



- Learning to be a teacher of mathematics – what makes the difference? Reflections from a group of students who have completed their first year of BA Primary Education at university.

LUCY WESTLEY  
LUCY.WESTLEY@NORTHAMPTON.AC.UK

---

## BACKGROUND AND RATIONALE FOR THE STUDY

The entry criteria for ITT - C grade /  
Level 4 English, Mathematics, Science

During the interview process candidates  
are asked about their subject strengths  
and areas for development. Anecdotally  
– candidates express concern about  
their mathematical knowledge.

# SUMMARY OF THE CURRENT RESEARCH

---

Perceptions – how they are formed – perceptions start in early childhood – (Devlin, 2006)  
Children have a natural love of mathematics at the age of 4 – Emen & Aslan ( 2018 )  
Ummanel ( 2017 ) – positive perceptions decrease with age.

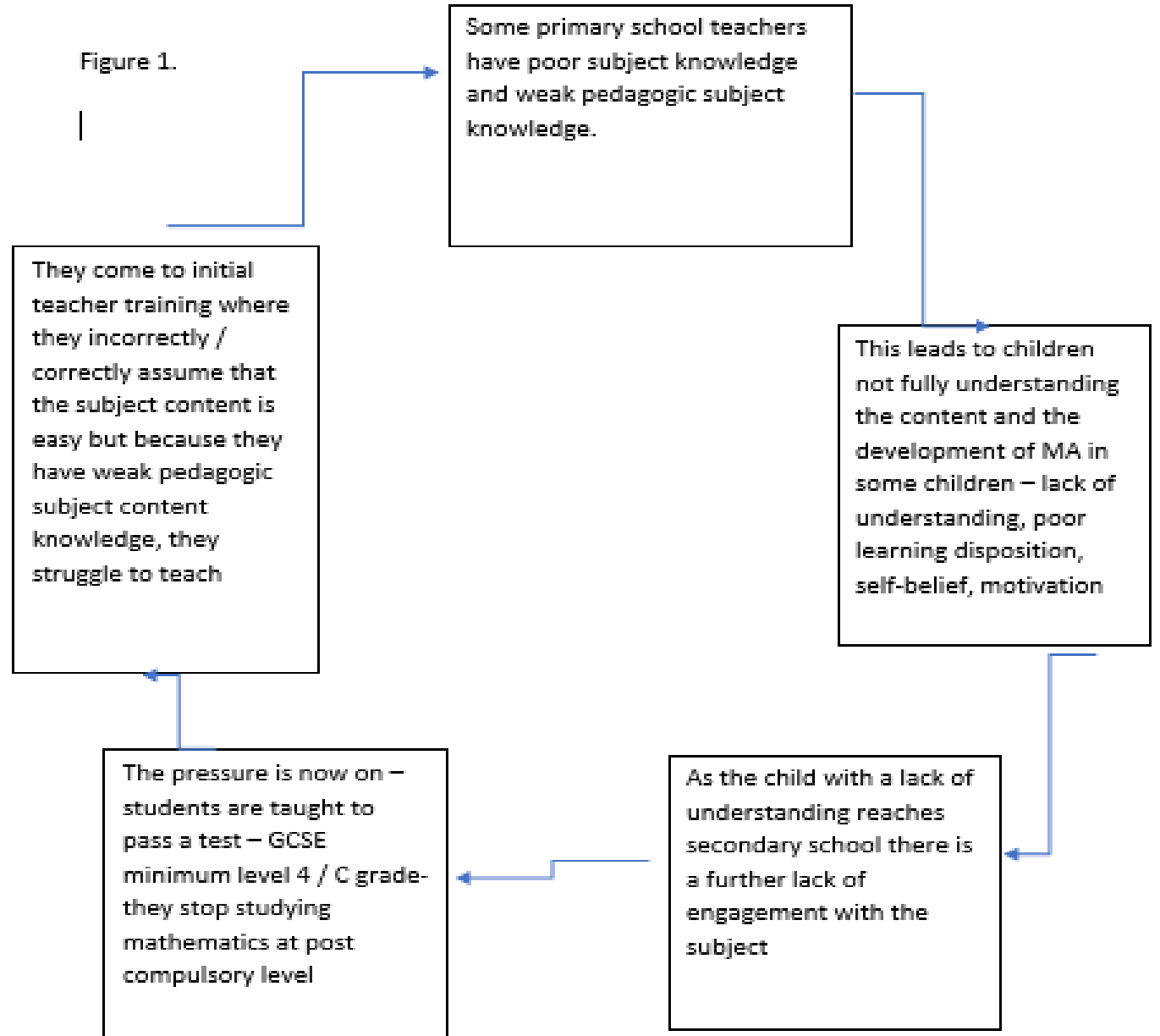
The importance of the development of identity – as both a teacher and also as a mathematics teachers

Identity and Self efficacy

# IMPORTANCE OF THE STUDY

- The cycle needs to be broken.
- The impact of the elements of training and how this can support the student teacher needs to be established.
- Other elements such as the approach to mathematics used by the school, the school curriculum and the mentoring may have an impact.

Figure 1.



# MANIFESTATIONS

---

- Children in school may be made to feel inadequate in mathematics from a very young age.
- You either 'can' or 'you can't'
- The point at which the change starts to happen from the natural pattern seeking mathematicians we see in young children to children who are developing negative perceptions is debated but the influence of teachers is critical ( Crafter , 2011)

# RESEARCH QUESTIONS



1. **What perceptions of their own competence do students hold about themselves within mathematics on entry to the BA Primary Education with QTS ?** This question explores the students' perceptions of the subject and how it might be taught on entry to initial teacher training.



2. **How might students' perceptions of themselves as mathematics educators change over the course of an ITT programme?** This question will explore any changes that students experience as a mathematics educator during the course of the degree and their development as a teacher.



3. **How might students be effectively supported to develop their self-efficacy as a mathematics educator?** This question allows the research to meet the intended aim of how establishing the most effective ways of supporting students' to develop their confidence and competence as mathematicians and mathematics educators. Students must be supported to develop their self-efficacy including critical thinking in the subject and the pedagogy as they enter the profession.

# FOCUS GROUP

---

- 1 male
- 5 females
- Range of ages
- Range of previous experiences
- Range of confidence and perceived competence with mathematics

# BANDURA'S - SELF EFFICACY – THEORETICAL FRAMEWORK

---

Self-efficacy refers to an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments (Bandura, 1977, 1986, 1997).

Bandura described four different types of experiences that may contribute towards the development of self efficacy :

1. Mastery experience - perceptions regarding previous experiences

2. Vicarious experience – feedback from others regarding their capability to performs

3. Verbal persuasion – positive feedback regarding practice

4. Physiological and affective response – somatic states such as anxiety / pleasure is induced



# MASTERY EXPERIENCE - PERCEPTIONS REGARDING PREVIOUS EXPERIENCES

---

- **The experience from secondary school influenced them most**
- *'I wasn't a massive fan coming into it because of experiences from teachers in secondary school.'*
- *'I think the problem that I had was in early secondary school, the teachers weren't supportive, especially being in one of the lower groups at my school.'*
- *'It was almost viewed that, oh, you're in a lower group. You're doing the lower paper. It doesn't matter about you. We're going to focus on the high.'*

# PHYSIOLOGICAL AND AFFECTIVE RESPONSES - SOMATIC STATES SUCH AS ANXIETY/ PLEASURE IS INDUCED.

---

- **Physiological and affective responses –**
- *‘Yeah, yeah, I like it when I understand it and I think oh, it's really great and very useful, but I get very frustrated if I can't understand it.’*
- *‘Maths has always been one of my stronger subjects, and now I've actually found it very interesting coming to university, because I actually struggled to change those abstract concepts in my head into pictorial and concrete. So learning about that actually helped me in knowing how to explain to children, even simple concepts, I've struggled to go from abstract in my head to what can I use to make this simpler for them to understand?’*
- *‘It's quite worrying, so almost not being able to do some of the work that the children were doing, especially in the first placement where they were in key stage two was quite, Yeah, it was quite worrying.’*

# VERBAL PERSUASION - POSITIVE FEEDBACK REGARDING PRACTICE

---

- *'And then once we got the feedback from them, we were able to teach it a third time and they understood it, so to sort of involve the children more in terms of how do you want to learn - this section of the lesson has definitely influenced how I would teach maths in my own class.'*

# VICARIOUS EXPERIENCES - FEEDBACK FROM OTHERS REGARDING THEIR CAPABILITY TO PERFORM

---

- *'Uh, the lesson planning like I could plan a lesson, but I can't be like what's next or what's before. I struggled with that part.'*
- *'The right amount of support in terms of stretching, challenge and scaffolding that you might need to provide for all the different learners within your class and how you manage that within an hour on one subject. That's the bit that's hard.'*

# IMPACT

---

- Open and honest discussions with trainees about personal experiences and journeys
- Consideration of their own perceptions and of those around them
- Tackling issues in subject knowledge
- Tackling issues in subject specific pedagogy
- Peer teaching
- Critical reflection on school and classroom experiences

# REFERENCES

---

Boaler, J. (2015). *Mathematical Mindsets*. Jossey-Bass.

Buff A, Dinklemann, I. (2015) Children's and Parents' perceptions of parental support and their effects on children's achievement in mathematics. A longitudinal predictive mediation model. *Learning and Individual Differences*. (50) pp.122-132.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum

Devlin K (2006) The useful and reliable illusion of reality in mathematics Presented at the workshop Towards a New Epistemology of Mathematics, held at the GAP.6 Conference in Berlin, September 14-16 2006.

Emen, M, Aslan, D. (2018) An Investigation Of Preschoolers' Perceptions About Science And Mathematics Through Metaphors. *European Journal of Educational Studies*. 4(10) pp.110-126.

Grolnick, W. S., & Pomerantz, E. M. (2009). Issues and challenges in studying parental control: Toward a new conceptualization. *Child Development Perspectives*, 3(3), pp.165–170

Ummannel A, (2017). Metaphorical Perceptions of Preschool, Elementary and Secondary School Children about Science and Mathematics. *Eurasia Journal of Mathematics, Science and Technology Education* 13(8)pp. 4651-4668.

# QUESTIONS?

---

- Thank you for listening.
- [Lucy.Westley@Northampton.ac.uk](mailto:Lucy.Westley@Northampton.ac.uk)