

# Educational imaginaries: governance at the intersection of technology and education

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## ABSTRACT

This article argues that sociotechnical imaginaries, defined as collectively held, institutionally stabilized, and publicly performed visions of desirable sociotechnical futures, are significantly connected to visions, policies, and projects of educating citizens. These visions, policies, and projects – or *educational imaginaries* – constitute ways to problematize, negotiate and ultimately govern citizens and citizenship at the intersection between technology and education. This article presents a model which conceptualizes and analyzes educational imaginaries, and specifically introduces the notion (and method) of ‘problematizations’ into these imaginaries. The model, consisting of four key components – technology, problematizations, collective actors, and target populations – is exemplified through a genealogy of the education of the ‘*digitalized citizen*’.

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## Introduction

Education can be understood as a central mechanism underpinning both the dissemination of and the preparation for (anticipated) societal consequences of digital technologies, ranging from the automation debates of the 1950s to contemporary artificial intelligence discourses. The potential negative effects of digital technologies are repeatedly described as being ‘resolved’ by a better, or properly, educated body of citizens or users. As such, education has long been a central component in the regulation of technology. Another way to put it is to say that education has been used to control technological implementation and govern citizens in order to create desired futures. This means that the problems and hopes of digital technologies have often been reconceptualized as educational problems. This article consequently suggests that education (particularly visions of necessary changes in knowledges and skills) is an integral part of sociotechnical imaginaries (visions of sociotechnical futures), which is often overlooked. I further argue that there is much to be gained by *historicizing* this entanglement in order to understand how it has been a mutual and recurring political approach aimed at creating a desired societal future. The central question can thus be phrased as: what role has education performed in the anticipations of a sociotechnical future? As a result,

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**Table 1.** Overview of educational imaginaries.

	1950s/1960s	1970s	1980s	1990s/2000s	2010s
Problems	Leisure time explosion	Dangerous computing power	Keep up with developments; avoid being left behind	Unequal access to the information society	Digital exclusion = societal exclusion
Solutions	Meaningful spare time through social engineering and education	Collective technological assessment via education	Individual computer skills through education	Computers for everyone	The digitized citizen
Targets	Everyone (especially the 'gifted boys')	Everyone	Everyone (with a focus on women with short education)	Everyone	Vulnerable groups 'outside society'
Collective actor rationales	Adjust people for utopia	Stop dystopia	'Keep up' with technical developments	Create strong 'IT nations'	Digital inclusion for rationalization (profit, surveillance, security)

this article presents a conceptual model for analyzing power and governance at the intersection between technology and education. To exemplify the model, I will focus on how informal education has been deployed as a form of broad governance in the shaping of the digitized citizen, and also show how education, as a part of sociotechnical imaginaries, can be used to untangle the hidden power asymmetries in the relationship between education and technology.

First, I will provide a background on how digital citizenship is understood in contemporary research and how this notion is connected to education. I will then explicate the notion of sociotechnical imaginaries before finally outlining how educational imaginaries provide a conceptual and analytical model of governance at the intersection of technology and education.

### **Background: digital citizenship and education**

Computers have, since the early 1950s, been seen as increasingly powerful tools demanding a serious consideration of their societal impacts (Ensmenger 2012). Education, at all levels, has been a primary (if not the most central) instrument in creating the necessary social preconditions for computerization – as well as for ensuring that citizens retain leverage over computer technology development (Rahm 2019). Today, and perhaps more than ever, technological change demands new and expanded knowledge(s) from the entire citizenry. In a time of ‘digital first governance’ (Baskerville, Myers, and Youngjin 2020; Williamson 2018), it is increasingly regarded as necessary for citizens to also *become* digital. An essential step in this process is to acquire digital competencies, specifically in order to be(come) part of the *digitally included* – a position which, in itself, is becoming a precondition for societal inclusion (Rahm 2018). Furthermore, the *digitalized citizen* is also repeatedly put forward as a qualifier for the continuous and complete digitalization of society (and all its services). What is now termed *digital inclusion* can thus increasingly be seen as an inevitable precondition for complete citizenship (Rahm and Fejes 2017). Interestingly, the dangers of the digital are simultaneously stressed as threats to democracy and citizen participation (Farkas and Schou 2020; Rossini 2020). Concepts and practices, such as online harassment, filter bubbles, fake news, and fictitious facts, are construed as serious societal problems. Another aspect of becoming digital envelops citizens being *overly* digital, or digital in the *wrong way* (e.g. by succumbing to gambling, or subjecting oneself to health hazards). Education, in the form of media literacy, digital literacy, computational thinking, digital skills, and even AI literacy, is again stressed as a solution to such socio-digital problems. (Kahne, Lee, and Feezell 2012).

Digital inclusion is making our everyday lives increasingly permeated by computer code, where governance is made ubiquitous by being embedded in normalized technological materiality. The overlaps between citizenship and digital media technologies are both discursive and material (Deville and Velden 2016). The computer code that envelops the digital citizen is not neutral; it has distinct effects on our lives (Fast and Kaun 2014; Kaun and Schwarzenegger 2014), it re-shapes spaces (McQuire 2006), and it accelerates our experience of time (Crary 2013; Rosa 2013). It sorts, orders, and prioritizes people based on sexist and racist logics (Noble 2018); and it protects borders through biometric ordering (Dijstelbloem and Broeders 2015). Digitalization – with all its protocols and interfaces – is infused into all our mundane activities, but the concealed functionality and

information is the property of the companies and governments that have designed the platforms, the gadgets, and the services. The material asymmetries that made them feasible are obscured, and the social and ecological costs are hidden (Hornborg 2013; Taffel 2016).

The development of continuously updated skills is thereby not only imagined as a way to deal with the problems of regulation, but also as a way to fortify citizens' trust in e-government and e-health systems (Klecun 2012). As mentioned, education has often been imagined as the means by which the best future can be created, and as the best way to address potential threats. From such a perspective, the struggle over the goals of digitalization can be seen as a governing of (different groups of) citizens through education. This governance aims to create a body of ideal citizens who are well-suited to face the foreseen future, or as it is expressed today, citizens who are digitally included. However, the fact that citizenship and (knowledge of) digital media technologies are now so tightly connected is seldom regarded as a result of a long history of educational efforts at different levels. Rather, there is a tendency to see it as a fortunate coincidence, or as a complex effect of seemingly autonomous technological innovation.

As such, this paper argues that in order to understand sociotechnical changes in society, we must analyze what is conceived of, presented as, or implemented as *problems*, and which societal functions these problems transform. Again, there is also a need to historicize the surrounding educational imaginaries, as such an approach can reveal continuities and disruptions regarding which corresponding skills and educational efforts are (construed as) necessary for addressing the problem.

### **Notions of digital citizenship**

In the simplest terms, citizens are the political members of a constitutional society. However, the constitution of 'the people' is in itself always a matter of inclusion and exclusion. The fundamental logic of democracy is about drawing a political boundary between an 'us' and a 'them' (Mouffe 2013). As such, 'citizens are not born, they are made' (Cruikshank 1999, 3), and citizenship is therefore also always a contested politics of belonging (Yuval-Davis 2011). In this broader sense, citizenship includes a wide net of social, political, and economic structures that, together, regulate the relationship between the individual and the state. This definition of *social citizenship* was coined in 1950 by Thomas Humphrey Marshall (1950). Since then researchers have shown how formal rights and actual rights are not necessarily the same thing, and that the concrete shaping of citizenship (and the agencies it includes) is contingent upon gender, sexuality, race, ethnicity, mother tongue, (dis)ability, and so on (Fraser and Gordon 1992; Schierup, Hansen, and Castles 2006; de los Reyes, Molina, and Mulinari). Other critics have shown how citizenship can be used (or transformed) under neoliberal governance, as a way to delegate more responsibilities to individuals, while concurrently delimiting their agency (Kymlicka and Norman 1994). One example of this neoliberal use of citizenship is how education is often regarded as a way to foster 'proper' citizens for the future (Lauder et al. 2006) and the prospect of lifelong learning has been explicitly connected to technological changes in society (Biesta 2009; Field 2006). As critical educational scholars have pointed out, education is an integral part of modern social imaginaries (Barone and Lash 2006; Gidley 2012; Nixon 2017; Todd, Jones, and O'Donnell 2016). These ideas entail the notion that society is made up of individual and free citizens but that they also need specific knowledge and skills in

order to navigate in society as full citizens. Knowledge is also imagined as key in the uphold of liberal democratic societies. This resonates with Charles Taylor who reminds us that: [t]he social imaginary is not a set of ideas; rather, it is what enables, through making sense of, the practice of society” (2004, p. 2). O’Neill (2016) builds on Taylor and states that: ‘[h]istorical analysis of the life cycle of educational ideas and ideals is integral to an understanding of educational policy and practice in a particular society at any given time’. In many ways, this paper echoes issues raised by O’Neill, but specifically connects them to the parallel development of digital technologies and reconceptualizations of citizenship.

Media research into digital citizenship tends to focus on how citizenship is *enacted* by individuals or groups (Lindgren 2017; Mosco 2017), and how they *participate* in the ‘electronic society’ (Mossberger, Tolbert, and McNeal 2007; Hintz, Dencik, and Wahl-Jorgensen 2017; Isin and Ruppert 2015). So, rather than studying the underlying preconditions that made citizens digital, this strand of research examines how people ‘do citizenship’ through digital technologies, or which skills and competencies are required to do it.

How people *act* (or do not act) as digital citizens has consequently been widely researched. However, the historical or structural preconditions (such as large- or small-scale education efforts) are often overlooked. So, rather than underlining what people *do* with digital media technologies (in terms of enacting their citizenships individually), this paper fills a gap by focusing more on the historical and structural relations between *digitalization*, *education*, and *citizenship*, and the question at hand is more about *how* the digital citizen and digital citizenship have been construed, problematized, and governed, through educational imaginaries over time.

### **Computerization and sociotechnical imaginaries**

Computer-oriented imaginaries of society, such as the post-industrial society or the information society, were coined long before the widespread use of the internet (e.g. Bell 1973). These concepts signify a change from the industrial society, where production of goods was central, to a post-industrial society, where the most important goods (and skills) were related to information. This phenomenon is, of course, as widely theorized as it is debated. More critical scholars tend to stress how this change is illusory, that capitalism has always strived toward replacing people with machines, and that a concept such as the information society is only helping to obscure the actual labor, and the material means of production, that underpin and drive it (e.g. Fuchs 2014). Proponents, on the other hand, tend to emphasize the revolutionary and liberating potentials of technology, i.e. that technological development will bootstrap innovation and generate more democracy, more liberty, and more growth. In relation to education, discussions of things digital often end up in entrenched polemics, where extreme downsides are weighed against extreme paybacks. As such, some researchers point to a pedagogical and didactic anarchy, where notions of scrutiny, authority, truth, and rational consensus are overthrown (Brabazon 2002; Fabos 2004). For others, the very same technologies create astonishing opportunities for pedagogical self-realization, collaborative learning, and democratization of studies in general (Collins 2009; Bergmann and Sams 2012). However, instead of simply describing the digital as completely new and revolutionary, or as just ‘more of the same’, this paper argues that a more beneficial approach is to focus on what is framed as problems and solutions at different points in

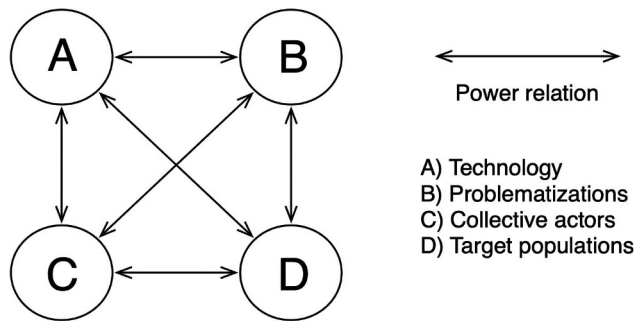
time. Here, the notion of ‘imaginaries’ can be introduced to address how problems and solutions are conceived of and what implications they have. The concept of the ‘imaginary’ has attracted significant scholarly attention over the last three decades, from a range of disciplines (Anderson 2006; Castoriadis 1997; Flichy 2007; Gaonkar and Povinelli 2003; Levitas, 2013; Taylor 2004). Strauss (2006), summarizes the intellectual history and contemporary uses of ‘the imaginary’ as: ‘[f]or Castoriadis, the imaginary is a culture’s ethos, for Lacan, it is a fantasy, for Anderson and Taylor, it is a shared cognitive schema’ (p. 322). To relate the concept more specifically to technologies, I will focus on socio-technical imaginaries as defined by Jasanoff and Kim (2015):

[Sociotechnical imaginaries are] collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology. (Jasanoff & Kim, p. 19)

This definition emphasizes *collective* visions of good and attainable futures, but it is important to understand that technological meaning is also historically embedded and contingent on the technological development of the time. Sociotechnical imaginaries propose that societal discourses can be seen as an integral part of the development of technical systems (Flichy 2007), which is to say that we do not only live with the technologies of *today* (and yesterday), but also with *imagined* future technologies and their foreseen effects (Natale & Balbi, 2014). In many ways, sociotechnical imaginaries become crossroads where future and past, descriptive, and normative, structure and agency, material and mental, local and translocal aspects meet (Jasanoff and Kim 2015). Sociotechnical imaginaries remind us that visions of future technologies always include broader visions of social futures, which in turn include potential risks and benefits, and ideas about the collective good. Likewise, visions of social futures almost inevitably include speculations of associated technologies. As such, they illustrate a reciprocal relationship between policymakers and technology developers, interested in promoting or justifying a specific policy or technology. Collectively held visions of the future can help finance the development of new technologies (for realizing that future); at the same time, new technological innovations can be adopted as solutions to already existing societal problems. Sociotechnical imaginaries can thus be both a goal in themselves, as stakeholders push toward certain collective, stabilized, and performed visions of the future, as well as instruments for legitimizing a certain policy or technological development. This paper’s focus on educational efforts allows us to pay extra attention to the complex interplay between technological achievements and education in sociotechnical imaginaries.

### **Collective educational myths and imaginaries of technology**

Educational imaginaries, as central parts of sociotechnical imaginaries, are introduced in this article as a conceptual and analytical tool for the qualitative analysis of governance at the intersection of technology and education. The analysis of sociotechnical imaginaries has had a tendency to take the construction of skills, knowledge, and education for granted, or at least not devoted specific attention to it. In this article, I want to highlight how education is always central to the general adoption, use, and dissemination of



**Figure 1.** Educational imaginaries as an ideal type.

technology, and as such is also central to the creation of desired futures. In his book on the role of collective imaginaries in social life, Bouchard (2017) outlines what he refers to as a model of mythification, representing a dynamic interaction between four closely related components (social myths, collective actors, target population, and power relations). To accommodate various levels or spheres of application, this model is presented as a so-called ideal type (in the Weberian sense). As such, it denotes characteristics and elements of a given phenomenon, but does not correspond to all potential characteristics of any specific case. Instead, it articulates the components that are common to most cases of the given phenomenon. Bouchard argues that myths ‘must be evaluated on the basis not of its “truth” but of its effectiveness’ (2017, p. 24). As such, his model offers an initial analytical trajectory to unpack how the notion of education, as a solution to socio-technical problems, operates. The relationship between sociotechnical imaginaries and social myths is, in this article, understood as sociotechnical imaginaries consisting of many different, sometimes competing, but also overlapping myths that are continuously repeated (for example the myth of ‘inevitable technical progress’). These myths are used to help frame and advocate for certain problems and solutions and thereby give the overarching sociotechnical imaginaries nourishment and political power. For the purposes of this paper, I have thus proceeded from Bouchard’s model, but I have repurposed it to address educational imaginaries of technology more adequately, and consequently also question parts of the structural layout of the original model (see Figure 1 below). Importantly, in this paper power is understood in a Foucauldian sense – not as something one holds, but as a reproductive force that generates certain effects. As such, the ideal type of educational imaginaries that I propose also consists of four components, but reconceptualizes power relations as existing between the components (rather than, as Bouchard sees it, a component in itself). The specific power relations between the components will of course vary, and will provide fruitful units of analysis in themselves. For example, the relation between target population and collective actors is often an unequal social, political, or economic relation that could be further unpacked in itself. So, instead of power relations being a component, I will argue that it exists as a relation between the components. Further, I will also introduce a new component to the model, problem-solution-co-constructions, or *problematizations* (Bacchi 2009). Put simply, problematizations are discursive framings of what constitutes a problem, and often also a proposed corresponding solution that (at least allegedly) solves said problem.



The rationale behind introducing problematizations into the model is quite pragmatic. Policies, public inquiries, and societal discourses, are essentially built on the problem-solution-paradigm (Bacchi 2012). Their narratives are based upon certain phenomena being framed as problems, and certain efforts being framed as solutions. As such, problematizations interplay with the other components of the model, impacting and coordinating the structural relations between them. However, by maintaining the Foucauldian approach to power as not determined, my model also offers opportunities for including resistance, opposition, paradoxes, disruptions, and alternative stories as elicited from various sources of material. For Foucault, dominance is determined throughout history, but not necessarily by those who are perceived as dominant (e.g. Foucault 1985, 1984a). As such, it becomes important to also reveal, and make visible, both the fact *that* political systems of rules and regulations shape educational imaginaries, but also *how* this (re-)shaping takes place in more detail.

In the model above, educational imaginaries consist firstly of technology, which, I will argue, is practically always an important part of educational imaginaries and its problematizations (from electricity, books, and slates to the internet, smartboards, and virtual reality headsets). I will thus claim that it is hard (or even impossible) to ignore that new (materialized or imagined) technologies are repeatedly invoked as motives for change in educational imaginaries. The next component is problematizations (or problem-solution coordinations), as developed in the Foucault-inspired post-structural policy analysis by Carol Bacchi (2009, 2012, 2015). Here, the function of problematizations is primarily to reveal how something is designated as a ‘problem’ – ideally a problem that also has a corresponding designated solution. Collective actors – policymakers, governments, social movements, educational institutions, et cetera – are mainly those with the agency and mandate to act in a sphere of policy production. The final component of the model is target populations, which are (in this case) mainly groups of citizens who, for various reasons, are seen as being in particular need of particular forms of education – acting in a sphere of reception, appropriation, adaption, and redefinition (Bouchard 2017).

One of the things the model immediately achieves is to clearly illustrate the *inter-connectivity* between its structural components. The power relations are operative in the model, and educational imaginaries can be regarded as emergent functions of the components and their performative relations. Therefore, it is sometimes hard to precisely distinguish one component from the other in a clear-cut manner – simply because they are dynamic in their relation to each other. I will nevertheless move on to discuss the specific components in more detail, exemplifying via the problematization and governance of the digital(ized) citizen.

### **Technology**

While a certain amount of context has already been provided, trying to comprehensively recapitulate the development and societal adoption of computers from the 1950s to the present day is a challenging task. Nonetheless, a condensed history may be useful as a backdrop to the article’s discussion of the digitized citizen. In an international context, the machines built in the 1950s were often backgrounded by military interests, and were large proprietary mainframes and minicomputers, developed for scientific, government, and business applications (Rosen 1969). The 1960s saw companies like IBM and DEC



introduce new brand lines of computers. Their use was still restricted to universities, corporations, governments, and the like (Ceruzzi 2012). Home computers became a market segment during the 1970s and 1980s – Altair, Apple, Commodore, and other vendors developed smaller, more user-friendly, and somewhat cheaper machines (Haddon, 1988). During these decades, the transistor, the integrated circuit, and finally the microprocessor changed the size and reliability of computers considerably – leading up to the personal computer (PC) revolution in the late 1980s and 1990s (Pfaffenberger 1988). The home market grew considerably, along with cheaper and more powerful memories and processors, and ‘recreational applications’ as well as home office applications became common. The introduction of the internet not only spurred the adoption of computers even further, but also radically altered business and consumer behavior, effectively creating a hyperlinked global information infrastructure. Today, computational and networked devices are ubiquitous, and flat screen devices come in all sizes. A pervasive algorithmic culture is emerging, including an ambition to digitize everything and put it online (e.g. the Internet of Things). Artificial intelligence, virtual reality, and (social) robots are arguably beginning to fulfil the imaginaries projected in earlier decades (or even centuries). However, we tend to think of classrooms as the last stop for mature technologies, but educational settings have been central in the user development of computers since the 1960s (Rankin 2018). As such, educational settings have been important actors in computer development.

The sociotechnical imaginary of machines as ‘citizen devices’ has deep roots. Different media and machines have, at different points in history, brought radically different needs for citizens’ education, and have at the same time changed the preconditions for citizenship. With each new (media) technological era follows discussions about the increased potentials and growing dangers – but also new needs for education. The television, the radio, the car, and the printing press, to name just a few of the most noticeable technologies, have all required thoroughly new aptitudes from citizens, and have all had radically liberating potentials ascribed to them (Winner 1980, 1986). The utopian potential of the computer is different from that of the car or nuclear power, for example, in that it has not diminished, but only increased (Johansson and Nissen 2001).

Digital technology is thus *inherently political* (Winner 1980). Technologies have characteristics, or specificities, that can have wide political ramifications. These specificities can also be *designed* with certain intentions, resulting in both expected and unexpected outcomes. Political intentions can be built into computer technologies, but – more importantly in relation to this article – adopted computer technology can be seen as strongly compatible with a certain kind of society and form of governance. Certain technologies require certain power relations and social infrastructures in order to administer them. Winner, expressing a sophisticated view in-between technological determinism and cultural materialism, thus claimed that technologies are not neutral. This position also resounds in some of the material, and the collective actors that have been studied in the work behind this paper – in particular during the 1970s and the 1980s. Computers were seen as much too powerful to be allowed into society without a serious consideration of their consequences.

But not only are technologies suited for certain purposes, and thus not neutral, they are also always striving toward a future sociotechnical imaginary (Jasanoff and Kim 2015), where an even greater technological realization is possible (utopian or dystopian).

In the context of educational imaginaries, it is not very surprising that the sociotechnical imaginary dimension of technology becomes particularly pertinent – technologies are always entangled in sociocultural dimensions, and the (imagined) effects of computerizations have been vividly problematized and actively governed throughout modern history.

Across many different time periods, technological development has often been described in terms of an autonomous force (utopian as well as dystopian), where education is mobilized to govern citizens in order to regulate said technological development. As such, digitalization was, for a long time, formulated as a political construction of a new system, where latent resistances were reshaped into problematizations, and thereby into solvable problems. The problems of computerization have, across different periods in time, repeatedly been rephrased as *educational* problems, where educating the entire citizenry has been imagined as a recurring solution.

### **Problematizations**

Carol Bacchi proposes that ‘we are governed through problematizations’ (2009) and that important analytical insights can be gained from analyzing how problems are construed, rather than the problems themselves. This is a challenge of the problem-solution paradigm which Bacchi argues dominates political agendas in most industrialized Western countries, and in supranational organizations. The problem-solution paradigm refers to the view that policies are the best way to deal with problems in society or in markets (Bacchi 2012). As such, the focus for analyses is on how problems are constituted, conceptualized, and charged with specific meaning, rather than on the factual (or presumed factual) problematic conditions (Bacchi 2016). Various ‘action programs’ cannot be executed without first problematizing their territory. This is grounded in the idea that, there is something problematic there, and that this calls for change. Policies are thereby always already problematizations, Bacchi claims. On this point Bacchi diverges slightly from Foucault, who instead emphasizes how the problematization process is foregone by some kind of ‘difficulty’, which then generates a response from governments (Bacchi 2009; Foucault 1984b). As such, Bacchi’s notion of problematization instead shares a lineage with the science and technology concept of ‘problematizations’ that highlight aspects of power and enrollment into networks (e.g. Callon 1986). This means that it is also closely connected to concepts such as ‘controversies’, ‘problematic events’, and ‘issues’ (e.g. Marres 2005). However, for Bacchi, the problems take form (or even emerge) during the creation of policies, not before. From this perspective, policies are not *reactions* to problems that exist in society; rather, they reframe (or even produce) a certain societal phenomenon as a problem. By producing problems (that also require solutions), these action programs construe certain conceptualizations of what the problem is. This leads to the value of understanding problems as not existing outside the frames within which they are produced and conceptualized. Bacchi even warns us that the idea that problems exist independently of the conceptualizations of these problems can have serious political implications. That is, because the problematizations are based on some form of consensus (that something is problematic and should be solved), they can obscure how governance takes place, how order is upheld, and, not least, which underpinning assumptions and values shape the problem. Bacchi puts it this way:

Problematizations are framing mechanisms; they determine what is considered to be significant and what is left out of consideration. As a result, public policies create ‘problems’ that channel and hence limit awareness of and sensitivity to the full range of troubling conditions that make up our existence. (Bacchi 2009)

So, even if problems – according to Bacchi – do not exist outside the action programs and policies that create them, the *representations* of them gain their own agency and impact, materially and symbolically, on how we are governed and how we live our lives. Bacchi states that ‘Policies constitute “problems”, meaning that they make a “problem” exist as a particular type of “problem”’ (Bacchi 2009, 263). Following Bacchi’s ideas, the approach of educational imaginaries contributes to problematization studies, and insights into the process of how problems are made, rather than trying to solve actual problems in themselves.

Again, rigorous analyses of the relations between solutions and problematizations can make fundamental, and potentially obscured, assumptions and values visible. A clear example of this is how digital exclusion is described as a problem. The problematization envelops a solid association between digital inclusion and societal inclusion. Notably, however, the concept of *exclusion* is in itself labelling, connoting and producing a certain type of problematization. The solution to societal exclusion consequently becomes digital inclusion. Further, problems must be understood as pluralistic and, often, entangled in other problematizations. Bacchi describes it as central to also study how problematizations are nested within each other (Bacchi 2009). Digital inclusion/exclusion is thereby closely connected to the problems attached to (a lack of) trust, democracy, and education. The digitized citizen, as a desired citizen, is a problematization/solution, which is built on a deep commitment to digital progress as a solution to all kinds of societal problems – including historically.

For example, the automation of the 1950s was imagined as bringing a quick and comprehensive increase in standards of living, and the first central problematization was the lack of a properly educated workforce. In 1957, the scientific journal *International Review of Education*, issued by UNESCO, devoted a special issue to automation and education. In the article ‘The call for men’, Idenburg advocated a scientific method in the search for talent in order to educate more of the ‘the gifted boys’ (1957, p. 416). This meant that both women and ‘low talented’ (sic) people were problematized as others, but in different ways. The second central problematization of the 1950s was the leisure time explosion, which was problematized as a central desired effect of a computerized society, but also as dangerous since it could potentially allow for more immoral living where popular culture would gain increased importance in the everyday lives of citizens (Dobinson 1957). The problematization shifted in the late 1960s and early 1970s, when computers were increasingly associated with imperial capitalism, surveillance, citizen control, and an invasion on personal integrity (Ilshammar 2007). The central problematization of the time was framed as ‘Who controls the computers?’. A foreseen solution was education about computers, giving people the capacity to control, govern and further develop computers in desired directions. During the optimistic and rapid technological development of the 1980s, many countries launched broad educational efforts directed to the entire citizenry. Examples of this are the British BBC computer literacy project (Twining, 1986) and the Swedish ‘Broad computer education and training in electronic data processing’ (Rahm and Fejes 2017). During the 1990s and around the turn of the

millennium, computers were increasingly conceptualized as ‘information technology’, and as such *access* to computers (and thereby information) was presented as a particularly important prerequisite for democracy (Berman and Weitzner 1997). Nowadays, a political coherence regarding digitalization seems omnipresent, on both national and transnational levels (e.g. European Commission 2014). Access to digital media technologies is seen as a human right (United Nations 2016), and as important as access to clean water or electricity (House of Lords 2015). As such, the use of digital media technologies is seen as a prerequisite for acting as a citizen. Digital inclusion becomes equal to societal inclusion.

Current (and historical) problematizations see conceptions of technology as being entangled with ideas about which knowledge and education citizens need, both now and in the future. This is fundamental to the general type of citizen that is being construed. Changes in (imaginings of) technology drive changes in (imaginings of) education, which in turn drive changes in technology. As mentioned earlier, this pertains to which desired type of citizen is being construed, and what skills this citizen should possess. Digitalization is today also presented, by both private and public actors, as the best solution to all kinds of problems, ranging from social exclusion to environmental problems and lack of housing (Cabinet Office 2014; European Commission 2014). In parallel, education is imagined as important in facilitating digital inclusion (Yermeche 2020). As such, current discourses are dominated by a lack of friction, where everyday smoothness, efficiency, and constant connectivity replace utopian social visions of change through digital technology. Further, as this replacement is located in an omnipresent system of power asymmetries, it will also serve the interests of those in power. As Joan Acker (2006, p.459) puts it: ‘In a culture that glorifies individual material success and applauds extreme competitive behaviour in pursuit of success, inequality becomes a sign of success for those who win’.

### **Collective actors**

Collective actors are the key stakeholders in the production of problematizations. They are, of course, not solely authoritative, and their relationships with the other components of the educational imaginary model are often complex. When it comes to the production of (problematizations in) collective imaginaries, Flichy (2007), – and the edited volume by Jasanoff and Kim (2015), – point to several possible types of collective actors: the scientific community and renowned individual scientists; companies and business leaders; social movements; educational institutions; political parties and prominent politicians; NGOs; public and legislative authorities; news media; popular culture and marketing; and popular science books, magazines and authors, to provide a non-exhaustive list. Of course, both within and between these groups of collective actors there are also power relationships and negotiations, or competition, over what we might call standardized problematizations (i.e. problematizations that are more or less agreed upon, and which are recirculated across collective actor outlets). The relationships between collective actors are often characterized by a circulation and continuous redistribution of agency and power between the governing state, social movements, and the market. Notably, these actors also overlap, and the boundaries between them are at times difficult to maintain (King and Pearce 2010).

An example of this is how, in the 1950s, many states effectively functioned as risk capitalists in computer development (McCartney 2001; Rosen 1969). Governments were consequently influential actors and procurers in producing and guiding problematizations around automation and computerization during this time. The main ambition was arguably to adapt people to an impending computerization of society, ideally characterized by increased welfare and more free time. But, if computers held a promise of utopia in the 1950s, this idea shifted in the late 1960s and early 1970s, when potential problems with computers were seen as so pressing that stopping their development was actually discussed. In some cases, the imminent computerization of certain workplaces *was* in fact stopped by striking workers (Ehn, Erlander, and Karlsson 1978). The social and public critique of computerization that characterized the 1970s shifted again in the 1980s. Grand government efforts to educate the whole citizenry were once again launched to keep people from ‘lagging behind’ in an unstoppable computer development. During the 1990s, collective actors emphasized access to technology, and governments’ efforts were often guided by providing public access. Today, digital society is increasingly controlled not only by governments, but also by multinational corporations, acting in a competitive market (Zuboff and Schwandt 2019). From a government perspective, digital skills are still seen as an educational (techno)fix that ‘solves’ exclusion. Thus, in problematization terms, the digital citizen is construed as the normal and desirable state of being, which at the same time also construes the problem – someone who is digitally excluded (the unwanted and abnormal). As such, contemporary education actors often emphasize their role and responsibility in increasing digital inclusion. However, the boundaries between actors are sometimes not distinct. Berg and Edquist (2017) have branded the construction of non-formal education as part of the free and voluntary civil society, a process of ‘autonomization’. Using this concept, they refer to the idea that certain actors are positioned as autonomous, while still also executing governmental functions. Thus, autonomization is to some extent based on an illusion – an ideological construct – which helps produce, and reproduce, the notion of civil society, but also the notion of free and autonomous citizens who independently shape themselves through education. The idea of autonomization becomes a useful concept in order to problematize the collective actor component of the educational imaginaries model. The state has, in many ways, used non-formal or liberal education in attempts to achieve computer educational goals, for example in efforts to reach adult citizens. As such, non-formal education (in the form of public broadcasts, for example) has historically been a way to manufacture consensus and to convey a sense of transparency around computerization. Non-formal education was seen as an adaptable actor that could quickly respond to new circumstances. So, by delegating computer political ambitions to swift, open, and citizen-grounded education and information, such ambitions have been re-cast as democratization processes, rather than state governance. As such, power relations between actors become central, including as an emergent effect of the enactment of imaginaries.

According to Foucault, power of domination is reproduced in rules, rituals, and the carefully designed procedures that distribute rights and obligations. A problematization approach is consequently not only interested in the creation of meaning, but also in revealing systems of domination and submission. This means that:

Humanity does not gradually progress from combat to combat until it arrives at universal reciprocity, where the rule of law finally replaces warfare; humanity installs each of its violences in a system of rules and thus proceeds from domination to domination. (Foucault 1984a)

Foucault presented systems of rules as colonizing regimes of dominance. The argument is that success throughout history is the same as controlling, or dealing with, the systems of rules. The term ‘to deal with’ entails not only a following of rules, but also an ability to use the rules against those who created them – that is, to shape, pivot, obscure, hide from, and redirect rules. In relation to the inherent political aspects of technology (Winner 1980), collective actors can thus be theorized as actors controlling or dealing with a (technological) system of rules.

Over time, many different collective actors have of course shaped problematizations in relation to technology and target populations (Rahm 2019). However, many of these actors have also performed state functions, as collective actors also have to relate to, handle, pivot, but mostly conform to, the general political agenda. At the same time, the role of the state has increasingly converged with that of the market – it is complicated to remain outside the digital imperative today, and as such the necessity for states to be interventionist in targeting populations is transformed. Interventions and efforts are instead focused on including the digitally excluded in a state-market hybrid of digitalism. Even though borders between actors are blurred, when many actors collectively uphold systems of rules, it also becomes a system of standardized problematizations. An efficient collective actor is one who can adapt to the system society – a holistic system made up of many components, shaping a totality, which is more than the sum of its parts. The system society preceded computerization, but is strongly compatible with it – in effect, they have a reciprocal relationship. As such, the computerized system society represents an imaginary of a seemingly self-organizing society, where the political intermingling of humans and machines is neutralized and normalized.

Today, the digitized citizen is construed as a seemingly autonomous actor, whose enactment of citizenship is conditioned by various socio-technical preconditions. The digitized citizen is thus both an individualized and an aggregated actor who sustains the digital imperative. Decisions about citizens are increasingly relocated to (digital) places where they are no longer presented as judgements, but as facts. Decisions are made invisible, since they are no longer political evaluations, but objective results (Gulson and Witzemberger 2020; Sellar and Gulson 2019). As such, the digital citizen also becomes a detached and apolitical concept – a necessary effect of computerization, rather than a historically emergent and politically charged figuration negotiated by collective actors.

### **Target populations**

The main target group included in educational imaginaries of digital technology was, for a long period of time, the general citizenry. *Everyone* was seen as being in need of some educational adjustment to handle the effects of computerization, or to control the digital development. Nevertheless, certain groups have also been problematized as particularly important targets for education efforts.



The concept of ‘automation’ was, during the 1950s, used to refer to an automated process including at least one ‘electronic brain’. An electronic brain was a colloquial concept used to refer to a digital machine that could control other machines. The British Department of Scientific and Industrial Research (1956) announced that in a state of full automation, the workforce can be reduced to maintainers of machines. The threatening hazard, as it was anticipated, was not one ubiquitous computerization as such, but rather not computerizing swiftly enough (Dobinson 1957). The automated future was expected to increase wealth, decrease workloads, create more spare time for everyone, and thereby increase well-being for all (Ivres 1956). The computer was conceptualized as a symbol for rapid technological development, and seen as increasing the demands for education in a changing society, where the individual must always be ready to re-educate himself. Automation was anticipated to be a powerful tool in the service of rationalization and productivity. From an economic standpoint, this was also seen as the *only* way to raise standards of living, increase consumption, extend spare time, and enrich the personal lives of the masses. Thus, humans needed to be adapted to this new type of society and education was anticipated as the best means to this end.

Although a growing need for an educated labor force was foreseen in order to secure a better future, differences in talent, capacity, and intelligence were expected to affect opportunities in the future. Through scientific methods, the most suitable candidates for education and re-education could be identified (Fejes 2006). These sifting procedures would also constitute a fairer way to determine futures, compared to letting economic conditions determine an individual’s possibilities.

If the educational imaginaries of the 1950s focused on adapting people to an impending high-tech future, the educational imaginaries of the 1970s represented the opposite – adapting machines to people’s needs. Knowledge of computers was regarded as important in order to control the threatening computing power. An illustrative example of this was that at the time, the Nordic countries conducted policy-driven workplace-based research and education initiatives, where a specific ambition was to include ‘low-skilled’ professions in the knowledge production of computers. These initiatives are often referred to as ‘the Scandinavian approach’, and are the starting point for the field now known as participatory design. The purpose of this education was to strengthen the position of workers and to provide them with tools to express requirements for computer systems, but also to develop computer systems in line with their needs (Gunnarsson 2006; Carlsson et al. 1978; Ehn and Sandberg, 1976; Palme 1976). In practice, however, these educational efforts were often aimed at those who were regarded as *more* qualified for computer use within the low-skilled professions – something which arguably created marginalization within groups. Norms relating to who the ‘qualified worker’ was, and whose knowledge counted, had consequences on popular education and other educational efforts regarding computers (Gunnarsson 2006).

From the turn of the millennium, the focus increasingly shifted from the general body of citizenry to those who have neither the technology nor the desired knowledge. Even though digital competency is a ubiquitous requirement in current times, not everyone is conceptualized as being in need of education. In fact, most people are not. The vast majority of adults are already digital, and educational efforts are, today, instead directed to the few – those on the ‘outside’. These efforts are thereby directed toward those who



are often described as already being the most vulnerable people in society: migrants, the homeless, people with mental health needs, and the elderly (Tinder Foundation 2016). The European commission stresses that:

[...] digital skills are increasingly needed throughout the economy and society for work, leisure, learning and participation. They are key competences; as important today for modern economies and their citizens as reading and writing. (European Commission 2016)

As such, the non-user of the computer is no longer depicted as left behind in technological development, but as left *outside of society*. Those who do not use digital media technologies say that they are not *interested* in their use or, for that matter, their usefulness. Very few refer to a lack of access, or a lack of time, as a reason for non-use (Davidsson, Palm, and Mandre 2018). As such, use is no longer a binary category (i.e. use vs non-use). Instead, there are new categories and divides. ‘Rare-users’ and ‘super-users’ are two new categories presented as important in order to understand today’s media landscape (Davidsson, Palm, and Mandre 2018). Those who are described as digitally excluded are then not (only) those who do not use digitally networked media technologies at all, but also those who only use them a few times a week. So, even though more and more people are using digital media, digital exclusion is not decreasing; it is growing, since people who are not using it ‘enough’ are now also depicted as digitally excluded. However, ‘shallow use’ (e.g. extensive gaming, gambling, and shopping) is also presented as a problem (van Deursen and van Dijk 2014). Even more so, extensive use is also problematized for those who are swayed by ‘fake news’ and ‘fictitious facts’ (Farkas and Schou 2020). These problematizations relate to excessive, insufficient, and misguided use of digital media, which is in turn often connected to low(er) levels of media or information literacy (Jones-Jang, Mortensen, and Liu 2021). Accordingly, the European Commission’s recent review of key competences for lifelong learning stresses the need to encourage ‘responsible participation’ in the digital society (European Commission 2018a). The digital citizen is consequently not only construed as someone who uses digital media technologies enough, but instead someone who seeks opportunities for self-development and someone who constantly keeps up with technical developments (Vuorikari et al. 2016). A common view is that digital skills and literacies will have to be complemented by soft skills or ‘powerful knowledges’ (Young and Lambert 2014), such as ‘learning compasses’ (OECD 2019a) and ‘futures literacy’ (Miller 2018). This means that proficiencies in anticipation, predictive knowledge, and social and emotional management (such as self-regulation) are seen as increasingly important for well-being, responsible citizenship, and ‘thriving in a digital world’ (OECD 2019b).

For most target populations, the governance of the digital citizen results in an increase in self-governance. It is the individual’s responsibility to always update himself, to maneuver and adapt to the algorithmic control of his citizenship, to escape his filter bubble, to learn to distinguish fake news from ‘real news’, and to regulate and remedy his (over)use of persuasive digital technologies. Today’s (desirable) digital citizen uses digital technologies ‘just enough’, and in ways that make him economically competitive and healthy. The digital citizen of today is construed as an active, informed and engaged citizen, who, through digital technologies, effectively interacts with authorities, takes

active responsibility for his own health, makes informed and independent choices, and 'drives innovation' (in some generalized sense). It is also seen as urgent that citizens have an opportunity to contribute and participate in the digital society, but not to *change* it. They are not imagined as evaluating, developing, or changing technology (as they were during the 1970s, for example), and are instead conceptualized in line with Toffler's (1980) old notion of *prosumer citizens*, i.e. as concurrent consumers and producers of digital media content.

Interestingly, such prosumer citizens – and their activities – are described as important in enabling a democratic society, and as ensuring future possibilities for the individual. Important abilities are entrepreneurship, learning to learn, and computational thinking. Computational thinking can be defined as the ability to (re)phrase a problem so that it can be solved by a computer. Thinking *within* the digital imperative is thereby encouraged, and the digital citizen can be understood as a product of, compatible with, and in reciprocal relation to, the advanced capitalist society.

As such, digitally excluded groups are also imagined as socially and economically beneficial to digitalize. For example, because of the growing ageing population, and an impending future where more people will need more expensive medical treatment, societal costs will rise dramatically in the coming years. The European Commission (2018b) stresses that e-health initiatives and care robots will be crucial for keeping healthcare affordable and accessible. The problems of an elderly population are thus resolved through more digital solutions.

In summary, the target groups of current times are 1) those who are already outside society and for whom a promise of digital inclusion is a promise of societal inclusion, 2) the non-user or rare-user who needs motivation in order to *want* to be digitally included, and finally 3) groups seen as not possessing *the capacity or the necessary education* to keep up with developments (i.e. non-users), or seen as using digital technologies too much or too superficially (i.e. wrong users), and who therefore need to be corrected. Digital competencies are increasingly defined as a *continuum* of making use of digital technologies, describing a desired, or proper, use of digital artefacts. Inscribed in these descriptions are differentiations between deeper (better) and shallower (worse) use. While the general population today is digitally included, the target groups of today are not especially unique historically. Like previous target groups, they are ordered in an intersectional logic of class, age and gender, and other 'unifying signifiers' (Lykke 2010). One difference is arguably that the target groups for digital adjustment today are increasingly groups who do not themselves request education. The adaptation (or education) of citizens is expressed somewhat paradoxically, since it emphasizes the importance of education to keep up with the unstoppable and impending computerization of society, while at the same time also underlining education as an important tool to understand and control the very same computerization process and its impacts on the individual (Laginder, 1989).

## Conclusion

By historicizing and analyzing the relationships between computer politics, citizenship, and education politics, this article has demonstrated how educational imaginaries fit into sociotechnical imaginaries. It has further shown that citizens and computers are now more entangled than ever before, but also that computer technology has, since at least the 1950s, had a significant impact on citizenship formation. This relationship has shifted from managing the unwanted side-effects of computerization to imaginaries of total digital inclusion. Regardless of whether the sociotechnical imaginaries are colored by hope or fear, education is repeatedly imagined as one of the central solutions to realize the hopes – and steer clear of the threats – of computers. This article has further shown how educational imaginaries, as a silver-bullet solution to problems of computerization, have had important functions as governing tools for at least 70 years. Scholars such as Gillespie (2014) and Seaver (2018) have studied algorithms as central aspects of media ecologies and how more and more data is made ‘algorithm ready’ by patterns of inclusion. Following this conceptualization, it could be argued that education is imagined as a pattern of inclusion making citizens algorithm ready. The targets for non-formal educational efforts, such as social programs, information campaigns, and mass education, have often been the whole body of citizenry – although certain risk groups have also been seen as particularly important to adjust. These risk groups have been historically contingent, but have often been construed as already marginalized or problematic in some sense. The summarizing Table 1 below presents an overview of the educational imaginaries during different time periods, and also serves as a reminder of the decisive entanglement of technology in educational imaginaries.

Nowadays, citizenship is conditioned by digital inclusion. Governing forces, and thus education, must arguably work to re-include citizens in a society that they were already part of, but which, through an unmitigated computerization of society, they have been gradually excluded from. Digital inclusion is imagined as solving societal exclusion, as well as adapting people to the ubiquitous use of digital technology; not too much, not too little, and in the proper way. Government-funded educational efforts herd citizens toward the digital capitalist market, where they become ‘users’. For the past 70 years, problematizations – in relation to (computer) technology, collective actors, and target populations – have been key components in political ambitions to educate an appropriate future citizen. That is to say, computers have always been associated with educational imaginaries. Education has repeatedly been set up as one of – if not the – most appropriate and effective forms for adjusting the citizen to the effects of computerization, promoting computer literacy, and later on fostering the completely digital citizen. It has been imagined as *particularly* suitable for getting people to use, evaluate, and influence digital media technologies, but also, to a certain extent, for evaluating and harnessing the risks associated with computerization. Societal organization, including the control of its citizens, is thereby partly upheld through education(al imaginaries) about digital technologies and their potential effects on stakeholders. By studying educational imaginaries and *problematizations* of technological imaginaries in relation to collective actors and target populations, educational-political ambitions based on dreams, hopes, and imagined risks can be made visible. The competencies demanded of the digital

citizen are co-shaped by how the digital ecology of the citizen is designed and regulated, and thus digital skills are a moving target demanding endless renewing of competences as a solution to new problems with and hopes for technology.

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## Notes on contributor

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