
PRESERVICE TEACHER PERCEPTIONS OF GOOD MATHEMATICS TEACHERS: WHAT MATTERS?



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That preservice teachers' understanding of what constitutes good teaching is partly shaped by their experiences as students in the classroom is well documented; but how they give shape to their recollections is underexplored. In this study, preservice teachers wrote about their perceptions of good teaching in narrative reflections of their experiences as school students. Almost 25% of the cohort chose to write about a mathematics teacher. Narrative analysis was used to investigate the content and the form of the 31 reflections to provide insight into how preservice teachers reconstruct their narratives of experience. Three distinctly different story types were found.

Preservice teachers come into teacher education programs with existing beliefs about what is good teaching mostly developed from their experience as a student; however, preservice teacher beliefs appear limited, underdeveloped, and particular to individual experience (Fajet, Bello, Leftwich, Mesler & Shaver, 2005; Lortie, 1975; Minor, Onwuegbuzie, Witcher & James, 2002; Prescott & Cavanagh, 2006). They have been shown to affect how preservice teachers respond to teacher education programs (Richardson, 2003). This paper contributes to a better understanding of preservice teacher beliefs by investigating the form as well as the content of narrative expressions of beliefs concerning good teaching.

The line of inquiry reported here emerged from a larger study that investigated how a second year subject in a four year teacher education program contributed to the development of professional teacher identity of preservice teachers (Balatti, Knight, Haase & Henderson, 2010). Prior to this subject, the preservice teachers (primary and secondary) have little or no experience teaching in a classroom. Also at this point, students have had no curriculum methodology subjects.

The learning identity framework (Falk & Balatti, 2003) underpinning the pedagogical approach used, views teacher identity in terms of "identity resources" that is, those behaviours, knowledges, beliefs and feelings that come from having a sense of belonging (or aspiring to belong) to a community of practice (Wenger, 1998) in this case, of teachers. According to this framework, identity resources come from the identity formation, re-formation and co-construction that occur through interacting and storytelling.

Polkinghorne (1988, p. 18) defines story or narrative as "a meaning structure that organizes events and human actions into a whole, thereby attributing significance to individual actions and events according to their effect on the whole." Narratives are open to contention and revision and can be reworked any number of times.

In the subject, preservice teachers were asked to write online weekly narratives that included reflections on their past school experiences and their teaching experiences during their school placements. One of the first tasks was to write about their experience of good teaching at school.

Approximately 25% of the responses concerned good teaching in the context of mathematics classrooms. Moreover, despite the prescriptive requirements of the task, the narratives displayed a range of content and structure that suggested further investigation was warranted.

This paper reports the insights that a narrative analysis of this set of experiential stories provides concerning preservice teacher understandings of what constitutes good teaching. In particular, it provides responses to the following questions:

- How do preservice teachers appear to make their judgements of what constitutes good teaching?
- What do preservice teachers consider to be good teaching or a good teacher in the mathematics context?

Method

The texts analysed were written in the first week of the subject which is delivered in the first semester. The non-assessable task read as follows:

We'd like you to write about a memory you have of a good teacher or of good teaching that you experienced as a child. Start by giving a context (e.g., your age at the time, subject). Then tell us why you thought that person was a good teacher. (Did you think this at the time or is this what you think only in retrospect?) Follow this by telling the story of a particular incident (or practice) that supports your claim. Conclude with a sentence or two showing the links between what the teacher did and what you know so far from your readings about what constitutes good teaching.

Of the 145 preservice teachers enrolled at the time, 136 completed the writing task. Of these, 31 wrote narratives of good teaching in a school mathematics context.

Analysis of the data comprised narrative analysis (Clandinin & Connelly, 2000; Riessman, 2008) followed by inductive analysis (Patton, 1990). The narrative analysis entailed both structural analysis and thematic analysis (Riessman, 2008).

As a starting point, the structural analysis used Labov's six elements of narrative structure (as cited in Riessman, 2008) and the thematic analysis identified the content of the narratives that directly or indirectly revealed participants' perceptions of qualities of good teaching. This phase produced the aspects of the narratives that were further analysed inductively.

The coding categories emerged from the data and were readjusted through the constant comparative method (Patton, 2002) across the 31 narratives. Figure 1, below, summarises the analytic process. The Nvivo 9 qualitative data processing software was used to assist with the coding of the data and the cross-tabulating of codes.

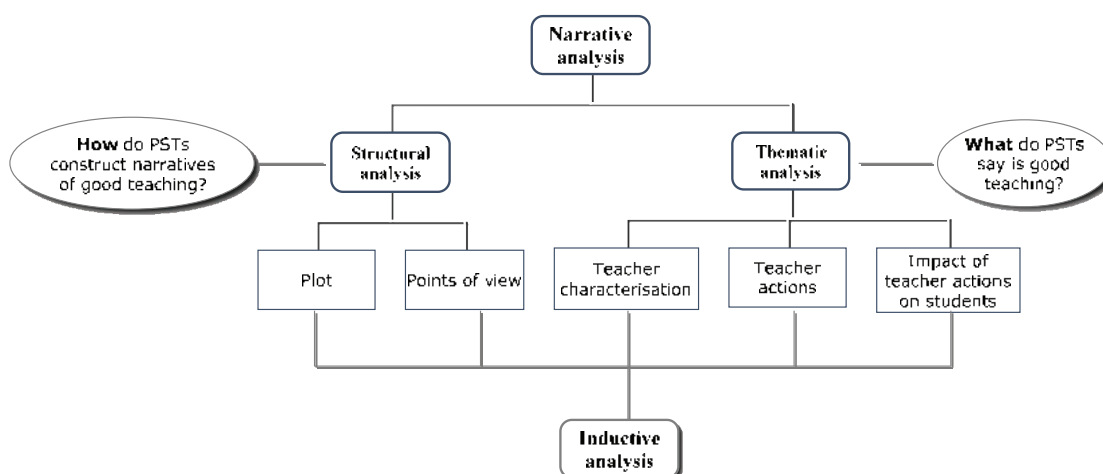


Figure 1. The analytic process.

Findings and discussion

This section is organised around the two research questions. The data selected to illustrate the findings are the three complete narratives reproduced below. The choice to use complete narratives rather than fragmented excerpts aligns with the preference in narrative analysis to retain stories “intact for interpretive purposes” (Riessman, 2008, p. 74). Examples were chosen for their brevity, to illustrate the three story types evident in the data, and to illustrate some of the indicators that preservice teachers use to determine what constitutes good teaching in the mathematics classroom.

How preservice teachers construct narratives of good teaching

The task elicited three different story forms which we called turning point stories (8), critical moment stories (7) and pattern of practice stories (16). All texts fell into only one of the three categories.

Turning point stories (see Tom’s below) refer to the stories in which a new teacher changes the student’s mathematics learning trajectory from a negative to a positive one in terms of engagement and/or performance. In these stories, the teacher is presented as the “saviour” to whom the student (the narrator) responds positively and becomes the “saved”.

Story type one: Turning point stories: Tom’s story

I started high school at an all boys school in NSW. When males going through puberty are all together, rebelling and all of the things that we go through during that time, it can be tough for teachers. I can see that now. I had a mathematics teacher that would show no respect for his students and would actually insult us if we didn’t understand a mathematics problem. I wasn’t understanding mathematics at all and I thought it was just me and my family genes. I am the first in the family to finish high school and the younger brother.

I had to change schools half way through year nine because I couldn’t keep up with athletic commitments. I changed to a co-ed state school. One of my first classes was Maths and I dreaded it. I sat down to a female teacher and actually understood everything the teacher wrote on the board. By creating a safe and supportive learning environment my new teacher had me loving mathematics. I wasn’t worried about being embarrassed to ask or even answer questions, because it was all right to get something wrong.

The second story type, the critical moment stories (see Cathy's below), is similar to the first story type in that the story narrates an event in which the main characters are the teacher and the student (the narrator). However, unlike the first story type, the student does not have a history of poor results and/or disengagement. Rather, they are stories of teachers who recognise that the student is in trouble and who intervene in a timely manner thus averting a negative outcome for the student. These are the "just in time" stories where through the vigilance and action of the teacher, students are spared a bad outcome. In these stories, the teacher is the watchful protector and the student is again the "saved".

Story type two: Critical moment stories: Cathy's story

In primary school (grade 3) I could never grasp the concept of measurement. Measurement was one of the most difficult concepts for me to learn. I couldn't comprehend the difference in length between a millimetre, centimetre or a metre. My teacher noticed I was struggling in this area. Instead of making me feel stupid (like the other students did, when I answered a question wrong), she took me aside one afternoon and asked me to do a "special" task for her. Of course, being young and receiving personal attention from my teacher, I greatly accepted her "special" papers and completed them for her. As years went on, I now realise that her "special" papers were extra Math exercises that helped me understand.

The third story type is markedly different from the previous two. The patterns of practice stories (see Pat's below) as the name suggests describe patterns of behaviour of good teachers. Of the 16 stories of this type, 12 were of the one teacher and the other four described patterns across more than one teacher with one of the teachers being a mathematics teacher. These stories do not refer to a pivotal or critical event and the narrator is usually absent from the story other than as one of a number of students. In these stories, the students are content and even thrive. The teacher is the trustworthy and trusted shepherd or nurturer and the students are the flock.

Story type three: Pattern of practice stories: Pat's story

Mr Jones, my Maths teacher in Year 10 who later became my Maths C and Physics teacher in Year 11 and 12 was the best teacher I ever had. He was always so enthusiastic about what he taught even when we were struggling to understand the concept of an 'imaginary' number or, in my case, graphs. He always listened to our questions, no matter how stupid they seemed later and encouraged us to explore anything that interested us in our classes. In my case, this meant that Mr Jones was always willing to talk over the possibility of aliens and the creation of the universe. He involved us in debates and discussions and always tried to make everything interesting and fun. Which was a hard thing to do when you're teaching complicated maths and science to a group of teenage girls! He was also a teacher who was unafraid to have a little fun in the classroom which made the whole learning process so much easier. He was most definitely the kind of teacher I want to be someday....only, I hope to have slightly better drawing and spelling skills!

Stories often conclude with a coda in which the readers are brought back to the present and this is sometimes done with changes in perspective. To encourage students to reconstruct their narrative from the viewpoint of a preservice teacher, the task had invited them to relook at a past experience either with "older eyes" or through the lens of the literature. A little over half the group included this aspect in their narrative (Table 1).

Table 1. Evaluation of significance of story from a new viewpoint.

Narrative type	No of narratives including new viewpoint		
	Revision of past experience	Reference to academic literature	Neither
Turning point stories (n=8)	1	2	5
Critical moment stories (n=7)	3	4(1)	1
Patterns of practice stories (n=16)	4	7(3)	8
Total	8	13(4)	14

Note: Numbers in brackets indicate stories that included both viewpoints.

Preservice teachers' understandings of good teaching

Within their narratives, the subjects described good teachers in terms of personal qualities they displayed, the behaviours they demonstrated, and/or the impact they had on their students. Table 2 summarises the attributes that “good teachers” possess. Although present in some narratives as contributing to good teaching, the least noted attributes were the mathematical content knowledge and behaviour management skills of the teacher. The most cited were the teachers' capacity to relate to their students and good teaching skills. A finer grained analysis revealed that good teaching involved organisational skills, communication skills, use of creative and enjoyable tasks, using real life applications, and learner centred strategies.

Table2. Narratives recording attributes.

Narrative type	No of narratives recording Attributes				
	Teaching skill	Content knowledge	Forging relationship	Behaviour management	Personal style
Turning point stories (n=8)	5	1	3	1	4
Critical moment stories (n=7)	4	0	4	1	0
Patterns of practice stories (n=16)	11	4	7	3	6
*Total	20	5	14	5	10

*Note: Some narratives had more than one category of attribute of good teaching evident.

Most preservice teachers also defined good teaching in terms of the teachers' impact on them personally or on others. Table 3 shows the categories of impacts that emerged from the data. Learning outcomes refer to improved performance in mathematics, the strongest impact for story types one and two; affective-self refers to outcomes to do with feeling valued or self esteem, the strongest impact for story types two and three; and affective–mathematics refers to students' feelings toward mathematics.

The final level of coding undertaken looked for patterns between teacher attributes and the student impacts for each of the story types. Because of the small size of the data set, no meaningful comments can be made other than to say the teaching skills was the category most cited in relation to impacts for all three story types. For both the turning point and critical moment stories, teaching skills were associated most with improved learning outcomes; for the pattern of practice stories, teaching skills were associated mainly with affective outcomes to do with the self.

Table3. Narratives recording impacts.

Narrative type	Impacts			
	Learning outcomes	Affective–Self	Affective–Maths	None
Turning point stories (n=8)	6	2	2	0
Critical moment stories (n=7)	7	5	1	0
Patterns of practice stories (n=16)	3	8	4	4
Total	16	15	7	4

Note: Some narratives described more than one kind of impact.

Conclusion and implications

This research studied snapshots, in the form of written narratives, of 31 reconstructed memories of preservice teacher experience of good teaching in a mathematics classroom. Using narrative and inductive analytic techniques, it explored how the narratives were constructed and what they said about good teaching. The three distinctly different story types that emerged and the different levels of engagement evident in adopting new viewpoints suggest that **how** preservice teachers think about their experiences of good teaching may be as relevant to teacher educators as the content of their narratives. Further research is required with larger data sets that investigates possible patterns involving preservice teacher story types and openness to learning the new identity resources (Falk & Balatti, 2003), including deeper knowledge of what constitutes good teaching, that come with becoming a teacher. Even without these larger studies, there may be merit in having preservice teachers use the methodology to study narratives of teacher experience. Understanding **how** they have constructed their narratives may help preservice teachers reflect more profoundly upon their own developing practice.

In the second set of findings concerning the characteristics of good teaching, the narratives looked to the attributes of the teacher and to the impact that the teaching had on the students. There was strong awareness that teaching skills and ability to relate well with students contribute to good teaching. In contrast, less awareness existed for the importance of content knowledge. Interestingly, while learning outcomes i.e., mathematical content knowledge, was the most cited form of impact that good teaching had on students, mathematical content knowledge was one of the least noted as an attribute of a good teacher. Further research that develops a better understanding of the reasons for preservice teachers not articulating it is recommended.

As teacher educators we can look at what preservice teachers bring in terms of their past experiences as a deficit or as resource to capitalise on and to further develop. A better understanding of their past experiences as students that the analytic approach used in this paper offers, may improve the likelihood of transforming past experiences into a resources for developing professional teacher identities.

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