

The cosmopolitan engineering student: an analysis of a recruitment campaign for KTH Royal Institute of Technology in Stockholm

Patricia Kingdon^{1,2}

Accepted: 29 April 2017 / Published online: 28 June 2017
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Abstract This paper presents a study that seeks to examine the messages conveyed in one of the initiatives that have been initialized in order to make young people interested in pursuing engineering studies at technological universities. The study is a case study of the web-based advertising (recruitment) campaign KTH from the Inside designed for KTH Royal Institute of Technology. The analysis draws on a theoretical framework from governmentality studies. The analysis of the campaign conclude that the ideal engineering constructed in the campaign is one of an individual who meets the requirements asked of a lifelong learner with cosmopolitan aspirations. This is an ideal that builds on a notion of progress associated with social progress and sustainability. This is a break with historical and cultural patterns, which symbolically have linked technology to capitalist profitability and masculinity. Though a break with gender patterns is suggested the ideal subject constructed in the campaign is almost exclusively based on the students on Masters' level. This excludes students at Bachelor programmes. This I argue is problematic as it narrows the recruitment of students to technological universities to a small group of students.

Keywords Governmentality · Lifelong learning · Cosmopolitanism · Gender patterns · Recruitment to higher education · Recruitment to technology universities

Introduction

Since the 1960s transnational organisations, i.e. the Organisation for European Economic Co-operation (OECD) and the European Commission (EU) have argued that nations with a high number of citizens with advanced knowledge in science and technology do better

✉ Patricia Kingdon
pkingdon@kth.se

¹ School of Education and Communication in Engineering Science, Royal Institute of Technology, Stockholm, Sweden

² Skogsmursvägen 16 F, 802 64 Gävle, Sweden

economically than nations with fewer citizens with this kind of knowledge (EU 2004; OEEC 1960; OECD 2004). With this in mind it is not surprising that the Swedish Government argued in a report on how Sweden is to tackle the globalisation that Sweden is at risk of falling behind in the global economic race unless more young people pursue educations leading towards careers in science and technology (Sveriges Regering, Utbildningsdepartementet 2008). Various stakeholders (industries, universities, branch organisations, trade unions) are engaged in strivings to make young people interested in studying STEM subjects (science, technology, engineering and mathematics). The Swedish Technology delegation, formed by the Swedish government in 2008, reports that in Sweden alone over 100 projects with the shared aim to increase young people's interest in science and technology were initialized in the years 1991–2009 (Teknikdelegationen 2009). Considering the high number of initiatives initialized in the quest to make young people interested in STEM subjects it is extraordinary how few empirical studies there are on the messages conveyed in recruitment campaigns (Andrée and Hansson 2013, 2014). Andrée and Hansson, two of the few researchers who have examined messages conveyed in such initiatives argue that ‘...initiatives to recruit young people to science are also ways for the scientific community to engage in the societal and cultural reproduction of itself’ (2014, p. 1985). This in itself makes it interesting to examine what is communicated in such initiatives. Does the scientific community invite new groups of people to the community, or not? Ottemo (2008), one of few researchers who have taken an interest in examining technological universities’ societal and cultural reproduction of themselves, argues that technological universities have treated young people’s low interest in studying at technological universities as something that can be changed easily, e.g. by targeting young people with ‘the right’ information. Ottemo is critical of this rather technical approach and recommends technological universities to reconsider their own activities rather than trying to change young people’s opinions.

This paper presents a study that seeks to examine the messages conveyed in one of the initiatives that have been initialized in order to make young people interested in pursuing engineering studies at technological universities. The study is a case study of the web-based advertising (recruitment) campaign *KTH from the Inside* designed for KTH Royal Institute of Technology (the campaign ran from Jan 2009 to May 2009). According to a Norwegian study of first year STEM students as many as 95% of the students say they visited websites of universities or colleges before making their choice, and 60% say that these sites inspired them. This is to be compared with advertising and campaigns on websites,¹ that had hardly any influence at all on the participants of the Norwegian study (Schreiner et al. 2010). Thus, it appears that those who universities are aiming to recruit perceive universities’ websites as a reliable source. This makes the messages conveyed on these websites especially interesting (the campaign *KTH from the Inside* was published on KTH’s official website). The overall rationale of this study is that it should contribute towards an informed and critical debate on who is ‘invited’ to study at technological universities, and who is excluded as a consequence of what is communicated. The focus of the analysis is on what is expected of the students, and what it is communicated on what is involved in studying at a technological university. For the sake of this analysis, it is not important whether or not those who actually study at KTH identify themselves with the students in KTH’s advertising. The focus is on the messages conveyed on the website, and in particular on who is considered to be suitable for such studies and who is not. The

¹ Websites where the focus is on providing people with information that may guide them in their choice of education.

research field of science and technology education has been primarily concerned with factors influential in student's choices, or no—choices of STEM subjects (Bøe et al. 2011; Eccles et al. 1998), or young people's attitudes towards STEM subjects (Lindahl 2003; Osborne and Dillon 2008; Schreiner 2006). These factors are not explored in this study.

Naturally, this paper is foremost of interest for those who have an interest in the recruitment of students to technological universities. Other than this it is of interest for the development of the theoretical framework that has been guiding in the analysis, namely governmentality studies (especially in education science). This is a field of study that has developed in the wake of Michel Foucault's later works (e.g. by Rose 1996, 1998, 1999; Dean 2010). My main source of inspiration on how this perspective can be applied in practice is Popkewitz' works on subject creation (i.e. the child, the pupil, the teacher) in educational contexts (i.e. teachers' training, policy and educational reforms). This study is also part of a larger project, a licentiate thesis. In the thesis the results from this study are compared with the results from a study of young people's perceptions on engineering education and engineering students (Kingdon 2013).

Aims and research questions

The point of departure of the analysis is diagnostic rather than descriptive. For this reason the research questions are explorative in their character. The research questions are:

- (a) What systems of reason (ideas, values, dispositions and desires) are linked to those sought to best suited to study (the desired students) at KTH in the campaign *KTH from the Inside*?
- (b) Who is invited and who is excluded from science and technology communities, as result of how the desired student is depicted in the campaign *KTH from the Inside*?

Review of research

The following review is organized in four sections. The first section is devoted to feminist technology studies and to statistics concerning the gender balance in educational programmes at technological universities in Sweden. The second section is devoted to research on young people's attitudes towards pursuing STEM subjects, and research on key values concerning young people's choice whether to study STEM subjects. The third section is focused on Andrée and Hansson's (2013) study of the messages conveyed in a recruitment campaign for the Natural Science programme at Upper Secondary education in Sweden. The fourth section connects the results to governmentality studies concerning *cosmopolitanism* and *lifelong learning*; both notions have helped the analysis forwards concerning the subject creation of the desired students in the campaign under study.

Feminist technology studies

A prioritized goal for technological universities is to increase the number of female students. According to Salminen-Karlsson (2003) technological university's interest in increasing the recruitment of female students is due, in large measure, to the expansion of technological universities in the 1980s. Although, the gender balance has improved over the years, female students are still underrepresented in many educational programmes at

technological universities. Recent statistics from the Swedish Council for Higher Education show that 31.5% of the students in Master of Science in Engineering programmes and 26.5% of the students in Bachelor of Science in Engineering programmes are female (Universitetskanslerämbetet 2016). Considering that 51% of the women aged 24 had started studying at college and university in 2016 in Sweden, whereas only 36% of the men aged 24 had done the same (Universitets- och Högskolerådet 2016) the low numbers of female students at technological universities are no doubt alarming. Several studies in this field of feminist technology studies show that the continued male dominance in engineering is due, in large measure, to the enduring symbolic association of masculinity and technology (Bernier 2003, 2004; Faulkner 2000, 2001; Mellström 1999; Ottemo 2008; Sjögren 2011; Wajcman 1991). Wajcman (1991) and Faulkner (2001) argue that women have been excluded from both technology and power due to hegemonic masculinity. A concept of interest when analysing symbolic associations to gender is the *hard/soft dichotomy*. The ‘soft’ side is associated with women and the ‘hard’ side is associated with men. Faulkner (2001) explains that inert and powerful technology is associated with the ‘hard’ side, whereas smaller-scale technology, such as kitchen appliances and organic technology are associated with the ‘soft’ side. Also, on the ‘hard’ side of the scale there is abstract theoretical (especially mathematical) and reductionist approaches to problem solving, whereas problem solving that uses emotional connectedness together with concrete empirical and holistic approaches is associated with the ‘soft’ side of the scale (Faulkner 2000; see also Kimbell et al. 1996; Murphy 1991; Sjögren 2011). A recent study shows that engineers working in four information and communication technology (ICT) organizations use the hard/soft dichotomy when valuing the competence needed for developing technology systems. The engineers in this study value technology financed by the industry and computer science technology as ‘hard’, and systems not of direct use for the industry are valued as ‘soft’. The systems that were valued as ‘hard’ were developed by men to a higher degree than the systems that were valued as ‘soft’ (Sjögren 2011).

Research on young people’s attitudes towards technology and science, and research on key values concerning young people’s choice of STEM subjects

The international comparative *The Relevance of Science Education Survey* (ROSE) reveals that few of the 15-year olds in the wealthiest countries in the world are less interested in working with science or technology than 15-year olds in countries in the developing world (Sjöberg and Schreiner 2010). Schreiner (2006) has explored the Norwegian youth’s answers in the ROSE-survey more closely and found two groups of young people, who may consider studying STEM subjects, although science is not a favourite subject of theirs.² Schreiner calls the two groups for *selective girls* and *selective boys*. Typical for the selective girls is that they express an engagement in environmental issues, and medical research and an interest in working with humans. They also express an interest in shaping a fit body. They do not particularly want to become scientists, nor do they believe that further technological development is needed. In contrast, selective boys typically express that they would rather work with technology than humans, and they believe that society benefits from further technological development. The Selective boy is not engaged in environmental issues, nor is he particularly interested in shaping his body. Schreiner’s findings confirm research by Duntzman and Taylor (1979) on key values:

² Norway is one of the richest countries with 15-year olds the least interested in studying technology.

thing-orientation or *person-orientation* predicting for students' choice of a major. Thing-oriented individuals are interested in reflecting and manipulating objects in the physical world, whereas person-oriented individuals are interested in understanding human interactions and helping others. Person-oriented individuals' interests are similar to selective girls' interests and thing-oriented individuals' interests are similar to selective boys' interests. Dunteman et al. (1979) study also shows that among various groups of students engineering students were the most thing-oriented.

An empirical study of the messages conveyed in the recruitment campaign 'The Broad Line'

In short Andrée and Hansson's study (2013) examined the messages communicated in the recruitment campaign, 'The Broad Line', a campaign for the Natural Science programme at Upper Secondary education in Sweden. They conclude that 'The Broad Line' campaign invites a desired subject whose characteristics fit with thing-oriented selective boys, leaving out individuals who are characterized as person-oriented e.g. selective girls.

Lifelong learning and cosmopolitanism

Popkewitz's research on cosmopolitanism has added a useful perspective to the analysis presented in this paper. Popkewitz (2008) notion of a cosmopolitan individual is that of an individual who uses reason and science to perfect the future" (p. 7). Although this is an idea that goes back to the Enlightenment the cosmopolitan ideal is very much present in today's society. Popkewitz' argues that in the twenty first century the idea of cosmopolitanism was replaced by the notion of lifelong learning (Popkewitz 2008). A lifelong learner is a self-managed individual who is willing to learn and re-learn throughout life and in all aspects of life (Edwards 2008; Popkewitz 2008). Popkewitz introduces the term *unfinished cosmopolitanism* to bring together the two terms: cosmopolitanism and lifelong learning. He argues that this narrative presents itself as an individual who is guided by compassion for others, and sees life as a never-ending process of choice, innovation, and collaboration (Popkewitz 2008).

Governmentality—a theoretical perspective on subject-creation

Foucault (1926–1984) is the 'father' of the theory used in governmentality studies. Foucault's main objective was to "create a history of the different modes by which, in our culture, human beings are made subjects" (Foucault 1982, p. 208). The term governmentality emerges in his later works (e.g. *Security, Territory and Population, Governmentality, Technologies of the Self*). In *History of Sexuality* he develops his theory of processes that objectivize the subject. Foucault examined how subjects are objectivized either by others, or by themselves in (historical or contemporary) discourses. Governmentality is the encounter between these two processes (Foucault 1994). A starting-point for this perspective is that people are autonomous self-responsible agents who take responsibility for their individual life paths. This is what 'we' do when making choices on the basis of our own ideals, abilities, and aspirations (Dahlstedt and Hertzberg 2011; Rose 1996). Rose (1999) and Dean (2010) have further developed Foucault's theories, making it into a perspective focused on liberal mentalities of governing (liberalism in the meaning of

a set of ideas about how governing should be conducted) (Fejes and Dahlstedt 2013). An example of such studies with this perspective is Fejes' studies of ideals that are shaping for the 'adult learner' (e.g. Andersson and Fejes 2005; Fejes 2006, in which it is concluded that the adult learner of today is expected to meet the requirements on a lifelong learner). Other examples are Olsson et al. (2011) and Johansson (2007) works that examine the encounter between regimes of truths (dominating discourses), policy making on education in nations of the European commission (EU), higher education and European identity. An important contribution to this field of research is Popkewitz's works (Popkewitz 1998, 2003, 2004, 2008). Popkewitz's works are focused on the encounter of pedagogical reforms and policy and how they shape the conduct of 'the child', 'the pupil' and 'the teacher'. I seek to apply this perspective to examine (diagnose) what capacities are linked to the position of the engineering student in the campaign 'KTH from the Inside'.

The design of the campaign

The campaign 'KTH from the Inside' was set up as a competition between twelve student projects.³ The design of the campaign was such that first the goals of the 12 projects were presented. In connection to the presentations of the projects the viewers of the campaign were invited to vote on what they considered to be the best project. In the next phase of the campaign, the three most popular projects and the students managing these projects were followed more closely. From this point and onwards the content of the campaign consists of interviews with the students, images of the students and their activities. For the most part the content consists of texts (blogs) images and films (vlogs) produced by the students who managed the projects.⁴

Method

In the first phase of the analysis the content of the campaign was categorized using the computer software QSR NVivo. The guiding methodological principle for the analysis was to examine the content of the campaign using the theoretical perspective to uncover ideas, ideals, dispositions and desires linked to the students (subject creation). This was accomplished by coding themes that were exposed in the analytic process.

Results

The result of the analysis is accounted for in two steps. The analysis starts with four themes relating to the research question: what systems of reason (ideas, values, dispositions and desires) are linked to those sought to best suited (desired student) to study at KTH in the campaign 'KTH from the Inside'? The themes are: (a) expertise and tradition, (b) making the future better for humanity, (c) lifelong learning, and (d) a break with cultural and

³ A jury, ranging from the vice-chancellor to students, chose the 12 projects that participated in the campaign.

⁴ Before joining the competition, the competing students agreed to share their thoughts on how the projects developed on several occasions on the campaign website by posting blog posts (if they progressed in the competition) (In Conversation with Johan Helander, Familjen AB).

historical gender patterns. The second research question is, who is invited and who is excluded from science and technology communities as a consequence of how the desired student is depicted in the campaign is discussed in the light of the themes that unfolded in the analysis and in relation to relevant research.

Expertise and tradition

Ten of the twelve competing projects in the campaign are projects managed by students who study at a programme leading towards an advanced degree (MA-degree). That is a degree from one of the Master programmes, or a degree from one of the Master of Science in Engineering Science programmes. The European Federation of National Engineering Associations (FEANI) (FEANI 2005) defines advanced engineering as engineering work associated with research and innovation, creativity and progress, whereas application-oriented engineering work is associated with less advanced engineering work. FEANI (2005) maintains that advanced engineering work is to a higher degree associated with engineers with an MA-degree, and less advanced engineering work is more often associated with engineers with a degree from a Bachelor programme in engineering (BA).⁵ In addition statistics from The Swedish Council for Higher Education shows that engineers who have a BA-degree in engineering are more likely to have trouble finding employment at some point in their lives than the engineers with an MA-degree (Universitets-Högskolerådet 2002). Consequently, the higher status associated with students who are studying towards a MA-degree is used in the campaign 'KTH from the Inside' to present a narrative that suggests that the students at KTH are tomorrow's expertise in the field. This narrative is also emphasized by several references to the past, which emphasizes that KTH is a university with a long tradition of bringing forward tomorrow's expertise, (e.g. as seen in the images used to present the competing projects. Each project is presented with an image in the same style). One is the location for the photo shoot, a reactor hall at the main KTH campus that is no longer used for educational purposes. In the image's background there is a wall on which the paint is literally falling off.

Other than the wall, the students managing the project presented some old technical objects that are placed in the background. The location and the objects connote that KTH is an educational institution that has successfully trained engineers for ages. Other than one of the technical objects (an old analogue telephone) only a person with specialized knowledge would know what the objects are. Using old technical objects in the images in this manner divides the viewers of the images into two categories: (a) those who know or wish to know and (b) those who do not know. Consequently, these images speak to the insiders, those who have an interest in the history of technology (or wish to have such an interest), which again is a barrier between those who know (the experts) and those who do not know (the others) (see Fig. 1). Also the only campus that is featured in this campaign is the oldest campus at KTH, which is located in the central area in Stockholm. None of the four campuses located in the suburbs of Stockholm (KTH Kista, KTH Flemingsberg, KTH Haninge, and KTH Södertälje) are featured in the campaign. This unbalanced representation is not due to a lack of Master of Science in engineering programmes in these campuses. All but one of the excluded campuses offers such programmes. In conclusion,

⁵ Since the early 1990s, there have been three possible degrees at technological universities. One is a three year long education (Bachelor of Science in Engineering). The other is a five year long education (Master of Science in Engineering). The third alternative is to complete a Bachelor degree with a degree from one of several available two year long add-on programmes (Master programmes).



Fig. 1 Project 11, The Nobel Museum. Published with permission from the photographer Viktor Gårdsäter

the campaign's narrative of the expertise excludes students on BA-level, and students who study at any of the KTH campuses in the suburbs of Stockholm.

Making the future better for humanity

All of the competing projects in the campaign share the goal to facilitate improvements. Simply, all of the students featuring in the campaign are linked to a desire associated with 'doing good'. Four categories of improvements are identified among the projects. The categories are:

- Facilitating better life conditions by improving medicine and health care.
- Facilitating sustainability and durability.
- Facilitating improvements in people's everyday lives.
- Facilitating better life conditions in developing countries.

Facilitating better life conditions by improving medicine and health care

Five of the twelve projects share an aim to improve people's life conditions by using technology to develop the medicine and health care sector. Two of the projects in this category are biotechnological research projects conducted in collaboration with professional researchers. The projects are: Project 1; *The Key to Multiple Sclerosis* that aims to find what causes multiple sclerosis, and Project 10, *The War on Bacteria* that aims to develop technology that can stop the spread of 'dangerous' bacteria on surfaces. The other three projects in this category share an aim to develop products that are to be used in medicine and the health sector. In Project 6, *Functional Bath*, the students design a lift for bathing people with functional disabilities. The goal is to make the lift both

comfortable and functional. In Project 9, *Simulated Care*, students develop a software programme that can be used by surgeons to train skills in surgery. In Project 2, *IT to Tanzania*, students develop and launch a mobile phone application that combines a weather reporting service with a system to organize the rescue of fishermen on Lake Victoria in Tanzania (this project also fits with the fourth category). However small or large the aims of these projects are, the students are depicted as saviours, individuals who use their competencies in an ethical manner to facilitate better life-conditions. The narrative of the saviour is also emphasized in the title of one of the projects: *War on Bacteria*. This is an example of a metaphor of struggle that acts as a symbol of nature's revenge on a technocratic world (Sontag 1978). With this in mind, the campaign reproduces a discourse that suggests that illnesses can be controlled by technology (see also Project 1). This, in turn, constructs an ideal that suggests that engineering students are morally responsible for using their knowledge in an ethical way to better people's life conditions.

Facilitating sustainability and durability

Four of the twelve projects share an aim to make already existing technology more sustainable. In Project 3, *The Climate Smart Water Scooter*, students design and produce an electrical 'eco-friendly' water scooter that is comparatively silent. In Project 5, *The Iron Oven*, students transform waste heat from an iron oven into electric energy. In Project 7, *The Sustainable Car*, students design and enter two car prototypes in a competition (Shell Eco Marathon). One of the prototypes is competing in the lowest possible energy consumption category; the other is competing in the category for the best-designed car. In Project 4, *The Space Probe*, a large group of students collaborate with professional researchers to create durable satellite systems. To conclude the campaign's emphasis on sustainability and durability constructs a subject of an individual who is both willing and capable of averting environmental threats facing humanity. This narrative is also reproduced in an interview used to present Project 5, *The Iron Oven*. The interviewed student says that if successful, the project will be a great step forward in the energy debate. To give authority to the statement, the student presents 'exact' figures on how much pollution will be cut with the invention. In conclusion, the desired engineering student is depicted as a 'saviour'. The message communicates is that the students are morally responsible for using their expertise in an ethical way.

Facilitating improvement in people's everyday life

Three of the twelve projects share an aim to develop and design technology to improve people's everyday life. One is the previously mentioned Project 7, *The Sustainable Car*, where a prototype for a car in the best design category is developed. A well-designed car improves the driving experience. The remaining projects are Project 11, *The Nobel museum*, and Project 12, *City Planning*. Both projects aim to redesign spaces. In Project 11, the students redesign the Nobel Museum to improve the visitors' experience in terms of functionality and interaction. In Project 12, students design a city plan that transforms a former industrial area into a housing area and a place for recreation. On the whole, the projects in this category emphasize that aesthetic and functional values come together in engineering. In an interview used together with the presentation of the students' projects, one of the students managing Project 12 speaks of the importance to plan for the future when designing a new space. In this context, the student refers to the building of the Stockholm underground in the 1960s. The student says that the platforms were made

longer than needed at the time to take future demands into account. In summary, the desired engineering student is depicted as a flexible individual who is attentive to society's changing needs. Yet again a discourse is reproduced that suggests that engineering students are responsible for society's advancement.

Facilitating better life conditions in developing countries

In two of the twelve projects students are starting or supporting enterprises in developing countries (Tanzania and Bolivia). One is Project 2, *IT to Tanzania*. This is a project where students develop a mobile phone application that combines a weather reporting service with a system to organize the rescue of fishermen on Lake Victoria in Tanzania. The other is Project 8, *Business Development in Bolivia*. This is a project with two separate aims: (a) support the development of an already existing enterprise, in the local wood industry, in Bolivia and (b) provide a learning experience for the two students running the project. Both these projects support the narrative of a desired engineering student, who acts as a 'saviour' by helping others, in this case citizens in Bolivia and Tanzania. The effect is that Bolivians and the Tanzanians are depicted as 'the other'—those in need of saving (e.g. Schneider et al. 2009). In the era of colonialism, 'the other' (those in need) was associated with savages. Naturally, the campaign does not depict citizens in developing countries as savages. Still, some of the students' statements depict citizens in developing countries as less knowledgeable (e.g., in a filmed interview produced by the students managing Project 2, one of the students says the following when speaking about the locals in Tanzania: 'They do not really understand what they are doing, but they are still funny') (Dovervik 2009). The same message is communicated in a blog post where a student writes about a 2-week holiday trip to Venezuela. In the blog post the student writes that 'During our stay we had two break-ins into our hotel room, and when reporting this to the local police, they did not know how to start the computer, so no report was written' (Ekenkrantz 2009). In addition, one of the students in the *IT to Tanzania* project says in a filmed interview produced by the students themselves that Tanzanian people come across as happy although they are poor (Carlsson 2009). Speaking of the Tanzanian people's poverty in this manner connotes that it is a non-issue. Another example of how the students are entwined in a trajectory associated with colonialism is seen in the presentation of Project 8, *Business Development in Bolivia*. Although the enterprise is developed in the wood industry, nothing is said in the project presentation about whether or not the enterprise meets Swedish standards for sustainability. The effect of this is that the project appears to be managed with an attitude of laissez-fairness that is reminiscent of the approach associated with colonialism; that is to say, natural recourses are endless and economic growth is good.

Lifelong learning

A recurring theme in many of the students' blog posts is their thoughts on learning. In these texts the students position themselves towards an ideal of a lifelong learner. The discourse of lifelong learning is by no means unique for students at technological universities. It has been guiding the politics that shape 'the child' since the 1980s (Popkewitz 2008). An example of how lifelong learning is linked to the students in the campaign 'KTH from the Inside' is seen in a blog post written by the student who is managing Project 1, *The Key to Multiple Sclerosis*. In the blog the students write about the importance of being self-managed to succeed as a student at KTH. The blog post includes a hand drawn chart consisting of three stacks to illustrate how she mastered her skills in programming.

Under the first stack in the chart it says ‘900 h of classes’; under the second stack it says ‘400 h of homework’, and under the third stack it says ‘one weekend messing with PEARL’ (a software). The last stack is more than 20 times as tall as each of the other two stacks (Ayoglu 2009a). The illustration makes it clear that the student regards the hours spent on the task independently as far more valuable than the hours spent in class or doing homework.

Another expression of lifelong learning is seen in blog posts where the blogging students write about the importance of being motivated. These blog posts are written in an advising tone that assumes that the reader (viewer of the campaign) is a person who may consider studying at KTH but is concerned (s) he does not have not what it takes. The blogging students’ recipe is simple: work hard, and if you lose your motivation, seek help. If you do this you will be all right. An example of this logic is seen in a blog post, where one of the students writes that a positive attitude takes you far when having problems. The student claims she personally experienced the value of a positive attitude when the equipment that she needed in her project broke (Ayoglu 2009b). Though several of the blogging students say that when their motivation dips they seek help from fellow students such times appear to be rare. Mostly, the students are self-assured and self-disciplined, as seen in a student’s answer to the following question: What do you consider the best thing about KTH? The student says: “you get to know people. The work is relatively independent, so I can manage myself. Also, KTH is a very good place to be if, like me, you hate to be ignorant in any subject matter” (Norberg 2009). Yet again, the importance of being a self-managed lifelong learner is emphasised in texts that touch upon the relation between the student and the teachers. In this context the teachers that supervise the students with their projects are praised for sharing their contacts, with professionals in the field of engineering with the students. Nowhere in the campaign do the students speak of their teachers in relation to their learning. The effect of this is that it appears, as all the students need to be successful, is to be hard working, and to be in the right environment with the right people. A feature in lifelong learning is ceaseless and takes place in all aspects of life (Hultqvist 2006; Petersson et al. 2007). This is confirmed in a blog post where a student writes about how becoming a father made him a better student. The student writes that before he became a father, he was concerned that he would have difficulties combining his new role, as a father with being a student. Then he goes on to say that his fears were never realized. What actually happened was that his study results improved because he became more efficient and spent less time worrying (Delin 2009). Another example of how a student reproduces the line of thought that learning is ceaseless is seen in a blog post where a student shares her thoughts, on how talking about her project to fellow students on the bus has taught her the importance of communication (Ayoglu 2009b).

In addition, when the students are asked what is your ideal future job? Many of them answer that it is a job that provided for opportunities to grow and learn. Consequently, the students support a line of thought that suggest that in today’s society individuals are expected to engage in economic capitalization of the self—a ceaseless retraining, skilling and reskilling (Rose 1999). Some of the students say that they wish to start an enterprise, or to have a leading position of some sort. This is, of course, an expression of an entrepreneurial desire from someone who believes in the economic capitalization and enterprising self (e.g. Rose 1998; Dahlstedt and Fejes 2013). The students do not waste any time in engaging in the economic capitalization of the self. Most of the students featured in the campaign are at the age of 23–24 years old (ten are 23–24 years, six are 25–26 years, and three are 28–30 years) and in their final year of their education.

The students' personal interests and goals are accounted for in blog posts and interviews. In these texts the ideal student is depicted as an active individual who like to hang out with friends (and family) and do sports and outdoor activities. Watersports are very popular among the students. The high interest for watersports is mostly likely due to that Project 3; *The Climate Smart Water Scooter* is a group with a large number of students who study vehicle, or maritime engineering. Many of the students that say that they are interested in watersports, also say that the ideal future job for them is in the shipping or yacht industry. Consequently, the campaign brings forward a trajectory that suggests one's ideal future job should preferably be an expression of your personal interests, and what you learn in your free time is also of use in your professional life. Many of the sports and activities that the students are interested in are costly hobbies (downhill skiing, sailing, motorbikes, and hunting). Such activities support a line of thought that that suggests that students at KTH belong to a privileged group. Other than sports and outdoor activities, the blogging students say that they are interested in music (listening and going to concerts), design, and travelling. Nevertheless, sports and outdoor activities are the most popular interests. This stands in contrast to the image of the geek, which historically and culturally has been associated with individuals with an interest in technology (Ottemo 2008). Johannisson (2007) argues in an article in the Swedish newspaper *Dagens Nyheter* in November 16, 2007, that the geek's ignorance of the body expresses an evaluation of the intellect as superior to the body. This viewpoint is obviously not communicated in the campaign. Instead, the campaign suggests that the desired engineering student is an individual who manages to be an ambitious student without neglecting the importance of having a healthy lifestyle. Consequently, the campaign suggests an alternative subject position to the image of the geek.

A break with cultural and historical gender patterns

Eight of the twelve projects in the campaign are presented with an aim that fits with person-oriented rather thing-oriented individuals (Projects 1, 2, 6, 8, 9, 10, 11, and 12). This is a break with the societal and cultural reproduction of engineering as a thing-orientated field of knowledge (e.g. Dunteman and Taylor 1979; Faulkner 2000, 2001). When breaking this pattern the campaign invites a student whose interests match *selective girls'* interests. Even the more thing-oriented projects (Projects 3, 5, and 7) are presented together with ambitions to bring forward sustainable technologies. This confirms selective girls' engagement in environmental issues. Most of the projects in the campaign could be of direct use in their respective industry (medicine, steel industry, wood industry, etc.). Still, only one of the projects (Project 8) is presented in a way that suggests that the project's goal involves generating profitability. Evidently, the campaign gains authority by linking technological progress to social progress rather than to economic profitability. Since, the majority of the students in the campaign are person-oriented male students,⁶ the campaign constructs a subject of an individual who challenges established societal and cultural norms symbolically associated with masculinity and technology. In short the (male and female) students featuring in the campaign 'KTH from the Inside' express interests that primarily are associated with selective girls' interests, e.g. an engagement in environmental issues, medical research work, working with humans, and an interest to shape a fit body (e.g. Schreiner 2006).

⁶ 79% are male of the students in three winning project.

Conclusion

In conclusion, the campaign 'KTH from the Inside' constructs a subject of a desired student as an individual who sees no finishing line for his/her learning (e.g. Fejes and Nicoll 2008). The generality of this ideal implies that anyone who fulfils the requirements asked of a lifelong learner is suitable for studying at a technological university. Since the narrative of lifelong learning dominates the politics of learning, basically all individuals are expected to strive to fulfil the requirements of what it takes to be a lifelong learner (e.g. Popkewitz 2008). However, as the campaign suggests that engineering students' responsibilities do not stop at this, it is more complex than this. The subject constructed in the campaign is one of a compassionate individual whose desire is to improve society for all, an unfinished cosmopolitan (e.g. Popkewitz 2008). This is an ideal that constructs an 'other' in need of being saved (e.g. Petersson et al. 2006; Schneider et al. 2009). Two types of 'others' are constructed in the campaign: (a) citizens in nations in the developing world, (b) those who do not live up to the demands of lifelong learners capable and willing to tackle the complex and difficult challenges such as diseases and climate change, that is tomorrow's engineers. Generally, when hope and threat are used to gain support for *the call for engineers* (the political strivings to increase young people's interest in pursuing science intense educations) the threat is mostly expressed in relation to the nation's economy (e.g. OECD 2004; Sveriges Regering, Utbildningsdepartementet 2008). What we see here is another kind of threat: diseases and threats to the environment. The message communicated in the campaign is that without tomorrow's engineers (and scientists) society is chanceless against these threats.

Since, the desired students are depicted mostly as engineering students who study at the Master's level, KTH is also depicted as an educational institution that is only interested in recruiting individuals whose desire is to study one of the advanced programmes. By highlighting only students on MA-level and coding them as 'saviours', 'we' learn that KTH is not prepared to broaden the recruitment of students by giving up the associations to an exclusive group of individuals, those who have the skills and the ambition to improve society for all (the élite in society). An interesting result is that the desired student in the campaign mirrors a person-oriented individual, i.e. selective girl's interests and aspirations.). This result stands in contrast to Andrée and Hansson's results on the messages communicated in the campaign the Broad Line, which were in line with selective boy's interests (Andrée and Hansson 2013). This result conflicts with the usual conception of the societal and cultural reproduction, which has linked technology and masculinity to one another (e.g. Schreiner 2006).

Despite the fact that messages conveyed in the campaign invites new groups of students (person-oriented individuals) the campaign reproduces a narrative that suggests that KTH is an educational institution that is only prepared to broaden the ideals and norms for that is those interested in studying at the MA-level. This results form the exclusion of a large group of students, those interested in studying at one of the three year long BA-programmes in the making of the campaign. None of the groups that were managed by students on BA-level qualified to the next phase of the campaign. Nor, did any students who study at one of the campuses in the suburbs participate in the campaign. This I argues is problematic as it narrow the recruitment of students to technological universities to a small group of students.

Funding This work was conducted within the framework of my work a doctoral student at the graduate school Technology Education for the Future (TUFF), a graduate school funded by the Swedish government

(2008) and by municipalities of the researching teachers that were part of the graduate school for my part the municipality of Gävle (in Swedish Gävle kommun), Sweden, and by KTH Royal Institute of Technology.

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References

- Andersson, P., & Fejes, A. (2005). Recognition of prior learning as a technique for fabricating the adult learner: A genealogical analysis on Swedish adult education policy [Electronic version]. *Journal of Education Policy*, 20(5), 595–613.
- Andrée, M., & Hansson, L. (2013). Marketing ‘the Broad Line’: Invitations to STEM education in a Swedish recruitment campaign [Electronic version]. *International Journal of Science Education*, 35(1), 147–166.
- Andrée, M., & Hansson, L. (2014). Recruitment campaigns as a tool for social and cultural reproduction of scientific communities: A case study of how scientist invite young people to engineering [Electronic version]. *International Journal of Science Education*, 36(12), 1985–2008.
- Ayoglu, B. (2009a). Some reflection on basic programming skills [Blog post]. Retrieved from <http://www.kthpainsdian.se>. Available from author of article on request.
- Ayoglu, B. (2009b). Final words [Blog post]. Retrieved from <http://www.kthpainsdian.se>. Available from author of article on request.
- Berner, B. (2003). Kvinnor i ingenjörsarbete. In B. Berner (Ed.), *Vem tillhör tekniken?: kunskap och kön i teknikens värld* (pp. 175–200). Lund: Arkiv.
- Berner, B. (2004). *Ifrågasättanden: forskning om genus, teknik och naturvetenskap (Tema T rapport 42)*. Linköping: Linköpings Universitet.
- Bøe, M. V., Henriksen, E. K., Lyons, T., & Schreiner, C. (2011). Participation in science and technology: Young people’s achievement—Related choices in late-modern societies. *Studies in Science Education*, 47(1), 37–72.
- Carlsson, H. (2009). Har resan ändrat din uppfattning om Afrika, Henrik Carlsson? [Video file]. Retrieved from <http://www.kthpainsdian.se>. Available on https://www.youtube.com/watch?v=Hx8mH_OlvIM (Aug 6, 2015).
- Dahlstedt, M., & Fejes, A. (2013). Family makeover: Coaching, confession and parental responsibilisation [Electronic version]. *Pedagogy, Culture & Society*, 22(2), 169–188.
- Dahlstedt, M., & Hertzberg, F. (2011). Den entreprenörskapande skolan [Electronic version]. *Pedagogisk Forskning i Sverige*, no., 3, 179–198.
- Dean, M. (2010). *Governmentality: Power and rule in modern society*. Thousand Oaks: SAGE Ltd.
- Delin, P. (2009) Hur är det att vara pappa och gå på KTH? [Blog post]. Retrieved from <http://www.kthpainsdian.se>. Available from author of article on request.
- Dovervik, L. (2009). Vad har varit roligast på resan, Lars Dovervik? [Video File]. Retrieved from <http://www.kthpainsdian.se>. Available on <https://www.youtube.com/watch?v=yEKS0bBhs-8> (Aug 6, 2015).
- Dunteman, G. H., Wisenbaker J., & Taylor, M.E. (1979). *Race and sex differences in college science program participation*. (Rep. no RTI-22U-1570). Research Triangle Inst., Research Triangle Park, N.C. (ERIC Document Reproduction Service No. ED199034).
- Eccles, J. S., Barber, B. L., Updegraff, K., & O’Brien, K. (1998). An expectancy-value model of achievement choices: The role of ability self-concepts, perceived task utility and interest in predicting activity choice and course enrollment. In A. K. L. Hoffmann, K. A. Knapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning: Proceedings of the Secon conference on interest and gender*. (pp. 267–280). Kiel, Germany: Institute for Science Education at the University of Kiel. Retrieved from <http://www.rcgd.isr.umich.edu/garp/articles/eccles98t.pdf>.
- Edwards, R. (2008). Actively seeking subjects? In A. Fejes & K. Nicoll (Eds.), *Foucault and lifelong learning, governing the subject* (pp. 21–33). Abingdon: Routledge.
- Ekenkrantz, F. (2009). Isla de Margarita [Blog post]. Retrieved from <http://www.kthpainsdian.se>. Available from author of article on request.
- EU. (2004). *Europe needs more scientists*. Report by the high level group on increasing human resources for science and technology in Europe 2014. Retrieved from <https://www.researchgate.net/publication/>

- 259705752_Europe_Needs_More_Scientists_Report_by_the_High_Level_Group_on_Increasing_Human_Resources_for_Science_and_Technology.
- Faulkner, W. (2000). The power and the pleasure? A research agenda for 'making gender stick' to engineers [Electronic version]. *Science, Technology and Human Values*, 25(1), 87–119.
- Faulkner, W. (2001). The technology question in feminism: A view from feminist technology studies [Electronic version]. *Women's Studies International Forum*, 24(1), 79–95.
- FEANI (The European Federation of National Engineering Association). (2005). *Competence of professional engineers/EUR ING*". Retrieved from <http://www.feani.org/site/index.php>.
- Fejes, A. (2006). The planetspeak discourse of lifelong learning in Sweden: What is an educable adult? [Electronic version]. *Journal of Education Policy*, 21(6), 697–716.
- Fejes, A., & Dahlstedt, M. (2013). *The Confession Society, Foucault, confession and practices of lifelong learning*. Abingdon: Routledge.
- Fejes, A., & Nicoll, K. (2008). *Foucault and lifelong learning: governing the subject*. Abingdon: Routledge.
- Foucault, M. (1982). The subject of power. In H. L. Dreyfus & P. Rabinow (Eds.), *Michel Foucault: Beyond structuralism and hermeneutics* (pp. 208–226). Hemel Hempstead: Harvester Wheatsheaf.
- Foucault, M. (1994). Technologies of the self. In P. Rabinow (Ed.), *Michel Foucault, ethics, essential works of Foucault 1954–1984* (pp. 223–225). Chicago: University of Chicago Press.
- Hultqvist, K. (2006). The future is already here—As it always has been. The new teacher subject, the pupil, and the technologies of the Soul. In T. Popkewitz, K. Persson, U. Olsson, & J. Kowalczyk (Eds.), *The future is not what it appears to be: Pedagogy genealogy and political epistemology: In honor and in memory of Kenneth Hultqvist* (pp. 20–61). Stockholm: HLS förlag.
- Johannisson, K. (2007, 16 November). Manlig anorexi. *Dagens Nyheter*. Retrieved from the database Retriever 2017, 26 June.
- Johansson, J. (2007). *Learning to be(come) a good European a critical analysis of the official European discourse on European identity and higher education* (PhD diss.), Linköping: Linköping University Electronic Press.
- Kimbrell, R., Stables, K., & Green, R. (1996). *Understanding practice in design and technology*. Buckingham: Open University Press.
- Kingdon, P. (2013). The successful student: A study examining how young swedish people represent engineering students discursively. In M. J. De Vries & I. B. Skogh (Eds.), *Technology teachers as researcher. Philosophical and empirical technology education studies in Swedish Tuff research school* (pp. 199–222). Series: International Technology Education Studies Rotterdam: Sense.
- Lindahl, B. (2003). *Lust att lära naturvetenskap och teknik? En longitudinell studie om vägen till gymnasiet* (PhD diss.). Acta Universitatis Gothoburgensis, Göteborg.
- Mellström, U. (1999). *Män och deras maskiner*. Nora: Nya Doga.
- Murphy, P. (1991). Gender differences in pupils' reaction to practical work. In B. Woolnough (Ed.), *Practical science* (pp. 112–122). Milton Keynes: Open University Press.
- Norberg, M. 2009 (n.d.) Interview published on the site of the campaign. Retrieved from <http://www.kthpainsdian.se>. Available from author of article on request.
- OECD. (2004). *Ensuring the supply of human resources in science and technology in OECD science, technology and industry outlook 2004*. Paris: OECD Publishing. Retrieved from http://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-industry-outlook-2004/ensuring-the-supply-of-human-resources-in-science-and-technology_sti_outlook-2004-7-en.
- OEEC. (1960). *Forecasting manpower needs for the age of science*. Paris: Organisation for European Economic Co-operation, Office for Scientific and Technical Personnel.
- Olsson, U., Petersson, K., & Krejsler, J. B. (2011). Youth'making us fit, on Europe as operator of political technologies [Electronic version]. *European Educational Research Journal*, 10(1), 1–10.
- Osborne, J., & Dillon, J. (2008). *Science education in Europe: Critical reflections* (A report to the Nuffield Foundation). Retrieved from http://www.nuffieldfoundation.org/sites/default/files/Sci_Ed_in_Europe_Report_Final.pdf.
- Ottemo, A. (2008). *Rekryteringsarbete och genusmönster i rekryteringen till Chalmers utbildningar på EDITZ-området. Genus delprojektet inom EDITS- översynen*. Göteborg: Chalmers Universitet.
- Petersson, K., Olsson, U., Popkewitz, T., & Hultqvist, K. (2007). Framtiden som styrning: en genealogisk betraktelse av det utbildningsbara subjektet och pedagogisk teknologi under det tidiga 2000-Talet. In S. Lövgren & K. Johansson (Eds.), *Viljan att styra* (pp. 239–266). Lund: Studentlitteratur.
- Petersson, K., Popkewitz, T., & Olsson, U. (2006). The learning society, the unfinished cosmopolitan, and governing education, public health and crime prevention at the beginning of the twenty first century [Electronic version]. *Educational Philosophy and Theory*, 38(4), 431–449.
- Popkewitz, T. (1998). *Struggling for the soul: The politics of schooling and the construction of the teacher*. New York: Teachers College Press.

- Popkewitz, T. (2003). Governing the child and pedagogicalization of the parent. In M. Bloch, K. Holmlund, I. Moqvist, & T. Popkewitz (Eds.), *Governing children, families, and education: Restructuring the welfare state* (pp. 35–61). New York: Palgrave Macmillan.
- Popkewitz, T. (2004). The alchemy of the mathematics curriculum: Inscriptions and the fabrication of the child. [Electronic version]. *American Educational Research Journal*, 41(1), 3–34.
- Popkewitz, T. (2008). *Cosmopolitanism and the age of school reform: Science, education, and making society by making the child*. New York: Routledge.
- Rose, N. (1996). Governing 'advanced' liberal democracies. In A. Barry, T. Osborne, & N. Rose (Eds.), *Foucault and political reason* (pp. 37–64). Chicago: The University of Chicago Press.
- Rose, N. (1998). *Inventing our selves, psychology, power, and personhood*. Cambridge: Cambridge University Press.
- Rose, N. (1999). *Powers of freedom: Reframing political thought*. Cambridge: Cambridge University Press.
- Salminen-Karlsson, M. (2003). Hur skapas den nya teknikens skapare? Ingenjörsutbildningens mansdominans och den kvinnliga teknologernas villkor. In B. Berner (Ed.), *Vem tillhör tekniken? kunskap och kön i teknikens värld* (pp. 145–173). Lund: Arkiv Förlag.
- Schneider, J., Lucena, J., & Leydens, J. A. (2009). Engineering to help. The value of critic in engineering service [Electronic version]. *IEEE Technology and Society Magazine*, 28(4), 43–48.
- Schreiner, C. (2006). *Exploring a ROSE—garden. Norwegian youth's orientations towards science—seen as signs of late modern identities*. Based on ROSE (The Relevance of Science Education), a comparative study of 15 year old students' perceptions of science and science education (PhD. diss.) [Electronic version], Department of teacher education and school development faculty of education, University of Oslo.
- Schreiner, C., Henriksen, E. K., Sjaastad, J., Jensen, F., & Løken, M. (2010). *Vilje-con- valg: Valg og bortvalg av realfag i høyere utdanning* [Project lily: Choice and no-choice of science, technology, engineering and mathematics in higher education] (Report from the Norwegian Centre for Science Education). KIMEN (2). Retrieved from April 14, 2017 <http://www.naturfagsenteret.no/c1515601/binfil/download2.php?tid=1509698>.
- Sjøberg, S., & Schreiner, C. (2010). The ROSE project. An overview and key findings. University of Oslo. Retrieved from <http://roseproject.no/network/countries/norway/eng/nor-Sjøberg-Schreiner-overview-2010.pdf>.
- Sjögren, P. (2011). 'Kan man särskilja kompetens från personlighet?' En genusvetenskaplig studie av kompetens och ideal i fyra IKT-forskningsorganisationer (Lic. diss.) [Electronic version], Institutionen för ekonomi, teknik och samhälle, Avdelningen för arbetsvetenskap, Luleå tekniska universitet.
- Sontag, S. (1978). *Illness as metaphor*. New York: Farrar, Straus & Giroux.
- Sveriges Regering, Utbildningsdepartementet [Government Offices in Sweden, Ministry of Education] (2008). Insatser för att öka intresset för ingenjörsyrket - rapport från globaliseringsrådet (Ds 2008:10). Retrieved from <http://www.regeringen.se/rattsdokument/departementsserien-och-promemorior/2008/01/ds-200810/>.
- Teknikdelegationen [The Technology Delegation]. (2009). *Nyfiken på naturvetenskap och teknik* (Rapport 2009:1). Statens offentliga utredningar.
- Universitets-och Högskolerådet [Swedish Council for Higher Education] (2002). *Tekniskt sett, högskoleingenjörer-kartläggning och enkätstudie* (Högskoleverkets rapportserie 2002: 27R). Retrieved from <http://www.uka.se/download/18.12f25798156a345894e2936/1487841892560/0227R.pdf>.
- Universitets-och Högskolerådet [Swedish Council for Higher Education] (2016). *Kan excellens uppnås i homogena studentgrupper? En redovisning av regeringsuppdraget att kartlägga och analysera lärosätenas arbete med breddad rekrytering och breddat deltagande*. Retrieved from https://www.uhr.se/globalassets/_uhr/se/publikationer/2016/uhur-kan-excellens-uppnas-i-homogena-studentgrupper.pdf.
- Universitetskanslerämbetet (UKÄ) [Swedish Higher Education Authority]. (2016). Statistik om jämställdhet (vårterminen, 2016). Retrieved from <http://www.uka.se/statistik-uppfoljning/statistikdatabas-om-hogskolan/jamstalldhet.html>.
- Wajcman, J. (1991). *Feminism confronts technology*. Cambridge: Polity Press.