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IDENTIFICATION OF LEARNING SITUATIONS DURING PROSPECTIVE TEACHERS' STUDENT TEACHING IN TWO COUNTRIES

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This paper compares two prospective teachers during student teaching practices from England and Slovakia. According to our theoretical framework, we identified the situations of prospective teachers' learning for both cases within these settings. Contrasting these two examples help us lighten several key characteristics of prospective teachers' preparation courses and show us some possibilities for further development in the prospective teachers' education.

Prospective teacher education, teaching strategies, reflection, comparative study

INTRODUCTION

Implementation of mathematics reform curricula in many courtiers causes a bigger interest of researchers into areas of prospective teacher education and teacher professional development. Findings in this area are relevant and used for redesigning several teachers´ education courses. Using this resource into own practice teachers educators undertake case studies that help in conceptualising prospective teacher preparation. There are also countries that kept their way of math education and just slowly introduce new curricular innovations. Within all this, there are many good mathematics teaching preparation courses around the world that operate during longer period of time and proved their consistency and sustainability. We found important to study these practices, because they can serve in comparison between different cultural settings and serve as a mirror (Runesson & Mok, 2004) for others to understand their own practices better.

THEORETICAL PERSPECTIVE

There are two main goals for those who prepare to become mathematics teachers. First is to learn mathematics and the second is to learn how to teach it. We looked at the role of practice in learning to teach as mentioned in (Oliveira & Hannula, 2008) from three different – although in some cases complementary – approaches: 1) observing teachers and students engaged in mathematical activity, 2) prospective teachers' interaction with students, and 3) prospective teachers' reflection. These three activities we see as essential in the process of prospective teachers' learning to teach. Within these three activities we mostly focused on the third, prospective teachers' reflection. Together with Schön (1983; 1987) drawing on Dewy, we argue that professionals should learn to frame and reframe the usual complex and vague problems they are facing, test out various interpretations, and then modify their actions as

a result, instead of only focusing on the application of scientific theories and concepts to real situations within the classroom.

Based on the work of (Ball et al. 2008) following Shulman and his associates (e.g. Shulman, 1986) and Wilson, Shulman and Richert (1987) we used the sub-domain of prospective teacher knowledge for general categorisation of prospective teacher learning. They consider Content Knowledge to be formed by Common Content Knowledge (CCK), Specialised Content Knowledge (SCK) and Horizon Content Knowledge (HCK). Pedagogical Content Knowledge they in the same way divide into three sub-domains: Knowledge of Content and Teaching (KCT), Knowledge of Content and Student (CKS) and Knowledge of Content and Curriculum (KCC).

We also consider reflection as a demonstration of self-awareness and from that perspective all reflection is desirable, because it indicates a consciousness of self. We chose reflection as an important factor for identification of prospective teacher learning. Learning is deeply connected with prospective teachers' change. Brown & Coles (2007) argue that:

> "we change as we open ourselves to, or in other words, become vulnerable to noticing something different. Most things we do not notice nor remember. We are vulnerable to new distinctions we have done work on and connections might be made. We start to see something we have not seem before and maybe act in a different way in response. We each develop awarenesses over time that deepen our understanding and appreciation of that which we do."

These processes of openness and vulnerable to noticing we consider crucial in our study.

Research Focus

Our main interest is on identification of prospective teachers learning situations that should help us to answer our research question:

What are the similarities and differences of student teaching in two countries and how do these differences influence prospective teachers' learning?

METHODS

General Background of Research

In our study we modify the Learners perspective study (LPS) methodology (Clarke, 2006). Within these settings we used video based lesson observation, video simulated interviews after each lesson and narrative interviews with prospective teachers in the sense of (Kaasila, 2007) before and after student teaching in both culturally specific settings. These were supposed to map the prospective teachers' mathematics history that includes also prospective teachers' beliefs about mathematics and mathematics teaching.

Instrument and Procedures

Data collection was achieved during one school year in both countries for two months in Slovakia and three months in England. From the larger study (Sunderlik, 2010) we selected two prospective teachers. One from England, we call him Ben and one from Slovakia, we call her Anna. We participated during the prospective teacher preparation course in both countries

and observed three consecutive lessons of Ben and eight consecutive lessons of Anna teaching students. All lessons were videotaped. The role of researchers in the study was only observational during the process of preparation and teaching the lesson.

Data Analysis

All lessons and interviews were transcribed and coded. Coding system was developed according the functions of particular activities. Transcripts served for further analysis in which we were looking for evidence of prospective teachers learning. From all available information, we identified lesson events that were critical for the specific prospective teacher and grouped them with appropriate bits from interview which we considered as important moments of prospective teacher learning.

FINDINGS

Ben's case

Ben participates in one year Post graduate Certification in Education (PGCE) course in Mathematics. During his school time he was educated in traditional way, but as an A-level student he was taught through problem solving which he thinks should be used in classrooms more.

We choose Ben's two lessons and associate tutor meeting between those lessons (Sunderlik, 2009).

In the first lesson, Ben was presenting an open-ended problem, where students needed to come up with ideas themselves and prove them algebraically. During this lesson, the pre-service teacher experienced a few behaviour problems which, combined with too lenient instructions, led to the fact that some students did not understand what they were supposed to do.

Mentor meeting with associate tutor lasted for about an hour having standard components as usual mentor meeting in the PGCE course. At the beginning the associate tutor asked the prospective teacher about the comfortable and uncomfortable moments. Later on the associate tutor went through the lesson with the prospective teacher and pointed out some noticed issues that he brought up to prospective teacher attention. It was because of the fact that the situation was fresh in prospective teacher's memory and he could connect it with the situation. Awareness of the associate tutor helped the prospective teacher with his reflection on action. We can find the evidence of further prospective teacher reflection process in the following transcript where Ben described the situation from classroom where he noticed that kids didn't know what they were supposed to do:

In the following transcripts the following conventions are used:

Anna – Slovak prospective teacher; Ben – English prospective teacher; R - Researcher; AT1 – English associate tutor; AT2 – Slovak associate tutor; [ ] are notes by authors to help the reading of the text; […] each dot is a one-second pause

Ben: There were some of them who said to me: „I don't really know what we are doing" and they done one and then stop.

AT1:	Yeah.
Ben:	And I kind of explained them that we are looking for patterns so they need to do a couple more…

In the last part of the interview with the associate tutor Ben was supposed to formulate few action points about what he wanted to improve for the next lessons. The first two of them were mostly influenced by the discussion about different aspects of lesson. The first action point was to improve board organisation that should help students find the board as a unifying resource, the second was to make the classroom objective clearer and to know what should be stressed out. In this discussion the associate tutor asked for one more action point. Prospective teacher remained silent for longer period of time and after that he started to reconstruct the situation from the classroom. What is more important he saw it in complex circumstances and was aware of the key strategy that he formulated it by himself. He wanted, instead of telling, to show the students his expectations.

Ben:	Yes, I just give them the structure for the task and lead it through the steps and let them on their own,
AT1:	Yes, yes.
Ben:	Yes I think is the difference between showing them how to do it and...
AT1:	telling them.
Ben:	and telling them....
AT1:	That is nice [...] (writing down) showing not telling that also (connected) with writing showing not telling. You can think about it for tomorrow.
Ben:	Yeah.

If we compare Ben's effort in those two lessons as he put it in the first lesson he told the pupils what they should notice and what they needed to find out and prove it by using algebra. Result of the lesson was that many students struggled succeed the work. In the second lesson, he decided to show the students his expectations and before he started the group work he had introduced an activity that he worked on with the whole class. In this activity, Ben showed his students how an algebraic proof can be used in order to verify a prediction. Ben's "process of opening himself to noticing something different" (Brown & Coles 2008) serves for us as an evidence of Ben's learning through reflection that led to a new awareness of the situation.

During the final-interview Ben explained the process of how he came up with teaching strategies in his teaching.

Ben:	When I started [PGCE program], I didn't really think about strategies and this kind of things… since I, I've been here [mean second placement school]… I think most of strategies came from talking to the teachers after my lessons. So after, yes … a bit chat about afterwards, that he…, like we bring up any issue and talk about it, …, what strategies are needed. …

Ben was supported not only by university mentor but also by his associate tutor at school. What he referred to is the willingness to think about developing and usage of his teaching strategies as he experienced that during the teaching practice.

Ben: I am kind of aware that I do use some of this [strategies] , they tend to be, I tend to pick them up and just used them and I don't then sort of plan for them …

Ben: I don't remember to plan for it again. But I think is that it is something I will keep doing. So I, I kind of think I decided to use a strategies and then I used it a little bit and comes part of my routines quickly so I don't really think about it.

We can consider this change as the "desired one" assuming that the prospective teacher not only started using a new strategy but it gave him the hint how to continue in his further teaching development. It is clear that this system of work with prospective students and experienced tutors can help prospective teachers identifying major issues and encourage them in self-improvement and willingness for continual development.

Anna's case

Anna volunteered to participate in the study. She was in last term of five year university programme. During her school time she was educated in traditional way. In her opinion mathematics education should be more about application of mathematical knowledge into real life. Anna taught in classroom where new reform curriculum was applied. The reform enables teachers to have more freedom in teaching strategies and content. Anna expressed worries about it:

Anna: The problem is that we as prospective teachers were educated in old system and we got used to traditional style of lessons… Now we suppose to force the students to start thinking why it is like that. Formulate a hypothesis and then test it…. I have my own experiences that I would like to tell them everything but the new school law requires more student centered learning. As a student I was taught within the system like: explain, give notes and go to the next topic. Now it is different. It will be difficult to teach like that.

Anna's teaching

We chose a set of three lessons where Anna presented topic about central and periphery angles. She taught the first lesson according to the textbook. This lesson didn't go well. Anna discussed the lesson with her Associate tutor and prepared next lesson in more detail and little bit changed the way when she was explaining the topic again.

During the mentor meeting the talk was done mostly by the associate tutor. It is the same pattern that the associate tutor asked Anna not to do "Try not to tell them everything as it is". After the lesson Anna was interviewed and invited to watch her teaching. Anna commented several times on her teaching. For example:

Anna   I told him again what he [student] is supposed to do.

R   You did the analysis of the problem for him.

Anna   Yes. That is true.

Anna   Generally they are supposed to do that for themselves. I should help them with questions to come up with that by themselves.

During the reflection on the lesson using video based interview she decided to change her approach to teaching the topic. But she has not been able yet to identify where the problem is and how to change it. She refers to her learning as a pupil the way she was taught this topic as a pupil. This example shows the lack of processes and support that will help Anna to develop new strategies for teaching. We can characterize Anna's student teaching as practicing the teaching she experienced as a primary and secondary student but with larger mathematical knowledge. But she struggles on how to transfer this knowledge in the classroom. Within her teaching she remains in the traditional way of teaching where she was looking for the best way how to explain the new topic to the students. Anna characterized her learning during student teaching in the final interview as following:

Anna: I've learnt how to go along with kids, how should I talk to them, know how to motivate them and learn a little bit about self-reflection. To know how to prepare the topic the way that all would be included and tell it the way they would understand it. That is maybe the hardest one. Because you know the content, you know how to solve the task, but it is hard to explain it the way that students would understand. Because they don't see things like we do.

Comparison of two cases

In both cases we identify several kinds of learning of prospective teachers during teaching their students. Both prospective teachers differ in their SCK which are given by the different cultural settings and also school culture. The most significant learning we can identify in two sub-domains we can identify the most significant learning in two sub-domains: KCT and KCS. In both cases the crucial factor was reflection on their own teaching. Anna has the possibility to identify several moments of her teaching through video recorded lesson. This helped her to identify situations that she could reflect on more be aware of her KCS and improve in her further teaching KCS.

During Ben's teaching we could observe process of opening himself to noticing something different (Brown & Coles 2008). This new awareness of the situation helped him to developed new strategies for his teaching. We can consider this change as the "desired one". It means that prospective teacher not only started using a new strategy but it gave him the hint how to continue in his further teaching development. This process was successfully used in inquiry environment where prospective teacher needed to come up with new awareness of classroom interaction. The whole process of "opening to noticing something different" is supported within the school culture and the culture of preparation course where the crucial role have an experienced mathematics teacher, associate tutor, that offer the prospective teacher his awareness of the situation, but didn't give the prospective teacher's "tips for teachers" (Brown & Coles 2008, p.17). This way of mentoring caused in Ben's case awareness of something different from his previous practice that is closely connected and understood within the learning situation.

On the other hand Anna's awareness was mostly driven by associate tutor advices or previous teaching experiences in her school time. These sources seem insufficient for development of

reform pedagogies. She focused mostly on the appropriate didactical settings of the content and suitable choice of tasks. Some opinions were expressed by Anna about her learning. After teaching students she more deeply realized that "students don't see things like we do". This realisation influenced the KCS of prospective teacher. We see this as a starting point for prospective teacher to make connections between theory from the mathematics education research and practice. This realization offers a lot of possibilities for further professional development. Within this study there were no reinforcements for Anna in this direction. We consider as a main issue in her student teaching the fact that she was not able to reformulate her own teaching strategy based on the complex understanding of teaching situation. Even though she developed within several sub-domains of KCT and KCS she didn't enact them into the complex strategy.

CONCLUSIONS

This study helps us identify different approaches to prospective teachers' learning in two cultural settings that are present not only in the classroom but also in the preparation courses. We can determine the parallel between the classroom culture and the preparation course culture. English lessons are more open and reform-based than Slovak. But also the way mentoring during student teaching is done is more prospective teacher centred in the English course. The power of these English settings was presented on the example of two lessons where after bad lesson there was reinforcement during mentor meeting. Ben was able to come out with new teaching strategy that came from his reflection on practice.

On the other hand reform oriented pedagogy seems to be something that Anna is worrying about, because she has only some information about reform pedagogy what makes it even harder to put it into practice. Also the mentoring is performed in traditional way with only little stress on prospective teacher's reflection. We could observe that Anna developed several skills like questioning and changed the lesson structure, but in her teaching she remained with traditional, teacher-centered way of teaching.

As teacher educators we developed our understanding of our prospective teachers' that influences the process of redesigning several parts of the preparation course. The results of the study also offer a wider meaning of development of models within mathematics prospective teacher education.

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