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# Recruiting the Next Generation Scientists and Industrial Engineers: How Industrial Actors Engage in and Motivate Engagement in STEM Initiatives

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**Abstract**

Many different actors, including government, academy and industry, are engaged in school- and recruitment-STEM-initiatives. The aim is to shed light on industrial initiatives, what actors are involved and what different repertoires are being used when motivating engagement in STEM-initiatives. The data collected consists of web-materials where industrial actors describe their engagement in STEM-initiatives and provide reasons for their engagement. The method for analysis is discursive psychology. The results show that a variety of constellations of industrial actors are engaged in STEM-initiatives and that the initiatives draw on a variety of discursive resources. In our analysis we identify the following interpretative repertoires: 1) The securing competent labor repertoire, 2) The developing specific job skills or competences repertoire, 3) The bright future repertoire, and 4) The general increase interest in science repertoire. The results of this study may contribute to the self-reflection of industrial actors on how the choice of resources and repertoires may afford and constrain possibilities for breaking the cultural patterns of selection to STEM education.

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## 1. Introduction

In many Western societies, there is a major concern about young people's low interest in science-intense educations and occupations (European Commission, 2004; Osborne & Dillon, 2008). A way of dealing with these worries has been to launch attempts to increase students' interest in STEM and STEM education. Such attempts are put forward by different actors (e.g. different levels of government, the scientific community, private companies) with different agendas as to why it is important to increase interest in science. The agendas range from ideas of citizenship education and 'science for all' to the expressed needs of more scientists and engineers in society on economic grounds. However, there is little research on the initiatives, the actors, aims and agendas involved. This study seeks to contribute to an understanding of the functioning of recruitment campaigns initiated by industrial actors.

To date, the field of science education research has been primarily concerned with students' interest in and attitudes toward science (e.g. Anderhag et al., 2012; Lindahl, 2003; Osborne & Dillon, 2008; Schreiner, 2006), students' images of science and scientists (Rodari, 2007), and rationales behind individual students' choices and no choices of STEM education (Bøe et.al., 2011). Factors influencing recruitment and retention in STEM higher education have been studied e.g. in the IRIS project (Henriksen, Dillon & Ryder, forthcoming). However there are only a few studies analyzing the effect of specific initiatives (e.g. Jensen & Sjaastad, 2013), and the messages conveyed in different campaigns (Andrée & Hansson, 2013; 2014). In our previous research we studied recruitment initiatives launched by actors of government and the scientific community (op cit.). We found that the two campaigns communicate quite opposite messages of the value of STEM education. When looking at recruitment campaigns targeting STEM-education, we find, however, that the industry is an equally important actor (cf. Teknikdelegationen, 2010). There is a large range of industrial initiatives including school programs, competitions, teaching materials, festivals and other event-based initiatives, e.g. inGenious, Draken Berta, AstraZeneca Summer Research School, First Lego League and Digigirlz.

In this study we draw on the theoretical frameworks of discursive psychology (Edwards, 1993; Potter, 1998). This means we view STEM- initiatives as discursive practices. Discursive practices are here understood as practices where groups of people (i.e. industrial actors) identify with one another as fellow participants and provide reasons for their actions and judgments (Shockley, 2006). Our starting-point is that the ways of providing public reasons for engagement in recruitment and school initiatives are cultural and constitute shared collective ways of dealing with the recruitment of young people to STEM from an industrial point of view (cf. Hsu et al., 2009). More specifically we look at what discursive repertoires are put forward by industrial actors as reasons for and desirable effects of engaging in recruitment and school initiatives (Potter, 1998). The aim is to shed light on industrial initiatives, what actors are involved and what different repertoires are being used when motivating engagement in STEM-initiatives.

## 2. Method

We have performed an analysis of web-materials where industrial actors describe STEM-initiatives. The material has been selected based on Internet searches for industrial initiatives targeting young people in Sweden. The searches have specifically focused:
   (1) business and employers organizations in the area of STEM,
   (2) other large collaborations involving several industrial actors, and
   (3) single private company initiatives.
The method for analysis used is discursive psychology (Potter, 1998). We analyze what interpretative repertoires are used by the industrial actors to motivate engagement in the STEM-initiatives (cf. op cit.). The interpretative repertoires have then been coded into different tentative categories. By a constant comparison, properties of the discursive practices were developed, integrated and re-organized until the categories became stable (cf. Glaser & Strauss, 1967).

## 3. Results

### 3.1. The actors

STEM-initiatives by industrial actors in Sweden are launched by a large variety of actors including: Single companies (e.g. AstraZeneca, Volvo, Scania), partnerships between multinational companies (e.g. Microsoft, Nokia, Shell and many more within the Ingenious project), and business and employers organizations (e.g. IKEM, *Innovations- och kemiindustrierna i Sverige* [Innovation and Chemical Industries in Sweden] and *Teknikföretagen* [Engineering companies]).

There are also several examples where industrial actors, university and/or different government bodies (e.g. EC and local municipalities) engage in projects together. One example is the First Lego Legue (with the Danish toy-company LEGO and the Norwegian energy-company Statoil as the main sponsors in Scandinavia in collaboration with local industries, university, and provincial government).

### 3.2. Discursive resources and repertoires

The industrial initiatives draw upon a range of discursive resources including:
1) competition resources,
2) 'fun' teaching resources, and
3) role-model resources.

The different actors are using different repertoires to provide reasons for engagement in STEM-initiatives. In our analysis we have identified the following interpretative repertoires: 1) The securing competent labor repertoire, 2) The developing specific job skills or competences repertoire, 3) The bright future repertoire, and 4) The general increase interest in science repertoire.

## 4. Discussion and conclusions

There are currently many industrial initiatives in relation to young people and STEM. Until recently there has been a lack of research on the functioning of such STEM-initiatives. This study contributes to give an overview of and scrutinize the range of different industrial initiatives. In particular, this study identifies the different repertoires that are drawn upon when industrial actors provide reasons for their engagement in STEM-initiatives. The results add to a line of research with the overall objective to identify structures and messages serving as selection mechanisms of STEM-cultures (cf. Andrée & Hansson, 2013; 2014).

As Ottemo (2009) argues there is a need for actors engaging in recruitment initiatives to engage in self-critique. The results of this study may contribute to such self-reflection concerning how the identified discursive repertoires may afford and constrain possibilities for breaking the cultural patterns of selection to STEM education.

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