

ZDM Mathematics Education

Methodological landscape in research on teacher identity in mathematics education: A review

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Appendix

Table 4. Chronological overview of the methodological approaches in reviewed studies ^{b,c}

Study	Topic	Methodological approach/study design (name)	Research participants (N)	Data collection method	Data analysis method	Context of the study
Losano, Fiorentini, and Villarreal (2018)	Professional identity development and agency in the first year of teaching mathematics	Interpretative case study	In-service mathematics teachers (1/6)	Semi-structured, in-depth interviews and written narratives	Narrative analysis of figured worlds; performative narrative analysis	<i>Argentina</i>
Lutovac and Kaasila (2018)	Overview of the mathematics education research into teacher identity and future direction	Review study	-	Journal, peer-reviewed articles (2000-2015)	Systematic review	<i>Finland</i>
Alderton (2017)	Pre-service teacher's identity work	(Qualitative study)	Pre-service elementary teacher (1/22)	Interview, weekly emails	Thematic analysis based on feminist post-structural understandings of discourse and power relations	<i>UK</i>
Nichols, Schutz, Rodgers and Bilica (2017)	Emotions in teacher identity development	Phenomenological study	Novice mathematics and science in-service teachers (8)	Semi-structured interviews (one time point)	Grounded theory	<i>USA</i>

Chen (2017)	The role of aesthetics in pre-service elementary teachers' experiences in mathematics and their views of themselves as mathematics learners	(Qualitative study)	Pre-service elementary teachers (6/51)	Autobiographies, drawings, individual interviews, written reflections	Grounded theory and analysis based on Cobb et al. (2009) framework	USA
Hodges and Hodge (2017)	Pre-service elementary teachers' personal identities in the contexts of mathematics methods course and teaching practice during teacher training	Narrative study	Pre-service elementary teachers (2)	Semi-structured and open-ended interviews, artefacts (mathematics autobiographies, lesson sequence assignment; and reflection on the autobiographies)	(Narrative analysis) Analysis of extended phrases: frequent, missing, declarative; chronological ordering of the data and accounting for change	USA
Heyd-Metzuyanim, Tabach, and Nachlieli (2016)	Pre-service teachers' opportunities to learn math content and teaching identity development via instructors' mathematizing and identifying talk in a mathematics course	Case study	A mathematics course instructor (1) and a group of pre-service elementary school teachers (16)	Transcriptions of 11 video-taped lessons, students' written work, field notes	Communicational (commognitive) analysis of mathematizing and identifying; linguistic and discourse analysis	Israel
Oslund (2016)	Teachers' learning and identity work within a mathematics professional development course	Narrative study	Elementary teachers (4/16)	Individual interviews (narrated autobiographies), group discussions, and presentations at teacher conferences	Structural narrative analysis and performance analysis	USA
Mosvold and Bjuland (2016)	Pre-service mathematics teachers positioning in mentoring conversations	(Narrative study)	Pre-service mathematics teachers (2/55)	Interviews, video recordings of the lessons, video-recordings of the mentoring sessions	Analysis based on Sfard and Prusak's (2005) framework; analysis of interactive and reflexive positioning in discourse	Norway

Allen, Park Rogers, and Borowski (2016)	One teacher's identity shift from a classroom teacher to a teacher educator and the role of the context in this process	Self-study	Teacher educator in the domain of elementary science and mathematics (1)	Reflective electronic field journal, recorded critical friend meetings, students' feedback	Analysis based on Gee's (2000) framework	USA
Palmér (2016)	Novice teachers' professional identity development	Ethnographic study	Primary school mathematics teachers (7)	Self-recordings, participating and non-participating observations, formal and informal and individual and group interviews (2 years)	Grounded theory; data analysed as narratives	Sweden
Jong (2016)	Novice elementary school teacher's experiences in relations to reform-oriented practice in mathematics, and the overall influence on her identity	Longitudinal case study	Novice elementary school teacher (1)	Semi-structured interviews, classroom observations, observations of the math methods course, classroom artefacts (3 years)	Constant comparative method	USA
Bennison (2015)	The development of 'identity as an embedder-of-numeracy'	Theoretical study	-	-	-	Australia
Woolhouse and Cochrane (2015)	(Re)construction of teacher identity through engagement with education policy	Mixed-methods study	Mathematics, chemistry and physics teacher trainees (math and science teachers) (40/159)	Survey, Focus groups	SPSS Constant comparative method	UK
Skog and Andersson (2015)	Positioning as a way of understanding teacher identity development	(Qualitative study)	Pre-service primary mathematics teachers (4)	Ethnographic data: semi-structured interviews, course documents, rich research journal	Analysis of discourses and positioning	Sweden
Boylan and Woolsey (2015)	Theorising social justice teacher education and teacher identity	(Qualitative study)	In-service mathematics teachers (4/10)	Survey, Interviews (narratives)	Thematic analysis based on positioning theory	UK

Essien (2014)	Teacher education opportunities for the development of multiple identities	Qualitative study	Teacher educators (4)	Video data of teaching	Analysis based on Wenger's (1998) framework	<i>South Africa</i>
Owens (2014)	The influence of mathematics and culture on teacher identity development	(Qualitative study)	Pre-service and in-service secondary teachers (60/239)	Reports written by participants	Document analysis	<i>Australia</i>
Pipere and Mičule (2014)	The dynamics of mathematical identity	Phenomenological study	In-service mathematics teachers (3)	In depth, semi-structured interviews	Data driven interpretative phenomenological analysis	<i>Latvia</i>
Chronaki and Matos (2014)	Teacher identity work and the role of ICT	Ethnographic study	In-service mathematics teachers (7)	Participatory observation, coursework, project supervision, semi-structured interviews	Analysis based on discourse theory	<i>Greece</i>
van Putten, Stols and Howie (2014)	Incongruities between self-perceived and actualised teacher identities	Explanatory, interpretive case study	Pre-service mathematics teachers (6)	Biographical questionnaire, interviews, lesson observations and recordings	Data-driven thematic content analysis with conceptual framework in mind	<i>South Africa</i>
Kasten, Austin and Jackson (2014)	Middle school teachers' multiple identities	Qualitative study	Pre-service middle school teachers (68)	Open response reflective prompts questionnaires	Open coding	<i>USA</i>
Lutovac and Kaasila (2014)	Contextuality of pre-service teachers' mathematical identity work	Narrative inquiry	Pre-service elementary teachers (6)	In-depth interviews	Analysis of narratives	<i>Finland</i>
Gujarati (2013)	Relationship between teachers' mathematics identities and their teaching practices	Multi-case studies design with portraiture method	In-service elementary teachers (3/20)	Autobiography, semi-structured interviews, classroom observations, debriefing conversations, reflective journal entries, classroom artefacts	Data driven analysis based on Grounded theory principles	<i>USA</i>

Clark, Badertscher and Napp (2013)	African-American teachers' practices in supporting students' identity development	(Qualitative study)	In-service upper-secondary school mathematics teachers (2)	Classroom observations, multiple interviews	Cross case analysis	<i>USA</i>
Pausigere and Graven (2013)	South African primary mathematics education curricula and projected teacher identities	Theory-driven deductive data analysis approach	-	Four official policy documents	Document/content analysis	<i>South Africa</i>
Neumayer-Depiper (2013)	Facilitating identity work in teacher education	(Case study)	Pre-service elementary school teacher (1)	Discussions, case-analysis, reflective writings	Discourse analysis (performative analysis)	<i>USA</i>
Hossain, Mendick, and Adler (2013)	Identity work in the mathematics enhancement course	(Qualitative study)	Pre-service non-mathematics graduates trained as secondary mathematics teachers (2)	In-depth semi-structured interviews	Analysis of positioning within discursive encounters	<i>UK</i>
Walshaw (2013)	The role of power in informing one's identity construction	(Qualitative study)	Pre-service mathematics teachers and secondary school students (1)	Email correspondence	Analysis based on Foucauldian framework; discourse analysis	<i>New Zealand</i>
McCulloch, Marshall, DeCuir-Gunby, Caldwell, and Ticola (2013)	Teachers' autobiographical memories of being mathematics learners	Narrative study	In-service elementary teachers (41)	Written mathematics autobiographies	Autobiography analysis	<i>USA</i>
Bjuland, Cestari, and Borgersen (2012)	Teacher identity development through reflective narratives	Narrative study	In-service elementary teacher (1)	Lesson, collective interview, focus group interview, small group discussion and a presentation in a workshop (3 years)	Analysis based on Sfard and Prusak's (2005) framework	<i>Norway</i>
Hobbs (2012a)	The role of contextual factors, particularly that of a subject context in teachers' identities	Qualitative study	In-service "out-of-field" teachers teaching math and science teachers (18)	Semi-structured interviews	Thematic analysis	<i>Australia</i>

Hobbs (2012b)	The influence of the subject context on teaching approaches	Video case study	In-service math and/or science teachers (3)	Classroom observations, Interviews, Focus group discussions, reflective interviews	Categorical and thematic analysis	<i>Australia</i>
Spitler (2012)	‘Literacy identity’ development and change	(Reflective study)	Pre-service mathematics teachers (1)	-	-	<i>USA</i>
Hodges and Cady (2012)	Contextuality of teacher identity development	(Qualitative study)	In-service middle-grades mathematics teacher (1)	Semi-structured interviews, classroom observations and field notes, classroom artefacts	Each type of collected data analysed via a different analytical framework	<i>USA</i>
Kaasila, Hannula, and Laine (2012)	Teacher identity development and change	Qualitative study	Pre-service elementary teachers (5/21)	Questionnaires, interviews and mathematical autobiographies	Narrative, discursive, and rhetorical analysis	<i>Finland</i>
Ma and Singer-Gabella (2011)	Development of possible identities within the figured words	(Qualitative study)	Pre-service elementary school teachers (N=11) and instructors (2)	Observations, field notes and video recordings of class sessions, class artefacts, informal interviews	Analysing positioning	<i>USA</i>
Williams (2011)	The role of biographical narrative in teacher identity (work)	(Qualitative study)	In-service mathematics teachers (2)	Biographical narratives produced from lesson observations, interviews before and after the lessons and interviews with students	Analysis based on Holland et al.’ (1998) framework	<i>UK</i>
Andersson (2011)	Teachers’ identity shifts in the face of changing teaching practices	Case study	In-service mathematics teacher (1)	Planned interviews and spontaneous conversations (audio-recorded), letters, emails, field notes	Analysis based on Sfard and Prusak’s (2005) framework	<i>Sweden</i>

Lutovac and Kaasila (2011)	The influence of narrative tools on teacher identity work	Narrative inquiry	Pre-service elementary teacher (1)	In-depth interview	Narrative analysis of content and form	<i>Finland</i>
Leatham and Hill (2010)	The role of reflection in students' and teachers' identities	Practitioner-oriented publication	-	-	-	<i>USA</i>
Llewellyn (2009)	Teacher identity development and conflicting and gendered discourses	(Qualitative study)	Pre-service elementary teachers (2)	Semi-structured interviews	Foucauldian critical discourse analysis	<i>UK</i>
Goos and Bennison (2008)	The role of online communities of practice on teacher identity development	(Qualitative study)	Pre-service mathematics teachers (52)	Messages posted in bulletin board of a web-based course (1 year)	Content analysis based on Wenger's (1998) framework	<i>Australia</i>
Owens (2008)	The development of 'identity as a mathematical thinker'	(Reflective study)	Pre-service elementary teachers (49)	Descriptions of class activities, records of assignment topics, observations, and anonymous self-reports	(Reflection on the data)	<i>Australia</i>
de Freitas (2008)	Contextuality of teacher identity development and issues of social justice	Case study in the context of action research	Pre-service mathematics teachers (12)	Class assignments (classroom discourse analysis, self-study narrative), instructor's in-class observations and post-class reflections	(Thematic analysis)	<i>USA</i>
Kaasila, Hannula, Laine, and Pehkonen (2008)	The change of pre-service teachers' views of mathematics during mathematics methods courses	Narrative case study	Pre-service elementary teachers (4/21)	Questionnaires, interviews and mathematical autobiographies	Narrative analysis	<i>Finland</i>
Hodgen and Askew (2007)	The role of emotions in teacher identity development	(Qualitative study)	In-service elementary teacher (1)	Observations of seminars, lessons, and professional development sessions, semi-structured and structured interviews with individuals and groups (4 years)	Constructivist grounded theory; technique of narrative structuring; analysis based on Wenger's (1998) communities of practice	<i>UK</i>

Wassell (2006)	The role of student voice in teacher identity development	Narrative study	In-service mathematics and science teacher (1)	Participatory observations, semi-structured interviews, group and individual interviews with students, video-recordings of the lessons, artefacts	Narrative analysis	USA
Goos (2005)	The development of pedagogical identity in the context of teaching with technology	Case study	Novice in-service mathematics teacher (1/3)	Survey, lesson observations, teaching materials, interviews, post-lesson interviews	Analysis based on Valsiner's (1997) theory of three zone development	Australia
van Zoest and Bohl (2005)	Developing a theoretical framework of 'mathematics teacher identity'	Theoretical study	-	-	-	USA
Drake, Spillane, and Hufferd-Ackles (2001)	The role of subject matter in teacher identity development within narratives	Narrative study	In-service elementary teachers (10)	Lesson observations and field notes, video recordings of the lessons, structured follow-up interviews, interviews	Thematic analysis; analysing the data as examples of coherent narrative	USA
Spillane (2000)	Interaction between teacher identity and subject matter	Case study	In-service elementary teachers (1)	Interviews, post-observation interview; field notes, informal discussions (4 years)	Open coding	USA

^b Some information on study designs and data analysis methods is provided in brackets. This means that these are our own observations based on the information provided in the reviewed papers, and not authors' own labels. For example, in the studies where the approach/design was not explicitly mentioned, we could notice that the study was qualitative, and have therefore placed this observation in brackets. If we could as well determine the further design of the study, we placed also that information in brackets. Similar logic was applied in the column where data analyses are provided.

^c Part of the information about the reviewed studies (e.g. topic, context) have been published elsewhere (Lutovac and Kaasila 2017). While this manuscript uses partially the same set of reviewed papers (i.e. 40 out of 52), methodological approaches have not been addressed in that publication.