

# Natural Science and Technology: Interpretations of Entrepreneurial Learning in Early Years of Education

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## Abstract

*In 2009, the Swedish government decided that entrepreneurship education is to be conducted throughout the entire public school system in Sweden. The implementation of the concept entrepreneurship is far from obvious; there is no single, unambiguous model for how to work with such an approach in schools. Earlier research has for the most part emphasized that it includes aspects like creativity and motivation for learning, but there are also scholars that stress the need for critical reflection. What happens when a concept from the business sector is brought into an educational context? The study contributes to the development of knowledge concerning how teachers perceive entrepreneurial learning and how it is enacted in practice. The study was conducted in a Swedish municipality in 2014 and involved preschools and primary schools. A stimulated recall method was adopted. The result shows that teachers' understanding of entrepreneurial learning is connected to a) entrepreneurship, b) science and technology and c) personal development. Each school and preschool have had to do its own interpretations of what this concept entails and the understanding and interpretation of what the concept entails become dependent upon single individuals.*

## 1. Introduction

Questions regarding entrepreneurship have become a matter of great importance in Sweden as well as in the Western world at large. The emphasis on entrepreneurship in education may be seen as an expression of globalization, where education has become an important tool for achieving political aims. In 2009, The Swedish national agency for education was commissioned by the Swedish government to stimulate the work with entrepreneurship in education. Today, entrepreneurship education is included in the Swedish curriculum and is to be implemented throughout the entire public school system, from preschools to higher education [9]. However, the implementation of these goals is far from obvious;

there is no single, unambiguous model for how to work with an entrepreneurship in schools. The agency has provided support in terms of publications and in-service training. Creativity, independence, flexibility, self-confidence, an ability to solve problems are examples of abilities that are being emphasized in policy documents [4, 8]. The expression 'entrepreneurial learning' is often preferred, highlighting creative learning processes in which pupils are actively participating [10]. A business orientation still prevails, in for example upper secondary school's courses in 'how to start a business'. This has been described as an external discourse of entrepreneurship education [4].

Earlier research regarding entrepreneurial learning has focused mostly on creativity and motivation for learning [2]. Politis [6] for example highlights that entrepreneurial learning is experiential in its nature and involves experiential processes. Seřkane [7] argue that preschools are settings where children's entrepreneurial skills, attitudes and behavior can be developed. Abilities like creativity, fantasy and cooperation are highlighted as part of an entrepreneurial pedagogy that may improve a teaching focused on developing pupil's motivation within all school subjects. This interpretation of entrepreneurship education, an internal discourse, has to do with a general approach to life and to pedagogy [4]. At the same time, Dahlstedt & Hertzberg [1] and others stress the need for a critical reflection, so that unexpected effects of the implementation of entrepreneurship into education may be perceived and acted upon.

Because entrepreneurial learning is a fairly new concept to professionals in schools and preschools, our study contributes to the development of knowledge concerning how teachers perceive it and construe it in practice. Our questions are: What are the meanings that Swedish pre- and primary school teachers ascribe to the notion of 'entrepreneurial learning'? Within what areas do pre- and primary school teachers perceive that entrepreneurial learning happens? From analyzing interview data, three meanings were found: *entrepreneurial learning as entrepreneurship*, *entrepreneurial learning as*

*personal development and entrepreneurial learning as science and technology.* In this article, we will discuss one particular interpretation of entrepreneurial learning; *entrepreneurial learning as science and technology.* Our discussion will focus on the possibilities and constraints of such an interpretation. Our study contributes to new insights concerning the role of entrepreneurship in education and suggests some conclusions for the work with entrepreneurial learning in schools and preschools.

## 2. Theory and method

The study is theoretically based on a sociocultural perspective [12, 3]. A point of departure is that learning and development are situated in and an inseparable aspect of social practices [11]. That means that we comprehend teachers' thoughts, understandings, and expressions as socially constructed and situated in certain practices.

The study was conducted in 2014 and involved three preschools with 3-5 year olds and two primary schools with 6-8 year olds. In total nine preschool teachers and three primary school teachers participated in the study. Inspired by Meade and McMenemy [5] we used a stimulated recall method. The teachers were asked to demonstrate activities that were considered to be examples of entrepreneurial learning. These activities were video recorded by the researchers. Later the same day the video recordings were presented to the teachers and used as a starting point for a semi-structured interview. The teachers were asked to stop the video whenever they felt the need to comment or reflect on what happened and they were also asked questions about their understanding of the entrepreneurial approach.

The analytical process was inductive. Each researcher read the transcriptions several times and highlighted passages of interest corresponding to the research questions. The researchers then met at several occasions and discussed the findings. In this step of the analysis patterns were discerned that resulted in the three categories described above.

## 3. Result

In *entrepreneurial learning as entrepreneurship*, there is a focus on children's learning about 'real' things for 'real' purposes, which mean that teachers stress the link between the school and the community. At the primary schools the teachers stress that they often work with projects like exhibitions and musicals in order to show that what is done in school is also interesting for others to experience. *Entrepreneurial learning as personal development* imply a pedagogical approach for

developing creativity, fantasy, self-esteem, and social skills. An activity at one of the preschools began with one of the preschool teachers gathering the children so they could share experiences about robots. The children had worked in pairs making drawings of robots, and were now supposed to tell each other how they were going to construct their robots, before actually constructing them. The preschool teachers stressed that they saw themselves as supporters of a process. They wanted to create an environment that was permissive, where children could be self-sufficient and had great opportunities to initiate and control their activities.

In *entrepreneurial learning as science and technology*, a distinctive trait was for children to be able to develop and realize ideas, often using technologies and science. The teachers designed situations that would challenge children's everyday scientific knowledge. At one of the preschools, a group of 4-5 year old children and three preschool teachers worked along the lines of a methodology called 'The Flashes of Genius'; a concept designed to awake the interest of children for natural sciences, technology and entrepreneurialism. The methodology offered the teachers a tool for working with the curriculum goal of stimulating children's interest in science and technology:

*We have found a way to include technology into our work, we want to include natural sciences and technology because we know that there will be a scarcity of such competence in society within a few years. We want to plant an idea that it is fun with technology and it is fun with natural sciences. We are more explicit when talking with the children now: this is technology, this is natural science.*

"The flashes of genius" consists of several steps, such as pottering, assembling, inventing and constructing ([www.snilleblixarna.se](http://www.snilleblixarna.se)). During the particular activity that we observed, the children had reached the step of constructing where they were to actually build their inventions. Attributes such as lab coats and plastic glasses were at this preschool associated with the methodology, as means for the children to go into the role of an inventor:

*They get to feel a bit important, in a way, now it is time to get to work, sort of. So that they feel that now I'm about to get into character and that this is something different than the everyday experience.*

During the activity, children were to work individually. The teachers explained that they wished for the children to be independent in their decision making and in their innovation process. 'Flashes of Genius' aims to strengthen self-reliance and the

confidence to develop and implement ideas on your own, and in the teachers view independence could be connected to this ability:

*We wanted to get away from what had happened in earlier years, sort of, when they just pick up others ideas. It resulted in similar inventions for everyone. Now, it was more like deciding for one self; to take the decision and deciding "this is what I want to do". It is so easy to fall for the group pressure.*

The children were encouraged to express their thoughts and needs, and the teachers often asked them what they needed to pursue their ideas. The teachers helped the children to go from design to production, and stressed how they would ask questions rather than providing answers. To be able to work independently was in this case more important than to be able to cooperate with others:

*She says: "I need", "I need this", and we want them to feel free to ..."Well, yes, do what you need" and to always ask "What is it that YOU need?", "what is it that YOU need?", "here is your blue-print: what do you need?"*

During the activity the teachers would assist the children in gluing different parts from screwed-apart apparatuses onto pieces of cardboard, by means of a glue gun. The children were free to decide what their inventions should look like, but they were not allowed to use the glue gun because of the risk of getting burned.

*I'm thinking about having to do the gluing FOR them. It becomes an obstacle in their work process. I would want a material where they can work independently. Now, they have to wait for their turn which becomes a stop for them, in their process. I would wish for them to go on their own, in their own pace, so that they don't have to wait.*

Within *Entrepreneurial learning as science and technology*, there is a focus on the subject content of technology, and on strengthening children's confidence in their own ability when it comes to inventing and developing ideas. Even though teachers wish for the children to be creative and independent, there are clear limits for what children can cope with. To work with entrepreneurial learning is not part of the everyday experience of children and can thus be connected to an "external" interpretation of entrepreneurship [4].

## 4. Discussion

When an entrepreneurial approach is supposed to run through all aspects of education, there is a risk that other ways of teaching are excluded. Our research shows that the intentions of the teacher, the planned activity, sometimes become more important than the abilities teachers wish the children to develop. An example described above is the case where every child is encouraged to wear attributes such as lab coats and plastic glasses, which can be associated with the concept of Flashes of genius and its focus on being an inventor. It appears to be crucial for the teachers to follow their interpretations of the guidelines of the concept, perhaps more important than finding out how the children can go on with their work in their own pace without having to wait for the teacher to glue for them. A central approach in Swedish early childhood education is to emphasize the interests of children, which demands from teachers the ability to see and try to understand what is going on in the group without a set frame of expectations and norms. Entrepreneurial learning embraces these trains of thoughts, as defined by teachers, but this doesn't always correspond to how the approach is enacted. However, the example with the preschool teacher that highlights the problem of having to do the gluing *for* the children, at the same time proves that the teachers wish to emphasize the child's own active participation.

In the study, we have highlighted both possibilities and constraints for entrepreneurial learning in schools and preschools. The meanings that Swedish pre- and primary school teachers ascribe to the notion of 'entrepreneurial learning' are situated in the different communities of practice [11]. Since the interpretations of the concept of entrepreneurial learning are far from obvious and no specific models for how to work with entrepreneurship in preschools and schools exist, each preschool and school have to do its own interpretations of what this concept entails. The implementation of the concept in practice somehow becomes dependent upon single individuals. This has as an effect that the implementations and practices might vary to a great extent. The consequences of this remain to be discovered.

## 5. References

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