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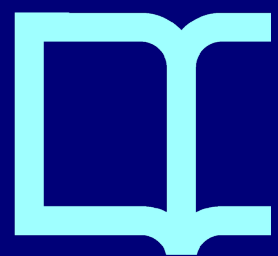
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# Engineering Lifestyles: career choices in late modernity

Jörg Müller

## Introduction

There is widespread concern about the low and declining participation of young people, and women in particular, in science, technology, engineering and mathematics (STEM) fields. Becoming a scientist is the least attractive option for children aged 12 to 13 (Archer, DeWitt and Willis, 2014). While engineering is a more attractive choice for boys (after business and sports), it is the least attractive for girls, along with science. Warnings by the European Round Table of Industrialists (2009) and others (OECD, 2008; Osborne and Dillon, 2008) about the declining labour supply in mathematics, science and technology should therefore come as no surprise.

We know that there is a complex interplay of individual and structural factors involved in this decline, but this insight can be enriched with perspectives from youth studies. Young people stay away from STEM fields for many reasons, including their decreasing interest, the perceived difficulty of STEM subjects, rejection of outdated models of STEM education, negative parental influence, school context and patterns of gender and ethnic exclusion. However, their choices are also related to the formation of increasingly expressive and creative identities. Contemporary trends towards individualisation and a widespread social emphasis upon creative self-

expression form part of the context for their study choices and preferences. Although processes of identity formation have long been the subject of educational and sociological research (especially in relation to gendered study choices), these processes have seldom been treated as key factors influencing career trends. Only recently has there appeared 'an emergent agreement that students' choice of higher education is closely interwoven with their identity construction' (Holmegaard, Madsen and Ulriksen, 2012: 188).

For some time, youth studies and cultural studies have highlighted the delayed entry of young people into an increasingly unstable and erratic labour market, and detailed its consequences for delayed adulthood (Ainley and Bailey, 1997; Ashton, Maguire and Spilsbury, 1990; Furlong and Cartmel, 2007). Consumption has also displaced work as a fundamental element of youth identity formation. Music, fashion and leisure are becoming more important to identity formation than traditional forms of work, not least because work itself has become erratic, temporary, and often precarious. This shift, in late modernity, places specific demands upon young adults, who now have to construct themselves as autonomous actors responsible for their own work destinies. Certain professional fields are less attractive to young people because they are fundamentally incompatible with the identities being fostered in today's young.

Whilst, however, traditional, very formal, and, to students, 'boring' technical careers are losing their attraction, apparently more creative work in design, fashion, or music, for example, involves an unprecedented level of self-exploitation, and this is partly due to a powerful personal identification with their work on the part of creatives. The desire for autonomy, self-management and

identity fulfilment helps to explain why the current generation of young workers is not only staying away from STEM careers, but is also enticed by more attractive alternatives, whose benefits have been 'virtualized'. As the present chapter will argue, the alternatives to technical careers are creative occupations that can be understood as forms of virtual work, not so much because they rely upon immaterial forms and circuits of production, but rather due to their immaterial quality of the benefits. Virtual work refers thus in the context of the present chapter specifically to the creative industries (Hesmondhalgh and Baker, 2011; McKinlay and Smith, 2009) where the enabling mechanism for the virtualisation of reward can be observed particularly well due to the over-identification of workers with their job. The fact that job satisfaction remains high despite very delicate working conditions draws the attention to those mechanisms that have managed to replace concrete (monetary) rewards with other types of benefits. Work is done not necessarily for monetary remuneration but for much more ephemeral assets such as networking and potential customers, portfolio building, or simply self-interest. Examining thus the ways in which identity is woven into the workings of the creative industries achieves a much deeper understanding of the virtualisation of work, including specifically the processes of its valorisation.

### Changing attitudes towards technological work

The following discussion is the product of an extensive literature review across a diverse body of research, including youth studies and the increasingly late and complicated transition of young people into the labour market; cultural studies and the role of consumption for young people's identity formation; management literature on how to accommodate a new generation of young

workers; and STEM education. Regarding the latter, the literature reviewed dealt specifically with the persistent underrepresentation of young women in Computing and Electrical Engineering. Overall, the literature review was designed to gather evidence for the ways in which contemporary youth identities are formed by their different types of life activities. The aim here is not primarily on dimensions of social identity such as gender or class, and their impact on career choices, which have been widely studied and are relatively well-understood (Eccles and Davis-Kean, 2005; Sáinz and López-Sáez, 2010). Rather, I wish to highlight the insights generated by a treatment of identity construction as a personalised, self-conscious, and self-directed process in late modernity.

The analysis drawn from the literature review will be complemented by the results of case studies of the participation of women in Spanish university telecommunications and computer science departments. I carried out these case studies in six departments of four universities, conducting 44 semi-structured interviews, focus groups (with a total of 63 students), and an analysis of curricular plans and official gender equality documents (for details on the methodology across the four major technical universities in Spain, see Müller, (2011)). The case studies showed the deep incompatibility between students' identity projects and the nature of technical careers for which the students were being prepared by the teaching staff.

The waning attraction of STEM careers is well illustrated by the under- and declining representation of women in these fields specifically Computing and different forms of Electrical Engineering. That women are predominantly employed in female-dominated professions like nursing or teaching, and much

less in male-dominated fields like computer science or electrical engineering, is not new. Extensive research testifies to the persistent under-representation of women in STEM, discussing the major causes and possible remedies (for a critical review see, for example, Cohoon and Aspray, 2006; Singh, Allen, Scheckler et al., 2007). One of the main explanations for the dearth of women entering engineering careers, and especially computer science as a profession, is the close association between technology and masculine culture (Cockburn, 1985; Wajcman, 1991). Many of the attributes of hegemonic masculinity, such as aggression, hierarchy, dominance and competition, are also features of some information and communication technologies (ICT) activity. Computer slang, for example, includes violent terms, while computer gaming is regularly associated with first-shooter games, predominantly male gaming pursuits. As Faulkner (2000) argues, 'being machine focused' vs. 'being people focused' further sustains this disjuncture between the feminine and technology. The hacker, nerd, or 'geek' is one of the most iconic stereotypes of computer- and technology-related activity. The association between the nerd - an impoverished, a-social being - and computing results in technical professions having little appeal for many women. Feminine gender identity is usually associated with communicative and expressive behaviour; for women, computing work thus involves 'gender inauthentic' behaviour (Cockburn, 1999). Indeed, the popular image of technology, and more specifically computing as a profession, lies at the centre of a semantic discourse that codes technology as predominantly masculine, deterring women and resulting in female under-representation in these fields (Cohoon and Aspray, 2006: 145 ff).

While aversion to technological, and indeed science, professions is much more pronounced among girls, boys exhibit a similar, albeit less pronounced,

reluctance to going into STEM careers. There is a surprising relationship between the level of development of a given country - measured in terms of the UN Index of Human Development (IHD) - and young people's attitude to science and technology studies and professions: the more developed the country, the less willing are young people to engage with science and technology (Sjøberg and Schreiner, 2005). This relationship is most pronounced among schoolgirls, who are less willing than their male counterparts in the same country to work in technological fields. Norway, which tops the IHD ranking, ranks lowest in terms of pupils' propensity to pursue technical or scientific careers. Statements such as 'I would like to get a job in technology' are negatively correlated with the level of development of the country. A partial explanation is that, in countries with lower living standards, technological professions are meaningful choices that can make a difference to those countries; in countries with higher standards of living, this is not necessarily the case. Technological endeavours recede in significance and get taken for granted. What then becomes paramount is how well certain fields of study and working life fit into young people's existential concerns. Young adolescents look for options that are meaningful and fulfilling to them, and that they can be passionate about.

Paradoxically, students do perceive sciences as interesting, fun, exciting and enjoyable when they study them at school (Jenkins and Nelson, 2005; Sjøberg and Schreiner, 2005). However, they do not picture themselves in these types of professions; indeed, there is a 'fundamental mismatch between the images students have of scientists and their own identities' (Archer, DeWitt and Willis, 2010; DeWitt, Archer and Osborne, 2014: 1624). As Osborne and Collins (2001) argue, science is a neglected option because it apparently leaves

little space for creativity, imagination, discussion and self-expression. Even when students say that they are 'crazy' about them, these subject fields appear 'too uniform, square and fixed' and hence 'too narrow a platform for constructing an attractive identity' (Holmegaard, Madsen and Ulriksen, 2012: 200).

Technological work is equally unattractive to a large proportion of students because they fail to perceive it as an outlet for their expressive concerns. (In fact, the handful of students who do choose sciences or engineering do so precisely because they enjoy this highly defined quality: the clear guidance and rigorous methods involved make them feel safe and ease the burden of navigating in a complex world (Holmegaard, Madsen and Ulriksen, 2012).

Rigidity of pedagogical method and a 'hardship culture' characterise technical higher education, particularly in engineering and computer science (Müller, 2011). With recent curriculum changes following the Bologna Process, however, there is increasing emphasis on cross-cutting, soft competences that include communicative and teamwork skills. The requirement for these skills does not sit easily with the established culture and technical teaching methods applied in traditional technical education. For example, instead of setting a single final exam, teaching staff are required to guide students more closely and provide more feedback on their learning progress over the duration of a course. However, several staff members whom I interviewed argued that too much guidance does a disservice to students by delaying their maturity. These technical courses, especially in engineering disciplines, are based on the premise of forging successful professionals by imposing a certain hardship upon them. Interviewees declared that this hardship and a degree of suffering form part of the engineering training, shape an engineer's identity and are silently-acknowledged ingredients in the formation of a good professional. This



view is corroborated by the dominant image of engineering as a rational, task-oriented, instrumental undertaking where emotional or relational labour does not belong. If, as one interviewee maintained, employers hire engineering graduates less on the basis of what they have learned than for their capacity to 'suffer', then we can assume that there is a tension between this and the leisurely, playful activities of students.

This tension is easy to discern when we consider, for example, the curriculum design of a Spanish first year course in engineering. Spanish engineering degrees are probably not much different from most other European and non-European engineering degrees, in that the first stages of the curriculum are packed with theoretical and abstract material on the basic mathematical and physics tools that students will need to pursue this field of work. Among the basic set of courses one usually finds Calculus, Graph Theory, Linear Algebra, Statistics, introductions to electro-magnetism or electronic circuits whose necessity and application to real-world problems is hard to discern when confronted with the often formalistic, proof-based introductions. As Becker (2010) succinctly remarked, introductory courses that establish the theoretical foundations of engineering are more often than not conceived as a way of 'weeding out the weak' (2010: 364), that is, of filtering them out and retaining only those students with narrow, formalistic aptitudes. Since the implementation of the Bologna Process, however, engineers not only have to know their maths, but they have to be equally capable of collaborating in teams, of communicating effectively, of working autonomously, and they also have to be flexible and creative. Several of my case study interviewees recognised the importance of social skills and interpersonal attitudes, but for many these also obstructed

traditional, instrumental engineering skills and knowledge, as the following quote demonstrates.

“... in the end it depends whether the engineer that graduates now is a better engineer than those in the past who graduated according to the old study plan, and I'm not so sure that this is the case. I think his education will be much worse, they know less of programming, know more about working in teams but I'm not sure if this will function well, you know? If they know how to working group but do not know how to make useful products...” (Computer Science professor, female).

This disjuncture deepens the chasm between students' lifestyle expectations and the prospects held out by formally technical careers. It is therefore not surprising that, even when they have taken the decision to enter a STEM career, students experience difficulties in reconciling the rigidity of their studies with their own self-understandings as creative, autonomous thinkers (see also Holmegaard, Madsen and Ulriksen,, 2012). Engineering is more attractive than science because of its hands-on, problem-solving aspects but, by as early as their first year at university, engineering students see their future careers as instrumental, formal and rigid, and miles away from their personal identity concerns.

Put simply, technical careers, particular engineering careers, are unattractive, not only because of their image, but also because they do not fit the self-perceptions and lifestyle concerns of today's young people. STEM careers in general are hard to match with personal aesthetic orientations to taste, style and consumption. (We can speculate that even if young people, especially young women, had a more accurate idea of what these careers

entail, they would probably still stay away.) This is not to suggest that career choices can be reduced to a question of lifestyle concerns, ignoring other factors such as professional status, pay, or demand. Nor does this mean that 'youth' is a homogeneous category with undifferentiated attitudes. However, the incompatibility of these study choices with young people's aesthetic aspirations poses both existential and practical challenges for them, as the next section shows.

### Young lives: how virtual work taps into a need for self-expression

What, then, are the major changes affecting young people in late modernity, which could be related to their changing attitudes towards technological work? The general detraditionalisation of social structures has been very significant for young people across the advanced economies (Beck, 1992; Giddens, 1991). Social identity markers such as class, race and gender have been weakened; labour market restructuring, the rise of flexible employment and an increased demand for educated workers have also had a profound effect on young people's life experiences (Furlong and Cartmel, 2007). Their transitions from education to employment, and into independent living and family formation have become delayed and prolonged (Brannen, Lewis and Nilsen 2002). Direct transitions from school to work are now extremely problematic in all European countries. Consequently, since the 1970s, a growing number of young people have been delaying completing their education, as finding appropriate employment immediately after school or university graduation is no longer a given (Ashton, Maguire and Spilsbury, 1990). The dominant pattern of linear transitions from education to employment has been replaced by fragmented, protracted, insecure periods of training,

employment and unemployment, 'waiting halls' and re-qualification schemes (Ainley and Bailey, 1997). The increasing complexity and insecurity of youth transitions is also reflected in the changing metaphors used in labour market research to describe them. During the mid-twentieth century, young people's entry into the labour market was seen in terms of filling waiting and abundant social niches, more recently, a language of 'pathways', 'trajectories', and 'navigation' documents the crisis and turbulence in the youth labour market (Evans and Furlong, 1997; Raffe, 2003).

Changes in education and the youth labour market are, of course, embedded in broader transformations in late modern societies. Ulrich Beck's term 'individualisation' (Beck and Beck-Gernsheim, 2002) describes the phenomenon in which people are liberated from traditional social bonds, forms of organisation and group identities such as class, ethnicity or family. Gone, too, he argues, are the traditional beliefs, social norms and social certainties; individuals are now obliged to make their own personal choices and take responsibility for themselves, so they need to determine and construct their own futures. However, these liberties, won from tradition, can only be had by new and equally powerful dependencies on social institutions such as the education system and the labour market. The 'choice biographies' of Beck's analysis have in fact become compulsory in the sense that, not only do we now have to make choices regarding most aspects of our lives, but these decisions are also dependent upon greater external circumstances that lie completely beyond our control, and that exacerbate the insecurities and uncertainty experienced by people such as the young.

## Identity formation: occupation versus consumption

A series of cultural and youth studies emphasise the parallel and increasing importance of consumption for the formation of youth identities. 'In the age of high modernity, as subjective class affiliations, family ties and "traditional" expectations weaken, consumption and lifestyles have become central to the process of identity construction' (Furlong and Cartmel, 2007: 11). Established socio-structural arrangements are being displaced by new cultural spaces that allow and demand constant reinterpretations of the self. Personal identity is no longer fixed, but rather has to be actively negotiated. The self is now experienced as an unstable thing, demanding constant reassessment and attention, and requiring personalised, stylised and often short-term shaping and adjusting. Harris has argued that '[...] as work diminishes as a mechanism of identity formation, self-presentation and lifestyle are becoming more important as resources for cultural capital' (Harris, 2004: 165). The market and particularly the sphere of consumption thus constitutes the primary arena in which young people experience independence and through which they acquire their sense of self. Traditional identity markers such as class, gender and ethnicity remain crucially important (Roberts, 2010; Woodman, 2010), but there has been a significant shift to a strong individually-directed sense of life choices and opportunities, even in the context of clear social constraints (Baker, 2010).

In an article entitled 'Unemployed by Choice' (Pultz and Mørch, 2015), young, unemployed people in Denmark, far from lamenting the lack of work, embrace their precarious status, which they regard as an opportunity for pursuing their creative ambitions. These young people see unemployment benefit as entrepreneurial support, which allows them to pursue and implement

projects that are in tune with their creativity and self-expressive desires. Benefit dependency is more than simply a means of managing their lives autonomously, but rather, and more importantly, is actively chosen by Danish young people in order that they may create their own artistic life course. Granted, this Danish case is unlikely to be applicable to youth more widely and in other countries, not least because the Danish social security system offers benefits that are almost unheard of in other countries in Europe or beyond. However, my general argument here is that youth identity formation in late modernity is an expressive project conducted using the discourse of entitlement and choice, and played out through the freedom and, often unacknowledged, constraints of the market (Miles, 1998, 2000; Osgerby, 1998; Ziehe and Baines, 1994).

#### Civic and political engagement among the young

The aesthetic thesis also provides a fruitful explanation for the political behaviour and civic engagement of young people. On this front, too, it appears that youth identity has become first and foremost an expressive project. Whereas some commentators have lamented the declining political participation of youth (Putnam, 2000), others have pointed instead to a change in the form of young people's political activity (Bennett, 2008; Furlong and Cartmel, 2007). They point out that their movement away from formal, large-scale party politics – itself an expression of their decreasingly stable identities – does not necessarily imply that young people are apathetic and disengaged. Rather, new patterns of civic engagement are emerging, highlighting the 'transient and self-expressive nature of participatory practices' (Harris, Wyn and Younes, 2010: 13). What has changed is the *form* of political action, which lies much more in

the realms of self-expression, self-confrontation, leisure and even play. In their study of twenty-first century youth culture, Riley, More and Griffin (2010) draw on Maffesoli's idea of 'neo-tribes', to argue that partying and the culture of electronic dance music need to be understood as a form of political participation in that they create 'temporary pockets of sovereignty in which to live out alternative values' (Riley, More and Griffin, 2010: 48). In this analysis, political activity has been taken out of the sphere of the State and its institutions, and towards the sphere of the personal and the informal - those pleasurable, expressive activities where people can enjoy a sense of autonomy and self-determination. Similar trends have been noted in relation to another form of civic engagement, work in humanitarian aid (Chouliaraki, 2013). Chouliaraki observes the emergence of a morality that is not inspired by solidarity based on pity for common humanity, but instead draws on a 'neoliberal lifestyle of "feel good" altruism' (Chouliaraki, 2013: 4). It is the pleasure of the expressive self that becomes the guiding principle for people's care towards others in need, rather than demands for social justice made through the grand narratives of traditional politics. In other words, people's engagement with social causes, whether political, civic or humanitarian, meet their personal expressive and aesthetic needs.

#### 'Generation Me' work attitudes

In the sphere of employment and work, too, a lifestyle-oriented youth culture is apparent. The de-traditionalisation thesis in the writings of Giddens (1991) and Beck (1992), for example, describes the social changes being experienced by the young at a high level of analysis. More detailed micro-level research draws similar conclusions about shifting value sets, personality traits

and attitudes held by the 'Millennials' (those born between 1980 and 1999) compared with 'Generation X' (1965-1981) or 'Baby Boomers' (1946-1964) (see, for example, Howe and Strauss, 2000). One distinctive trait of so-called 'Generation Me' (Twenge, 2006), apart from its members being much more immersed in digital technologies than their predecessors, is their individualism and desire for self-fulfilment. Twenge and her co-authors identify a notable increase in the desire for work-life balance in recent generations compared to older ones (Twenge and Kasser, 2013). Work is less central to the lives and identities of these younger generations, who make leisure a 'particularly salient work value for GeMe' (Twenge, Campbell, Hoffman et al., 2010: 1133). As Millennials make their transition into the labour market, their desire to achieve a better balance between paid work and other parts of their lives materially affects the strategies and practices of employing organisations in relation to working time and place (Ng, Schweitzer and Lyson, 2010: 289).

Within leading companies in the ICT sector, such as Google, today's workers' desire for adequate leisure time is re-interpreted as a need to engage in creative, playful, self-expressive activities in the workplace. The Google '20% rule' (and similar rules in other technology companies such as 3M and HP) allows employees to devote about one day a week to their own interests. This is very attractive to young university graduates who want to have some degree of autonomy but also their employer's sanction to indulge their personal interests – activities with which they identify and for which they believe themselves to be capable (Giraud, 2009). By making employees' leisure pursuits part of their work, these types of organisation therefore seem to be acutely aware of the values and expectations of the younger generations. Softonic is a Spanish company that offers software downloads and won the 2011 'Best Place to Work'



award. Its corporate image and online recruitment material (<http://corporate.softonic.com/careers/office-tour>) suggest that in this company, work and leisure, or play, have become indistinguishable. Part of the company's office space is set aside for table tennis, darts, a pinball machine and table football, and employees have the opportunity to play video and arcade games, or to make music. For its employees, work, in this environment, is another way of being themselves, and of engaging in their preferred leisure pastimes. It seems that, in making their work decisions, and equally in pursuing political, civic or humanitarian projects, young people use criteria which go well beyond simple labour market or job prospects; they increasingly seek and demand activities which respond to their existential and expressive needs.

### The 'cool' alternatives and their implications

The way that technical subjects are taught within higher education has been identified as one of the most important factors in the decline in student interest in this field as an eventual work destination (Osborne and Dillon, 2008). There is a widely-recognised need for modernisation of technical education. Similarly, it is clear that the attitudinal changes among the educated young which have been analysed by Twenge and other researchers pose a serious challenge to the education system: the Millennial generation's need for immediacy relates to the achievement of academic and intellectual results as well as to the acquisition of resources more generally. The sustained motivation of students over a long-term education programme is a major challenge for the content and delivery of technical education. And there are now increasingly popular career alternatives. If, as careers advisers note, computer science, for example, is increasingly seen as being 'nerdy', too difficult and 'too boring'

(Careers Research and Advisory Centre, 2008), the prospect of 'cool' and attractive alternatives naturally arises. What are the enticing choices for contemporary youth with technical training or higher education?

New media work, or cultural work more broadly, appears to be much more attractive. As Gill notes, this type of work is regarded as exciting and at the cutting edge, 'and its practitioners as artistic, young and "cool" – especially when compared with the previous generation of technologically literate IT workers' (Gill, 2002: 70). Creative work in different occupations in the film, television or music industry, as well as in design, fashion, advertising, video game development or new media, is attractive because of its apparent informality, autonomy, flexibility and absence of hierarchy – all features that contrast strongly with the rigid and fixed features of traditional technical careers and jobs. Indeed, work in the creative industries is attractive because it necessitates a much deeper integration of affective labour and the self into the performance of work. This work, often in the form of self-employment, is appealing and sought after because it exploits feelings of individual responsibility, self-exploration and self-fulfilment – in short, it possesses exactly those attributes that are absent from traditional, technical work, such as STEM employment.

The embracing of the creative as a career is not without its drawbacks. The dangers lie precisely in employees' over-identification with work, which often goes hand in hand with levels of self-exploitation unheard of in other domains. As Arvidsson, Malossi and Naro (2010) show in their study of the Milan fashion industry, working conditions are very punishing. Low pay, long hours and unstable working patterns are legion, and extend well beyond the

fashion industry. More generally, high levels of instability in temporary and precarious jobs are typical of a great deal of cultural work (Gill and Pratt, 2008). What is perhaps surprising is the fact that job satisfaction is exceptionally high in these creative fields. It seems as though the 'cool' image of this type of work, together with the autonomy and the satisfaction derived from it, compensates for all its negative features. Since the work is experienced as meaningful and intrinsically fulfilling, the precarity of the working conditions is overlooked or forgotten about, at least for a while. Creative work may be more attractive to young people because it matches up better with their identity concerns, but it is also the case that identity has become one of the main sources of value in the creative industries. In the case of the Milan fashion industry, for example, 'the value of work as well as one's own value as a worker are increasingly conceived in terms of identity and lifestyle' (Arvidsson, Malossi and Naro, 2010: 306).

Thus, young people's expressive ambitions become just another form of labour, the outcome being the closing down of any space outside of work. For work, 'just be yourself' is the new credo of much management thinking (Fleming and Sturdy, 2009). Indeed, it is the intimate relationship between self and work that characterises creative work as virtual work. The scarcity of this type of employment, coupled with over-identification with work, and self-exploitation by virtual workers, allows first and foremost for postponing the receipt of the rewards of their efforts, and consigning these rewards mercilessly to the future. The creative, first-choice careers of today's youth are to be understood as virtual work because the benefits of this work are immaterial: its value seldom lies in pay, pensions, in-work benefits or other forms of social protection, but rather is expressed in intangible benefits to be cashed in further into the future.

'(T)he creative career, like the creative economy, is about immanent, unfulfilled potential' (Morgan, Wood and Nelligan, 2013). Indeed, an increasing proportion of creative work involves building portfolios, developing and honing social networks, performing internships, doing 'playbour' (Kücklich, 2005) or supplying other forms of free labour with no immediate, obvious financial return. Its salience lies in the fact that it is labour invested for rewards that are indeterminate, uncertain and unlikely to be reaped until some time into the future, be it 'in the form of potential leads, potential loyalty, or potential customers' (Adkins, 2008: 195) - or, one might add, potential employability.

However, virtual work conceived in terms of a virtualisation of benefits is not restricted to the creative industries. Students rejecting formal, boring and rigid technology careers and turning towards more creative activities that offer them authentic engagement and self-fulfilment as described in detail in the preceding paragraphs offer one route into virtual work. Similar, the scarcity of stable employment as observed across European countries over the past years obliges many to become entrepreneurs and convert their necessity into a virtue by setting up small companies (Røed and Skogstrøm, 2014). Becoming one's own boss under conditions of economic hardship however, sets the ideal stage for self-exploitation and the concomitant virtualisation of benefits. A strong identification with one's enterprise – for whose success one is now the sole responsible – makes it easy to postpone benefits into an indeterminate future. As such, 'entrepreneurs out of necessity' (Poschke, 2013) can be found across all disciplines including Computer Science or Telecommunications Engineering. What all these forms have in common is the fact that the grip of work tightens considerably because self-fulfilment and identification with one's work rules supreme, accommodating otherwise quite precarious working conditions. In

closing, we can say that the identity projects of young people reveal the self-expressive but ultimately unrewarded dynamics of virtual work, as this new generation of workers tries to carve out a place between the hardships of relatively secure technical careers and the freedom of a creative precariousness.

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