RESEARCHING THE IDENTITIES OF SPECIALIST MATHEMATICS TEACHERS IN ENGLAND THROUGH GRAPHICAL AND NARRATIVE INTERVIEW APPROACHES

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STARTING POINT

Who am I?
Ah, that's the great puzzle.

—Lewis Carroll, Alice in Wonderland
MATHEMATICS
WHY?
What did I research?
Main research question:
How do biographical processes and experiences shape identity development and career trajectories of Primary Teachers who become PMaSTs?

Sub-questions:
SQ1: What are the professional and personal circumstances that lead to primary teachers becoming PMaSTs? (Beginning)

SQ2: How do primary teachers describe and understand their experience in the role of a PMaST? (Being)

SQ3: How do PMaSTs’ professional identity developments reshape values, practice and future career goals? (Future)
LITERATURE

Policy- range of reports and data sets e.g. Cockcroft(1982), Williams, 2008, Vorderman (2011), ACME (2012), range of reports on the TIMMS comparative data sets...

Primary Teacher and the professional space- CPD

Very limited literature on Primary Teachers in England becoming PMaSTs. This was a gap-

-McCulloch, Marshall,DeCuir-Gunby and Caldwell (2013)-study in USA but with group of kindergarten teachers on their mathematical autobiographies- article provided a lot of food for thought. Discusses intervention that worked in developing teacher expertise.
Identity literature- A comprehensive review of mathematics learner identity literature has been conducted from Darragh, 2015 and Radovic, Black, Williams, & Salas, 2018- main argument is that although literature exists around mathematics Learner Identity and Mathematics Identity, there is a lack of conceptual coherence.

They discuss three ways the literature conceptualises identity in mathematics:
- Social/ subjective - self/ constructivist/
- Enacted/ representational
- Change/ stability
Career trajectories- literature reasonably sparse that provides a context for primary teachers, careers and PMaSTs career trajectories.

- **Chen (1998)** discusses career as follows:
  - Career as a Life process
  - Career as individual agency
  - Career as meaning making.

- **Draper, Fraser & Taylor (1998)**- work with range of primary and secondary teacher developing leadership roles and their career aspirations.

- **Ibarra (1999a, 1999b, 2004,)**- substantive body of work looking at careers as a continuum as opposed to static. Linked to CPD and life long development.

- **McCormack, Gore and Thomas (2006)** provide some evidence for early career teachers valuing a sustained process of professional learning opportunities.

- Recent government statement on developing early career opportunities to develop Chartered Teacher Status, is a positive step in sustaining this.
GAPS

Research into Primary mathematics specialists in England and broadly across significant comparable countries.

Data sets missing in the number of maths specialists in primary schools, sporadic and not factored into the annual data census.

Identity literature gaps in primary teachers developing as PMaSTs... how they build this identity and agency as PMaSTs.

Teacher career trajectories and decision making into subject leadership roles such as PMaST and how these build over time.

Theoretical suggestions around a mathematics identity are not asserted by researchers, therefore, there remains a gap in theorising and framing a primary teachers’ mathematics identity and how this develops over time.
Developing a Framework for my ideas.
A Mathematics Specialist

Career
Identity
CPD
THEORIES I HAVE DRAWN UPON

Lave and Wenger (1998) - Situated learning and Communities of Practice

Illeris (2014) - Identity constructs-core, personality and preference


Berger and Luckmann (1966) – social construction of reality and identity – institutionalisation plays a key role in construction of an identity within a school context.
IN PARTICULAR, I DREW HEAVILY ON THE WORK OF ILLERIS (2014) AND HIS IDENTITY WORK
THE NARRATIVE/ LIFE HISTORY APPROACH

How PMaSTs negotiate their *self-identities*, including their identities as *mathematics learners* and *mathematics educators*.

How PMaSTs experience, create and make sense of their *career development* and the significant moments which or people who enable/hinder their career development.

How these PMaSTs *build their agency* as experts and inform their career paths as a result of developing these complex identities.

(Goodson and Sikes 2001).
My Data collection process and methods used
Email sent out to potential participants

Telephone conversation to explain context and provide instructions for LIFE GRAPH

Participants complete Life Graph and send it back to me

I analyse the life graph and develop interview questions

I send through the interview questions to participant and set a date for the interview

The interview is conducted and transcribed within a fortnight of it being completed. It is sent back to the participant for final approval.
1986
Left school with low math GCSE. Didn't like it. Didn't understand it.

1986/87
Went to college. Failed maths O level. Used to dread maths on Friday. Didn't understand what they were talking about.

1999
Achieved grade B at GCSE at night school. Met the most amazing maths teacher. He made everything so clear. For the first time I really got maths.

2001
AS Maths Grade B. I needed A level maths. It was like solving potions out the time. I took extra tuition to help plug gaps.

1986
Had the same teacher. He was brilliant - working with 13-year-olds.
Year 6 at primary school - job share maths teacher gave reassurance at parents evening - became a mathematician for the first time. End result: Level 4. Felt relieved that I could do well/ succeed.

Up to age ten, a lack of conceptual understanding was provided in maths learning - negative learning behaviours gained. Felt low in confidence.

Supported by parents / job share maths teacher who was also Headteacher.

At the bottom of the top set in secondary school throughout Key Stage 3.

Felt disempowered.

Felt grateful that someone could help.

Supported with learning by friend I had met at age 11.

Friend, who I sat next to, taught me the maths curriculum. Teachers appeared unable to help me keep up and couldn't empathise.

No further maths learning was accessed through AS/A-level, although decision taken to start teacher training (BaEd) at university.
studied for degree whilst working as TA
single mom
continued to support own children

TA

worked in various Yr groups
children with EBD
children who struggled with maths
supported in class
planned, delivered own interventions
covered whole classes

became HLTA

aware not all teaching was good

decided to train to become teacher
as could have more impact

GTP route into teaching

2 schools GTP year
worked with maths
lead at both - not particularly inspiring ones
but got to know role & read around topic more

v diff cohort
advised to follow scheme
low exp of children
maverick - ignored 'scheme'
did what I thought right
CPA approach
ensured children enjoyed maths

NQT year

worked at new schl

given lower set maths as all NQTs were

large school
year leader went off on maternity
more exp teacher
used 'old style' teaching strategies
worked with supply on newer ideas
CPA approach embedded in my class
“so emm and I can remember being at secondary school and it was just like someone was talking Japanese to me, I couldn’t understand it didn’t, I just didn’t know anything about it at all and I left secondary school really failing in it and I went onto college for a year and I took maths and it was on a Friday and in the end I just bunked off because I just hated it …” (Reece)
“and it was only really in when I got to year 6 that I found a teacher who had some belief in me as a mathematician ...I recall a parents evening in year 6 where it was verbally fed back to my parents whilst I was present that I had made some steps forward. I guess the very final memory from primary school was being the very first year of the KS2 SATs testing ...I was predicted a level 3 ...I did attain the level 4 on the test which I find quite ironic looking back.” (Gregory)
and at that moment I was like, **okay I am not used to publically being good at maths**... I think at Primary school I was just, I quietly felt achievement because I was further ahead with the book (scheme book) but nobody else knew that emm, and then **so that was my very first maths lesson in secondary school, emm and I got teased a little bit for it and that set me feeling well actually no you don’t do that again you can quietly do your stuff but you don’t show anybody that you have done your stuff.” (Belinda)
Data Analysis
Initial reading through of the data

Being that person who said no I really am a maths head and we love maths this was it and it was just
in my head because somebody else was coordinator and he (headteacher) was going okay
but also I am going to do a better job than that
cordinator and it was like brilliant. And then it was just
not you wanted but the MaST made me confident
and the whole calculation policy I changed the way
the primary strategy team people coming in to
to do, we got LSAs trained but we also had
it was unfortunately the year I left but over the
more that maths was a really important thing and
that was a really big think, okay what are
for me it was a real focus on year 3 4 because it
so they were quite happy to use all the bits and
bigs but they weren’t there was no kind of on
its maths and the more you got excited about
itted about it. You know I’m not the maths lead
and they children will say look what I’ve done
ow that seeps out, it must seep out somehow.
Saldana (2016)
## Illustrating examples of themes emerging from one extract of the coding process.

<table>
<thead>
<tr>
<th>Structural coding/ open coding (first cycle)</th>
<th>Axil coding/ linking/ analysing data into themes (second cycle)</th>
<th>Selective coding- linking the themes to the literature and the conceptual framework.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoying mathematics at primary school</td>
<td>Love for mathematics</td>
<td>Identity as a learner of mathematics</td>
</tr>
<tr>
<td>Gifted mathematician</td>
<td>Developing mathematics resilience through developing independence in mathematics</td>
<td>The core layer of identity</td>
</tr>
<tr>
<td>Self-motivation</td>
<td></td>
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<td>Teacher believing in potential</td>
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<td>Teacher lack of confidence to work with confident mathematician</td>
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<td>Teaching approaches led to negative attitudes towards mathematics</td>
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<tr>
<td>Interactive, practical mathematics teaching at school, enjoyed learning</td>
<td>Being influenced by teachers (Positive and negative)</td>
<td>Identity as building confidence in the learning of mathematics</td>
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<tr>
<td>uninspiring teachers and ‘bland’ mathematics lessons</td>
<td></td>
<td>Personality layer of identity</td>
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<tr>
<td>Placed in a low set for mathematics</td>
<td></td>
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<tr>
<td>Working with family on homework</td>
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<tr>
<td>Parents playing a positive role in mathematics development</td>
<td>Home and personal influenced positive and negative</td>
<td>Identity core layer with elements of personality layer</td>
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<td>Seeing parents gain mathematics qualifications- positive role models</td>
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<tr>
<td>Could not relate to mathematics- like a foreign language</td>
<td>Anxiety about learning mathematics</td>
<td>Identity as a preference layer- influenced by learning experiences</td>
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<td>lacked confidence in learning mathematics at grammar school</td>
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<td>Being picked upon to answer questions in class</td>
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<tr>
<td>Mathematics tests in class</td>
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<tr>
<td>Left to learn mathematics via a textbook</td>
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<td>Peer group influence</td>
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</tbody>
</table>
FINDINGS- BEGINNINGS OF A PMaST

Becoming- From experience of learning mathematics at school and at home to becoming a Primary Teacher and a PMaST

- Family
- Friends/ peers
- Community- school, university, workspace
- Interactions between
FINDINGS-
BEING A
PMaST

Being- From experience of learning mathematics at school and at home to becoming a Primary Teacher and a PMaST

- Stumbled into role
- Spotted by leadership in school or Local Authorities
- Anxious as did not see themselves as champions of mathematics
- Enablers for developing into PMaSTs-
  - mentoring and coaching,
  - professional learning (nationally funded courses)- structured and sustained over time
  - Support from leadership
  - Professional networks
  - Empowering process
FINDINGS - FUTURE - CHAMPIONING MATHEMATICS

- Headteacher
- Deputy Headteacher
- Mastery teacher
- ITT Mathematics Lecturer
- Independent mathematics consultant
- Primary Teacher
- SENCO

PMaST
THEORETICAL CONTRIBUTION
CONCLUSIONS

All participants became PMaSTs when they had *no intentions to purposefully* pursue this pathway for their careers. This was facilitated and constructed through *significant people* both in their personal and professional lives who enabled them to develop their identities as PMaSTs—linked to Illeris (2014) *identity constructs and layers of identity*.

Becoming a PMaSTs was and continues to be a *transformative experience* into leadership, opening more doors to career opportunities—this built their careers—links to Ibara (2004) *working identity*.

All participants demonstrated and *shared experiences* of learning and facilitating learning in mathematics that provided to be transformative in enabling them to develop a PMaST identity—Lava & Wenger (1988) *situated learning and Communities of Practice*.
ACME. (2016b). *Professional learning for all teachers of mathematics* Retrieved from London: