

DISENTANGLING A PROSPECTIVE TEACHER'S PARTICIPATION DURING TEACHER EDUCATION

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The effect of teacher education is of international interest, at the same time expectations on newly educated teachers increase. Deep understanding of what it means to become a primary school mathematics teacher is necessary and this constitutes the focus in the research project. The aim of this paper is to illustrate how two conceptual frameworks, System Functional Linguistics and Patterns of Participation, have been used in the study. The first has been used as a methodological tool and the second as an analytical tool. The use of these will be illustrated by the case of Lisa, a prospective teacher. The results show that System Functional Linguistics successfully disentangles the heritage of Lisa's past and present practices, and facilitates interpretations through Patterns of Participation.

Keywords: identity development, participation, prospective teacher, teacher education

INTRODUCTION

The role of teacher education in the educational system is highlighted and discussed more and more, both in Sweden and internationally. Expectations on teachers seem to increase, and the increased demands raise questions about the quality of teacher education and how its various parts affect prospective teachers' knowledge and identity development (Hejzlar, 2008). To develop as a teacher is a long process that evolves gradually. By understanding that process leading to the formation of a teacher can we better understand what it means to become an upper primary school mathematics teacher.

The content of this paper derives from a study focusing on prospective teachers' and aims to disentangle these students' participation in different practises and analyse and understand how different practices influences students' identity development. It is about understanding and contributing to knowledge in the process of becoming an upper primary school mathematics teacher. The point of reference is that prospective teachers' participate in different situations that reflect aspects of what mathematics is, how to learn and teach mathematics and what it means to know mathematics. The focus in the study is on how prospective teacher's participation, according to these questions, change during teacher education in relation to external and internal influence. Internal influences may be different parts of teacher education and possible external influences may be family, media, social structures or relationships.

Historically there has been some change within the educational system regarding teacher education. Between 1968 when the program started to 2012. One of these changes concerns 1988 when teachers went from a special upper primary school teacher education to a general primary school teacher education (Hejzlar, 2008). In

2011 a new upper primary school teacher degree was reinstated. The main reason for this was that the former teacher education had neglected the specific content regarded to teach children aged ten to twelve.

Phillip (2007) points out that traditional research on teacher development generally has focused on the individual. However, in recent years the focus has been changing towards more social theories. According to Morgan (2010) taking a social perspective to analyse and understand teacher development and identity can bring greater understanding of processes within teacher development. Above all, a social theory provides us with other information about teachers' identity development and change than, for example, traditional research on beliefs.

The aim of this paper is to illustrate how two conceptual frameworks, System Functional Linguistics and Patterns of Participation, have been used in the study. The case of Lisa will be used, a prospective teacher at teacher education, as illustration.

METHODOLOGICAL AND THEORETICAL FRAMING

Two conceptual frameworks are used as methodological and analytic tools. First to address and unfold situated communication System Functional Linguistics (henceforth SFL) has been used (Halliday, 2004). It is strictly considered as a methodological part in the analysis when disentangling students participation and is a well established concept when addressing and unfolding communication that are situated (Björklund Boistrup, 2010). However, SFL does not emphasise any content or situation, it mainly focus on, in this case, how the prospective teacher addresses the content or situation.

Therefore, secondly, there is need for a framework that focuses on the content and situations that has been addressed. Doing this the conceptual framework Patterns of participation (henceforth PoP) will be used.

In both perspectives the concepts: learning, identity development and evaluations are seen as situated within context. They do also explicitly focus on the construction of context as something that arises within situations. In that sense they are alike. SFL and PoP complement each other in one imported way since SFL addresses and PoP describes shifted participation in situations, evaluations and communication. SFL makes processes visible while PoP allows you to make interpretations about them.

System Functional Linguistic

Language, in a broad sense, has two main functions. The first is to make sense of our experience and the second is to act out our social relationships. This means that language is the tool for construing our experiences; it is the tool we use when we evaluate our participation in different practices. When this is done text is produced. A text may refer to some content, which is a representation. In this study, different representations concerning aspects of what mathematics is, how to learn and teach mathematics and what it means to know mathematics?

SFL draws upon the notion that a text is not something predefined, rather, it is something that is constructed while participating with others. It regards a text as being handled in three different processes, so called meta-functions, simultaneously. Morgan (2006) says that this unfolding into meta-functions does not create descriptions about mathematical situations but it serve as a crucial window when following processes. It provides means that can be interpreted through a compatible framework. I will present these meta-functions while addressing the following sample from the transcript of Lisa's first interview.

I do not really know what I want to be, and I still do not really know. Then I was at a school and had practice, so it was there the idea came. But as I said I do not still really know [...] I thought that teacher education would be a little easier than this. You have of course heard from various people, that everyone goes through and no one will fail. That was why I chose it too. That is, if you have nothing to do, you can always be a teacher.

The first meta-functions concern peoples expressed experience, the ideational function (Halliday, 2004). It focuses on the construct of reality by linguistic means. It concerns statements that address the interpretation of one self in different contexts. An example of this is when Lisa expresses her scepticism towards the choice of being a part of teacher education. "I do not really know what I want to be, and I still do not really know."

While using language and express our experiences we at the same time focus our participation against someone or something. This is the second function and is called the interpersonal meta-function. Lisa continues, "Then I was at a school and had practice, so it was there the idea came." This is more active than the ideational meta-function; it is interpersonal by mean that it is both interactive and personal (Halliday, 2004). In the interpersonal meta-function we negotiate about social relations and identities.

This means that a text is about something and is addressing someone. This is done within situations and calls the textual meta-function, which is the third function. It concerns the process of construing the coherence of a text. The textual function also addresses general meta-assumptions of coherence. Lisa continues. "You have of course heard from various people, that every one goes through and no one will fail. That was why I chose it too. That is, if you have nothing to do, you can always be a teacher."

Patterns of Participation

Lerman (2002) suggest that research on teacher development would go from focusing acquisition to focus participation, to learn is to participate and become another. This is to pay more attention to the interpersonal, the personal experience in a social setting. This perspective sees prospective teachers' identity formation and learning as a result of shifted participation in educational situations and acknowledges that all activities are situated (Lave, 2000; Skott, 2010).

Through students' participation, there are several aspects of patterns that are related to different levels, individual, social, institutional, political and cultural. It is the shifting participation in these levels and aspects that Patterns of Participation want to describe by focusing the pre-reified processes that are said to precede mental construction (Skott et al., 2011).

Teacher education includes several contexts of actions that are separated and connected in different ways and intends to reproduce and alter students' participation in situations (Dreier, 2000; Lave, 2000). According to Dreier (2000) a context of action is an arranged situation in a specific location with specific content and specific participants. This notion, context of actions, is not used within the Patterns of Participation framework but will be used in this article to emphasize that it is the actions that makes the context occur. This notion is consistent with Skott's (2010) use of context as something that arises in situations. In Patterns of Participation prospective teachers' individual mathematic skills or beliefs are not central, but the process said to precede it (Skott, 2010; Skott, Larsen & Østergaard, 2011).

Participation requires participants, that is, individuals who by participating develop their individual participation. The individual is part of a situation and a part of the context of actions overall repertoire. Since participation is situated in specific location individuals participate in a specific way. A prospective teacher brings multiple ways of participating into the education's different contexts of actions. Some of them derive from mathematics and others do not. The different contexts of actions that prospective teachers during teacher education involves in will somehow transform their way of participating in relation to what mathematics is, how to learn and teach mathematics and what it means to know mathematics.

Patterns of Participation are phrasing, in participatory terms, the shifted movement when relating to these different aspects of teaching and learning mathematics and is described as an alternative approach to research about beliefs, teacher change and identity development (Skott, 2010; Skott et al., 2011). It distances itself not from beliefs research in general but from a monolithic view that put emphasis on acquisition, and promotes a participatory approach in researching teacher development.

METHODS CONCERNING THE STUDY

The study from which the content of this paper derives from is a theory driven multi-sited ethnographic study. Theory driven because theories that emphasize the social is guiding the choices made during the on going project (Walford, 2009). Multi-sited because the mode of construction is not a single site, instead the mode of construction is a process that takes place in multiple sites (Pierides, 2010). In the study four prospective teachers are followed through their teacher education. They are observed and interviewed before, during and after different context of actions like courses, lectures, seminars, internships, study groups and examination work.

The focus in observations and interviews are, on learning and teaching mathematics and the interviews were transcribed word by word. The assumption is that prospective teachers cannot evaluate their participation in past and present context of actions without simultaneously identify them self and relate to different people in different ways. When this occurs they present specific content while in communication addresses others through an evaluation.

In the analysis one case will be focused on, the case of Lisa. The generated data intended to give examples of Lisa's participation in different past and present context of actions and comes from semi-structured interviews (Kvale, Brinkmann & Torhell, 2009) with voice recording.

When analysing the data first System Functional Linguistics has been used. Every clause in the transcripts has been connected with the specific meta-function. Then the unfolded communication has been compiled into the different functions. After this the full transcript and the compiled transcript has been coded, analysed, organized, summarized and compared. The next step in the analysis was to apply the framework of Patterns of Participation with the intention of phrasing Lisa's participation in participatory terms to describe the shifting movement when she relates to different aspects of teaching and learning mathematics.

THE CASE OF LISA

Lisa, who is in her 20s, started teacher education directly after high school. According to Lisa she comes from a family history of not entering University. Her family is proud that she wants to continue studying after high school. Lisa is included in this study because of her interest in mathematics and because she intends to write at least one master thesis, 15 credits, at advanced level in mathematics education. This means that she will have at least 45 credits in mathematics education after her graduation. The school where she carried out her first internship is located in a small town. The supervisor teaches Mathematics and Nature Science. In this example I choose for space reasons only to present one aspect, among others, that Lisa emphasised in her initial interview. This aspect is related to competitions as inspiration for motivation in learning.

The first interview with Lisa was directly conducted in the beginning of her teacher education and focused on past classrooms experiences and current understanding about teaching and learning mathematics. The second interview was made at the end of the first five-week internship period, this after seven months at teacher education and concerned Lisa's experience gained during this period in relation to what mathematics is, how to learn and teach mathematics and what it means to know mathematics.

Lisa highlights in the first interview her own experiences from her own schooling by pointing out that different competitive elements were increasing her motivation, "this to get it a little more challenging." The example is collected from her experience when learning multiplication, which was the beginning of her interest in mathematics

that continues today. "I have studied to level D and it has been great fun to study mathematics." Mathematics is one of the topics highest ranked, and she looks forward to teach mathematics after her teacher education is completed. In this interview Lisa relates to how these experiences occurred. She mentioned one very good teacher that taught in a playful manner in which the element of competition is presented as important, "we had a lot of competitions." Competitions helped Lisa become more interested in the subject and "get better results because you are more engaged." The competitive element made "you get interested."

In the second interview Lisa's involvement with the supervisors on the internship makes her having a general discussion about what and how a teacher should be. She highlights that "teachers should be committed, being knowledgeable is very important, the desire to develop students, to be close to students and I think it is important to have a sense of humour and the ability to see the students. It is possible to make the long list even longer." All these diverse criteria were fulfilled, according to Lisa, in the mathematics teacher who she had met in recent weeks.

The experience, expressed in the second interview, she gained from being one part of the classroom is that the mathematic teacher engaged in teaching, according to Lisa, closely to pupils thoughts. "The teaching is at their level, it is very playful all the time, experiments and interaction with the students, they do contend all the time." Participation and competitive element is something she highlights in this interview in relation to the above elements, "where the competitive instinct may be awakened and so." This is highlighted as positive, that the mathematics teacher according to her awakes the competitive spirit within students. There are many mathematic tests where students can challenge themselves on time. According to Lisa this gives a good working pace while she points out that when the teacher says something among all competitive elements and activities, "it becomes very interesting to listen."

One additional interview were conducted one month before Lisa's first internship with her becoming supervisor and concerned school culture, experience about teaching and learning mathematics and prospective teachers expected participation during internship. At the interview of the supervisor, before the practise period began the mathematics teacher stressed students' individual competing against them self as central to how the students would be able to see their own individual learning.

I teach multiplication every third week. We do it both on Mondays and Fridays on time. It may seem a bit stressful and messy but they like it very much because it is easy to measure with one self. I always tell them that you have to beat yourself and no one else. Then we do the same thing on Friday and compare. There is not anyone where I can show that they have not developed and I think that is pretty cool.

This is a deliberate strategy by the teacher, to increase their motivation and confidence. "When I say I have not done anything, it is you who done this. I think that is fantastic when they realize that I have actually taught myself this."

Analysis - Interpreting the case from a participatory stance

Lisa re-engages initially in the first interview in a pattern that emphasises the element of competition as central for creating engagement and motivation. The competitive moment makes, according to her, teaching more challenging and was seminal to her interest when participating in past mathematical contexts of actions. This is her own re-enactment in relation to the situations she herself through schooling participated in, her earlier experience that is one part of her current patterns. The key question then becomes if this aspect, one among others, competition as central for motivation, during teacher education will change and if so, how. Through participation in various contexts of actions the aspect described either will be enacted and re-enacted, moulded, fused, and sometimes changed beyond recognition as they confront, merge with, transform, substitute etcetera (Skott et al., 2011).

Lisa's representation emerged through participation in a specific teacher's context of action. This teacher is, according to Lisa, the person who initiated her interest in mathematics through participation in various competitions. Participation in these competitions, enable you to relate your own skills towards one self and others. In Lisa's first two interviews this is a key element for learning mathematics. Her prior interest in mathematics is unsupported by the subject itself. It is the engagement that arose through participation, in competitive teaching that is central. Good performance is achieved by commitment and this occurred, in Lisa's case, through participation in competitive elements.

The difference between the representations in Lisa's first and second interview is that the first to great extent is ideational, because she cannot relate to anything else but personal experience from her previous life. This observation is relevant when discussing about past and present participation and how Lisa re-enacts to these practices. It is first when following up the competitive aspect, later in interview one, that she relates it to the teacher from past experience. In the second interview she relates the aspect entirely to the interpersonal, i.e. the experience she gained from participating in the mathematics teacher's classroom during the practise period. Her prior engagement and experience from historical mathematical classrooms has absorbed, merged and/or changed into another representation. Lisa's identity has changed through shifted participation.

However, she discusses without relating to social relations how a teacher should be and then intertwines this argumentation to include the mathematics teacher whose practice she participates in. Lisa describes an active classroom where participation in the mathematical situation is crucial. What she describes as central in this participation is the competitive instinct that the teacher creates in students. The teacher is said to enact this competitive instinct recurrent, which gives good working pace and makes the teachers' instruction varied.

Lisa's representation regarding 'competitions as inspiration for motivation in learning' has been both complemented and constructed through her participation in

relation to the first interview. Competitions during interview one is motivating, challenging, playful and engaging. After participating in the mathematical classroom, competitions form a natural part of teaching. My interpretation is that her repertoire of words used to describe the aspect expanded while she participated in the supervisors, mathematic teachers, context of action and has deepened her reasoning about the importance of competitive elements.

After the analyses of Lisa's two interviews were conducted, an iteration of the supervisor's interview was done through the categories that had emerged from the initial analysis. Regarding the element of competition, there was a long section, about four minutes, where the mathematics teacher devoted himself to describe his teaching. He emphasised competitions as a developmental force when teaching multiplication. That it is in this moment that students clearly view their progress. What the supervisor describes as a three-week interval Lisa describes as something frequent, a natural part of teaching. Whether it is every third week or a natural part of teaching, it can be interpreted as Lisa's participation in this mathematical classroom has re-enacted her past experience and that her representation about competitions as inspiration for motivation in learning in the mathematics classroom has been complemented and strengthened.

SUMMARY

The article is based on a participatory perspective on students' identity development and is derived from the overall interest to better understand what it means to become a primary school mathematics teacher. To follow this process of becoming makes it possible to take into accounts both internal and external influences from past and present practices. Both the internal and external are a natural part of all situations which prospective teachers participates in. The participation in these past and present practises has in this paper been highlighted or more explicitly one chosen aspect has been presented and how this aspect has evolved during the first part of teacher education.

To follow prospective teachers in teacher education is therefore based on patterns that occur not only as institutional context of actions, but because of the length of the education and it's complexity it evolves from diverse social practices. The analytical tools showed potential in disentangling Lisa's participation in these past and present complex practises and enabled interpretations through Patterns of Participation. Especially when describing the difference in Lisa's two interviews concerning the aspect, competition as central for motivation in learning mathematics.

Lisa's evaluation is not seen as an expression or an individual imprint that she believes in, but as an identity expression that arising from the situation. Nor does her statements sees as expressions of a position but as a continuous variable motion through teacher education. SFL has helped to demonstrate this movement by the assumption that texts have different functions, i.e. addressing different objects and situations. In relation to different aspects and levels it is possible to disentangle and

compare patterns and discuss if they have been enacted or re-enacted, moulded, fused, changed, merged, transform etcetera.

By using the specific conceptual framework Patterns of Participation it has been possible to interpret different patterns and present one aspect in participatory terms. I have also presented how this aspect during practice at a school has an effect on Lisa's identity development. The data construction and data analyse made it possible to interpret her shifted participation during the first year of education. The analytical tools have contributed to highlighting how Lisa's representation of competitions potential has changed in relation to her participation in social practices.

SFL showed to have unexpected potential in relation to the ethnographic approach. As mentioned earlier the mode of construction is not a single site, but a process that takes place in multiple sites. When addressing and unfolding situated communication it became, in many cases, very clear which sites or phenomenon to further explore. In Lisa's case for example the teacher from past experience, the present supervisors classroom or a family member that she often addresses in interviews. System Functional Linguistics made it very explicit where to further conduct research to understand Lisa's participation in past and present practises.

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