ON MATHS TEACHER IDENTITY: A RESPONSE TO ANNA CHRONAKI'S 'IDENTITY WORK'

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There has been an overwhelming increase in studies investigating the concept of maths teacher identity, with several reasons being given for this trend. Though it has been difficult to reach a common definition of the term the literature notes some accepted dimensions of identity. Chronaki's (2013) paper discusses some of these issues and focuses on how maths teachers change and cope with technological demands in current reform contexts. Drawing from the discourse theory, Chronaki explains how maths teachers change through engaging with technology and in the process negotiate their identity (work) within societal, institutional and curriculum reform contexts demands. This response questions some of Chronaki's arguments and also explains the implications of her unique study on maths teacher education.

THE IDENTITY (RE)TURN

There has been an overwhelming increase of studies investigating the concept of identity in education and in maths education. In maths education, this phenomenon emerged as a result of the 'social turn' in the late 1980's, with identity having had been a preserve for psychology and philosophy in the 1960s (Hall, 1991; Lerman, 2000; Sfard & Prusak, 2005). It is the borrowing and drawing from the social and the humanistic sciences that have made the concept of identity central in maths education research. There have been several notable studies focusing on maths teacher identity (Boaler, 2000; Graven, 2002; Hodgen & Askew, 2007; Lerman, 2012a; Parker, 2006; Van Zoest & Bohl, 2008; Walls, 2008, Zembylas, 2005) and currently there are a number of on-going PhD studies across local universities investigating the notion of maths teacher identity. Chronaki's (2013) paper also takes note of this increasing interest for identity research in the field of maths education calling it the 'turn to identity research'

There are several reasons why identity, and maths teacher identity in particular, has become the unit of analysis for many studies. As said earlier, the focus on identity was triggered by the maths education's research tendencies to draw from the social and humanistic sciences such as anthropology, sociology, psychology and cultural studies, these disciplines foreground the notion of identity. Chronaki (2013) also acknowledges that the concept of identity in maths education research has benefitted from interdisciplinary theorising. I also want to argue that given the local challenges, and the maths crisis in education, identity becomes a focal research point, thus in maths crisis contexts the concept of identity (*who someone is*) receives much attention. The notion of teacher identity also allows researchers to explore and investigate various aspects in education. Gee (2001) and Sfard and Prusak (2005) concur that identity can be used as an analytical and interpretive tool for studying

both human conduct and important issues in education. In relation to this assertion, Chronaki's (2013) study focuses on the key and crucial issues of how maths teachers change and cope with technological demands and different maths knowledge views in current reform contexts, and within that space fashion their identity.

Chronaki (2013), like other notable studies in education (Beijaard et al., 2004; Gee, 2001) and maths education (Beauchamp & Thomas, 2009; Lerman, 2012a; Sfard & Prusak, 2005), admits the difficulty of reaching a common definition of the term 'identity'. However in the endeavour to define identity or maths teacher identity, the literature has discerned some common dimensions or features of identity which resurface in Chronaki's (2013) paper. Literature reveals that identity is dynamic and complex, constantly evolving, multifaceted, relational and is context related (Beauchamp & Thomas, 2009; Beijaard et al., 2004, Gee, 2001; Walls, 2008; Wenger, 1998). The multi-faceted, complex, relational and context related aspects of identity are discussed by Chronaki (2013) in relation to maths teacher identity change, in the context of technology and current global reforms.

INFORMING THEORIES & RESEARCH METHODS

Most studies on maths teacher identity have been informed by theories which originated from the broader modern version of the social theory (Lerman, 2000; Wenger, 1998). Generally the theoretical frame of reference that informs a study is paramount in delineating what maths teacher identity entails. Quite a substantial number of studies investigating maths teacher identity have been informed by Lave and Wenger's situated theory (Graven, 2002; Hodgen & Askew, 2007, Van Zoest & Bohl, 2008), Bernstein's sociological theory (Johansson, 2010; Lerman, 2012b; Morgan et al., 2002; Parker, 2006) or the post-structuralists (Lerman, 2012a; Zemblays, 2005). Zemblays' (2005) study compliments postructuralism with discourse theory. Similarly Chronaki's paper (2013) relies on both discourse theory and post-structuralism to investigate maths teacher identity. It also relates the personal-social interplay aspect of the discourse theory to Wenger's (1998) three modes of belonging (to communities of practice) namely; engagement, imagination and alignment. Wenger's notion of alignment relates to the macro structures which are influenced and affected by education reforms. However key within discourse theory is how narratives, stories, dialogues or discursive aspects create one's identity. Whilst this is discussed in Chronaki's paper, she however doesn't elaborate on the methodological tools which she uses in her study, how the data presented in this paper was captured, and how frequently this was done and also how the information was analysed. From a discourse perspective, which portrays identity as relational and discursive, these elements are critical aspects that readers need. Because the paper lacks a discussion on how the data was analysed one is left wondering how the two related axes, that is the societal and the pedagogical, discussed in this paper emerged, whether they were theoretically informed or arose from emerging data themes. It will be interesting to engage further with these while at the conference.

SOCIETAL AND PEDAGOGICAL AXIS

The two related axes, however, clearly illuminate how maths teachers articulate their identity changes in the process of appropriating technology to enhance maths teaching. Under the heading **'Articulating the Societal'** the sampled Maths teachers disclose how their involvement with technology for maths learning related to the youth culture and could be regarded as a result of increased marketization of technology use in education. In the section titled **'Articulating the Pedagogic'** the research participants felt that learning technology promoted learner engagement and interaction, enhanced power re-distribution in mathematics classrooms and also enabled the teachers to embrace mathematical knowledge in diverse ways. The issues raised herein, which relate to the two axes, are key and paramount in configuring Chronaki's concept of maths teacher identity. According to Beijaard et al. (2004), teacher identity relates to core teaching aspects of subject matter, didactic and pedagogical expertise. In her discussion of the two axes, Chronaki (2013) reveals how mathematics teachers' engagement in a maths-technology course improved and changed their subject matter, didactic and pedagogical approaches which ultimately impacted and influenced their identity.

THE USE OF THE TERM IDENTITY WORK

Key to Chronaki's argument is how the sampled maths teachers change through engaging in a maths-technological course and in the process articulate and negotiate their identity work within societal, institutional and curriculum reform demands. In Chronaki's work teacher change and identity work are regarded as complex, multifaceted and discursive processes. Educational policies and teacher training programmes that aim for maths teacher identity change should engage teachers in disciplinary knowledge, curriculum reform politics and most importantly improve the maths teachers' instrumental, functional and critical competences in technology (Chronaki, 2013). Chronaki's argument in this regard is quite convincing, however her use of the term identity work is not yet fully clear. The author does not justify her use of the term, neither does she trace its history or origins either in education or maths education. Could the writer have borrowed the term from Hall (1991) or from Mendick (2006) who both prefer the term in reference to being a process of identity formation or identification? In this regard identity is captured as situated, constantly evolving, relational and becomes represented in narratives (Hall, 1991; Mendick, 2006; Walls, 2008). This assertion seems to be close to Chronaki's construct of identity work, however Chronaki's paper doesn't connect her use to any of these.

My second reading and interpretation of the term identity work is that the writer might have been referring instead to work-identity. "Work identity" might be an appropriate term to describe the tension and space that maths teacher negotiate their identity as a result of the interplay between the maths discipline, societal and curriculum reform demands. The term originates from Gee's (2000) work, which Chronaki cites in the paper but fails to make a connection to, and is derived from the

Institution-Identity category which interrelates with both the Discourse and Affinity-identities (Gee, 2000). Gee's (2000) Discourse-identity coheres with the discourse theory which theoretically informs Chronaki's work. The Affinity-identity resonates with Chronaki's empirical field of study which composes of a collective social group of seven maths teachers. Given such coherence the term identity work might better be phrased as work identity.

Having cited Bernstein (2000) and Wenger's (1998) work in her discussion, I believe these writings provide opportunities for Chronaki to fully exploit the concept of maths teacher identity. The paper could have been extended by investigating and discussing how teacher-students power relations manifest in maths technological informed classes through Bernstein's (2000) concept of framing, which alongside classification is a function of pedagogical identity. The need for Bernstein's theoretical lens is mainly justified if one reads the *themes* emerging from Chronaki's axes on: **'Articulating the Pedagogic'**. Similarly Wenger's (1998) dimension of Community of Practice's shared repertoire which include artifacts, tools, discourse and concepts could have provided the analytical and explanatory tools to describe how maths teachers' identity change through their engagement with technological artifacts and tools and mathematical concepts and how the teachers articulate these. I think this is Chronaki's aim in the paper and drawing from Wenger's concept of shared repertoire might have enriched the discussion on maths teacher identity.

CONCLUSION

Besides some ideas I raised in this response, and my wish to engage further and deeper with several issues, Chronaki's study clearly contributes to the growing body of maths teacher education literature that highlights teacher change as part of identity formation, what Chronaki prefers to call identity work. The teacher change results in the transformation of their mathematical knowledge views, their pedagogical approaches and enables them to meet society and institutional demands. Chronaki's paper uniquely discusses how maths teachers in curriculum reform contexts articulate their engagement with technology and within that space negotiate and change their identity. Few studies in maths teacher education have focused on the issues raised by Chronaki and credit must be given for her unique paper and approach of investigating maths teacher identity. The suggestions and recommendations raised in this response will help strength this unique study which discusses maths teacher identity from a different perspective. May I conclude this paper with my sincere wishes for maths education to continue to learn from this work. I hope that this high concentration and explosion in 'identity' will yield viable and sustainable solutions to the challenges in maths education and will ultimately result in more effective teaching and learning of mathematics.

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