" as something real and substantial.

Education was construed as a central measure in this task of governance, and computer skills were introduced into the compulsory school curriculum.[72] Since children were now supposed to be computer savvy, the Swedish Trade Union Confederation argued that adults must also be given a chance to develop their computer skills, so that they would not become a "lost generation" in the computerised future. This is regarded as particularly important for the labour movement, since half of the trade union members had a maximum of seven years of schooling.[73] In parallel with this development, voices were being raised claiming that it was crucial to educate *all* adults as a counterbalance to the massive force of computerisation. The Social Democratic Government initiated a national education effort, which was supposed to provide every Swedish citizen with the necessary computer skills—the "entire Swedish population" was thereby the target audience for this educational project.[74] The project was called "Broad computer education and training in electronic data processing" and was described as a "million program for new knowledge." The breadth of this project was doubled: "It is aimed at a broad audience, basically every adult, and the content gives a broad overview of the area. It can be given as part of work, or in one's free time."[75]

The underpinning reasons for this enormous educational effort were presented as follows: Firstly, Swedish competitiveness in general should be increased. Secondly,

67 W. Schneider, "Discussion" presented at the Tage Erlanders datasymposium, Bommersvik 1980, 93. My translation.

68 B. Frejhagen, "Discussion" presented at the Tage Erlanders datasymposium, Bommersvik, 1980.

69 Swedish Trade Union Confederation, *Vi väljer vår framtid: Datorerna, makten och våra jobb* (Stockholm: Brevskolan och LO, 1983).

70 Ingvar Carlsson, "Ett miljonprogram för ny kunskap," in *Forum för vuxenutbildningsdebatt: Arbetsrapport 4: Datautbilning* för alla vuxna, ed. Skolöverstyrelsen (Stockholm: Skolöverstyrelsen, avdelningen för vuxenutbildning i samverkan med Forum V, 1985), 4. My translation.

71 Government bill, *Om datapolitik 1984/85* (Stockholm, 1985).

72 Swedish National Agency for Education, *Läroplan för grundskolan*, Lgr 80: Studieplan – Datalära i grundskolan. (Stockholm: Liber, 1984).

73 Swedish Trade Union Confederation, *Utmaningen: En skrift från LO om hur vi kan lära, erövra och använda den nya tekniken*. (Stockholm: LO, 1986).

74 Commission for Informatics Policy, *Bred data utbildning*, SOU 1985:50.

75 Ibid., 9. My translation.

marginalised groups (e.g. the low-skilled, women, and other vulnerable groups) would become more attractive in the labour market. Thirdly, and most important-ly, education of the entire adult population was necessary to steer technology, and thereby also the future, in the desired direction. Skilled citizens were emphasised as a goal because "citizen-based influence over computer technology" could then be as-sured. As a long-term goal, the commission stated that "all citizens should be given a basic and adequate education in computing.[76] By training the entire population, democratic order could be strengthened and 'the society we want to live in after the year 2000 can be created.'"[77]

The project involved cooperation between many different actors and pedagogical forms, but non-formal adult education was key

> since we represent a party, and a movement, that has always been convinced that knowledge is one of the most important tools in political struggle—and at the same time something that liberates us and makes us grow as human beings—it was natural for us to think in terms of non-formal adult education.[78]

Thus, it was stated that: "Broad computer education should be characterised by a strong connection to the everyday lives of the participants, and the reality they face in society. This requires an 'open' pedagogy, which is best supported in partici-pant-centered education." The goal was to "recreate the glow and ambition that char-acterised adult education during the infancy of the labour movement."[79] The proverb "let a thousand flowers bloom" was used to stimulate a grass-roots computerisation movement.[80]

The Broad Computer Education effort was described as both needed and desired by the population. According to a survey at the time, 40 percent of the population between the ages of 16 and 64 saw themselves as needing computer education. Half of these were so interested that they would sign up for a study circle immediately if one was available.[81] In 1984, 5 percent of the population had a computer at home, but this figure would soon rise.[82] Public authorities emphasised the need for education before acquiring a computer: "Before the household buys a computer, one or more of the household members should take a basic computer class."[83] Education was also described as the best cure for "computer anxiety."[84] The Broad Computer Education program was described as the biggest education effort in Swedish history.[85] In 1984,

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76 Ibid., 48.

77 Carlsson (1985), 4. My translation.

78 Ibid., 7. My translation.

79 Swedish Trade Union Confederation (1986), 65.

80 Dataeffektutredningen, *Datorer och arbetslivets förändring: Betänkande* (Stockholm Liber/Allmänna förlag, 1984), 7. My translation.

81 Statistics Sweden, *Folkets datorvanor: Information i prognosfrågor* (Stockholm: Statistiska central-byrån (SCB), 1984).

82 C. Pettersson, *Datorer åt manga: En studie om datorn som vardagsteknik och kunskapsverktyg* (Linköping: Linköping University, 2001).

83 Commission for Informatics Policy, SOU 1985:50, 51.

84 "LO och psykologerna överens: Information och utbildning bästa medicin mot dataångest." *Dator-nytt* 4 (1984).

85 Carlsson (1985), 4.

a pilot project was initiated, targeting less trained employees. They were offered 40 hours of free computer education during working hours. The plan was to terminate and evaluate the pilot project after six months, and then make a decision on further education efforts. Instead, the pilot project would run for another two and half years, and broad computer education for the entire population was never fully realised.

During this period, broad knowledge about computers was seen as a key solution for fulfilling the hopes and avoiding the risks of computerisation. The problematisations would be transformed, however, and *broad access to computers* would be increasingly emphasised. In the early 1990s, the Swedish bureau for official statistics conducted studies of computer habits. These studies showed extensive differences in class and gender in terms of access to computers, a finding which would generate a series of new problematisations.[86]

Computers for Everyone!

By the end of the 1990s, the Swedish Trade Union Confederation (LO) had entered a new era of computerisation. In terms of negotiations, they had so far mostly been involved with workplace conditions. Now, they were also beginning to negotiate employee access to capital goods—namely the "Trade Union Computer" (*LO-datorn*). This was presented as a necessary effort, since national surveys had shown that the population's computer habits had changed. Specifically, the survey showed that 50 percent of all blue-collar union members did not have access to a computer at home or at work. The corresponding figure for white-collar workers was 10 percent. Consequently, a risk was identified that if action was not taken soon, blue-collar workers would be excluded from the future information society. The Trade Union Computer was the proposed answer—and the implementation of this project has been described as a significant effort in educational politics.[87]

The underpinning reasons for developing the Trade Union Computer were presented as twofold. Firstly, there was the issue of redistribution politics. The national surveys showed that blue-collar workers had poorer access to computers than other members of society. The associated risk was that they would be worse off in the future labour market. They would also be more marginalised in terms of access to information. This was presented as a class-based knowledge gap. The second reason was that the unions would benefit greatly once more union members owned their own computers. That is, by establishing records of members with computers, and by registering those who acquire the Trade Union Computer, union work could be simplified. The computers could then be used to hold "digital councils" and send electronic mail, for example.

The computer was leased by members, and the reason given for this was that it prevented the computer from being re-sold. Further, access to support and better product warranties could be secured through an additional leasing deal. Naturally, the Swedish Trade Union Confederation had much better opportunities to negotiate prices, terms and conditions compared to single individuals, thanks to its massive volume. Thus, a procurement process was initiated. Certain requirements needed

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86 Statistics Sweden (SCB), *Datorvanor 1990* (Stockholm: DF Förlags AB, 1990); Statistics Sweden (SCB), *Datorvanor* (Örebro: SCB Förlag, 1995).

87 M. Martos-Nilsson, "LO-datorn storsäljare," *LO-Tidningen*, October 24, 1997.

to be fulfilled: primarily that the hardware was powerful enough to surf the internet and run modern software. The monitor should also comply with the established Swedish Confederation of Professional Employees (TCO) standard for electromagnetic emissions. These requirements would, admittedly, make the computer slightly costlier, but the Trade Union Confederation stated that it could not accept lower standards in the home than at work. An internet access subscription would also be included in the package. To qualify for the computer lease, proof of membership and a credit check were required.[88] The buyer of the computer was also offered supplementary education through the Workers' Educational Association.

The initiative generated debate within the various trade unions: How many people would actually be able to operate the computer? This question was raised by representatives of a number of local trade unions in the Trade Union Member Magazine. The computer was described as being far too expensive and too advanced to be fully utilised by members. It was argued that such an advanced computer would require extensive training. There was also a risk of increasing divides between rich and poor trade union members. So instead, an appeal was made to procure a computer which was easier to use, and more adapted to the current skills of trade union members.[89] Consequently, the Industrial Union of Metal Workers procured a computer of its own, with a smaller hard drive, and where the buyer was automatically enrolled in the union's IT school.[90]

A couple of months after the launch, the Trade Union Computer was reported to be a huge success, exceeding all expectations. Six months after its introduction, 50,000 members had signed a lease deal. This figure represents almost 2 percent of the total membership. Suppliers reported that they would encounter difficulties delivering products in time if the level of interest was maintained. The project was described as the biggest ever order for computers in Sweden, having a massive impact on the Swedish computer market. The union claimed to have caught the computer industry by surprise, and the result was greater competition and lower prices. However, the industry would also come to "misuse" the concept of the Trade Union Computer, with many retailers marketing and selling "the People's Computer" or "the Trade Union PC" as a way to piggyback on the LO project.

The general divide between white- and blue-collar workers was reported to have diminished, but new splits also seemed to be emerging. The interest in the Trade Union Computer was said to be six times higher among paper industry workers and electricians than among members of the hotel and restaurant union.[91] Class, gender and age were discovered to have an impact on computer adoption and use. In 1999, 16 percent of the female blue-collar members between the ages of 50 and 64 had used a computer within the last year, while 83 percent of white-collar men in the same age range had used one. Over the next few years, this discourse (and the statistics underpinning it) would change dramatically. In the early 2000s, 80 percent of all union

88 M. Martos-Nilsson, "LO-datorn för hela familjen," *LO-Tidningen*, August 22, 1997.

89 Ö. Isgren, M. Wallberg, N. Lund, M. Engelmark, and T. Pettersson, "'LO-datorn' – hur många kan nyttja den," Letter to the editor, *LO-Tidningen*, September 12, 1997.

90 M. Martos-Nilsson, "Allt fler LO-förbund satsar på 'egen' dator," *LO-Tidningen*, December 5, 1997.

91 M. Martos-Nilsson, "Datorköp avslöjar klassklyftor inom LO," *LO-Tidningen*, March 6, 1998.

members had a computer at home.[92] Computers were described as no longer being the territory of men and children. Adoption and use within the female blue-collar member category grew more than in any other category of users. During these years, computer use in homes grew significantly more than computer use at work.[93]

Only a few months after the launch of the Trade Union Computer, in early 1998, the Social Democratic Government introduced a similar reform. This time, *everyone* (who was a taxpayer with a job) would be given the opportunity to buy a computer. The reform was based on the policy that computer equipment provided by the employer could be exempt from taxation. However, the deal also stipulated that every employee at a given workplace must be given access to the agreement. In practice, the reform meant that a computer with accessories could be acquired at less than half the recommended retail price. This general "PC reform" quickly became the most advantageous deal, and would soon replace all other computer access subsidy projects from unions, including the Trade Union Computer.

The domestication of computers exploded during these years. Somewhere between one and one and a half million Swedish citizens acquired their first computer during this period, which could only be seen as extremely important for the computerisation of society. During the first four years of subsidies, the number of households with at least one computer doubled.[94] The home PC was, again, a government effort to "bring everyone on board," with important consequences for computer use in general. Around 20-30 percent of Swedish citizens took up the offer.[95] On a side note, the home PC reform also received international attention. Suddenly, computer manufacturers in the US started receiving significantly more orders from the relatively small country of Sweden.

The home PC reform was a contributing reason why Sweden actually surpassed the US as a leading IT nation.[96] It was, however, criticised for mainly favouring high-income earners and thereby widening the digital divide (a phenomenon often highlighted around the year 2000). Further, the costs for society (and ultimately taxpayers) were regarded as too high, and when the Liberal-Conservative Government seized power in 2006, the reform was abolished. The home PC reform can be understood as a disruptive political effort, as it emphasised access to computers rather than knowledge about them. Instead of broad computer education, technological supply was the focus of political initiatives and subsidies. For the first time in Swedish history, *access* was regarded as more important than increased education. Thus, with the help of the Government, computers were increasingly commodified and privatised.

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92 Swedish Trade Union Confederation, *Datoranvändningen ökar – men stora grupper står fortfarande helt utanför* (Stockholm: Löne och välfärdsenheten, LO, 1999).

93 Swedish Trade Union Confederation, *Ett IT-samhälle för alla? Hur har datoranvändningen och arbetslivets utvecklats?* (Stockholm: Löne- och välfärdsenheten, LO, 2004).

94 Carina Pettersson, *Datorer åt många: En studie om datorn som vardagsteknik och kunskapsverktyg* (Linköping: Linköping University, 2001).

95 R. Steen, *Personaldatorer: En utvärdering av arbetsmarknadseffekter* (Stockholm: IT-Kommissionen, Näringsdepartementet, 2002).

96 IDC and World Times, *Sweden Edges the United States out of Top Positions in the Information Revolution*, 2000.

Discussion

This article has illustrated how computers have been described as a problem (and sometimes a solution) in material from the Swedish reformist labour movement associations, at different points in time. One question to be addressed is why *education* was repeatedly suggested as the solution to both foreseen problems and the realisation of possibilities. One plausible explanation is that "more education" was in fact the most politically appealing alternative (for most stakeholders, ranging from unions and political parties to citizens in general). An alternative strategy, for example a union right to veto decisions about the implementation of new technology, would go against the employer's right to manage work and the division of labour—a fundamental aspect of the Swedish model. Thus, the right to veto was never really considered, and more education became a more politically attractive—and diplomatic—option on which all stakeholders could agree. Another overarching question is how well Sweden has in fact succeeded in forming capable digital citizens. Using a more rational norm of success, the short answer seems to be "incredibly well." Virtually all Swedes are "digitally included," and capitalist and surveillance logics are ubiquitous and normalised in modern societies[97]. However, "pockets of resistance" and new problematisations and tensions are emerging. That is, a renewed public (and scientific) discourse seems to be emerging resembling that of the 1970s, where wider issues such as personal integrity, surveillance, automation, and wellbeing are given renewed critical attention.

To give a more chronological and detailed account, the 1950s and 1960s were dominated by optimism. After "years of degradation and horror in the shadow, and lingering risk, of war," a new age of prosperity emerged. Apart from increased welfare, computers and automation were also seen as generating an increasing amount of free time for workers. The problems of computerisation were thus conceptualised as both a difficulty educating enough skilled people and a struggle to fill the new leisure time with meaningful activities. The effects of computers were thus both desirable and problematic, but education was seen as a perfect solution. It could adapt people to a high-tech society, and at the same time avoid undesirable side effects. From the end of the 1960s, and during the 1970s, computers were described as worrying. Again, education was imagined as guiding people towards risk-awareness and readiness to take charge of technological development—in a collaborative effort, the population would be able to evaluate and control new technologies. During the 1980s, "unstoppable development" became a watchword. Luddite tendencies were regarded as problematic, and it was again described as being important to focus on positive technological potential. The main focus of education was to compensate people at risk—to "update" adults, so that they did not become lost generations in the wake of technological progress. The attempt to educate *everyone* can be seen as trying to create a public-private arrangement that would respect both the needs of industry and the worker. The broad computer education effort was a more diplomatic consequence of the 1970s activist efforts to include workers in the development of the technologies they would use.[98] In the 1980s, computers were once again charged

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97 Shoshanna Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (New York: PublicAffairs, 2019).

98 Robert Howard, "Utopia: Where Workers Craft New Technology," *Technology Review: MIT's Magazine of Innovation* 88, no. 3 (1985), 43-49.

with optimist notions, but unlike in the 1950s, the "Good Computerised Society" had to be controlled by citizens themselves. Education is put forward as an important part of driving developments in the desired direction towards a democratising future. As computers were increasingly conceptualised as "information technology," the 1990s were characterised by an emphasis on *access*—a compensatory political move, which was important for equal adoption and use of computers. Even though these political efforts were not aimed at everyone, only union members and employees, the subsidy was seen as important for domesticating computers and getting households online. All time periods (with the exception of the early 1970s) were characterised by a strong technological imperative. There are differences, however; adaptation was important in all time periods, but in the 1980s and 1990s there was more of an emphasis on control over development. During the 1970s and 1980s the imperative was, in effect, rather one of education. *Everyone* must be educated to become qualified evaluators of technology (or avoid becoming "lost generations"). In the 1990s the educational imperative was slightly dissolved, in the sense that computer education became individualised, and it was up to the individual citizens to educate themselves. However, there was still a strong sense of techno-optimism, fueled by the notion of a "knowledge society." Unique "human capital," such as creativity and knowledge, was emphasised in terms of management, but education was also individualised and preconditioned by access to technology. The home PC project is a clear indicator of this shift.

The labour movement's relationship to computers is connected to its general relationship to technological development. Swedish labour unions were early to accept automation and rationalisations. In parallel, this is also connected to the education efforts of the labour movement, where the development of one's *own* knowledge is central (along with fostering diligent workers and shaping a coherent social movement). At the same time, the overlap between computer policies and education is an interesting field of tensions, problematisations, and solutions. The efforts made by the labour movement to educate people can be seen as an investment in the workforce, and as an attempt to upgrade the worker rather than the means of production. The labour movement, and in particular social democracy, put themselves forward as the most qualified actor to control computerisation. Nevertheless, rationalisation was ever-present, and resistance towards computerisation was also described as a problem that must be addressed. It should be noted that the education of the citizenry was presented as a project with strong nationalist tendencies, as the enhancement of human capital also fortifies national competitiveness.

The organisation of society, and thereby also its citizens, is increasingly upheld through digital technology as systems of values. New technological systems, implemented at different points in time, thereby reveal the political and ideological ambitions of that time—ambitions that are based on dreams, hopes, and imagined risks. Most significant is the central role that education and knowledge, in the form of mass education of citizens, has played in the imaginings of solving these problems. Educational efforts by the reformist labour movement both domesticated computers and disseminated their use, but also prevented resistance to them. However, the main socialist objective, that is to foster a cooperative economy, became less prominent in the material from the 1980s onwards. The Marxist ambiguity about machines—both as capitalist accumulation and a tool for proletarian emancipation—

was also increasingly downplayed. By the turn of the millennium, computers were no longer perceived as a tool for unfair capitalist accumulation or a means of controlling workers.

This article has argued that the discourses permeating these debates expose the political imaginaries of digital technologies as being designed with certain intentions, as supporting (or being compatible with) a certain societal order (and not others)[99], and as increasingly delicate reciprocal relationships between the human-like capacities of machines and the machine-like capacities of society and its citizens.[100] Throughout the studied material, and across different time periods, technological development is often described in terms of an autonomous force (utopian as well as dystopian), where education is mobilised to govern citizens in order to regulate technological development. As such, digitalisation is still—and was for a long time— formulated as a political construction of a new future, where latent resistances were reshaped into problematisations, and thereby into solvable problems. The problems of computerisation have, across different periods in time, repeatedly been rephrased as educational problems and solutions, where educating the entire citizenry has been imagined as a recurring remedy.

As such, the imagined goal for education has been one of political control—either to adapt people to machines, or to adapt machines to people.

Sociotechnical imaginaries of the future are shaped by the idea of progress, and the discourse of progress is in turn often used to justify political intervention. This article has shown that new knowledge is repeatedly enacted as a solution to imagined problems with digital technology. Thus, education is imagined as a societal remedy that will reform citizens into knowledgeable users, but will also repeatedly shape them not to stand in the way of progress. However, Swedish computer politics are shaped by the socialist logic of redistribution where education's strong role as a form of political intervention among the Swedish broad left was often linked to the Marxist view that the ruling class produces the ruling ideology. Those who have the means of production at their disposal control not only capital, but also our way of thinking. Computers and automation are, after all, both machines and information. Knowledge about computers was seen as important because this knowledge also included the power to shape society in the desired direction. Over time, the Swedish labour movement presents educational imaginaries of digital technology that express hope for an epistemic network of heterogeneous actors that can hold society together and enact desired futures for all.

Acknowledgments

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99   Langdon Winner, "Do Artifacts Have Politics?" *Daedalus* 109, no. 1 (1980), 121–36.

100 Lucy Suchman, *Human-Machine Reconfigurations* (Cambridge: Cambridge University Press, 2006).

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