LUND UNIVERSITY

Making Youth Innovation Visible

An Actor-Network Theory Study of the Relationship between Education Environments and Youth Innovation and Youth Innovativeness in Skåne

Ivanche Dimitrievski

Abstract

In the European Union, innovation policies have called for boosting the innovative capacity of youth through education. Despite all efforts made towards this end, however, European economies still find youth innovation to be scarce. This scarcity exists in the region of Skåne too, and is evident in the increasing youth unemployment rates. The objective of this thesis is to shed a new light on this situation through exploring the relationship between the education environment and youth innovation and youth innovativeness in Skåne. I have employed participant observation as the ethnographic strategy to study two case-studies from Skåne: Redesign and Clothing Library 'Morpheus' and an educational plumbing practice session. I have used a variety of methods, including interviewing, video recording, notes taking, photography, following of material objects, and following of Facebook activity. I have employed actor-network theory as the theoretical and analytical tool for this thesis. The analysis of the plumbing practice session brings out the problem of visibility: the ways this education environment functions as a network, make it difficult for outsiders to identify the youth innovativeness which exists there. The analysis of Morpheus points out that youth innovation is a network effect which happens through spreading a youth's idea or project outside of the education system by becoming linked to various material and human actors. This thesis recommends that, in order to boost youth innovation and innovativeness, policy makers should inspire education environments to make their innovative youth, their innovative ideas and projects, visible to society through linking them with external actors, both human and nonhuman, that can make their project grow, gain strength, and attain independence.

Key Words: youth innovation; youth innovativeness; education environment; innovation policy; applied cultural analysis; actor-network theory.

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INTRODUCTION

Wide across the European Union (EU), policies have frequently emphasized the importance of innovation in addressing the economic, environmental, and social crises of today (Cachia et al, 2010). These discussions have shared the notion that a key factor to future progress in the EU is the development and harnessing of the innovative potential of European citizens (European Council, 2008). In particular, EU policies have called for reinforcing the role of youth in strengthening the innovative capacity of EU and the development of a knowledge-intensive economy and society (European Commission, 2009). Towards this end, the Europe 2020 strategy has given a green light to several initiatives such as 'Innovation Union', 'New Skills for New Jobs', 'Youth on the Move', and the 'Digital Agenda' (European Commission, 2010).

In the current EU innovation policies, education leads one of the central roles. The Council of the EU (2008a), for instance, highlighted that "schools have a duty to provide their pupils with an education which will enable them to adapt to an increasingly globalized, competitive, diversified and complex environment in which creativity, entrepreneurship and a commitment to continue learning are just as important as the specific knowledge of a given subject." (p. 21). Herewith, EU countries were invited to consider ways of encouraging a greater synergy between knowledge and creativity, and to promote, monitor, and assess youth innovative capacity at all levels of education (see Council of the European Union, 2008b). Specifically, EU countries were asked to engage in dialogue, cooperation, and research towards developing environments for youth, especially conducive to innovation. These environments have been termed as 'good practices' (for example see Youth in Action Programme, 2009).

In Sweden, the conditions for steering the education system towards a good practice were set during the 1990's when Swedish education underwent fundamental reforms (Looney, 2009). For example, the Swedish Upper Secondary School Reform of 1992 directed that both theoretical and vocational education "must provide the student with the key tools for renewing skills and supplementing knowledge throughout an entire lifetime." (Friberg, Carnstam & Henry, 1995; p. 1). This Reform envisioned a flexible education system which focused on producing innovative lifelong learners. Today, the role of the education system in increasing the innovative capacity

among Swedish youth is outlined in the Swedish Innovation Strategy. As stated in the latter, schools should equip youth with the knowledge and skills necessary to translate their ideas into reality (Swedish Ministry of Enterprise, Energy and Communications, 2013).

What is this thesis about?

The purpose of this thesis is to explore the relationship between the education environment and youth innovation and youth innovativeness. For this reason, I will use actor-network theory as the methodological and analytical tool to study two cases from the education context of the region of Skåne, Sweden. The first case is a redesign and clothing library. This case is an example of youth innovation which originated from a course on design and sustainability at Malmö Högskola, in Malmö, Sweden. The second case is a plumbing practice session from a vocational gymnasium in Lund, Sweden. This case addresses youth innovativeness. In studying these two cases, my intention is to generate insights which would assist innovation policy makers in designing environments which enable youth innovativeness and innovation to flourish.

Swedish curricula: the case of problematic identities

The Swedish education Reform as well as the subsequent national and regional policies which addressed youth innovation imposed new identities onto Swedish education actors (see Otterborg, 2011). In particular, these framed new kinds of teachers and students. These identities were especially evident in the reformed education curricula, where "individual freedom of choice [was] meant to produce creative, motivated, alert, inquiring, self-governing and flexible users and developers of knowledge." (Dovemark, 2004; p. 657).

According to the Swedish curriculum for upper secondary education, teachers are supposed to "stimulate student's creativity, curiosity and self-confidence, as well as their desire to explore and transform new ideas into action, and find solutions to problems." (Skolverket, 2013; p. 5).

Teachers are also responsible for "[contributing] to students developing knowledge and attitudes that promote entrepreneurship, enterprise, and innovative thinking." (p. 5). These 'responsibilities' transformed the 'teacher-as-instructor' into a 'reflective practitioner' (see Cachia et al, 2010). With this, teachers gained the role of unleashing the innovative potential of youth.

The new Swedish education curricula also endowed students with a more active role in the education process. With the curriculum for upper secondary education, for example, students were obligated to "take personal responsibility for their studies and their working environment [and to] strengthen confidence in their own ability to individually and together with others take initiatives, take responsibility and influence their own conditions." (Skolverket, 2013; p. 11). In turn, this meant that apart from gaining personal flexibility, students also became responsible to be creative, flexible, and self-motivated.

While on the level of policies these identities gained in vigor, in practice the situation was different. Drawing from their ethnographic study of Swedish secondary education, Beach and Dovemark (2009) found that under the new Swedish education paradigm "space for creativity [was] squeezed by a need for standards and performance control in relation to the attainment targets in the curriculum." (p. 693). More specifically, "spaces for agency, self-reliance and creativity [were] not free, in the sense of free valorization of personal forms of knowledge as educational capital, but instead [represented] interrupted agency in an amalgam of creative responsibility, submission, trust and control." (p. 693). In essence, Beach and Dovemark's argument was that, even in an education system based on flexibility and creative expression, being seen as flexible and creative was mainly about 'making the right choices'. In other words, the identities which made sense in policy were 'problematic' in practice.

Youth innovation in Skåne: blame it on the education system!

In the region of Skåne, the interest in youth innovation intensified in 2008, when the financial crisis which stroke Sweden wielded negative effects upon Skåne's economy. These effects were

immediately evident in, for instance, the sharp escalation of youth unemployment rates in Skåne (see Nordic Social Statistical Committee, 2011). Also, the financial crisis led to a transformation in the Swedish economy which affected youth on the long run. In an interview with Flora Blom [pseudonym], specialist in youth unemployment at Näringsliv Skåne[1], she said: "*Since 2008, many of the traditional employers in [Skåne's] municipalities moved, closed their businesses, or trimmed down their workforce. This meant that there was no more room for recruiting young people*" (Int. 1). In the post-crisis period, the Swedish economy opened the doors to increased and reshuffled youth unemployment. At the same time, it disabled some traditional solutions such as 'fixing unemployment through employment'. In Skåne, the post-crisis situation imposed a need for more youth businesses and self-employment.

From the perspective of Skåne's regional policy, the answer to this problem was youth innovation through entrepreneurship. This very idea gained strategic proportions when Näringsliv Skåne, in cooperation with VINNOVA[2] and Tillväxtverket[3], developed the International Innovation Strategy for Skåne (IISS). They emphasized: "Entrepreneurship is the driving force behind the process that generates innovations. We need to stimulate work on entrepreneurship in schools by developing students' curiosity, creativity and initiative." (Näringsliv Skåne, 2011a; p. 6). Hereby, youth became part of the greater vision of making Skåne "Europe's most innovative region in 2020." (Näringsliv Skåne, 2011a; p. 3).

Essentially, the IISS approached youth innovation in two ways. First, it addressed youth in education by encouraging innovativeness among students. Here, the innovation policy met the education policy and the Swedish curricula in suggesting that education should encourage the entrepreneurial spirit of students through engaging them in a flexible learning environment where students may develop their innovation skills. Second, the IISS called for better alignment

[1] Näringsliv Skåne is the division of Region Skåne, responsible for coordinating all business-related issues in the region of Skåne, Sweden. The goal of Näringsliv Skåne is to develop a stronger regional industry. Towards this end, their work is divided in three areas: innovation systems, entrepreneurship, and business development (Näringsliv Skåne, 2011b).
[2] VINNOVA is the Swedish agency for innovation whose aim is to increase competitiveness and promote sustainable growth by funding needs-driven research and by developing an effecting innovation system in Sweden (VINNOVA, 2012).
[3] Tillväxtverket is the Swedish agency for economic and regional growth. Their mission is to promote economic and regional growth through support of entrepreneurship (Tillväxtverket, 2013).

of the innovation support bodies, outside of education, and emphasized the role of various regional organizations in assisting youth to establish enterprises, their maintenance, and growth. With these two approaches, the IISS envisioned an innovation enabling environment in Skåne which allowed youth to both *develop* and *apply* their innovation skills and ideas.

At Näringsliv Skåne, however, policy makers shared the notion that there was a lack of youth innovation in the region. They attributed this 'lack' in part to the inability of education environments to encourage innovativeness and develop innovators. In an interview, entrepreneurship specialist Rosa Byquist [pseudonym] stressed this issue. She said: "*The problem from the beginning was that the school system, from pre-school to university, teaches youth on how to get employed. That's a problem because we need more businesses in Sweden. We need people who are proactive, that can be in charge. But at school, we don't get to learn these things*" (Int. 2). This situation was problematic, especially in view of the increasing rates of youth unemployment rates in Skåne, and called for new ways of thinking about using the education environment in boosting youth innovativeness and innovation.

Applied cultural analysis as bridge between innovation policy makers and youth innovation

This thesis is intended as work in the field of applied cultural analysis. With roots in anthropology, ethnology, and sociology, applied cultural analysis is "a way of looking at and analyzing the world" (Sunderland & Denny, 2007; p. 49), not for the sole purpose of understanding it, but also for devising ways of intervention (Graffman & Börjesson, 2011). Sunderland and Denny (2007) argued that "a sense of 'making visible the invisible' is often associated with cultural analysis because cultural matters can be so familiar or so tacit that neither research participants nor the researchers can immediately discern their existence" (p. 48). They continued: "as we are researching, we are trying to make the very familiar, the very tacit, and the very new obvious to ourselves and to our clients" (p. 48). For Sunderland and Denny, thus, doing applied cultural analysis was about unpacking the implicit from everyday life, from culture, and illuminating it, both to ourselves and to our clients.

In Sylow's view (2008), the motivating force behind the field was curiosity. She contended that "when we can answer the question 'why' then an actual opportunity for change is possible" (p. 14). In studying fast food, for instance, Sylow (2008) suggested that "what to eat, how to eat, and in what contexts food is used are part of the shared routine that forms everyday culture" (p. 14). As in this example, in applied cultural analysis, the research focus is placed "on the sociocultural, symbolic meanings, practices, and situations" (Sunderland & Denny, 2007; p. 47) which surround a particular object of interest. Applied cultural analysis aims to investigate the culturally shared and/or contested. This emphasis, in turn, differentiates the field from other forms of applied research, say applied psychological approaches, which often center on exploring the individual's singular personal dynamics.

In applied cultural analysis, researchers employ a diversity of ethnographic methods in acquiring qualitative material. Here, the ethnographic methodology should be understood as a "companion mode of discovery" (Sunderland & Denny, 2007; p. 50). "A vast amount of qualitative data", however, "does not automatically result in powerful innovation data" (Voldum & Havelund, 2008; p. 33). For Voldum and Havelund (2008), for instance, the stronghold of the field was the use of theory to interpret qualitative material in new ways. They argued that "social and cultural theories are indispensable tools in raising ethnographic 'raw material' to the abstract level of analysis where findings and patterns translate into deeper understandings of the cultural logic" (p. 34). They further emphasized that "understandings based on this level of abstraction may move innovation beyond the 'fallacy' of, for example, 'making a new product blue' because the user simply wants a blue product" (p. 34).

To paraphrase Wilk (2011), applied cultural analysis is very much like cooking, "a skilled process of taking many ingredients – some intentional and some fortuitous – and turning out something palatable and pleasing" (p. 24). It is about combining ethnographic methodology, qualitative material, and social and cultural theory to gain new insights about, a new interpretation of, social phenomena. The final stage in applied cultural analysis, and indeed its crucial feature, is transforming these insights into simplified recommendations (Sylow, 2008). These recommendations make cultural analysis *applied* by connecting it to a potential insights-user, the client. In regards to this position, Jönsson (2008) 'nicknamed' the field 'an innovative

intermediary'. He maintained that the work of the applied cultural analyst was "to study a group's culture in order to explain that culture to another group" (p. 81). The 'others' could be industry, business, public administration, and so on.

O'Dell and Willim (2011) stated that "[applied cultural analysts were] working in contexts in which they [were] expected to help clients solve specific problems, provide cultural insight, or complete a predefined task" (p. 7). To paraphrase Willim (2008), then, the aim of analysts working in the field is to 'build bridges between diverse mindscapes'; in this case, those of the informants and of the respective client. This thesis too is an endeavor of such sort. Here, I will use actor-network theory to reach new ways of thinking about youth innovation and youth innovativeness in education. But also, I will yield a set of simple recommendations which will assist innovation policy makers in boosting the capacity for innovation amongst youth. In essence, this thesis is an attempt to build a bridge between innovation policy makers and youth innovation.

Structure of the thesis

The following material is divided into five main chapters. In the first, I will delve into some of the questions that youth innovation research has raised hitherto. Here, I will also propose actor-network theory as the theoretical framework for this thesis. In the second chapter, I will present the methods used in acquiring the empirical material for this study. I will also raise a few methodological concerns. In the third chapter, I will explore the relationship between the education environment and youth innovation. In this chapter, I will deliver a story about a redesign and clothing library beginning with its conception to its establishment. By recounting for a plumbing practice session, in the fourth chapter, I will investigate the relationship between the education environment and youth innovativeness. Finally, I will conclude this thesis with a summary of the key insights and with two simple recommendations for innovation policy makers.

TOWARDS A THEORETICAL FRAMEWORK

Youth innovation is a boundary object in the sense that "it means different things in different worlds of practice" (Gomart and Hennion, 1999; p. 237). The understanding of the concept thus differs both within and between applied and research contexts. Furthermore, the field of youth innovation lacks theoretical and methodological consistency. Instead, the body of literature on youth innovation looks very much like a mish-mash of mainly psychological, sociological, pedagogical, and business discourse (for such a summary refer to Sebba et al, 2009). Consequently, the field of youth innovation is scarce with clarity, uniformity, and coherence. Such a situation is not necessarily disadvantageous, however. On the contrary, over the years, the study of youth innovation has gained in scope, plasticity, and applicability (for examples see Kirby, Lanyon, & Sinclair, 2003; Bragg, 2007; DCSF, 2008; Fullan, 2007; Prout, 2005; Druin, 2002; Druin & Fast, 2002; Cairncross & Waugh, 2005; Nesset & Large, 2004; Sebba et al, 2007; Bell, 2005; Weller, 2003; Zeldin, Petrokubi & MacNeil, 2008; Karlin, 2004). In this section, I will focus on exploring some of the key questions that youth innovation research has raised hitherto. My aim, here, is to set the theoretical basis for this thesis.

Who innovates?

In the literature, the concept of youth innovation generally refers to youth-*led* innovation. For instance, according to Sebba et al (2009), youth-led innovation is "the process by which young people are instigating potential solutions to a problem, often one that they themselves have been at least partly responsible for identifying or defining" (p. 14). Furthermore, Sebba et al claimed that, when innovating "young people take responsibility for coming up with the solution and also implementing it" (p. 14). In discussing about youth-led innovation, these authors have thus conceptualized a kind of innovation content which consists of young innovators who innovate by way of problem-solving and implementation.

The latter definition of youth-led innovation should not be taken at face value. Rather, it should be understood by what 'it does'. First and foremost, this definition positions the subject, in this case the young innovator, at the heart of the innovation process. In this way, when it comes to youth innovation, it is youth *themselves* who do all the innovating. Second, by placing the subject at the center, this definition endows the rest of the content with a passive role. Everything else is, in other words, the means to innovate. Finally, by these two moves, the definition of youth-led innovation compels us in shifting our attention away from 'everything else' and onto the active subject.

What makes one innovate?

In the 2009 OECD report on assessment and innovation in education, Looney reported that "successful innovation depends upon the human creativity, knowledge, skills, and talents" (p. 4). This statement reflects the arguments, generally represented in the literature on youth innovation; specifically, that the relative success of youth innovation depends upon concrete capabilities, or characteristics, of youth that enable them to innovate (Sebba et al, 2009; Cachia et al, 2010). In 2006, for instance, the EU Key Competences Framework for lifelong learning established a comprehensive set of such capabilities (European Parliament and the Council, 2006). They mentioned critical thinking, initiative taking, problem solving, risk assessment, decision making, constructive management of emotions, and creativity.

The introduction of 'innovation capabilities' as the cause of the ability to innovate is based on two conditions. First, it is generally accepted that innovation capabilities are the characteristics of all human beings. For instance, Carsten (2010) argued that "humans have an evolved propensity for being creative that transcends generations and both geographical and cultural boundaries" (p. 442). This notion was supported by others too (Chiu & Kwan, 2010; Erez & Nouri, 2010; Hempel & Sue-Chan, 2010; Tsai, 2012). And second, it is taken that innovation capabilities can, in fact, be instilled and developed by every youth. For example, Cachia et al (2010) reported that "creativity should be conceptualized as […] a skill which everyone can

develop" (p. 9). In this way, most research in youth innovation has taken the position that every youth *can* become an innovator by virtue of developing their innovation capabilities.

Under what conditions?

In general, the body of literature concerning youth innovation embraces a developmental perspective on youth innovation. For instance, it is assumed that "the young person's capability to innovate increases with age and is acquired or developed in the transition to adulthood" (Sebba et al, 2009; p. 15). In taking this perspective, Sebba et al (2009) suggest that "attention should be given to the role of adults and existing organizational structures in creating the capacity within which [innovation] capabilities can be realized" (p. 15). This suggestion directs us once again. This time, however, away from the active subject, or their innovation capabilities, and towards the environment in which youth innovation is being performed. Youth is still the active subject. Innovation skills still determine the outcome of youth innovation. *But*, it is the innovation environment or structure which in due time determines how youth innovates, the degree to which their skills express, and the eventual outcome of the innovation process.

Environment that enables and hinders

"[…] what seems important in [youth] spaces is that they are enabling environments and that any adults present do not seek to control or inhibit the ideas and actions of young people. Some spaces, often by their very nature, do not encourage innovation because of the required conformity to adult social norms." (Sebba et al, 2009; p. 27)

In terms of the existing literature on youth innovation, the relationship between the environment and youth innovativeness and youth innovation is one of *expression*. As implied in the quote above, youth innovation happens as a consequence of the capacity of a certain environment to influence the degree of expression of innovation capabilities in youth. In relation to youth

innovation, then, environmental capacity is inherently dichotomous: the environment can in certain aspects *enable* youth innovation and *hinder* in others. For instance, the latter quote emphasized 'required conformity' as a particular instance of hindrance.

Generally, both research and applied contexts embrace this dichotomous view concerning the education environment. For example, Cachia et al (2010) established that "*enablers* represent the circumstances or support mechanisms that make creativity and innovation more likely to thrive" (p. 20). They also found that "the coexistence of several of these [enablers] could lead to an [innovation] enabling environment […] if enablers are not present, creativity is less likely to flourish" (p. 20). In their study, Cachia et al stressed the role of certain environmental factors for their role as enablers or inhibitors to youth innovation in education. They mentioned, for instance, curricula, pedagogies and summative assessment, teacher training, availability of information and communication technology, and educational culture and leadership.

Eradicate barriers! Multiply enablers!

The literature on youth innovation, in general, envisions two interrelated contexts where youth innovation is happening: the educational and entrepreneurial (for example see Schoof, 2006). In Schoof's view (2006), the education environment serves to endow youth with innovation capabilities. The entrepreneurial environment, he contended, is responsible for disclosing opportunities and incentives for commercialization of youth's ideas as well as providing various forms of capital. Most research on youth innovation has been oriented towards investigating the extent to which these two contexts are able to perform these functions.

At least in the EU, the education system has frequently been labeled as 'stifling' or 'inhibiting' to youth innovation. Research has attributed two main reasons behind these labels (Cachia et al, 2010). First, education practices have been found as characterized with various *inhibitors*, including instruction, direct transmission of study material, encouraging conformity, lack of experimentation, reproductive learning, summative assessment, and grades. Second, research has suggested that the structure of most education systems in the EU is itself an inhibitor;

specifically, due to the imposition of high-content curricula upon education institutions, the many performance goals, and high-stakes assessment.

In reporting on the barriers and incentives to enterprise start-ups by young people, Schoof (2006) outlined a list of 'lacks' pertaining to the entrepreneurial context. Thereby, the author listed the lack of knowledge of available support, confusing support system, lack of business training and advice for young entrepreneurs, absence of mentoring capacities and workplace infrastructures, and lack of financial support, to name but a few. In addition, the author emphasized the importance of culture in enabling youth innovation by means of promoting a positive image of the young innovator in society. In practice, these findings are generally translated into work of almost militant character. Eradicate all barriers! Identify and multiply enablers! In the EU, for instance, this situation is evident in the various policy calls for reformation in the education systems as well as for improvements in the entrepreneurial support structures of the member countries (for examples see Cachia et al, 2010). These calls are based on the premise that the reorganization of the environmental cues would eventually lead to more innovation-friendly environments for youth.

From the end towards the beginning

In my view, the current study of youth innovation has reached a state of paralysis. In part, this owes to the fact that youth innovation students have already *decided* about 'who does the innovating', 'what fuels that process', and 'under what conditions'. Since these are 'known' beforehand, researchers need only to investigate the particular forms in which the answers to these questions manifest in particular contexts. In other words: Which youth? What kind of capabilities? How many of the enablers and the inhibitors? Consequently, current research is 'wandering' within this pre-determined frame without any intention of 'moving out' and taking a fresh look at youth innovation.

In this thesis, I have understood youth innovativeness and youth innovation as effects of educational practices. In approaching this assumption, I have chosen actor network theory

(ANT). I have based this choice in ANT's power of studying practices – people's everyday actions, activities, and behaviors (Nimmo, 2011). ANT has often been used as the approach to studying innovation (Akrich, Callon, & Latour, 2002a; Akrich, Callon, & Latour, 2002b). For example, Hoholm (2009) employed the methodological and analytical tools of ANT in studying innovation processes in the food industry. To my knowledge at least, ANT has not as yet been applied in the study of youth innovation. By using ANT, therefore, my hope is to contribute to the enrichment of youth innovation as a field of study.

In contrast to the literature on youth innovation that takes firm positions on the actors and conditions which are important to youth innovation, ANT is based on no stable theory of the actor (see Latour, 2005; Law, 2004; Latour, 1999a; Latour, 1999b; Sismondo, 2004; Miettinen, 1999; Callon, 1991). It rather assumes the *radical indeterminacy* of the actor. For example, "the actor's size, its psychological make-up, and the motivations behind its actions – none of these are predetermined" (Callon, 1999; p. 181). In ANT, the actor may "alternatively and indiscriminately, be a power which enrolls and dominates or, by contrast, an agent with no initiative which allows itself to be enrolled" (Callon, 1999; pp. 182). In other words, the young innovator, 'the innovated', innovation capabilities, enablers or inhibitors are all categories which ANT does not presuppose.

By using ANT as the analytical and methodological vehicle, I will go back to a moment before 'who innovated', 'what made them innovate', and 'what were the important conditions' became established. I will start from a point before 'enablers' and 'inhibitors' existed as categories. From that moment on, I will follow the chains of associations that give birth to a particular 'youth innovation', a specific kind of 'young innovator', and a certain type of 'innovation environment'. In this way, I will readdress the issues raised in the youth innovation literature, not to verify or extend the already provided answers, but for the purpose of answering them afresh. In doing this, my aim is to gain new insights on the relationship between the environment and youth innovation, and to eventually give directions on how we can use this relationship in boosting youth innovation.

Actor-network theory

ANT proposes a socio-technical account in which neither social nor technical positions are given a privilege (Latour, 1987). For instance, when we think of a laptop, we may wonder which part of the laptop is the result from human interaction and which part from technical. We may realize that it is difficult to differentiate say the laptop's software from the ways in which the software-development team who developed it was influenced by their socio-cultural backgrounds. It then looks as if the technical parts of the laptop were partly social, and vice versa. If we take a closer look at this example, we may also see that the laptop is not only an object, but also an association of heterogeneous elements, themselves constituting a network. Whether the laptop is an actor or a network is thus a matter of perspective. This insight is central in ANT, postulating that everything is simultaneously an actor and a network (Cressman, 2009).

Another key assumption in ANT is that actors emerge in relations. For instance, Law (1999) argued that "actor-network theory is a ruthless application of semiotics. It tells that entities take their form and acquire their attributes as a result of their relations with other entities. In this scheme of things, entities have no inherent qualities." (p. 3). These 'forms' and 'attributes', however, are not always reliable and *can* become unstable, depending on the associations from which they emerge. For instance, we may say that laptops have certain capacities, among them 'computing'. From an ANT perspective, this capacity is not inherent to the laptop itself but it emerges in the associations between say computing software, software developers, and the users of this software, to name but a few. If these associations collapse, the capacity of the laptop to compute will disappear as well.

In ANT, this position is applied both to humans and nonhumans (for examples see Latour, 1983; Latour, 1999a). To address these equally and fairly, ANT is based on three principles: agnosticism, generalized symmetry, and free association. Here, agnosticism means "impartiality between actors engaged in controversy", generalized symmetry is "the commitment to explain conflicting viewpoints in the same terms", and free association refers to "the abandonment of all a priori distinctions between the natural and the social" (Callon, 1986; p. 196). For instance, when trying to understand how a laptop works, we may end up examining its technical parts, but

also how these parts were developed, who developed them, under what socio-cultural conditions, and so on. With the three principles, ANT asks us to approach all these instances in the same way, without privileging any instance over others.

This is not to say, however, that 'privilege', 'differences', and 'divisions' do not exist in the real world. ANT rather suggests that we should explore the conditions which made these possible (Latour, 1991). In other words, to explore the ways in which the networks of relations were composed, how they emerged and came into being, how they were reconstructed and maintained, how they competed with other networks, and how they were made more durable over time. These dictums, in turn, will be the theoretical and analytical basis for this thesis.

METHODOLOGICAL REFLECTIONS

I have worked on youth innovation in the context of two projects. Both of these projects were commissioned by the innovation department of Näringsliv Skåne. The first was realized in a five-member team consisted of fellow MACA students. We completed this project in May of 2012, and presented our results in the form of an ethnographic album titled 'Bicycles, Skeletons, and Hip Hop: Youth Innovation in Skåne'. The second project was an individual three-month internship at Näringsliv Skåne. The resulting deliverable of this internship was a publication titled 'Lessons in Innovation by the Youth of Skåne: an Actor-Network Theory Perspective'. Throughout these two projects, in a group or individually, I studied youth innovation in a diversity of contexts and geographical regions. The two case-studies presented in this thesis were among these.

The first case is a redesign and clothing library – a youth enterprise, initiated in and established through the help of a course on design and sustainability at Malmö Högskola, in Malmö, Sweden. I studied this case from July to September of 2012, in the context of my internship. The second case is a plumbing practice session. Initially, I investigated this case in the context of the team project for Näringsliv Skåne. It was part of our one-week fieldwork at a vocational gymnasium in Lund, Sweden, which we conducted during April of 2012. I continued studying this case during my internship too. I have chosen to use these two cases here primarily for their empirical completeness, but also for their different accounts on youth innovation and youth innovativeness. In order to conceal the identities of my respondents, in the subsequent chapters of this thesis, I will use pseudonyms.

Tracing the networks

In studying these two cases, my principal fieldwork strategy was participant observation. In their work on reflexive ethnography, Davies (2008) argued that "[participant observation] is more properly conceived of as a research strategy rather than a unitary method in that it is always

made up of a variety of methods" (pp. 77). The participant observation strategy was particularly useful in this case because it enabled more freedom in both identifying and following of the various actors pertaining to the two cases. My selection of methods reflected this 'following'.

I used interviewing as the 'basic' method of inquiry. In the course of 2012, I did two interviews with the owners of the clothing library and seven with the plumbing teachers at the vocational gymnasium. The interviews lasted between one and three hours. These interviews were 'basic' in the sense that I used them with the purpose to gain a general impression of the actor-networks pertaining to both cases. For this reason too, the interviews were unstructured. According to Davies (2008), "interviewing carried out by ethnographers whose principal research strategy is participant observation is often virtually unstructured, that is, very close to a 'naturally occurring' conversation." (pp. 106). In this case, a 'naturally occurring' conversation was the goal. That is, I expected that the 'lose' nature of the interviews would yield with more genuine, wider, and detailed account of the two cases.

I coupled interviewing with video recording, notes taking, and photography. With these methods, my intention was to record actor-networks in the very instances of their 'weaving'. I wanted to document 'interaction', 'feelings', 'messiness', and 'movement'. For these two cases, I produced about six hours of video, nearly two hundred photos, and approximately sixty pages of notes. I also gathered material artifacts such as plumbing curricula, student projects, newspaper articles, examination criteria, advertisements, posters, and so on. These material artifacts helped me gain a better understanding of the interviews, the various records, and, eventually, of the actor-networks themselves. In addition, throughout my internship, I continuously followed the Facebook activities of the redesign and clothing library. I paid attention to their posts, their events, comments, and so on. This latter approach helped me stay connected with my informants, the whole time.

In their work on 'shadowing', Czarniawska (2007) discussed the idea of 'following objects'. My fieldwork experience, at least in part, reflected this idea. Yet, I believe that 'detecting and following traces' is a phrase which better depicts the fieldwork I did, in its entirety. Conceptually, thus, my fieldwork approaches 'trace ethnography' in that the exploratory focus was placed on the 'traces' (see Leander & McKim, 2003; Geiger & Ribes, 2011). During my

fieldwork, for instance, I constantly looked for traces of innovation and innovativeness, as well as for traces which pointed out at how the two cases 'functioned'. This 'tracing', in turn, helped me to better visualize the position of youth innovativeness and youth innovation, both within the actor-network of the redesign and clothing library and within that of the plumbing practice session.

Going native while tracing the networks

In the course of the various fieldworks, I encountered many individuals. With some of them, I shared almost a year of mutual acquaintance. With these informants, I developed a strong bond of friendship. This very bond, in turn, led me to experience some ethical dilemmas, especially in the post-fieldwork period. I often felt obligated to produce a 'positive', even 'praising', image of my cases and informants. In moments, I even had the urge to 'omit' or 'disguise' the material which reflected an image that could be perceived as 'negative criticism'. The post-fieldwork period, thus, seemed like an ethical struggle between 'what to represent' and 'how'. This ethical issue is common in ethnographic endeavors which embrace participant observation as the research strategy (Li, 2008).

Tedlock (2012), for instance, argued that "during participant observation ethnographers attempt to be both emotionally engaged participants and coolly dispassionate observers of the lives of others" (pp. 69). However, they also recognized that assuming such a position was difficult. In Fuller's terms (1999), this situation was reflective of a classic issue in anthropology which was popularly termed as 'going native'. They mentioned that "[going native was] indicative of the development of a sense of over-rapport between the researcher and those under study" (pp. 221). Although Fuller themselves did not take such a position, they acknowledged that, often, "the inclusion within the research of the 'researcher as person' is interpreted as an apparent inability to distance him/herself from the events in which (s)he is participating, ultimately undermining the authority of the voice of the 'researcher as academic'" (pp. 221).

I am not sure on 'how native I went' during my fieldwork. Yet, I would like to point out that the emotional bond with my informants helped me gain their 'honest' accounts and reach a breadth of empirical material which, under different circumstances, would have been more difficult to attain. In this text, I have tried to resolve the ethical dilemma by giving descriptions which were in line with my informants' statements. At the same time, I have left room for a more 'distanced' perspective in the analysis of the material towards the end of each chapter.

What and where to look for

It is important to note that while doing fieldwork I acted in the capacity of a 'representative', both as a 'team member' and an 'intern', of the innovation department of Näringsliv Skåne. They had a clear understanding of innovation:

> "An idea is not an innovation and that's that. Innovation can be new services, products, ways of working, things that improve society and lots more besides. But an innovation always has to create new value and produce growth. In most cases this means that the last part of an innovation process is commercialization. Our shared definition is: innovation is the entrepreneurial process that gives a new idea a value. The end. (Skåne Research and Innovation Council & Soundingboard Innovation in Skåne, 2011)

In almost the year of experience in working with Näringsliv Skåne, I was given to understanding that this definition was all inclusive. Even so, *not everything* was innovation and *not everybody* was an innovator. Since my status as a student of youth innovation was largely contingent upon my relationship with Näringsliv Skåne, I felt obligated to be mindful of this understanding. As a result, my position as a researcher was partially framed by this particular version of innovation.

In practice, this position had a directive character in the sense of guiding me in 'what to look for' and 'where to look for'. In this way, I was not 'objective' in the sense of exploring the two cases through an unspoiled researcher's gaze. Rather, I was looking at certain things in certain ways. For instance, during the fieldwork process, some *stuff* seemed innovative partially because I had Näringsliv Skåne's version of innovation in mind.

Apart from being Näringsliv Skåne's representative, I was also an applied cultural analyst. As such, I was a part of a social group, of a discipline, which expected me to act as an impartial observer. When accessing the research sites, I was supposed to study youth innovation with an 'open mind'. This meant to embrace the notion that apart from Näringsliv Skåne's, other versions of youth innovation could also exist. In practice, however, it was difficult to discern between 'a' and 'the' youth innovation.

Consequently, representing Näringsliv Skåne, to a degree meant to 'violate' the principle of impartial observation. While doing research, I was in the constant danger of simply recognizing and marking only the cues which matched what I already knew about innovation or what Näringsliv Skåne saw as innovation. Sometimes, I even found it hard to believe my informants, even when they were explicitly convincing me that they were doing 'something innovative'. The main difficulty with having an open mind, therefore, was to actually *allow* myself to acknowledge other versions of youth innovation.

ANT's prescription was simple. 'Just follow the actors!' It was said:

> "[Actors] know what they do and we have to learn from them not only what they do, but how and why they do it. It is *us*, the social scientists, who lack knowledge of what they do, and not *they* who are missing the explanation of why they are unwittingly manipulated by forces exterior to themselves and known to the social scientist's powerful gaze and methods." (Latour, 1999b; p. 19)

Yet, such a methodological instruction was problematic. Throughout my entire fieldwork, it was never as simple as 'learning from *them* what they do or how and why they do it'. Despite all the self-monitoring, self-reflection, and attempts to avoid any kinds of bias, I was still *coming from somewhere*. In practice, this meant that I was following *certain* actors, identifying *certain things,* and acknowledging *certain* insights, more so than others. For this reason, I would like to acknowledge at this point that the subsequent case studies might have looked otherwise had I come from *elsewhere*.

'Following actors' was thus anything but straightforward. At least in my experience, it was about running to and fro, towards and away from, within and without, and constantly struggling to

convince myself to acknowledge that what my field respondents 'said' was perhaps yet another alternative; a plausible understanding of youth innovation and innovativeness. I am still blind to whether the issues raised here were somehow resolved during or after the fieldwork process.

In his anecdotal expression, Simpson (2006) suggested that "you don't do fieldwork, fieldwork does you" (p. 125-137). I would like to add a third alternative: I and the fieldwork *did* each other. By this, I mean to say that in the process of doing fieldwork, I, policy makers, plumbing teachers and students, plumbing equipment and tools, clothes and clothing libraries, to name but a few, were constantly trying to understand and teach each other. Essentially, the insights provided in this thesis are the product of this mutual 'doing'.

REDESIGN & CLOTHING LIBRARY 'MORPHEUS'

On the first floor of Grön Äng [pseudonym], in Malmö, there is a boutique with the name Morpheus [pseudonym]. Only a wide poster mounted on the windows reveals its identity of redesign and clothing library: a place where people can sew, redesign, and rent clothes. Today, Morpheus is considered a youth innovation and a running enterprise. Throughout this chapter, we are going to follow the founders of Morpheus. We will embark on a journey, starting from their first encounter at Malmö Högskola, through their struggle to reach out to indifferent Malmö citizens, through situating the enterprise in a physical location, until Morpheus's recognition as youth innovation. In this chapter, our aim is to understand how youth innovation happens and to relate this understanding with the innovation policies that address youth innovation in education.

Setting the scene for making friends and goals

Violet Berg [pseudonym] is from Gothenburg. In following her interest in clothing, as a gymnasium student, Violet specialized in textile. She is particularly fond of sewing, likes to be creative, and thinks about the environment and sustainability. Mimosa Lindquist [pseudonym] is from Helsingborg. During her gymnasium education, Mimosa attended the social studies pathway. Today, she is striving towards a professional career in sustainable architecture. As Violet, Mimosa too is interested in clothes and sewing.

At this point, Violet and Mimosa do not know each other. They both pursue their interests independently and, for all we know, they may continue their lives in different directions and never meet. Violet and Mimosa are, to use Latour's conception (1999a), "mutually disinterested" (see p. 183-186). This situation changed when they both decided to enroll in a course on design and sustainability at Malmö Högskola, in Malmö. Consider this quote:

"[We met] in this course at Malmö Högskola on design and sustainability. The aim of this course was to put thoughts on sustainability and social innovation into practice. We were asked to come up with an idea that was possible to do in reality, something innovative, and turn it into a school project. I and Mimosa were in the same group. So we started talking about sustainability and the things that we liked. We both liked clothes and sewing. During the course we became really good friends. So after many conversations, together we decided to make a redesign workshop" (Violet, Int. 3)

Here, Violet informs us about the course on design and sustainability at Malmö Högskola. For Violet and Mimosa this course was literally *a meeting place*. It brought two unacquainted, mutually disinterested youth into one physical location. Most importantly, however, this meeting place revealed, reshuffled, and tied their interests together, into a single knot. They discovered that they "*both liked clothes and sewing*" and, upon this small discovery, they started planning on transforming their "*thoughts on sustainability*" into reality, into "*something innovative*".

When Mimosa and Violet met for the first time, they started talking. They talked about sustainability, sewing, the environment, and about their goals in life. And before anything else, Mimosa and Violet "*became really good friends*". Eventually, the entwinement of mutual likes and friendship led to the composition of a common goal of starting a redesign workshop project. In this way, by setting the scene for mutual interaction, the meeting place transformed the initially unknown, unacquainted, and disinterested youth into particular subjects, i.e., friends and partners, striving towards a specific object, i.e., a redesign workshop. We may thus view the meeting place as a conjunctural event in which "the relevant objects and subjects […] are co-produced" (see Gomart & Hennion, 1999; p. 228).

The meeting place delegates chores

The very birth of the redesign workshop idea was attended by mixed feelings of excitement and skepticism. Yes, Mimosa and Violet were motivated and interested in realizing their common goal. They even had that spark of entrepreneurial drive which fueled their deepest ambitions for

the project. All this, however, faded away before the giants of realization: the sudden notion that turning an idea into reality involves real people, real things, and doing real stuff.

At the very birth of the redesign workshop, Mimosa and Violet descended into a vortex of many hopes but even more 'maybes'. Maybe their plans were overly ambitious! Maybe they will not get the sufficient support to realize their idea! Maybe people will not like their idea! Yet, Mimosa mentioned: "*[at first] we didn't know if we should do [the redesign workshop idea]. But, after many class discussions and conversations with out teacher, we were like 'we have to do it, now!*" (Int. 4). Mimosa and Violet were thus not alone.

When everything seemed to be collapsing, the meeting place unleashed a legion of classmates to assist Mimosa and Violet in their planning. They discussed and gave each other ideas. During the seminars, they also tried to identify issues and deliberate on solutions. Whenever Mimosa and Violet felt discouraged and unmotivated, the classmates were there to cheer them up. In this way, by setting the scene for yet another type of interaction, i.e., class discussion and mutual motivation, the meeting place 'authorized' classmates to push Mimosa and Violet through to a more positive attitude: "*we have to do it, now!*"

Whose idea was the redesign workshop, then? On the one hand, it was indeed Violet's and Mimosa's. It stemmed from their friendship and common interest in clothing and sewing. Without Violet and Mimosa, this particular idea would not exist. On the other hand, the same idea morphed into different shapes as more and more classmates came to talk about it. Without their thoughts and encouragement, the particular idea of redesign workshop would not exist either. In this second perspective, the idea was the product of a particular co-creation experience (see Prahalad & Ramaswamy, 2004).

There is a third way to look at the question of 'ownership'. The co-creation experience in the meeting place was also 'doing something' by assigning Violet and Mimosa with 'all the doing' concerning the redesign workshop idea. It was precisely Violet and Mimosa who would take the idea, in whatever shape, and make it a reality, in whatever form. In this third perspective, then, ownership is not so much a question of 'who *thought of* it' as much as it is a question of 'who is

doing all the work'. To say that the redesign workshop is Violet's and Mimosa's idea, then, is also to argue that it is Violet's and Mimosa's task, their chore.

In this way, the meeting place both hosts and enflames the co-creation experience and, in so doing, it delegates chores. The concept of *delegation* is was initially developed by Latour (see 1999a; 187-198), here extended to signify that 'the work of the few stems from the directions given by the many'. The many were both the classmates and the teacher. For instance, the meeting place delegated chores through positioning the teacher as a 'road sign'. As such, their role was not to instruct or to solve students' problems. Rather, their job was to direct students on the path to finding the right answers, *by themselves*. Consider this example:

> "The teacher directed us to some people who would be interested in us. First, we interviewed a professor at Lund University. She was a specialist in Swedish handicrafts. She suggested that we make [the redesign workshop] an easy thing, so that everybody can grasp it, something that everybody can try." (Mimosa, Int. 4)

In this quote, Mimosa informs us that their teacher at Malmö Högskola directed them in discussing their ideas with a specialist in Swedish handicrafts at Lund University. The specialist helped Mimosa and Violet by advising them to make their redesign workshop easily understandable for their future customers. This 'advice', however, did not happen inside the meeting place. Rather, through teacher's delegation, the two youths found the advice *outside* from the meeting place. In this case, the advice stemmed from the interview with the specialist at Lund University.

In Violet's view, the reason behind this delegation was obvious. Teachers simply "*did not know all the answers*" (Int. 3). In this view, delegation is important for practical reasons; that is, students might benefit from interacting with external experts. But also, an interesting and crucial aspect of this particular delegation was its *outward* orientation. Up to now, the idea of a redesign workshop was neither greater nor lesser than the meeting place itself. Once Mimosa and Violet were directed out, the meeting place opened the possibility for more people to get exposed to the redesign workshop idea. By physically going out of the classroom and to other places, thus, Mimosa and Violet made the first steps toward making their idea, at least, more visible.

We just wanted to show that we exist!

Upon the advice from the specialist in Swedish handicrafts, Violet and Mimosa decided to test their idea of redesign workshop. They wanted to examine how it would work out in reality. Their plan was to organize a redesign workshop event in the cafeteria of Malmö Högskola. Violet summarized this in the following quote:

> "As part of our school project, we decided to test our redesign workshop idea by organizing one in the cafeteria of Malmö Högskola. First, we asked our teacher for permission. She told us: 'You are the students. This is your space.' So we did a one-day workshop. We brought a table, a sewing machine, and many clothes. We just wanted to show that we exist!" (Violet, Int. 3)

Here, Violet is pointing out at an important goal: "*we just wanted to show that we exist*". A simple goal, yet it compels us in examining how 'to show' and 'exist' relate to one another.

In essence, 'to show' indicates to 'exposure'. By organizing the redesign workshop event at the cafeteria of Malmö Högskola, Mimosa and Violet wanted to expose others to their ideas. In this case, exposure was achieved by two moves. First, Mimosa and Violet 'materialized' their redesign workshop idea by transforming it into a setting comprised of a table, a sewing machine, and clothes. In this way, they produced a 'material inscription' for their idea. Second, Mimosa and Violet situated this inscription within a larger physical setting: the cafeteria of Malmö Högskola. With this second move, they positioned the material inscription of the idea as the object of exposure. In other words, the material inscription was given a particular audience: the cafeteria attendants.

Before this event, the redesign workshop was limited to the status of an idea. As such, it could be discussed, believed, liked or disliked, and so on. Yet, nobody could tell with certainty how the idea would work out in reality. Through the two moves however, Mimosa and Violet opened the doors to potential customers. During the event, the many cafeteria attendants could take part in the redesign workshop by performing different activities. They could sew, redesign clothes, or simply discuss with Mimosa and Violet about their ideas. In this way, the girls set the scene so

that the various attendants of the cafeteria could perform the material inscription into an operating redesign workshop.

The event, however, did not go out as the two girls expected. Mimosa complained:

> "Many people were around. Some of them came, looked [at what we were doing], and then left. Not many were interested in discussing with us. Actually, they didn't really want to participate in our workshop. Then, we realized that it was actually difficult to reach out to people." (Mimosa, Int. 4)

In this quote, Mimosa emphasizes the indifference of the cafeteria attendants. She said "*it was actually difficult to reach out to people*". Even though many people were exposed to the redesign workshop, these people only saw Violet and Mimosa as they were sewing and redesigning clothes by themselves. By not having people to actually participate in it, therefore, the redesign workshop failed to be performed into existence. At least that day, at the cafeteria of Malmö Högskola, Violet and Mimosa's idea did not work out in reality.

The birth of Morpheus

At the very beginning, the redesign workshop was merely a spark of ambition, fading away into the background of skepticism. Then, the classmates from the meeting place jumped in. The idea grew to the size of the meeting place itself. The girls were sent out. They reached the specialist in Swedish handicrafts at Lund University. The idea also moved out from the confines of the meeting place. Eventually, at Malmö Högskola's cafeteria, the idea gained materiality and exposure. Finally, Mimosa and Violet met Jasmine Engberg [pseudonym]:

> "We didn't know about clothing libraries before we met Jasmine. She worked with [clothing libraries] in Stockholm. After moving to Malmö, she got involved in another clothing library here. She wanted to develop the movement. We liked the idea and we took Jasmine to be our third partner. So we decided to make Morpheus, our redesign workshop and clothing library." (Violet, Int. 3)

As Violet pointed out here, before meeting Jasmine, Violet and Mimosa did not know about the clothing library movement. Before Jasmine, they just wanted to make a project on redesign workshops. When Jasmine, Mimosa, and Violet met, the idea of a redesign workshop changed fundamentally. Their meeting resulted in a composition of a new goal: a redesign and clothing library. The transformation of the idea was evident: before Jasmine, an ambition about a redesign workshop; after Jasmine, a vision about a different entity. And so Morpheus was born.

From failed workshops towards the 'place to be'

With Morpheus, Violet, Mimosa, and Jasmine aimed to "*decrease clothes consumption in society by providing people with the alternative to sew, redesign, and rent clothes*" (Int. 3). Their vision was the product of their common interests and fruitful imagination. Violet, Mimosa, and Jasmine firmly believed that such a vision will one day become reality. And as they employed various strategies to realize this vision, they moved further and further away from the meeting place. Their next move was to organize yet another event, to test their ideas one more time. Consider the following quote:

> "We organized four workshops at Stpln. It is a place near the Turning Torso, in Malmö. There, you can repair your bicycle, go and study, or maybe have a temporary work place for your business. With these workshops, our goal was to reach out to people, introduce them to our idea, and see how it worked." (Mimosa, Int. 4)

Here, Mimosa brings in Stpln into our story. This youth organization is located in Malmö, at Västra Hamnen. According to their website (Stpln, 2013), Stpln is "an open house, available for those who want to produce and take part in cultural events, develop ideas, or create prototypes in one of the workshop areas". At Stpln, one is provided with access to machines and tools, exhibition facilities, office space, stage and stage technology, and meeting rooms. As indicated in the quote, Mimosa, Violet, and Jasmine decided to use the opportunities that this organization offered in order to organize a series of four workshops. Mimosa continued:

"We invited people to join us over Facebook. Many people said that they will come. Maybe thirty, fifty, or more! We were like: 'oh, how can we do this with fifty people!' And then, there were just four who actually came." (Mimosa, Int. 4)

With this latter statement, Mimosa gives us an idea of the strategy that they employed in *mobilizing* participants into their workshop events. The concept of mobilization refers to "all the means by which nonhumans and humans are progressively loaded into discourse" (Latour, 1999a; p. 99). This particular mobilization process was performed though and by Facebook. This nonhuman actor was important for three reasons.

First, it overtook action by 'doing the work' for Violet, Mimosa, and Jasmine. Instead of the three youths actually inviting each participant by themselves, Facebook did all the inviting for them. Second, Facebook scaled action since it could reach and invite more people than any human would be able to, in an instance. Without Facebook, each invitation would have been a chore for itself. Finally, by overtaking and scaling action, Facebook produced 'time' in the sense that it made it possible for the three youths to 'do something else'. For example, instead of spending time on doing all the invitations by themselves, Mimosa, Violet, and Jasmine could work on preparing the workshops.

As Mimosa indicated in the previous quote, however, from the fifty people that confirmed their participation, "*just four actually came*". This mobilization process 'failed' in the sense that, while it succeeded in inviting people, it did not bring people back to the workshop events at Stpln. In the following quote, Mimosa deliberates on this problem:

"Stpln was not situated in a good location. So, not many young people hang out there. It's not 'the place to be'. It is not easy to just drop by and even the people who know about it think that it's too far." (Mimosa, Int. 4)

Here, Mimosa attributes the reason behind the failure of the mobilization process to the location of Stpln. In our conversation, she particularly emphasized that this location was "*not the place to be*". For the three youths, this failure meant that, in reference to future attempts, they needed to select a better location for situating Morpheus. Mimosa continued:

"The other thing about Stpln was that we didn't have a storage room. So we had to carry our things [to and fro] during the whole time. And things were really heavy. At the beginning, we thought that we should be just guests at different places, such as Stpln, restaurants, shops, or different events in the open. But, after these workshops, we realized that we needed a constant location. We also wanted to do the clothing library idea. One of the thoughts we had was to find a more central location so that many people would find us easily." (Mimosa, Int. 4)

As indicated in Mimosa's statement, before Stpln, the three youths intended to run Morpheus through being guests in different localities. The failed mobilization process, however, led them in noticing a particular externality; namely, the *need* for a permanent and central location. In Callon's interpretation of the term (1999), externality is "everything which agents do not take into account and which enables them to conclude their actions" (p. 189). In this way, the *need* which was previously unaccounted for became indispensable for the three youths. If Mimosa, Violet, and Jasmine wanted to 'conclude' their efforts in making their vision a reality, they needed to find a location for their enterprise, both permanent and 'the place to be'.

Becoming superior to the problems

When it was difficult to "*reach out to people*", Mimosa, Violet, and Jasmine felt fear. What if nobody was interested in sewing, redesigning, or renting clothes? When they found Stpln's location to be problematic, they were confused. Could they afford a suitable location? When they found their materials to be heavy to carry, they grew skeptical. Would they manage to transport stuff from one location to the next, constantly? Herewith, Mimosa, Violet, and Jasmine were indivisible from the issues that they experienced. They were one and the same!

Yet, the three girls were not alone. However thin, the umbilical cord with their meeting place was still holding. And when the situation grew scary, and confusion and skepticism clouded their judgment, the three youths could still go back to the meeting place. There, they talked to their

teacher who, still playing the role of a road sign, directed them once again, to another youth organization in Malmö. Violet highlighted:

> "Selfmade helped us see some of our weaknesses. For instance, the fact that we were not originally from Malmö meant that our social network was severely limited. This meant that we needed to work on that. At the same time, they helped us to identify some of the threats. Let's say, that maybe we wouldn't find a proper location. But also, Selfmade made us think of the small stuff. For example: 'what if the sewing machine gets broken!' We also thought of the opportunities we had. For instance: there was a need on the market for our services. SWOT was good because when you do practical things, it is easy to focus on the details and forget the big picture." (Violet, Int. 3)

In this quote, Violet introduces Selfmade: a youth organization in Malmö with the mission to "help creative people to develop and realize their commercial, ideological, or cultural ideas" (Selfmade, 2013). As discussed in the quote, Selfmade helped the three youths by introducing them to SWOT which is a diagram consisted of four categories: strengths, weaknesses, opportunities, and threats. The employees at Selfmade assisted the youths in filling in the blank fields of the diagram. Suddenly, the youths had a piece of paper with four categories of statements inscribed on it. This move was crucial. Now, Mimosa, Violet, and Jasmine could objectively gaze at a paper with inscriptions. They were physically divided from their problems.

In this way, the power of the SWOT inscriptions was constituted in their ability to reshuffle the power relationships between the youths and their issues. In their hands, the three youths held their problems, fears, confusion, and skepticism, even as they experienced them. In regards to a similar situation, Latour (1999a) argued "thanks to inscriptions, we are able to oversee and control a situation in which we are submerged, we become superior to that which is greater than us, and we are able to gather together synoptically all the actions that occurred over many days and that we have since forgotten" (p. 65). Similarly, with SWOT, Mimosa, Violet, and Jasmine became superior to their problems. Like this, they could at least plan ways of solving them out.

To settle in means to bring things in

By providing the three youths with SWOT, Selfmade did not solve their issues. Selfmade, however, sent the three youths out, directing them on the path to finding the solutions of their issues by themselves. And so, they were directed to Grön Äng:

> "The person at Selfmade suggested that we contact Grön Äng. So we did. The project leader of the place showed us around and the different spaces where we could settle in. This was 'the place to be'. At the same time, they were really generous with the rent. We thought: 'we would never get a lower rent in this area!' So we decided to take it. Soon after, we signed a contract." (Violet, Int. 3)

As evident in this quote, Grön Äng was everything that the three youths could hope for. Grön Äng was a building which was situated in a location frequently visited by many a youth. It was 'the place to be'. But also, this location was affordable. As Violet stressed "*they were really generous with the rent*". Once they signed the contract, their SWOT diagram also changed. Now, their weakness of not having "*a proper location*" was transformed into strength. With this, the next move of the three youths was to 'settle in'.

In this case, to 'settle in' meant to initiate a process of mobilizing specific things while considering the restrictions imposed by the circumstances. For instance, Mimosa, Violet, and Jasmine had limited financial means at their disposal. They could not afford to spend much on hangers for the clothes. They were not even thinking of buying mannequins for their boutique. Also, they could not invest in a luxurious sewing machine and expensive furniture. Yet, hangers, mannequins, sewing machine, and furniture were necessary.

In the following quote, Violet informs us of how they mobilized Morpheus's furniture:

> "Our new location was empty at the beginning. So, we were thinking of how to organize the place. I knew an artist that I met on an event about sustainability in Lund. He was making furniture through recycling and redesigning. We contacted him and he agreed to help us in exchange for some [public relations] and advertising. So, he got himself a 'showroom' and we got our furniture." (Violet, Int. 3)

Here, Violet speaks of an incidental encounter she had with an artist. With this, she also indicates to a crucial effect of this particular mobilization process. Before the mobilization process, the encounter with the artist was at best a memory, an event of Violet's past. But, as the mobilization process started, this encounter gained use-value. The encounter became useful. In essence, through the mobilization process, the past encounter was transformed into a future potential.

In the quote, Violet also points out at how this potential was utilized. She stressed "*...he got himself a showroom, and we got our furniture*". By shifting our attention onto the evident reciprocity, this statement suggests that this mobilization process was effective because all the relevant parties gained something from the established contract. Morpheus got their furniture. The artist got his public representation. In this way, the particular process of 'settling in' was based on a mobilization process which brought something *in* Morpheus but, simultaneously and necessarily, also gave something *out*.

The final frontier: producing the customer

The process of 'settling in' was to endow Morpheus's physical space with a particular production potential. In this case, this meant a material setting which would enable the production of relations between people, sewing machines, and clothes. Through their mobilization processes, thus, Violet, Mimosa, and Jasmine aimed to set the scene which would enable the emergence of a new actor: the Morpheus's customer.

Mimosa, Violet, and Jasmine envisioned a particular type of customer for Morpheus. They saw an environmentally conscious, everyday citizen of Malmö who made a statement about their personal identity by redesigning and renting clothes. As Mimosa indicated:

> "I think that redesigning clothes is more personal than buying clothes. At least, it is more personal than going to H&M® and buying clothes that are really 'You'. Also, redesigning and renting clothes is a more sustainable way of consumption. If in other stores a thousand people would buy a thousand shirts, in our shop they would all rent the same

shirt. And also, renting clothes gives you the chance to wear more clothes and build your identity that way." (Mimosa, Int. 4)

In this quote, Mimosa paints an image of the Morpheus's customer. This particular 'image' is the goal of their next and probably most difficult endeavor: to reach out to the citizen of Malmö and to bring in the customer of Morpheus. Maybe, both the 'Malmö citizen' and the 'Morpheus's customer' refer to the same human entity. Yet, these two identities are different. While the former is indifferent and disinterested, the latter must be 'produced' in relations of 'redesign', 'sewing', and 'renting'.

The eventual occurrence of these relations, and through them of the 'customer', is pertinent for the existence of Morpheus as an independent entity. Violet specified "*we need at least twenty customers, paying membership fees monthly*". They need these fees in order to pay for rent, electricity, and to further equip their enterprise. As the three youths realized, however, "*it is difficult to reach out to people*". And so, Mimosa, Violet, and Jasmine will continue trying to reach out to citizens and to convince them in becoming Morpheus's customers. In this way, Morpheus is not a finished entity. Rather, it is a process existing in the "*many clothes in movement*", "*a lot of redesigning*", and the constant negotiation with Malmö citizens.

The short story of youth innovation

Now, Mimosa, Violet, and Jasmine were far away from the course on design and sustainability at Malmö Högskola, their meeting place. Their idea of a redesign and clothing library was finally *framed* into the autonomous entity of Morpheus. Here, the concept of framing refers to the set of operations "used to define individual agents which are clearly distinct and dissociated from one another" (Callon, 1999; p. 188). In this case, Morpheus was framed because in the process of its realization, it became distinct, or independent, from its place of birth. The umbilical cord with the meeting place was finally severed.

Up to this point, the story of Morpheus was not about youth innovation. It was rather a story about youth, meeting places, redesign workshops, clothing libraries, sewing machines, clothes,

indifferent Malmö citizens, and what not. Until this point, Morpheus was not an innovation because it was caught up in a network of relations which defined it otherwise. But then, Morpheus became part of the following statement:

> "Winner of Ungas Idetävling [Young People's Idea Competition]: Morpheus was one of the ten winners of Ungas Idetävling, a competition which was organized by Ungas Innovationskraft during the spring of 2012." (Ungas Innovationskraft, 2013)

This statement defined Morpheus as one of the winning ideas of Ungas Idetävling. This competition aimed to award innovative ideas "that would solve a small or big problem and provide a solution that makes the world better, or life easier" (Ungas Innovationskraft, 2012a). The competition was organized by Ungas Innovationskraft which is the Swedish national program for youth innovation, aiming to stimulate the Swedish innovation system in taking a better advantage of the innovative potential of Sweden's youth (Ungas Innovationskraft, 2012b). For me, the reason behind the decision of this organization to select Morpheus as one of the winners remained unknown.

Yet, Morpheus became a youth innovation by virtue of becoming "*one of the ten winners*" in a competition which presented itself as being *about* innovative ideas, organized by an organization which was *about* youth innovation. In technical terms, then, Morpheus got *punctualized* in the network of Ungas Innovationskraft. In Callon's interpretation of the term (1991), punctualization means "the process of converting an entire network into a single point or node in another network" (p. 153). In this case, Ungas Innovationskraft took the whole story, the whole network that Mimosa, Violet, and Jasmine weaved around the entity of Morpheus, and assigned it with a single identity of youth innovation. Consequently, 'Morpheus as youth innovation' and 'Mimosa, Violet, and Jasmine as the innovators' were retrospective points which became meaningful only after Morpheus won the Ungas Idetävling competition.

Concluding remarks

Youth innovation imposes that we view the education environment not solely as a knowledge- or skills-providing institution but as a meeting place. In producing youth innovation, the meeting place plays two major roles. First, it gathers youth in one place, reveals and matches their common interests, and by means of fostering and enflaming a coproduction experience, it helps youth to develop their ideas into projects. In playing this role, the meeting place encourages interaction and collaboration among classmates and promotes friendship. As it was demonstrated in the example of the redesign workshop, these aspects were important for ideation and project development purposes, but also for the emotional values, ambition, and initiative that they produced.

The second role of the education environment as a meeting place was to promote the realization of youths' projects, not by solving youth's questions internally, but by directing them *out* from education and into other contexts. Essentially, this role had to do with linking youth and their projects with actors from various environments, outside of the education system. For instance, the teachers at Malmö Högskola linked Mimosa, Violet, and Jasmine with external organizations such as Stpln and Selfmade and with individuals such as the specialist in Swedish handicrafts at Lund University. This 'outward linking' was important because it made the project of the three youths, at least, more visible.

Innovation policies often call for increasing the links between industry and education. These links are, however, often envisioned as having a purely educational character; for instance, the links between schools and the industry are usually envisioned as producing internships for the students. These kinds of links are important for enabling a smooth transition from education to the workplace. However, as demonstrated in this chapter, the links that produce youth innovation aim at producing a new object, "*something innovative*". For example, rather than training Mimosa's, Violet's, and Jasmine's skills for their skills' sake, the link between Stpln and the three youths was supposed to advance Morpheus, their mutual project. These kinds of links are rarely addressed in innovation policies.

Furthermore, youth innovation content and context are the temporary effects of movement, of spreading an idea or a project through time and space. For example, at the beginning of our journey, we saw how the idea of a redesign workshop included the discussions between Violet, Mimosa, their classmates, and teachers at Malmö Högskola. The education environment was thus the content of the redesign workshop idea. At this point, the context consisted of organizations such as Selfmade and Stpln. As Violet and Mimosa moved out and away from the meeting place, and into Selfmade and Stpln, the latter two organizations started becoming more of Morpheus's content. Conversely, the meeting place was becoming more of a context. Organizations such as Stpln and Selfmade are therefore important. Not only for the assistance which they provide for youth, but also because temporarily they are the content of their innovations.

As it was shown in this chapter, some contexts needed to be produced from scratch. For example, when Mimosa, Violet, and Jasmine made up the idea of Morpheus they simultaneously needed to make up a context of customers who would keep Morpheus into being. Morpheus's customers were not always 'there'. It was rather the three youths who, through mobilizing various humans and nonhumans, strove to 'convert' the everyday Malmö citizen into a Morpheus's customer. The various possibilities that youth have in initiating these kinds of mobilization processes are therefore crucial for youth innovation. It is through these mobilization processes that 'incidental encounters', 'Facebook contacts', or any kinds of conditions for that matter, can be transformed into potential for youth innovation.

The final point which I would like to raise in this section is that youth innovation and young innovators are network effects. For instance, Mimosa, Violet, and Jasmine *became innovators* once they were assigned with this identity by the network of Ungas Innovationskraft through the Ungas Idetävling event. Then too, Morpheus became an innovation. This moment of punctualization is crucial because it brings new innovations into the social discourse. Yet, innovation policies should not forget the networks of material artifacts and humans which led Morpheus *to* the point of punctualization. In these networks, each actor is crucial: from Malmö Högskola, Stpln, and Selfmade, through Mimosa, Violet, and Jasmine, to sewing machines,

clothes, and furniture. Each of these actors was equally important for transforming Morpheus into and keeping it as an independent entity which later became defined as youth innovation.

EDUCATIONAL PLUMBING PRACTICE SESSION

During 2012, I had the opportunity to study the education environment of a vocational gymnasium in Lund. I was particularly interested in their plumbing program. There, I saw instructive practice, a lot of 'doing the right stuff', and very little 'value added'. In my mind, these observations indicated to an education environment which inhibited innovativeness. Yet, during my fieldwork there, some of the plumbing teachers insisted that innovativeness did happen in the program. Where I saw the plumbing program as not being innovative, these teachers held the opposite view. Consequently, I noticed tension between the different ways of qualifying the same education environment in regards to youth innovativeness.

In this chapter, I will explore the relationship between the education environment and youth innovativeness. The plumbing practice session is the case in point. I will follow plumbing teachers, plumbing students, and plumbing equipment in the process of making bathroom installations. The purpose of this following is to investigate how youth innovativeness is positioned within the plumbing practice. I will close this chapter by pointing out at how the generated insights relate to innovation policies which address youth innovativeness.

Producing a plumber that fits

At the plumbing program, the purpose of the plumbing practice sessions is to train students in plumbing techniques. In these sessions, each student is expected to acquire the basic skills, capabilities, and knowledge in plumbing that will enable them to function within the plumbing work environment. The goal of the plumbing practice sessions is therefore to produce a plumber that *fits* in the industry. This is achieved through employing a set of procedures during the practice sessions which reflect the interests, rules, and prescriptions of the plumbing industry. As a plumbing teacher put it:

> "After finishing school, the students will go out in the real world to work. Most of the time, they will have nobody to ask [about how to perform their duties]. That's why they

need to know how to make decisions. They must make sure that the [plumbing] system works according to standards. It's drinking water. People drink it! So students cannot do whatever they want, in the school or outside." (Plumbing teacher, Int. 5)

This quote speaks of the 'real world'. In that, the teacher refers to the future work environment of the plumbing students. The real world expects young plumbers who can make decisions independently, who have both the skills and knowledge necessary for 'proper' plumbing, and who can complete their obligations effectively and efficiently. A plumber that fits is, in this way, an identity which is envisioned by external actors such as the plumbing industry. The plumbing practice session aims to bring this externally-envisioned identity into reality. But consider the following quote:

"Skolverket sets the minimum requirements. This is what each student needs to know. But that's the minimum and that's what I like about it. I can always reach a higher standard as long as I don't lose track. I can give students the minimum requirements and then I can add my part to it. That's where, I think, teaching becomes art: when I can give my approach, my ideas, and my own standards." (Plumbing teacher, Int. 6)

From here, we can see that the plumbing practice session has a say in the production of a plumber that fits. For example, the teachers are responsible to "*give*" or transform the minimum requirements imposed by Skolverket into learning activities during the practice sessions. But, the teachers are also free to "*add*" or capitalize upon these requirements in the attempt to create a more meaningful learning experience for the students. In this way, both internal and external actors are active in the production of fit. What is envisioned as a good plumber or a good student in the outside, either by the plumbing industry or by Skolverket, must happen in the inside, through the learning activities played out in the plumbing practice session.

Teachers cannot "*lose track*", however. In other words, learning activities, whether 'just meeting the standards' or 'capitalizing upon them', must conform to the frame set by Skolverket or the plumbing industry. If this is not the case, then, the plumbing program risks producing a plumber that does not fit in the outside, be it in the plumbing industry or in the education system. In this way, a plumber that fits is both the goal of and the outcome from making the interests of the

external and the internal actors more or less congruent. Law (1999) has termed this *translation* or "the work of making two things that are not the same, equivalent" (p. 8).

In the midst of uncertainties

The plumbing practice session is an event. The experience of entering this event for the first time defies short description. It suffices to say however that one takes part in a total chaos. This chaos is reflected in the jungle of scattered tools, messy work desks, 'mysterious' machines, and the randomly dispersed piles of copper pipes. The sheer abundance of things makes one dizzy! But this chaos gets even more chaotic when one attends a plumbing practice session. Suddenly, everything starts doing something. Teachers are talking to students. Students are cutting, welding, and combining stuff. Things are forming other, more complex things. The plumbing practice session is literally an 'explosion of activities'.

At the beginning, no one is entirely sure of the kinds of entities which will enter the plumbing practice session. All students seem different. Some of them are already well-skilled in plumbing. Others are less skilled, but they also see a career in the plumbing industry. All teachers seem different too. Some of them got tired from being professional plumbers and wanted to transfer their expertise to the next generation of plumbers through education. Others saw the plumbing school as an opportunity to explore new ways of doing things and thinking differently. Finally, the plumbing workshop is full of plumbing equipment whose exact use during the plumbing practice session is unknown beforehand. In this way, at the beginning, what enters in the plumbing practice session is uncertain.

At the beginning, no one can really predict the kinds of relationships that the students, the teachers, and the plumbing equipment will form during the practice session. Some teachers are frequently frustrated by students' rebelliousness. Some students seem reluctant to follow their teacher's instructions. They would rather play with their friends. Plumbing equipment is being handled carefully. One wrong move, one safety criterion disobeyed, and real people may get hurt. One might wonder. Will students be happy with teacher's guidance? Will the teacher be

content with students' performance? Will the plumbing equipment function properly? For all we know, everything can happen during the practice session! Therefore, at the beginning, what will go out of the session is also uncertain.

The plumbing practice session is then a play between these two uncertainties. In this play the production of a plumber that fits is being negotiated between plumbing students, plumbing teachers, and plumbing equipment. The outcomes of this negotiation are crucial. If students do not follow the industrial standards while populating the bathroom stations, they risk not being able to perform well as future employees in the plumbing industry. If the teachers do not follow Skolverket's minimum requirements for the program, they risk producing youth who are illegible as plumbing students across educational contexts. And, even the tiniest malfunctions in the plumbing equipment may compromise the wellbeing of the students!

The bathroom stations

The process of resolving the two uncertainties is centered on six empty cubes. The plumbing teacher calls them "*bathroom stations*" (Figure 1). They are cube-like structures connected with the water supply system, where students practice bathroom installation. At the beginning of the practice session, the stations are empty. Working in groups of two, the students' task is to populate each empty station with bathroom elements. Their ultimate goal is to transform the empty cubes into proper functional bathrooms. In reaching this objective, the students are provided with all the necessary resources and means. They can use bathroom parts, pipes, welding machines, and so on. Students also have teachers' guidance at their disposal, the whole time. Consider this quote:

> "So, there is an empty bathroom station. Inside, you want to have a toilet, place where you can take a shower or bath, and place where you can wash your hands and brush your teeth. First, I teach my students how to attach the toilet seat, the sink to the wall and to the sewer, and how to attach the bathtub or the shower-head. Then, I shift their attention towards the walls of the stations. The students need to know how to install water pipes.

The bathroom station is finished once the students have connected all the necessary elements according to the rules and standards of the industry, the insurance companies, the government, and so on. (Plumbing teacher, Int. 7).

In the latter quote, the teacher indicates how all internal actors – the teachers, students, and equipment – are positioned towards the bathroom stations. Although students' behavior may seem messy, they all work on trying to populate the empty cubes the best way they can. Although plumbing tools and equipment seem randomly scattered across the entire plumbing workshop, they will all eventually be used in populating the bathroom stations. And although at times the teacher seems to have lost control over the situation, he constantly interacts with the students in helping them to populate the bathroom stations in 'the right way'. The plumbing practice is an explosive chaos, but *around* the bathroom stations.

Figure 1. In the plumbing practice session, plumbing students, teachers, and equipment are all gathered around the bathroom stations.

In the plumbing practice session, the *properly populated bathroom station* is an obligatory passage point or "the situation that has to occur in order for all the actors to satisfy their interests" (Callon, 1986; p. 8). This means that, if the plumbing program is to produce a plumber that fits; if the plumbing industry wants to get skilled plumbers; and if plumbing students want get a job in the plumbing industry one day; students must be able to populate the bathroom stations properly. In this way, the plumbing practice session aims to steer each student towards this obligatory passage point. The production of a plumber that fits is dependent upon the relative success of this steering.

A teacher, a notebook, and a list with criteria

In the plumbing practice session, each student's performance is measured against their ability to produce a more or less proper functional bathroom. In this way, the plumbing practice session involves a process of qualification by means of which students 'reveal' their skills and qualities as plumbers. For instance:

> "What are the minimum requirements actually about?" (Ivanche)

> "Of course, grades! If I want to give a student an 'A' or a 'B', I have to go to my documents and see. If I give the student an 'A', he needs to know this and this. Then, he should be able to do certain things in a certain way, with certain skills. For example, a bathroom installation, you can do it in so many different ways. The minimum is, of course, that it works. But also, how did you make it work? Did you ask me? Did you do it independently? Then, there is a difference in the grades that you receive." (Plumbing teacher, Int. 8)

In this quote, the plumbing teacher informs us that, in the process of populating the bathroom stations, he uses the minimum requirements as the base on which students are being evaluated, or qualified. As evident in the quote, this qualification process enables the emergence of grades. Let us examine how this works.

In his right hand, the teacher holds a list with criteria. This list is the material object which gathers industrial and educational actors *in* the plumbing practice session through written plumbing standards and minimum education requirements. Once he explains them the task, the teacher then engages the students in the process of populating the bathroom stations. He constantly observes students' performance. He also helps the students whenever they need help. At the end, the teacher examines the populated bathroom stations. He flushes the toilet. "*Did it leak? Were all pipes connected properly? Were hot and cold water taps placed in the right way?*" (Int. 8).

In his left hand, the teacher holds a notebook. As he observes the students, the teacher occasionally inscribes his observations in this notebook. At the end, he compares his observations against the list of criteria. For each comparison, he marks a 'tick'. During the practice session, the teacher makes a different list of ticks for each plumbing student. The teacher's notebook is, in this way, the material object which gathers the explosion of activities within the plumbing practice session and, by 'amalgamating' it with the inscribed criteria, reduces it to a series of ticks.

Within the list with criteria, different sets of ticks correspond to different skill-levels, abilities, and knowledge in plumbing. Based on the various comparisons, thus, different students are qualified differently. After many practice sessions, the piling up of 'better' or 'worse' sets of ticks leads to different skill-patterns and then to grades. Finally, as grades accumulate for each student, we see the rise of differences in the plumbing practice session. We see more or less properly populated bathroom stations. We see better or worse plumbing students. And eventually, we also see more or less skilled plumbers.

In this qualification process, the combination of a teacher, a notebook, and a list with criteria plays the role of, to borrow Latour's term (1987), an inscription device[4], or "any set-up, no matter its size, nature and cost, that provides a visual display of any sort" (p. 68). This inscription

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[4] In his Science in Action: How to Follow Scientists and Engineers through Society, Latour (1987) conceptualizes the inscription device as one providing display of any sort "*in a scientific text*" (p. 68). In this thesis, I have extended the concept to signify any set-up which produces any sort of inscriptions which qualify an emerging actor; for instance a student or a skilled plumber.

device produces specific inscriptions, such as signs – ticks and grades – and specific identities – students and skilled plumbers. Through producing these inscriptions, the inscription device also resolves the two uncertainties. Who went in, then? Better or worse students, who had a better or worse teacher, and who used better or worse plumbing equipment. Who goes out? Better or worse grades and eventually more or less skilled plumbers.

Through this qualification process, the plumbing practice session both 'produces' and 'exports' skilled plumbers. That these skilled plumbers will fit, is a 'promise'. This promise is made to the external actors, such as the plumbing industry and Skolverket. If the plumbing program fails to keep this promise, then the external actors would wonder. Skolverket would send inspection to check why the plumbing program was not performing according to their expectations. The plumbing industry might want to examine why the young plumbers they received, could not fit in the work environment.

If the plumbing workshop constantly keeps its promises, however, no one will question the plumbing program, the plumbing practice sessions, or the qualification process. The external actors will focus only on what goes out from the plumbing program in the form of grades and skilled plumbers. In this way, the inner workings of the plumbing program will be 'made invisible by their own success'. They will become a *blackbox* (see Latour, 1987; p. 1 – 17).

From flexibility to youth innovativeness

In the plumbing practice session, the production of a skilled plumber that fits is largely based on instructive practice. For some of the teachers, instruction is self-justified: students must be *instructed* in how to populate the bathroom stations properly. This instruction is underlined by industry and education goals and standards. As if in an assembly line, each student needs to follow the same rules, in the same way, and produce the same thing: virtually the same populated bathroom stations. Having this in mind, I felt that there was little freedom of expression and a lot of doing the right stuff: nothing *new*, nothing *different* was happening.

One of the plumbing teachers shared my feelings. He said:

"In the plumbing courses, we have all these goals and they are often very [strict] and direct. 'You have to know and learn this and that!' But to become innovative, you need flexibility and to allow [students] to explore their ideas." (Plumbing teacher, Int. 9)

According to this plumbing teacher, 'innovativeness' in the plumbing workshop was compromised by the need to meet the minimum requirements and standards. These inhibited innovativeness by leaving no space for individual flexibility. He further noted that:

"What will be required to increase innovation skills is that you have to have more creativity which means that you give [students] more flexibility. And giving them more flexibility requires that they work more with their own driving force and their own interests, their own ideas, and things like that." (Plumbing teacher, Int. 9)

From the perspective of this plumbing teacher, the innovative education environment should be a 'flexible environment'. In other words, one which implies a degree of freedom, or flexibility to the side of the students, that enables the plumbing students to set their own goals according to their own ideas and interests. In our conversation, the teacher also indicated to how he envisioned this innovative environment to be realized. He argued:

"If you start perhaps earlier in school, giving [the students] the opportunity to develop their own ideas [from young age]. Not telling them 'you should do this and you should do that on the test'. *You* make a product and *you* show that you understand these objects through what you are doing. You think individually, make your own decisions, and do your own projects that increase innovation and innovative thinking." (Plumbing teacher, Int. 9)

In this quote, the teacher points out at three dimensions concerning the 'rise' of the innovative environment. First, it is an environment that should come "*earlier*" in the plumbing education: students should get used to the 'flexible ways' of doing things. Second, rather than instructing, the role of the teacher should be to facilitate students' self-expression. And third, the students should demonstrate their qualification as skilled-plumbers through the realization of their own ideas, projects, and decision-making. Other research has recognized these three dimensions as imperative to innovativeness (for example see Cachia et al, 2010).

These three dimensions, in turn, problematize the status of the plumbing program as the macro-structure that transforms the students into skilled plumbers. It envisions multiple micro-structures, represented by individual plumbing students, who transform themselves into skilled plumbers by virtue of self-motivated, self-interested, and self-propelled qualification processes. In this perspective, the plumbing workshop should take a step back and fuel this transformation by facilitating with the various means, including space, plumbing equipment and tools, textbooks, and teachers' guidance if necessary.

The vision of a flexible environment, however, was difficult to achieve in the plumbing program; or, as the plumbing teacher indicated, "*it is difficult to achieve these things with this kind of students*" (Int. 9). By this, the teacher meant that not all students were 'ready' for the responsibilities that flexibility would bring. Not all of them were prepared for playing the role of a 'micro-structure'! He argued:

> "Maybe we should give this opportunity to only a few of the students. Maybe not to all of them, because you cannot have a whole class to be occupied with coming up with something new. Many students want just to be directed. 'Tell me to do that and I will do it!' They don't want: 'ok, let's combine these two objects and bring something new out of them'. Not many [of the students] think like that." (Plumbing teacher, Int. 9)

Here, the plumbing teacher leads us into two important directions. First, he argues that not all students should be 'forced' into being innovative. In his understanding of the plumbing industry and education, some plumbers "*need to do the work of plumbing*" (Int. 9). Not everybody should be occupied with "*coming up with something new*". And second, the teacher claims that some students "*just want to be directed*". These students, in his view, should not be "*punished*" by changes in the education policies in Sweden that increasingly demand that 'everybody is innovative'. The plumbing teacher thus envisioned a flexible environment which was a possibility for those students who wanted to realize their creative ideas. The flexible environment, in his view, should not be 'forced' unto students.

From aesthetic variation to youth innovativeness

Another plumbing teacher had a different perspective on youth innovativeness in the plumbing program. He contended:

> "All bathroom stations look similar. But, there are differences between the different installations. These differences are often aesthetic. It will not be very good if the students just do the bathroom stations in the quickest way. It should also be the best, the most aesthetic way. This is where individual differences lay: the ways different students go from [point] 'A' to [point] 'B'. This is why plumbing is like art. And I am very hard with [the students] in that. This is really important for me." (Plumbing teacher, Int. 10)

As this teacher indicated in the quote, different students would populate the same bathroom station, but in different and creative ways. These different ways, according to the plumbing teacher, often fall in the domain of aesthetic variation, as important as the proper functional bathroom itself. The process of populating bathroom stations, in this way, was not a mere execution of tasks. It rather implied a *creative execution of tasks*. In other words, creativity and self-expression existed, even while the final product was a largely standardized entity such as the properly populated bathroom station.

In our conversation, the teacher indicated that these types of creative skills were often disregarded in innovation policies which addressed youth innovativeness. In his view, innovation policies focused too much on 'the new' and 'the different' while forgetting or disregarding the idea that standardized outcomes often come as a result of different ways of doing the same things. In this teacher's perspective, this type of creativity and self-expression could form the basis for youth innovativeness.

For instance, the plumbing students found an old, broken bicycle. They decided to fix it using the knowledge and skills they had learn in plumbing practice sessions. This bicycle refurbishment was not merely about fixing a bike. It was also about self-expression. With scrap pipes they constructed a fanciful bicycle, long and with wide handlebars. They welded the pieces together, painted the bike, and after they finished it they test-rode it. It was basically no use as a bicycle.

The students had not been thinking of functionality while they were making it. They rather used self-expression to explore what a bicycle *might be*. The final version of the bicycle is now used as an exhibit in their school workshop (Figure 2).

In making the long pink bicycle, the plumbing students used virtually the same skills and knowledge as when populating bathroom stations. In this case, however, these skills seemed more 'creative', more 'innovative', due to the fact that the final product was "*something new*", something 'creative'. The plumbing teacher, thus, saw the entire plumbing program as abounding in *potential* for youth innovativeness. This potential existed in the aesthetic variation and in the different ways of using plumbing skills and knowledge among the plumbing students. According to this teacher, the focus on producing 'standardized outcomes' did not inhibit these 'creative skills' per se. In his view, the standardized outcomes only rendered the creative potential of plumbing skills and knowledge invisible by inducing the impression that 'the fact that the students did the same product also meant that they were not being creative'.

Figure 2. The long fanciful bicycle is an example of the creative potential of students' plumbing skills and knowledge. This potential might be used as the basis for youth innovativeness in the plumbing program.

The fate of 'doing things differently'

The plumbing teacher in the previous section saw the educational plumbing practice as a creative practice. In the midst of this creative practice, however, I stood 'blind' to both aesthetic variation and to the different ways of doing things among the plumbing students. I could not recognize the creative play, even when it was 'being performed in front of my eyes'. And yet, where I saw mess, the teacher saw aesthetic nuances. Where I identified mundane behavior, he recognized critical thinking and self-expression. Where I thought incoordination, he understood initiative and problem-solving.

It was not a matter of who was right or wrong, however. Both me and the teacher were 'correct' in our understanding of the plumbing practice session. Nevertheless, I came in the session for the first time. It was in fact the first time that I saw plumbing being performed in real time. Consequently, I experienced the different nuances in populating the bathroom stations as one explosive chaos. The teacher, conversely, had years of experience in both working as a plumber and as a plumbing teacher. He could recognize sparks of creativity in all their forms and manifestations. We both saw 'something', but only the teacher recognized it as youth creativity and self-expression. In this way, a creative practice is a matter of *recognition*.

This plumbing teacher, however, did not imply that every 'different way of doing things' was recognized as 'creative'. For instance:

> "When [students] finish their assignments, they can do whatever they want. Just be creative. But don't do rubbish! Make a purpose with what you are doing. I had one student who brought his car. He took away the car's piping system because it was damaged, and welded it back. I mostly tell to my students: 'Don't do it for the garbage.' 'Do it with the purpose to use it.'" (Plumbing teacher, Int. 11)

In this quote, the plumbing teacher informs us that different ways of doing things might result into something which is recognized as 'useful', and thus creative, or into something that is 'for the garbage', and thus useless. The teacher also implied that only the ideas and activities which were recognized as 'something useful' could become realized in the plumbing practice session or

in the plumbing program in general. In regards to a similar situation, Beach and Dovemark's argument (2009) was that 'the realization of creativity' was decided upon externally. In their view, students' freedom to creatively express themselves was contingent upon their making of 'the right choices'. In this case too, creative realization seemed dependent on whether the creative initiative was perceived as useful by the teachers.

The plumbing teacher shed light on why this happened. He argued that "*something is useful if it either has a practical value or it trains students' plumbing skills*" (Int. 11). In essence, his argument meant that, in the plumbing program, 'doing things differently' made sense only if it contributed to the qualification of 'plumbers that fit'. In this way, 'the right choice' was important because it reaffirmed the production of fit. On the other hand, the teacher perceived the moments when 'doing things differently' strayed from this qualification as moments of deviance, of making something 'for the garbage'. In this teacher's mind, inhibiting these moments of deviance was not the same as inhibiting youth creativity.

What happens then with 'doing things differently', being it something 'useful' or 'for the garbage'? It depends. If doing things differently is recognized as something for the garbage, then the whole plumbing workshop will 'rush' to steer it in the right direction, towards generating something useful. If something is already recognized as useful, it becomes part of the qualification process in the plumbing program. Then, the inscription device transforms the 'something useful' into series of ticks, resulting into better or worse grades, and eventually into more or less innovative plumbers. Finally, together with the entire plumbing practice, the creative also 'disappears' for the outside as it gets blackboxed.

The creative does not vanish, however. Rather, it gets packed, masked, and exported from the plumbing program in the form of grades and skilled plumbers. At the plumbing program, what was once the height of self-expression and creativity is now at best a trace, collecting dust in the school's archives or storage facilities: a long bike, standing still as an exhibit. The outside only sees better or worse grades and more or less skilled plumbers.

Concluding remarks

In conclusion, the central concern in the plumbing practice session is to produce a skilled plumber, which is a plumber that fits within the plumbing industry. The skilled plumber is an identity which emerges within a network of associations. On the broader scale, this network includes institutions such as industrial actors, Skolverket, and schools. On the narrower scale, the network involves students, teachers, and plumbing equipment. These actors are intimately connected through industry and education standards. Inside the plumbing practice session, these standards become part of a qualification process which is performed through the exercise of populating bathroom stations. The identity of skilled plumber is produced through and results from the more or less successful performance of this exercise.

Innovation policies often take the position that every youth *must* become innovative. They approach education environments by promoting flexibility, for instance. In regards to the previously described network, this means a call for producing a new identity of 'innovative plumber'. In calling for innovative plumbers, innovation policies mainly target the actors from the broader scale of the network, such as the industrial actors, the schools, and the education agencies. Innovation policies often disregard the narrower associations within the network, such as those between teachers, students, and material artifacts. This situation results in misbalance or incongruence between the internal and external actors within the network. The external actors demand an identity that is difficult to produce within the existing associations between the internal actors.

In this incongruent network, the identity of innovative plumber stands in opposition to the identity of skilled plumber. Inside the plumbing program, this opposition is manifested in two forms of tension. First, more flexibility to the side of the students is potentially dangerous for the production of fit. This owes to the fact that more flexibility might also mean more freedom to engage in creative behaviors which stray from the existing qualification processes within the plumbing program. In other words, this means a potential influx of many student activities which result in 'something for the garbage'. And second, this opposition appears as a tension between 'how youth really want to be' and 'how innovation policies want them to be'. Innovation policy

makers largely disregard the idea that *maybe* not all youth should feel 'forced' into being innovative and that *maybe* the plumbing industry does not really need so many innovative plumbers.

In this way, increasing youth innovativeness through freeing students from standardized pressures and endowing them with flexibility, or rather imposing flexibility on them, is problematic. At the same time, however, the creative potential of the existing plumbing skills and knowledge might form the basis for increasing youth innovativeness. What might be missing in today's education, however, is guiding students, and plumbing students in particular, in using this creative potential, not only towards producing 'standardized outcomes', but also towards reaching innovative ends.

The realization of this potential also requires a situation where the flexible environment is conceptualized *not* as the general frame of the plumbing program but as a frame *within* the existing plumbing program. It is a flexible environment where 'to innovate' is a *possibility* for those students who actually want to realize their own ideas and create something new while using their skills and knowledge. In return, the harvesting of this potential would require for innovation policies to trust the internal actors of the network – the teachers, students, and artifacts – in their ability to both recognize and negotiate creativity and innovativeness in their own ways.

The final point that I would like to raise here is one of visibility. Each education environment, including the plumbing program, is designed to produce specific identities; in this case, skilled plumbers. Everything that happens within these environments, therefore, becomes part of the qualification processes which endow students with the qualities that are important to these identities. This is the fate of creative and innovative processes and products as well. Once they happen, the inscription device transforms them into less and less recognizable forms. They get packed into grades and eventually into skilled plumbers. As such, they are made invisible for outsiders. In increasing youth innovativeness, innovation policy makers should view this situation not as problematic but as an opportunity. They should approach education environments by asking the question: How can we make youth innovativeness visible to outsiders again without compromising the existing qualification processes?

CONCLUSION

The education environment and youth innovativeness

In order to explore the relationship between the education environment and youth innovativeness, I have followed plumbing teachers, plumbing students, and plumbing equipment during a plumbing practice session. During this session, teachers, students, and equipment engaged in the exercise of populating bathroom stations. At the very beginning, the plumbing practice session was surrounded by uncertainties. 'Who and what went in' and 'who and what went out from' the plumbing practice session were both unclear at the start. It was demonstrated, however, that the resolution of these two uncertainties was in the interest of both internal and external actors. The plumbing industry, Skolverket, the school itself, teachers, and students, were all interested in seeing a 'plumber that fits in the plumbing industry'. For this to happen, each student needed to learn how to populate the bathroom stations in 'the right' or 'the proper' way. Whether a 'fit' was achieved was thus relative to the more or less successful steering of the students towards this 'right way' during the plumbing practice session. This situation is graphically represented in Figure 3.

So that we see a plumber that fits at
the end…

We don't know
exactly who and
what enters the
practice session.

We enter here.

Process of populating
bathroom stations: the
'explosive chaos'.

…outside actors:
plumbing industry,
Skolverket…

…inside actors:
students, teachers,
plumbing equipment…

Uncertainties

We exit here.

We don't know
exactly who and
what goes out of the
practice session.

…each student must be able to
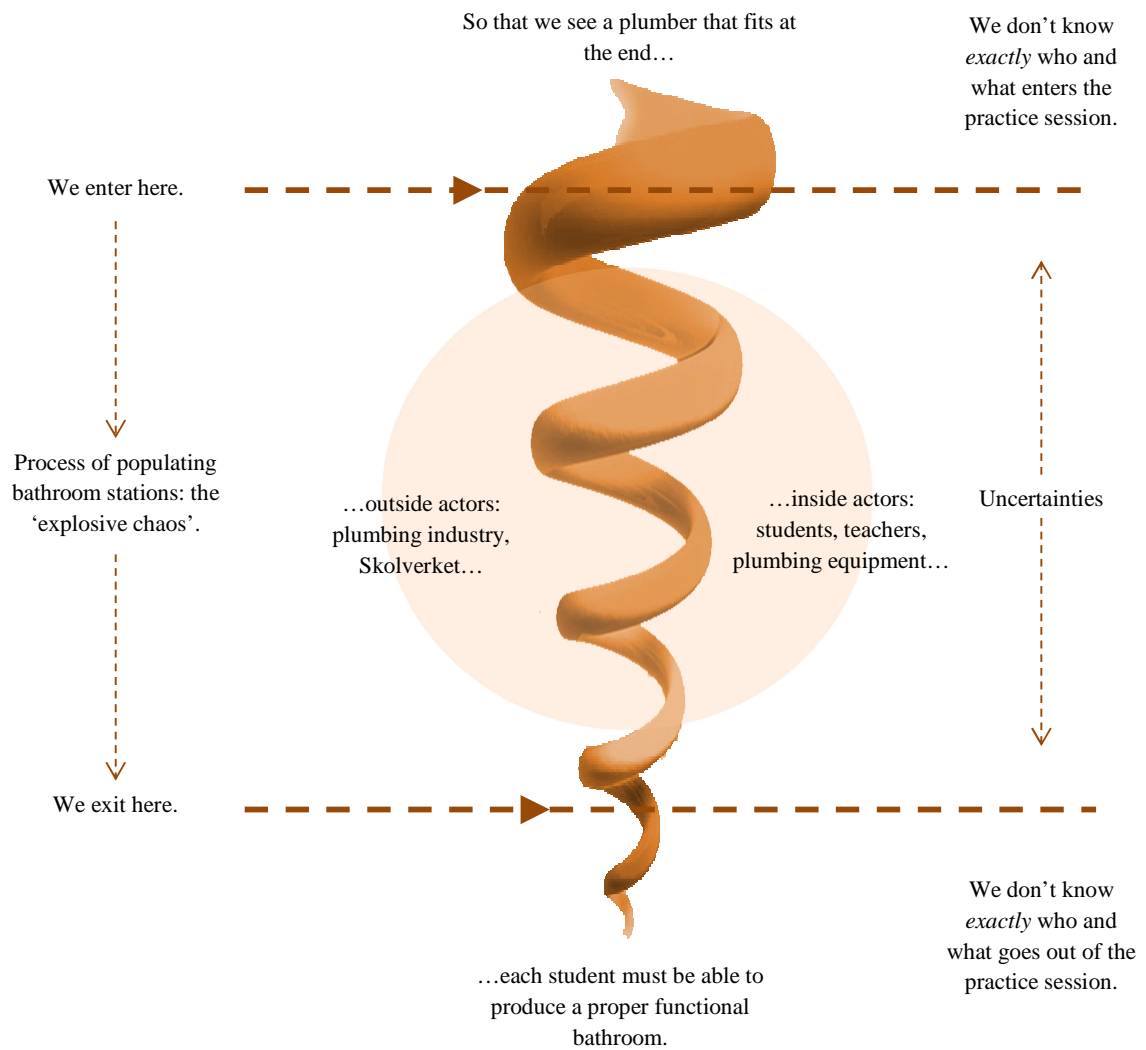produce a proper functional
bathroom.

Figure 3. At the beginning of the plumbing practice session.

At the heart of the exercise of populating bathroom stations laid a qualification process. This qualification process was performed by and through an inscription device which constituted a plumbing teacher, a notebook, and a list with industry and education criteria. During the exercise, the inscription device reduced the 'explosive chaos' in the plumbing practice session into a series of ticks. A list of ticks was produced for each student. In the list with criteria, these ticks matched specific plumbing skills. The piling up of better or worse skills, thus, led to the piling up of better or worse grades. These grades qualified the plumbing students as more or less skilled plumbers. In this way, through the inscription device, the initial complexity, process, messiness, activity, and interaction in the practice session were transformed into specific signs – better or worse grades – and specific identities – more or less skilled plumbers. With this reduction, the inscription device also resolved the two uncertainties. Who and what went in? Better and worse teachers, students, and plumbing equipment. Who and what went out? Better and worse grades and more and less skilled plumbers. Since no one complained about this process, the whole plumbing practice session 'disappeared from the eyes of outsiders'. It became a blackbox. This situation is graphically represented in Figure 4.

`

…complexity, process,
messiness, activity,
interaction …

So that we see a plumber that fits at the
end…

**…better and worse
teachers, students,
and plumbing
equipment…**

We enter here.

Explosive chaos...

Ticks...

Skills...

Grades...

Identities....

…if all promises are
kept, this interval is
made invisible; i.e., it
is blackboxed.

…the inscription
device resolves the
two uncertainties
simultaneously…

We exit here.

**…better and worse
grades and more
and less skilled
plumbers…**

…signs & identities…

…each student must be able to populate
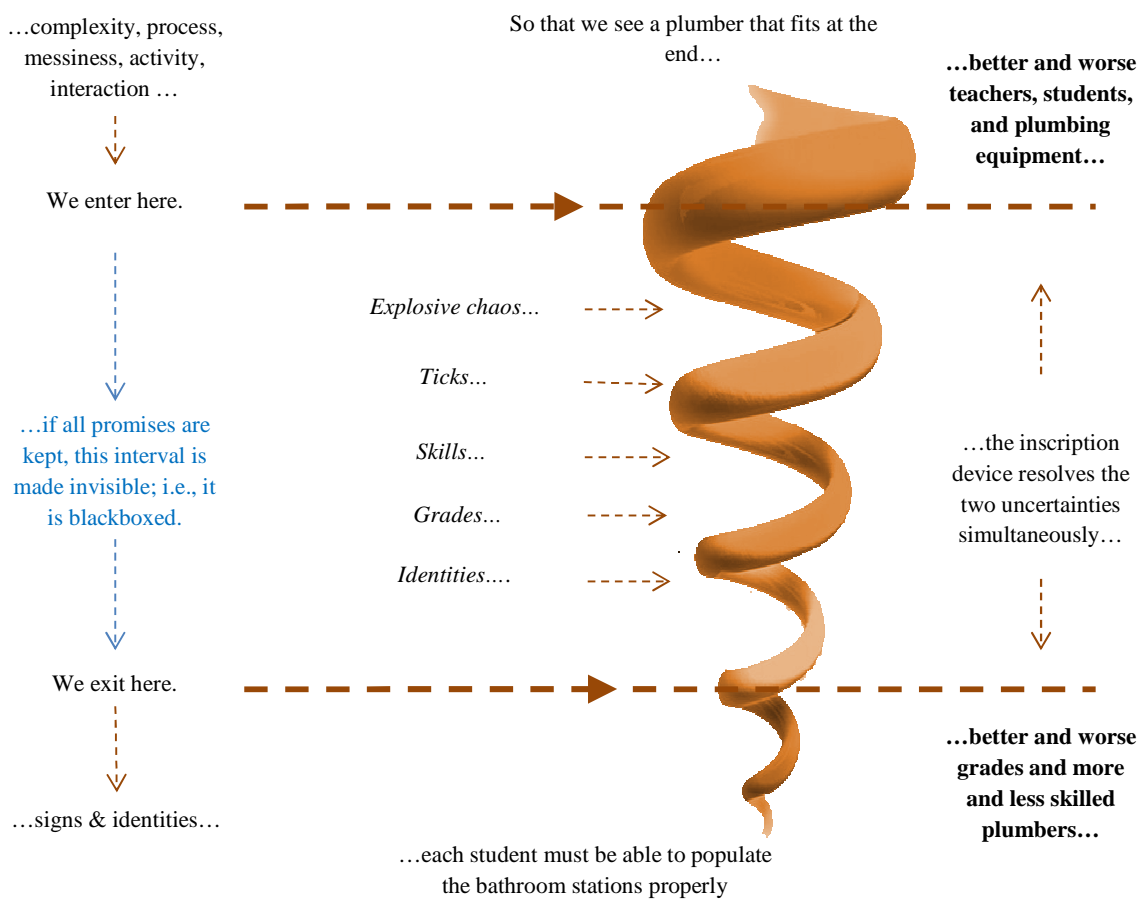the bathroom stations properly

Figure 4. The qualification process.

In the plumbing program, the creative skills of students, their creative potential, and their innovative endeavors were being recognized, observed, and steered towards useful ends. They too were part of the general process which qualified the students in becoming skilled plumbers. As such, they were also being reduced to ticks, skills, signs, and identities. When the qualification process became a blackbox, these creative skills, potential, and innovative endeavors disappeared from the eyes of external actors also.

If external observers arrived too early in the qualification process, they might not see innovativeness when it finally happened. If they came at the right moment, they might not recognize it. If they came too late in the qualification process, they could have missed it. If they did not attend the qualification process whatsoever, they would only see what was being exported from the plumbing program. Better and worse grades and more and less skilled plumbers. This situation is graphically represented in Figure 5.

The problem with youth innovativeness in the plumbing program is therefore visibility. It is a problem because the ways in which the plumbing program functions as a network, make it difficult for outsiders to see youth innovativeness. Then, it is easy for outsiders to 'accuse' the plumbing program as 'inhibiting' youth innovativeness. Yet, as it was shown in this thesis, innovativeness did happen in the plumbing program and the long bicycle was the example.

**…better and worse teachers, students,
and plumbing equipment…**

If we come too early in the
qualification process, we might not see
innovativeness when it finally happens.

…something 'for-
the-garbage'…

If we come exactly in the moment
of innovativeness happening, we
might not recognize it.

…innovativeness…

If we come too late in the qualification
process, we might miss innovativeness
because it has happened.

If we focus only on what goes out of the
plumbing program, we might not see
innovativeness because it is now packed
into grades and skilled plumbers.

…something 'useful'

**…better and worse grades and more
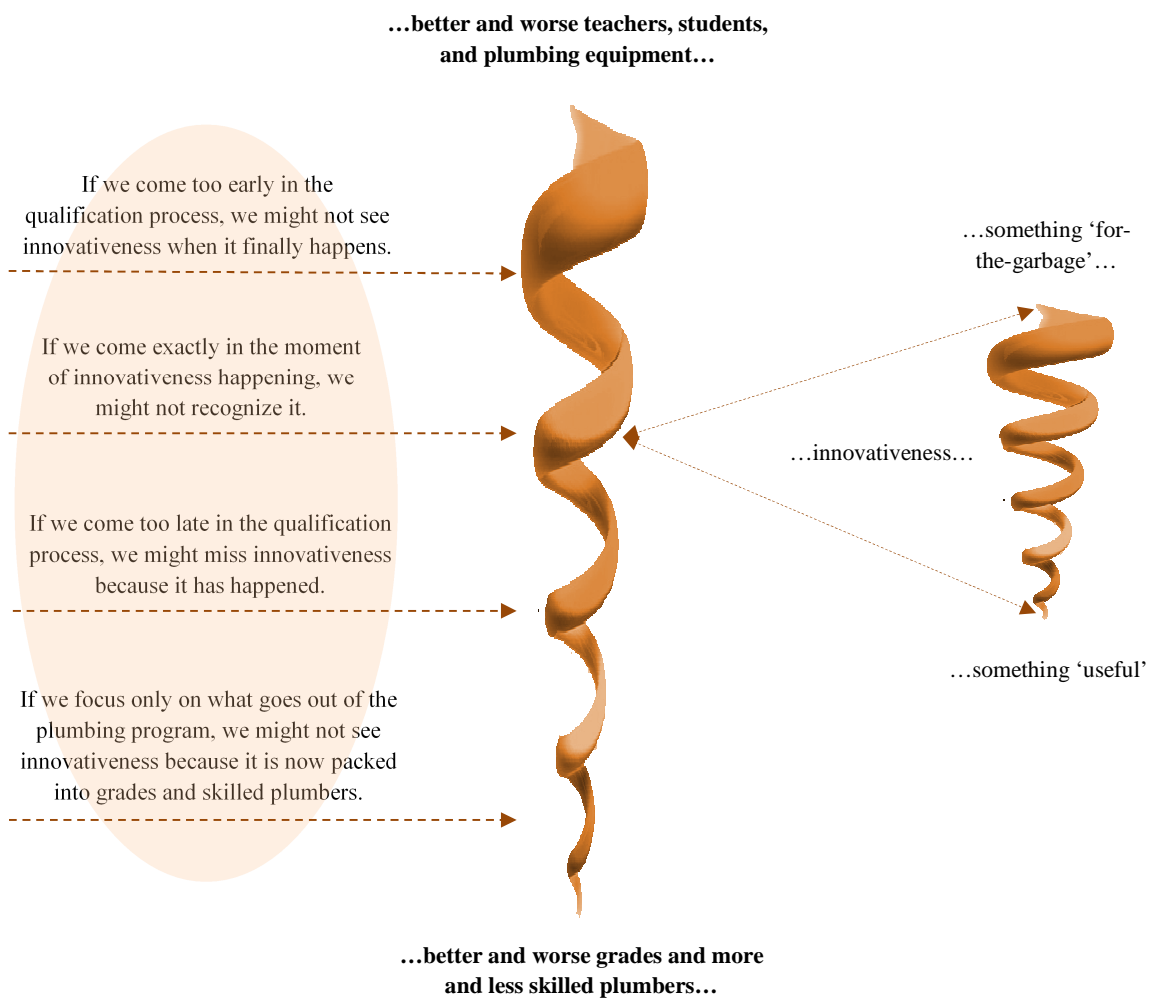and less skilled plumbers…**

Figure 5. The difficulty of identifying youth innovativeness.

The education environment and youth innovation

In order to explore the relationship between the education environment and youth innovation, I followed Violet, Mimosa, and Jasmine. The journey started from their meeting place at Malmö Högskola and ended at the moment when Morpheus became a youth innovation. Throughout this journey, Morpheus took different shapes, sizes, and statuses as it became linked to different people and different artifacts. In Figure 6, I have shown the process of turning the idea of 'Redesign Workshops' into 'Redesign and Clothing Library Morpheus'. This process is outlined through the various events that occurred in between.

The first event was the encounter between Mimosa and Violet at the course on design and sustainability in Malmö Högskola. This course was their meeting place. The meeting place was important because it put youth into one place, revealed, reshuffled, and matched their interests, and promoted discussion, friendship, collaboration and emotional support. But also, the meeting place developed youth's ideas and goals into projects, and made these projects visible through linking youth with external actors.

A chain of events followed. From the meeting place, Mimosa and Violet moved *to* the specialist in Swedish handicrafts; *to* organizing a redesign workshop event at the cafeteria in Malmö Högskola; *to* meeting Jasmine; *to* Stpln and Selfmade; *to* establishing a physical location for Morpheus at Grön Äng; and finally *to* 'settling in' by mobilizing furniture through the artist. Each of these events was an attempt at making a different reality for Morpheus. The transformation of the initial idea into the final enterprise should then be understood as being performed through attempts at making different, but 'linked', realities.

An idea of 'Redesign Workshops'

Meeting Place: Malmö Högskola

Specialist in Swedish Handicrafts

…discussing with classmates, talking with the handicrafts expert….

Cafeteria at Malmö Högskola

Meeting Jasmine

…organizing a redesign workshop event; birth of Morpheus…

Stpln

Selfmade

…organizing new workshops; SWOT analysis….

Grön Äng

'Artist' Settling in

…finding a 'place to be'; mobilizing furniture…

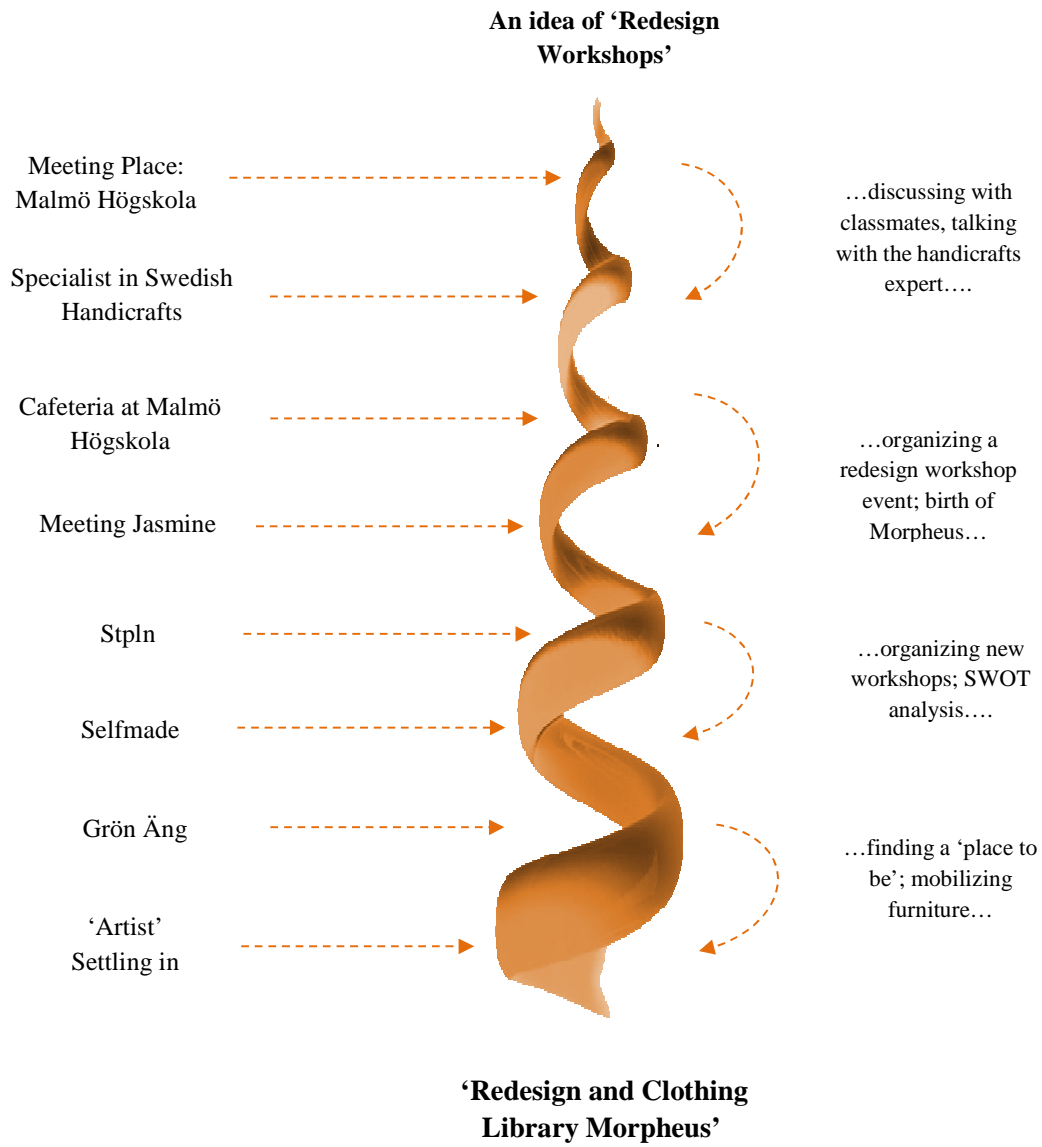**'Redesign and Clothing Library Morpheus'**

Figure 6. Establishing 'Redesign and Clothing Library Morpheus'.

Through the various events, Mimosa, Violet, and Jasmine brought a number of actors in the story of Morpheus, including humans and nonhumans. As more and more actors became attached to the network around Morpheus, the enterprise became stronger, more independent, and more visible for society. Eventually, Morpheus became part of the network of Ungas Innovationskraft through the Ungas Idetävling event. This network defined Morpheus as youth innovation. In turn, Mimosa, Violet, and Jasmine were defined as young innovators. This situation is graphically represented in Figure 7.

Morpheus did not have a fixed content and context the whole time. Rather, the content and context of Morpheus were temporary effects of its spreading. For instance, Stpln, which at beginning seemed a contextual actor, after Mimosa, Violet, and Jasmine moved in, at least in part became the content of Morpheus. At the same time, the meeting place, which at the beginning seemed the content of Morpheus, after Mimosa and Violet moved out, became more a contextual actor. At the end, the meeting place became the context in which Morpheus was born. At this point, Morpheus was an independent enterprise.

In this way, youth innovation, led by students, happens by spreading an idea, a project, outside from the education environment through external contexts. The youth project grows and gains strength and independence as it gets linked to various human and nonhuman actors. In this way, the education environment should be seen as a 'birth place' of youth innovation rather than its 'container'.
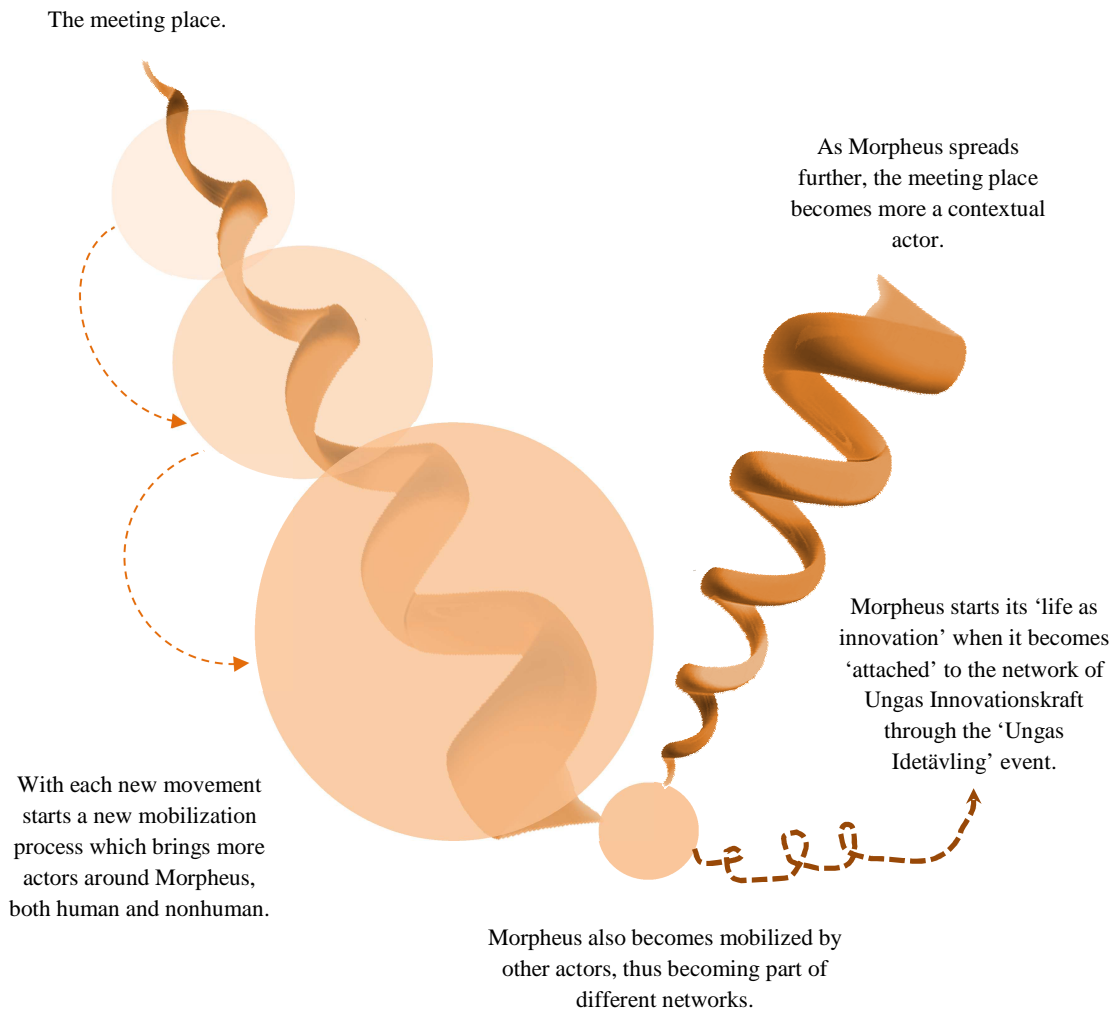
The meeting place.

As Morpheus spreads
further, the meeting place
becomes more a contextual
actor.

Morpheus starts its 'life as
innovation' when it becomes
'attached' to the network of
Ungas Innovationskraft
through the 'Ungas
Idetävling' event.

With each new movement
starts a new mobilization
process which brings more
actors around Morpheus,
both human and nonhuman.

Morpheus also becomes mobilized by
other actors, thus becoming part of
different networks.

Figure 7. From a youth project to a youth innovation.

Final words and recommendations for policy makers

The recognition of youth innovativeness will always lie in 'the eye of the beholder'. The many eyes, however, should be utilized towards boosting of the innovative capacity of youth in education. Instead of fighting against inhibitors to one idea of youth innovativeness; instead of fundamentally changing education environments towards flexibility; innovation policy makers should focus on making the many kinds of youth innovativeness in the existing education paradigms more *visible* to society, and even to the students themselves. Schools should be inspired to export acts of innovativeness, of creativity, of making difference, in more imaginative ways than, for instance, grades and skilled plumbers, without compromising these.

It is important to remember that, in the process of making their ideas reality, youth mobilize both people and artifacts. People and artifacts are the core of youth innovation. Innovation policy makers should encourage schools to link students, their innovative ideas and projects, with environments, institutions, individuals, and artifacts that can make their ideas and projects stronger, more independent, and more visible. If plumbing students envisioned a new kind of bathroom, the education environment should be able to link these students with the right resources, innovation support bodies, plumbing and entrepreneurship experts, and industrial actors that can help these students make their bathroom a commercial product. Only so can youth's visions become reality. And only so can these realities reach the networks that define them as youth innovation.

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