

The pre-service secondary mathematics teacher self-efficacy development

An abductive phenomenological study

Gosia Marschall
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Faculty of Education

In this seminar

- The concept of Teacher self-efficacy (TSE) and its importance in mathematics education
- Current state of affairs in the research field
- Recent study (design and findings)
- Implications for the field of TSE and wider context of Teacher Professional Learning (TPL)

Teacher self-efficacy

TEACHER SELF-EFFICACY - “teacher’s beliefs in [their] capability to organise and execute the courses of action required to successfully accomplish a specific teaching task in a particular context” (Tschannen-Moran et al., 1998, p. 22)

Task-oriented, domain and context specific

The importance of (teacher) self-efficacy in human functioning

“[t]here is a marked difference between possessing knowledge and skills and being able to use them well under diverse circumstances, many of which contain ambiguous, unpredictable, and stressful elements” (Bandura, 2012, p. 24).

Knowledge — Self-efficacy → action

The importance of (teacher) self-efficacy in human functioning

“unless people believe they can produce desired effects by their actions, they have little incentive to act” (Bandura, 1997, pp. 2–3).

“Individuals who feel that they will be successful on a given task are more likely to be so” (Bruce & Ross, 2008, p. 347).

Self-efficacy affects our cognitive, motivational, affective and selective processes

helps build resilience

regulates action

regulates coping mechanisms

regulates affect

e.g. helps us exercise control over anxiety

Teachers with higher TSE

more enthusiastic and committed to their profession¹

tend to have higher quality of classroom instruction²

more likely to experiment with their teaching³

more effective in behaviour management⁴

more likely to use innovative and student-centred teaching approaches⁵

higher levels of job satisfaction, show lower levels of stress, are less likely to burn out⁶

e.g., 1). Chesnut & Burley, 2015; Klassen & Chiu, 2010; 2). Holzberger et al., 2013; 3). Abrami et al., 2004; 4). Chacón, 2005; 5). Thurlings et al., 2015; Nie et al., 2013; 6). Aloe et al., 2014; Klassen & Chiu, 2010; Skaalvik & Skaalvik, 2010

Teacher self-efficacy development

Sources of TSE

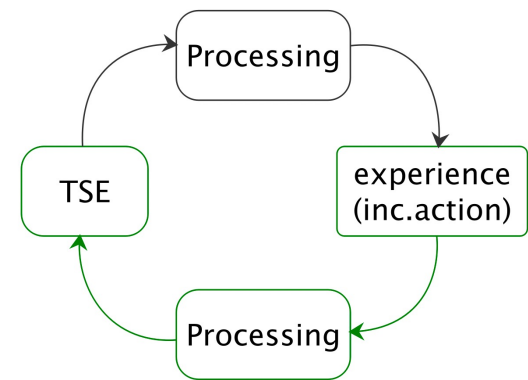
Bandura (1997) describes four sources of (teacher) self-efficacy

Vicarious experiences

Enactive mastery experiences

Social and verbal persuasion

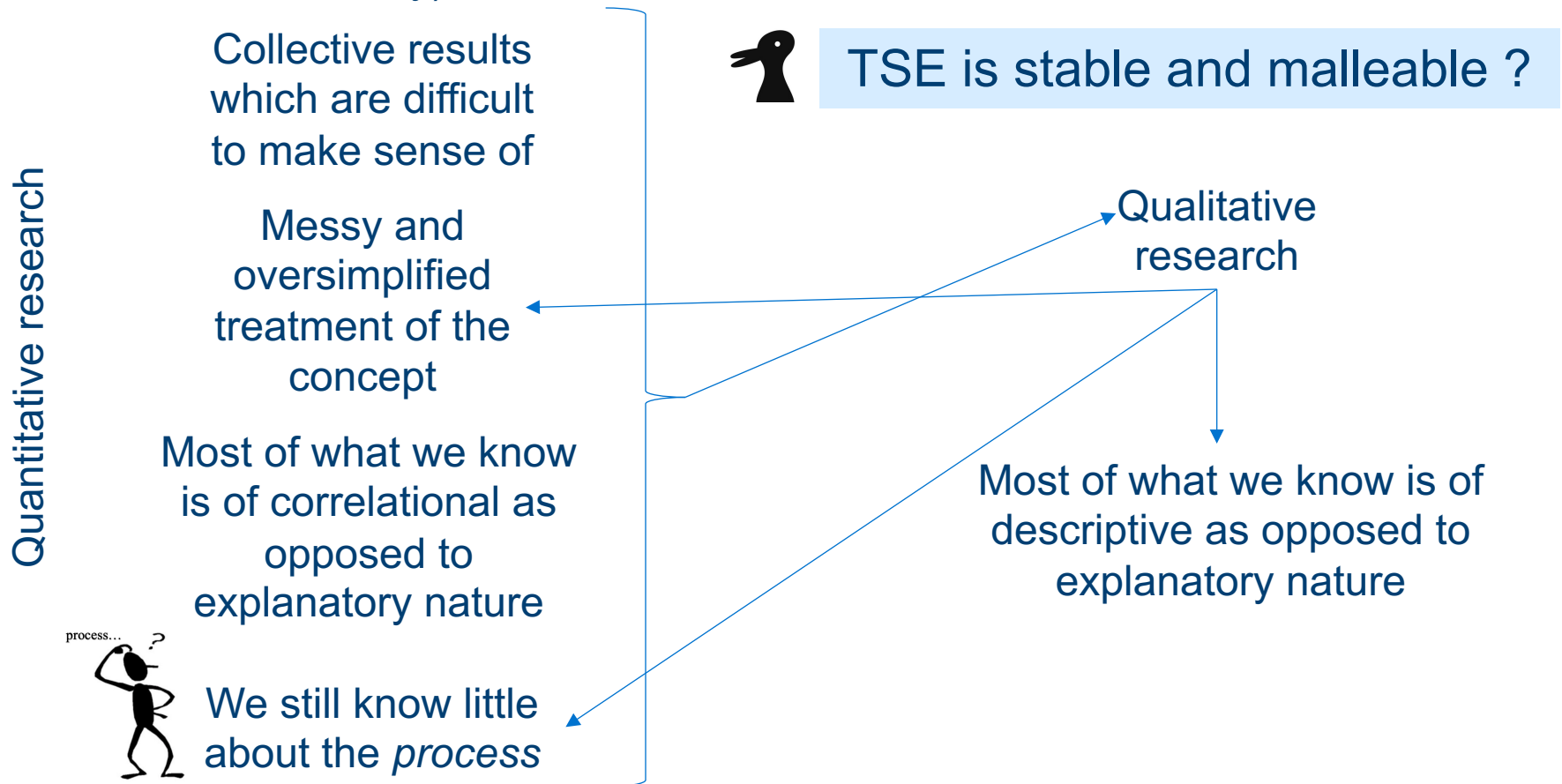
Physiological and affective states



Teacher “self-efficacy is not a simple product or sum of one’s experiences” (Morris et al., 2017, p. 798) but rather a product of cognitive processing” of those experience (Bandura, 1997, p. 115).

Where are we currently?

Four self-efficacy sources / factors interacting with TSE (e.g., teacher knowledge, mathematics self-efficacy)



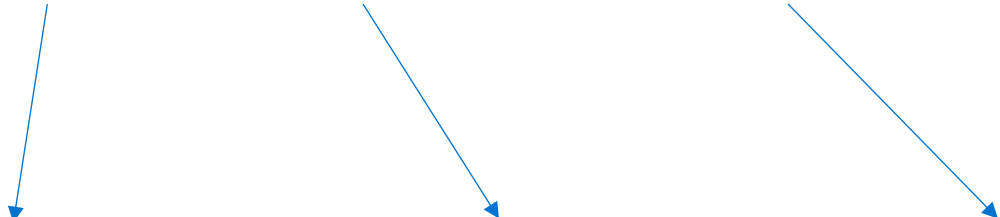
The recent study

“The development of pre-service secondary mathematics teacher self-efficacy”

1. An examination of TSE appraisal and development
2. A reconceptualization of TSE

The current study - design

Qualitative longitudinal phenomenological multiple case study



not concerned with
measurements or
summative ways of
thinking about TSE

full academic
year with
multiple points
of data
collection

focused on
hermeneutics
- the meaning-
making of the
individuals

The context

- one year Initial Teacher Education (ITE) programme at the University of Cambridge (in academic years 2017/2018) – secondary mathematics
-

Participants

- four pre-service secondary mathematics teachers on the programme
-

Data

Written weekly reflections

Weekly planning documents

5 lesson observations / field notes

6 interviews spread across the academic year

iterative **Abductive** IPA

First and second iteration

Processing of various enactive, vicarious, social and affective experiences in the process of TSE appraisal

(Marschall a, in review)

Processing attending to: effort expenditure, difficulty of the task assessment, success attribution, weighing up the importance of experiences

Identity appeared to affect the process of TSE

Identity appeared to be intertwined with the process of TSE

The process of appraisal appeared to be hinged around affective experiences

(Marschall b, in review)



Turn towards teacher identity and narrative way of meaning-making of experiences

Third iteration

Turn towards narrative way of meaning-making of experiences



Meaning-making
of significant
experiences

**TSE schema
construction**
(Bandura, 1997)

narratives

Sociology (Archer, 2000)
Folk Psychology (Bruner, 1990)
Narrative identity (Sfard, various)
emplotment (Ricoeur, 1994, 2008)

**affect
emotions**

Self-narrative schema
(Trzebinski, 1995)

Theoretical/analytical framework

Self-efficacy theory (social cognitive theory)

Bandura (1997, 1986, 1989)

Sociological perspective on human agency

(Archer, 2000)

Narrative self from a socio-psychological perspective

(Markus, Nurius et al.; Bruner, 1990)

Action/behaviour is guided by goals and motivations in pursuit of aspirational self (a standard).

“If performance matches the standard, the person does nothing” (Bandura, 1989, p.49). However, a perceived **discrepancy between experience and future reference standard** “triggers action to reduce the incongruity” (Bandura, 1989, p.49).

As a continuous running commentary of our lives, emotionality often remains ‘invisible’ but in sudden and urgent situations it can be immediately brought to our consciousness through immediate affect.

We navigate our lives by negotiating experiences and their meaning. **“When things are as they should be, the narrative of folk psychology is unnecessary”** (Bruner, 1990, p.40).

However, when we encounter a deviation from what we expect, we stop to reflect.

Theoretical/analytical framework

Self-efficacy theory (social cognitive theory)

Bandura (1997, 1986, 1989)

Bandura classifies experiences into 4 clear categories.

TSE is appraised on the basis of information accessed through four sources: ME, VE, VP and PAS.

Bandura discusses the centrality of affect in moments of experiencing discrepancies but **does not engage with a more explanation of the process.**

The data related to the process of TSE appraisal in my study showed that although it was based on the four self-efficacy sources, it was also displaying narrative characteristics

Past, present, future (forethought)

Sociological perspective on human agency

(Archer, 2000)

Organising experiences (and regulating affect) takes place through the process of narrating, which hinges around the affective moments which require our attention.

The narrative process involves sense-making of affective experiences by engaging with past self and aspirational future self in one process.

We organise experiences to achieve a continuous sense of self (autopoiesis)

Cognitive processing of information involves: success assessment, weighing of the significance of particular experiences, attribution, effort expenditure, difficulty of the task assessment

Narrative self from a socio-psychological perspective

(Markus, Nurius et al.; Bruner, 1990)

Narrative thought is the vehicle for organising experiences and meaning-making

When using a narrative structure we “**lace together**” (Märtsin, 2019, p. 677) **the past, present and future in one continuous process of becoming** (May, 1983).

We organise experiences to achieve a continuous sense of self (autopoiesis)

Third iteration

Turn towards narrative way of meaning-making of experiences



Meaning-making
of significant
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**TSE schema
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Sociology (Archer, 2000)
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Self-narrative schema
(Trzebinski, 1995)

(Marschall & Watson, in review)

Example – the case of Jacob

Born in France to British parents

Bilingual (French and English)

Education up to 18 in France; engineering university degree in England

Confident, displays calmness and composure, proactive

(Marshall & Watson, in review)

TAKS: mathematics instructions
classroom management

Example – the case of Jacob

TAKS: mathematics instructions
classroom management

PAST

Who am I? Where have I come from? What have I brought to the present from my past?

View of mathematics
and self
(based on past exp.)

fond of rigour, first-principle
mathematics traditional seating
plans, and bare classrooms.

pragmatic view of mathematics

quick to skip proofs and
conceptual understanding for the
benefit of an efficient method and
a quick result.

Mathematics and
pedagogy in new
context

I don't really know what people
are used to or what's a typical way
of teaching this or that.

More recent vicarious
experiences
(related to the task)

I now better understand that this is
a poor picture to present to pupils.

I've observed teaching practices,
so I am more aware of what
works and what doesn't so much.

(Marschall & Watson, in review)

Example – the case of Jacob

TAKS: mathematics instructions
classroom management

FUTURE

it was not perfect

this has gone well and it definitely boosted my confidence and it is

something I can praise myself on. ...

The idea of being in front of the class is appealing.

but

but also doesn't feel like I'm there yet

there is a certain apprehension and nervousness about it

I'm not sure how good I'll be

a different ball game

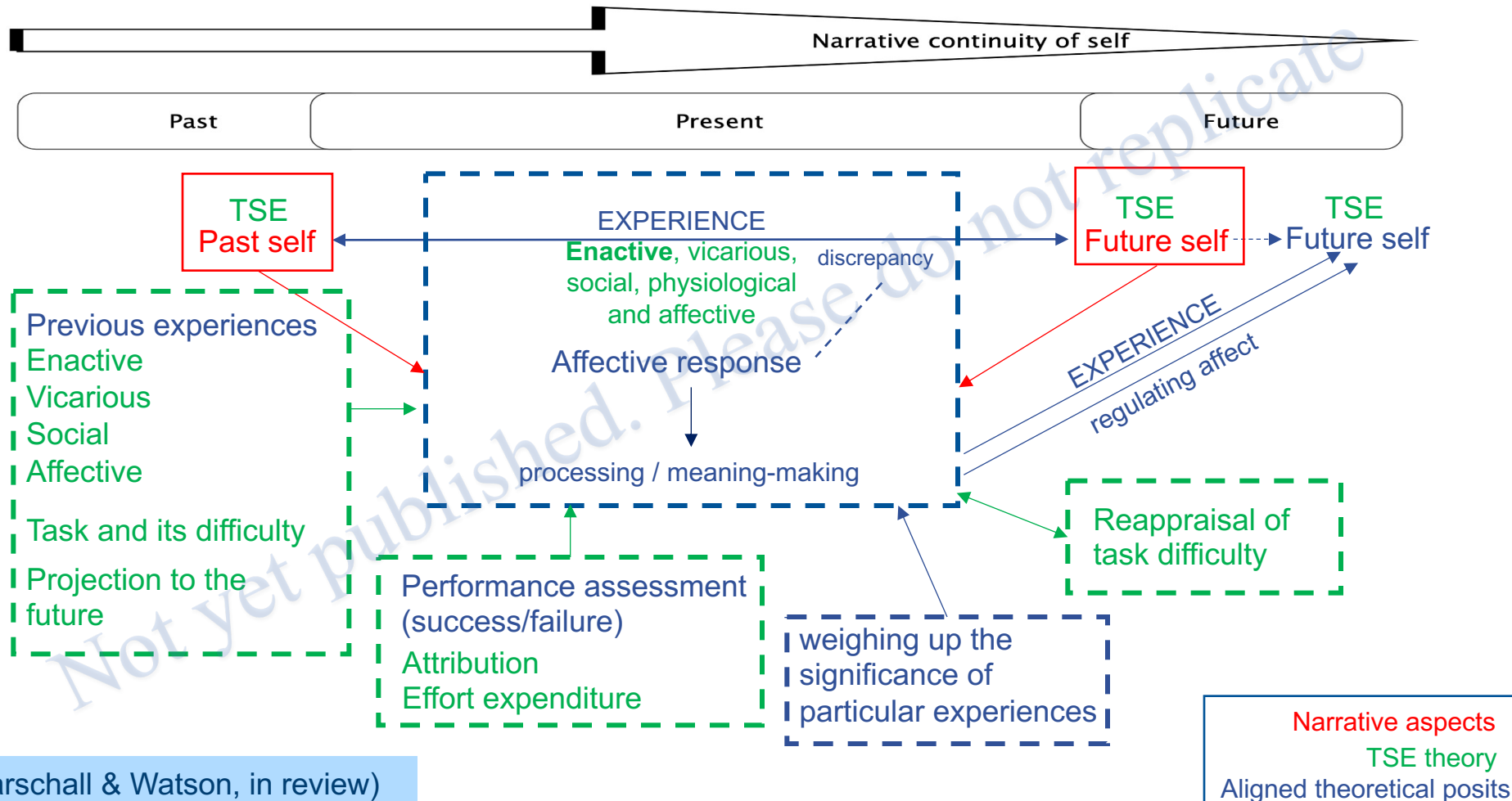
... My worries come from whether I will be able to adapt to the English system quick enough, not be put on the spot by something I don't know about the English system that pupils might ask me about ... That does bother me a little bit.

... should I be an officer ... or should I be a moderator ?

Is it not better, as a novice teacher, to prioritise being in control of the class, and with experience work towards the more delicate and difficult task of a self-regulating class? A bit more experience should help me find my feet here.

(Marschall & Watson, in review)

The model of narrative process of TSE appraisal



Drawn conclusions

TSE is appraised through a reflective narrative process, in which individuals pay attention to and make sense of their significant experiences (in the light of their past and future selves).

TSE – task-oriented aspect of self-narrative schema (Trzebinski, 1995)

self-narrative schema - a domain- and context-specific cognitive schema in which self-narratives frame how individuals understand themselves and reality, through an on-going engagement with the world.

In the process of self-narrative schemata (re)construction, self-narratives focus on the **process of meaning-making on providing continuity concerning one's experience, by attending to situations, events and actions which are of particular importance concerning the individual's intentions and emotions.**

(Marschall & Watson, in review)

Implications for the field of TSE

TSE (self-narrative schema)

Moves away from the simplistic treatment of TSE

Helps understand the process of TSE, with all its aspects (incorporating all affective, social, cognitive, enactive in the process of TSE appraisal and learning)

Intertwined with the process of narrative identity formation

Helps us grapple with issues such as: TSE is stable and malleable

(Marschall & Watson, in review)

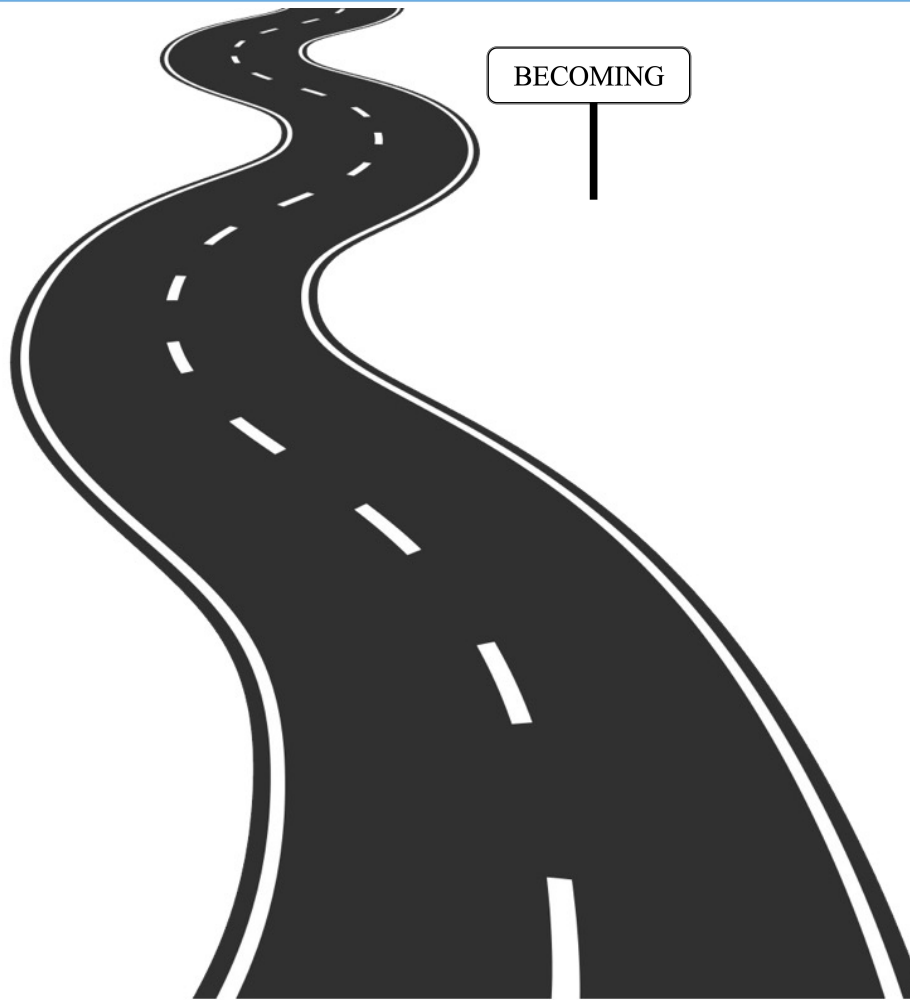
Implications for Teacher Education



TSE (self-narrative schema)

1. Affect/Emotions are an inextricable part of human functioning
 - Educational models which do not pay attention to those will continue suffering from shortcomings
 - Focus on the individual
 - Embrace their personal stories, characteristics, goals, hopes, fears...
2. 'Narrativising' is a highly individual process
 - Embrace the process as opposed to product
 - Teacher as a life-long learner
 - Embrace the development over time and accept that necessity to sustain the provision of support for as long as / when it is needed
3. 'Narrativising' is an ongoing process
 - Challenge the knowledge-based and participatory models of teacher education
 - Challenge performance-focused view of the profession
 - Focus on developing of functioning skills
4. Conceptualising Initial Teacher Education (and teacher education and development in general)

Thank you



Contact details

Please do get in touch should you have any questions that you would like to raise and discuss, or should you be interested in future collaborations.

Cambridge: mzm21@cam.ac.uk

Stockholm: gosia.marschall@mnd.su.se

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