

Contrasting pre-service teacher education and school practice in two countries

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In this article, I will present two contrasting mentor meetings and some approaches to exploring the development of mathematics pre-service teachers during their student teaching. I am trying to identify themes for both countries, Slovakia and UK and discuss the influence of pre-service teacher development in different cultural settings.

Keywords: comparison, pre-service teacher, student teaching, reflection

Introduction

After finishing the teaching preparation programme in Mathematics Education in my home country Slovakia, I spent two years teaching at a middle school in the USA. During this time I was often confronted with different situations where I had to question my teaching practices. It was hard for me to understand why I needed to use several “new” teaching strategies for every single lesson and try to avoid worksheets and working on problems with the whole class. I also observed that the students’ understanding of mathematics, their terminology and problem solving suffered some misunderstandings of the mathematical concepts from previous years. Moreover, classroom management was a big issue for me, which I had not heard about during my teaching preparation programme in Slovakia. Sometimes, I could not find the explanation and answers based just on my knowledge gained in Slovakia. I cannot say that this experience is the only cause of my interest in different teaching practices – it certainly helped me to understand more about the variety of teaching approaches in different countries and cultures. Teacher preparation programmes differ in several countries and within universities in the same country as well. What are some of the relevant practices they can offer to their students? What can we learn from them? I decided to look closer into similarities and differences of one teacher preparation programme in two countries: Slovakia and the United Kingdom (UK). I chose the UK because it can offer a variety of interesting examples of new approaches to teaching and implementing mathematics strategies into practice. I chose Slovakia because it is my home country and I obtained my education there. In this paper, I will present two lessons from a pre-service teacher from each country, followed by a meeting with their mentor which happened between those two lessons.

Short description of Slovak and the UK pre-service mathematics teacher programmes

	Slovakia	UK
Type of programme	integrated 5 years master programme in two subjects	several types of programmes – I focus on PGCE – Postgraduate Certificate in Education - One year post degree

Pedagogical preparation	integrated in first three years, state exam in the fourth year (first year of master studies)	included in the program, EPS - Educational and Professional Studies
Student teaching	<p>the 6th semester: 13 hours (1 week) only observation</p> <p>the 7th semester: 26 hours (2 hours per week)</p> <p>the 8th semester: 26 hours (2 hours per week)</p> <p>the 10th semester: 4 weeks full teaching in school (30 hours)</p> <p>same amount of hours is from the second subject</p>	<p>Autumn term: week 5 and 6 – three-day practice</p> <p>week 7, half of 9, 10 -12 (teaching 10–20 lessons)</p> <p>week 14 - three days in another school</p> <p>Spring term: whole term student teaching (by the end of term - two thirds of regular teacher’s assignments)</p> <p>Summer term: four weeks (teaching about 20 lessons + other school assignments)</p>
Gained qualification	Master in mathematics education	QTS qualified teacher status + 60 credit points at M- level

Collecting and analysing data

I videotaped two lessons of student teaching in each country during the last term of the programme. Both teachers were chosen on a voluntary basis. The Slovak student teacher was 23 and the English one 27 years old. After the first lesson, each pre-service teacher had a meeting with their associate tutor (mentor) where they discussed the lesson. These discussions were audio taped. The main focus was on the teacher’s practice, teaching style and identifying the pattern of teaching in the first lesson.

For the interview with the mentor I focused on the how the mentoring is done. I looked at the mentor’s talks and pre-service teacher’s reflection on his or her teaching and identifying the “critical” moments – the parts that were mentioned during the mentor meeting. Then I looked back at the lessons and tried to identify the “critical” moment during those lessons for each teacher and I searched for patterns in their student teaching. Then I focused on the evidence of difference in the second lesson and will compare those two pre-service teacher’s practices at the end of this article.

In the following transcripts the following conventions are used:

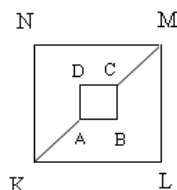
T1 – Slovak pre-service teacher T2 – English pre-service teacher S - student
 SS - class or students AT – assistant teacher [] are notes by JS to help the reading of the text [...] Each dot is a one-second pause

Case of Slovakia

The Slovak lesson which is described in this paper was the first lesson of the day at the end of pre-service teacher second week of teaching. I present the part where the pre-service teacher is introducing a new problem.

Lesson one - Slovakia

Problem: The area of square KLMN is 1m^2 . The diagonal KM is divided by the points A and C into three identical parts. [KA, CM and the hidden AC.] What is the area of square ABCD?



T1 We have a square KLMN. The diagonal KM in the square is divided by the points A and C into three identical parts. They are asking us: what is the area of the small square? [.....] So we know that all sides in the square are identical, we know the area of the square, we need to calculate the length of the diagonal and then using this to calculate the area of the small square.

[The chalk is placed in front of a student who comes up to the board.]

[.....]

S We can calculate the diagonals using formula. [.....] [Work shown on the board]

T1 What do we write down first?

S The formula for the area.

T1 The formula for the area. We use the formula to calculate the side 'a'. [.....]

S [The student continues working on the task.]

T1 Substitute for area equals 1m^2 . Equals 'a' ...

S Square

T1 We can calculate 'a' ... which is equal to...?

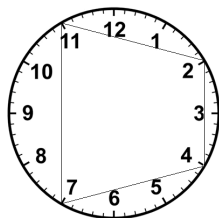
S One

$$S = a \cdot a$$

$$1 = a^2$$

$$a = 1\text{m}$$

Lesson two - Slovakia



The Problem: On a circular watch face there is a chordal quadrilateral joining 2, 4, 7 and 11. a) Find the quadrilateral's interior angles and b) the angle between its diagonals.

...

T1 So, we need to calculate the angle between the diagonals. Any ideas? [.....]

SS Mmmm

S Is it 60...?

T1 What did we get when we uhhh, ... when we've drawn the diagonals?

S Triangles.

T1 Triangles. Yeah.

T1 What is the advantage of having triangles here? As we had it for homework [....] -

That the sum of the interior angles of a triangle is 180 degrees - so how many angles do we need to calculate? How many is enough..?

S Two.

T1 So we can use the triangle, triangle 2, X, 4. [X is the intersection of the diagonals]

At the BSRLM day meeting in Bristol, I presented this transcript to the participants of the session. What attracted their attention was the pre-service teacher's way of presenting the problem. When we try to compare the first lesson with the second one we notice that the same pre-service teacher presented the problem in a different way. As one of the participants said "I was looking for question marks in both transcripts..." In the first transcript there were only two question marks and the

questions were more or less about adding the missing words to the pre-service teacher's sentences on how to solve the problem. Right in the first sentence of the first transcript the teacher gives the instructions on how to solve the problem. In the second lesson, after posing the problem the pre-service teacher continues with the question: "Any ideas?" and then pauses for about five seconds. In this example we can see development of pre-service teacher's awareness of students' thinking and improvement of questioning skills. Initially the students did not arrive at the solution, so the pre-service teacher continues asking questions which lead towards the solution of the problem.

After discussion about these two lessons we looked together in the session at BSRLM into the transcript of the mentor meeting which happened between those two lessons.

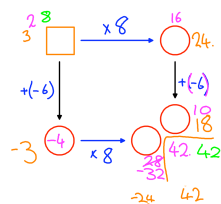
Mentor meeting – Slovakia

- AT You know, try not to tell them everything as it is.
 T1 Uhm.
 AT [Checking the notes from the lecture ...] And the same for that square. Right? That was the square with the little square.
 T1 Right.
 AT It was a really nice problem. You said - formula, so we have the square, that was the first task you gave them, first...
 T1 Uhm.
 AT Next, formula for the square, [...] have to write down, formula for the square [looking at her notes from the observation] formula for the square. Next, in square we have the sides of equal size. Well, they should have done this if they had seen it there. Next, we have to find the length of diagonal - that's another property which you told them ... You didn't let them think, you overwhelmed them with the information. So we have to find out the length of the diagonal and then the area of the square. Actually, you solve the whole problem for them, they were just drawing and maybe even not listening to you...

The mentor meeting transcript points out the close-ended approach of the pre-service teacher to the problems. One participant at the BSRLM session said: "The mentor did exactly the same as what she said to the pre-service teacher not to do." It is clear that the mentor did the most of talking during the meeting with the pre-service teacher. Mentor's comments were mostly about mathematics, how to solve problems and present them to students. This was how the mentor was used to working with pre-service teachers. She focused on mathematics concept and how to present these in the classroom. The teacher presented different strategies on how to solve the problems, but the pre-service teacher was passive. There was also a lack of open - ended problems in the planning. Both lessons were teacher-centred. Nevertheless the pre-service teacher changed in line with what was said.

English case

Lesson one UK



[Reflecting on the starter projected on the whiteboard shown above.]

- T2 How would we show any number we put in? How could we work that out - that it always comes to forty-two? What could we put in right on the top? Tom.
- S An "a".
- T2 An "a" or any letter we wanted. Yeah?
- S Yeah...
- T2 OK, what I'd like to do is continue working on your grids and choosing different numbers to put in. And I want you to keep looking for any patterns that come out. But more importantly, I want you to find out why those patterns are there. And if they all be there. If you decide it's a three times three - then the difference is always gonna be twenty. Then, may try to put letters in instead of other numbers and if you still get twenty in the end. OK. If you struggling with thinking of numbers put in I have got some grids pre-printed this time, so I come around and hand out those as well. If you need a hand to put the algebra in, put hands up as well, and I'm gonna help you, OK? (stands up in the middle of the classroom) Carry on.

Lesson two - UK

- T2 Can anyone suggest how we might, go ... the question giving all the prompts we had and all we've been doing yesterday.
What might we do to try to prove it is always going to be 'three'? [...] So, to prove it we need to try every single number in the world. But, as an easier way, we...
- S Use the algebra... [exited student yell out]
- T2 Heeej. [Teacher is happy about it] We can use algebra, we can use, we can put a letter in to represent all those millions and billions numbers and use that to just help us to step through and see what happens.
- S [exited student keep saying the word] the algebra
- T2 What we are gonna do is we gonna to use [...] OK, one column we are going to have a number we're gonna to test. [The pre-service teacher used the interactive whiteboard to work on the problem, the outcome is shown below]

The image shows a handwritten algebraic proof on a whiteboard. It consists of two vertical columns of numbers and algebraic expressions, with corresponding text instructions to the right.

- Column 1 (Orange background):** 1, 3, 9, 8, 4, 3
- Column 2 (Yellow background):** a, 3a, 3a+6, 2a+6, a+3, 3

Instructions to the right of the columns:

- Think of a number
- Multiply it by 3
- Add 6
- Take away your starting number
- Divide by 2
- Take away your starting number
- What have you got?

Handwritten notes include: $9a$, $3a+9$, and $2a+6$ next to the $2a+6$ expression.

In these two transcripts we can see lessons where the pre-service teacher was working on algebra skills. The structures of the lessons were similar. At the beginning the pre-service teacher started with a warm-up activity, then introduced the main investigation part, which was done in groups, and at the end brought the class together and tried to share the findings and summarised the lesson. Both transcripts are an introduction to the main part of the lesson. In the first lesson, the pre-service teacher was presenting an open-ended problem, where students needed to come up with ideas themselves and algebraically prove them. During this lesson, the pre-service teacher experienced a few behaviour problems which, combined with too lenient instructions, led to some students who did not understand what they were supposed to do. He told the pupils what they should notice and what they needed to find out and prove it by using algebra. In the second lesson, he decided to show the students his expectations and before he started the group work he played a game with the class together. In this game, the pre-service teacher showed his students how an algebraic proof can be used in order to verify a prediction.

Mentor meeting UK

- T2 Yeah, I'm just thinking about... wherever I set out more tasks I end up telling them what they need to do as opposed to them sort of knowing what they're supposed to be doing. Like with this if we've done it a few times, all done altogether two or three times. They would over the case they would this is what we did, suppose to do one or two on the board even with them doing it on the board. And then say "ok, do some more and look for some patterns" It feels like giving them instruction as opposed to they are continuing on without me.
- AT Yeah.
- T2 Because they haven't done anything yet. So, they got know basics gone part what they can remember from the discussion we've just had.
- AT Yes, yes. That is a really good realisation, I think. [...] It is a really good realisation.
- T2 So, really ehmm. [...] yeah... Maybe just getting spend sort of... giving them a minute or two to do one, come back, minute or two and come back and then, when you've done a few, then let them go and work on their own.
- AT Yes, yes.
- T2 I think I was trying jump in, jump in the openness.

According to this practice the pre-service teacher recalls the previous lesson and is able to think about the "critical" point(s) in the lesson, followed by a proposal for an action for improvement. This part of the transcript was from the action points, where the pre-service teacher reflected on his practice. Most of the talk is from the pre-service teacher.

Comparison of the two cases

When we look at the both cases, we can find some differences in how the lessons were structured and how the mentor meeting was done. The Slovak pre-service teacher solved the problems with the classroom and was in the centre during the whole lesson. The mentor meeting was more about mathematics concepts. On the other hand, the UK pre-service teacher gave more autonomy to the learners by setting up group work for an investigation. During the mentor meeting he tried to analyze the lesson together with the mentor and three action points were set up by the pre-service teacher.

There are also differences in how the reflection was done during the mentor meetings. Being able to reflect on your own practice is a part of the standards of the PGCE course. On the other hand, during the Slovak mentoring the talk was mostly done by the mentor in a technical rationality way (Neville & Smith 1995) and some reflection on action was done by the mentor as well. What is the most interesting is that both pre-service teachers did change their teaching practices during the second lesson in line with what was discussed in the mentor meeting. They became more aware of what happened in the classroom and were more focused on students' learning and understanding. This case comparison supports the idea that the cultural practices are not right or wrong, because the practices are effective in their own cultural settings.

References

Hatton, N., and D. Smith 1995. Reflection in teacher education: Towards definition and implementation. *Teaching & Teacher Education*, Vol 11, No 1, pp 33- 49.