Preservice Teachers' Intentions to Provide Good Examples and Help Children Replicate Them

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Commencing and graduating preservice teachers completed written surveys and interviews. Results from an item in the written questionnaire indicated preservice teachers intend to provide children with good examples and help them replicate them in both literacy and numeracy lessons. Follow-up audiotaped interviews with 17 of the 186 graduating preservice teachers surveyed found preservice teachers were as likely to use the strategy at the end of their courses.

As prospective generalist teachers, preservice teachers in the primary school context have to juggle pedagogical mindsets in their facilitation of literacy and numeracy lessons. However, in this study, preservice teachers intend to provide good examples and help children replicate them in both literacy and numeracy lessons. The intention is consistent with advice from authors in literacy education (Edwards-Groves, 2003; Luke, 1993).

Indeed, during literacy sessions, effective teachers of literacy act as good role models for the use of Standard English; they explicitly articulate and demonstrate practices and processes used by effective readers and writers (Edwards-Groves, 2003). Teachers help children learn the social and cultural practices valued in different situations. One approach teachers frequently use is the *genre-based curriculum cycle* (Derewianka, 1990) which describes the strategy central to this paper. In brief, the cycle begins with *building up the field* in which teachers lead children through an exploration of exemplary models as they discuss contexts in which these are suitable. In *modelling*, teachers demonstrate skills and communicate their thoughts aloud to children. In *joint construction*, teachers assume responsibility for difficult aspects of tasks as they replicate the skills and processes together. Finally, *independent constructions*, children having seen the process a number of times attempt the task individually. In literacy, good examples that are selected are those which best address both the socially valued practices of the context and the needs of the audience.

Teachers using the same approach in a numeracy context might for example, introduce the topic, demonstrate how to multiply two numbers, explain their processes, complete a similar question together and have children complete a few computations following the teachers' example. While the approach is appropriate in literacy contexts, its use in numeracy contexts may reinforce the assumption that there is only one way to solve equations and that children should use teachers' methods. In numeracy lessons, good examples provide logical explanations for correct responses.

During audiotaped interviews, 17 graduating preservice teachers shared their thoughts about using this approach in their teaching of both literacy and numeracy. This paper summarises preservice teachers' views by addressing two questions:

- How often do preservice teachers intend to provide learners with good examples and help children to replicate them?
- In which situations is providing good examples and helping children replicate them helpful?

Teaching and Learning Approaches

Some authors advocate particular teaching approaches for specific disciplines. Summarised in this section are some authors' perspectives about approaches or strategies for teaching and learning mathematics.

Koehler and Grouws (1992) argued that teaching mathematics differed from teaching other disciplines, and that teachers' beliefs and attitudes about teaching, mathematics and learners contributed to the dynamic nature of teaching mathematics. They summarised various approaches for learning mathematics: constructivist approach; expert-novice paradigm; sociological and epistemological view; mathematics content view, and Cognitively Guided Instruction (CGI).

According to Koehler and Grouws (1992), teachers from a *constructivist* perspective view learning as a social enterprise and choose tasks to actively engage learners and build on learners' prior knowledge. Teachers using the *expert-novice paradigm* have greater control of the subject matter, knowledge of their students and a range of instructional strategies that enable greater flexibility in the delivery of their lessons. In the *sociological* or *epistemological* view, mathematical talk is highly valued. Teachers choose interesting problems and allow children to bounce around and struggle with mathematical ideas for a while. By fostering a collaborative approach, children are expected to express their thoughts and processes as part of learning. The learning involves a process of elimination and refinement of ideas. In the *mathematics content* view, it seems that content and key features for successful performance are identified and teachers select instructional strategies to best help children develop that content. During *cognitively guided instruction*, teachers provide instruction appropriate for each child based on their prior understandings gained through questioning and extended by posing problems for children to solve (Carpenter, Fennema, Loef, Levi & Empson, 1999).

In sum, approaches to teaching mathematics described in the literature are diverse and range from those which are teacher-directed to others which are more child-centred, emphasising varying measures of product and process. The teaching strategy addressed in this paper is the use of good examples and the intention to help children replicate them is most compatible with the *mathematics content view* described earlier. The strategy implies teachers choose exemplary artefacts and model processes and practices explicitly to children so that they too will value teachers' products and processes. To some extent, the focus is on mastering the processes demonstrated rather than developing children's abilities to think mathematically.

Preservice Teachers' Beliefs

Given the focus on preservice teachers' intentions for teaching some consideration of their beliefs about teaching is necessary. Some authors suggest beliefs serve as filters for thoughts, decisions and actions (Ambrose, Clement, Philipp & Chauvot, 2004; Smith & Croom, 2000). Although there is no agreed definition of teacher beliefs (Beswick, 2003), several authors offer definitions and conceptual frameworks to operationalise them. Pajares (1992) said beliefs are "based on evaluation and judgment" (p. 313), and being created through a process of enculturation and social construction are context-specific and personally meaningful. Using this as a working definition for the paper, assumptions of beliefs relevant to this discussion are teachers' beliefs vary in intensity, are context-specific and long-held beliefs are resistant to change (Beswick, 2003). It seems that although beliefs influence the decision-making process they cannot guarantee predictable

behaviours (Sarver, 1983). Indeed, Thompson (1992) concluded there were no consistent findings across studies about the relationship between beliefs about teaching and instructional practice. Yet, it seems important to examine preservice teachers' beliefs about teaching literacy and numeracy especially if the strategy used in literacy may be counter-productive for learning numeracy.

Data Collection Processes

Beliefs about aspects of teaching and learning mathematics were sought from two groups of preservice teachers: those commencing and those graduating from preservice primary teaching degrees. The subjects were studying teacher education courses at two tertiary institutions in Australia, one located inner city and the other in a regional centre. Early in the second semester of their first year of their courses, 163 commencing preservice teachers completed written surveys and during the final weeks of their courses 186 graduating preservice teachers also completed the written questionnaire.

The *Preservice Teacher Intent Questionnaire* (PTIQ), comprising 65 items, was an adaptation of the *Undergraduate Teacher Intent Questionnaire* (UTIQ) piloted a year earlier with 163 participants (Scott, 2003). Both instruments required participants to consider specific beliefs about learning and teaching for two disciplinary areas—literacy and numeracy. Reported in this paper is a comparison of preservice teachers' responses for both disciplines with implications for primary preservice mathematics education courses.

One section of the PTIQ focussed on identifying preservice teachers' intentions for frequency of specific teaching strategies and practices. The five-point scale enabled participants to indicate how often they intended to include a particular strategy in their literacy and numeracy lessons. The range incremented by 25% of lessons, which spanned from 100% (in every lesson) to 0% (meaning never). Also included was a *don't know* (D) option. The item in Figure 1 is an example of the 43 items in the second section of the questionnaire.

In _% of lessons	Beliefs about learning	In _% of lessons
Literacy	I intend to …	Numeracy
100 75 50 25 0 D	use class discussions because I believe that children learn from each other.	100 75 50 25 0 D

Figure 1. Beliefs about learning: Item seven.

A few weeks later, of the 349 preservice teachers surveyed, 17 graduating and 14 commencing preservice teachers were interviewed either individually or in focus group situations depending upon volunteers' availability. Using the same semi-structured questions and format for focus group and individual interviews, all discussions were audiotaped and later transcribed verbatim. Interview transcripts were first read for potential commonalities, and preliminary categories were formed. Key issues were coded, in some cases with subnodes, with the assistance of a qualitative software program, *NVivo* (Richards, Richards, Fraser & Barrington, 2000). Data grouped into similarly coded sections were inspected for coherence. Discrepant comments were re-categorised, or where necessary new nodes created to accommodate them.

Results and Discussion

Presented in this section is a summary of preservice teachers' beliefs about teaching using one particular strategy: i.e., to provide good examples and help children replicate them. To keep within the constraints of this publication data are reported from two sources: written responses to one PTIQ item from 349 preservice teachers surveyed and audiotaped comments from 17 graduating preservice teachers interviewed either individually or in focus group situations.

The first of the questions central to this paper is addressed by data gained from this PTIQ item. Table 1 presents preservice teachers' intentions for providing good examples and helping children learn how to replicate them from both groups in both literacy and numeracy lessons. Percentages incrementing by 25 per cent indicate the frequency of lessons: e.g. 25% … means in 25% of lessons.

Table 1
Comparison of Intentions for Providing Good Examples and Helping Children Replicate them

I intend to provide good examples and help children learn how to replicate them in …

		numeracy					
	literacy	0% …	25%…	50% …	75% …	100%…	Don't know
Commencing	0% …		1				
(n=163)	25% …		4				
	50% …		1	9	4	2	
	75% …		2	4	39	12	
	100%…			1	5	75	
	Don't know						1
Graduating	0% …	1					
(n=186)	25% …		2	1			
	50% …		3	11	1		
	75% …		2	8	47	10	
	100%…			6	10	84	

The figure 84 in the bottom right cell indicates that 84 of the 186 graduating preservice teachers surveyed intended to provide good examples and help children replicate them in every literacy and in every numeracy lesson. This suggests that these graduating preservice teachers view this strategy as important and equally suitable for learning both disciplines. In fact, regardless of the year level, about 80 per cent of preservice teachers indicated the same intention in either 75 per cent or in every literacy and numeracy lesson. Such a response is expected in literacy considering the emphasis on *modelled* and *guided* reading and writing sessions as key components of the *Early Years Literacy* block (*Teaching*

writers in the early years, 1997). As the result was somewhat unexpected for the learning of numeracy, it seemed valuable to gain preservice teachers' explanations for this outcome.

During interviews preservice teachers' views on the usefulness of this strategy were sought and addressed the second key question of this paper.

Often the practice was associated with teaching different text-types during the writing session of the literacy block. Common to four graduating preservice teachers in a focus group discussion (number 1) was this response:

> Kerry: I would show them the process and teach them how they can replicate the examples I had given them, but ultimately I want them to create their own work for their own purposes so they understand it. So, if in English they understand the genre approach and they know how to build up that genre, allowing them to explore that and then comparing it [to other texts] would be better rather than a straight replication of what [the teacher did] because I need them to understand why it's done that way and when it's done that way.

It seems that Kerry values using good examples of different text-types and modelling the process for constructing them but expects children to move beyond simply replicating them.

Using a good example was considered a useful strategy to teach specific parts of speech. For example, during another focus group discussion (number 2), a graduating preservice teacher said:

> Max: We'd pick one of the children's work which was a really good example and we'd use that on the overhead and to show how pronouns were used in a really good way. The teacher was really into that using [children's work] as an example.

It seems that Kerry and Max know how to use the strategy to enhance children's literacy skills.

As indicated in Table 1, many preservice teachers intend using this strategy in both literacy and numeracy lessons. PTIQ responses from 14 of the 17 graduating preservice teachers interviewed indicated their intention to use the strategy in 75 per cent or more of their literacy and numeracy lessons. A graduating preservice teacher, from focus group discussion (number 3), drew on her experience from high school:

> Emily: How I learnt has been a good example of how it works particularly in maths. I remember when I was in high school they gave you a formula and you go, "I have no idea what that means" but then when they show you how to use it in whatever context, then you find out how it works and then you can make something out of it.

It seems that Emily found the strategy helpful as a learner.

Later in the discussion, Emily referred to her recent practicum experience convinced this practice was appropriate in both disciplines and said:

> Emily: In English and maths we all sit down and have the whole group discussion and you model it and then [they] apply it to their own [situation.] I'm actually doing some placement at the moment for my own benefit and we were doing that yesterday with some maths work. We did it altogether and we did a practical example and then they applied it to their own situation.

It seems the strategy provides a focus for a class discussion.

Interviewed individually, a graduating preservice teacher explained that some children found it helpful to observe others doing the skill and said:

> Kelly: Probably with different learning styles a lot of kids need to see it first to sort of know what you are talking about but then they actually need to do it to understand it more.

It seems the strategy caters also for some children's preferred learning style.

Also interviewed individually, Ally, a graduating preservice teacher explained that providing good examples for children showed the teacher's expectations and was helpful in linking children's prior knowledge with the lesson's focus.

> Ally: I guess if you are being a role model, you are trying to show them the standards you expect and you're providing background knowledge for the students. I think by doing examples on the board it can link their prior knowledge to what you are doing now. I think some children need a bit of a role model before they go off and do things.

It seems that Ally considers the strategy to be a combination of several good teaching practices.

Others saw it as an opportunity to measure the success of their instruction and/or their lack of confidence with the subject matter. A graduating preservice teacher interviewed individually said:

> Mandy: If I see my students doing exactly the same thing as what I'm trying to do, then I think they are learning. I see that some of that information is getting through, whereas, if I gave them more leeway then I might not be as comfortable because I haven't got that experience to let them run with their ideas. If I give them an example and they replicate it then I've got more of a chance of understanding what they are doing.
>
> Later, she added:
>
> Mandy: When you are writing and making examples of a particular topic then the students seem to copy that, but in maths, not really, well sometimes, it really depends on what you are working on. I'm thinking of what I did with my Grade 3's, we did pattern type things, so they didn't copy my example; they do use their own thoughts and creativity.

Mandy's need to be in control is a typical concern of novice teachers (Woolfolk & Hoy, 1990). She seems confident about its appropriateness in literacy lessons but less certain about its suitability for teaching mathematics. Nonetheless, her comments suggest that she showed her pattern as an example before the children began their work.

During a focus group discussion (number 4) about the use of this strategy with three graduating preservice teachers, one said:

> Paul: In the younger grades a lot of examples are given in literacy, in maths a lot of constructing is going on like finding things etc., and then the upper grades it was, "you know what to do in literacy but here's an example of how to do the maths."
>
> Interviewer: Did you discuss these [approaches] with your supervising teachers?
>
> Paul: Yes, definitely.

Paul, influenced by both his observations of classroom experiences and discussions with teachers, explains how approaches differ with children in varying grade levels. It seems that he would use the strategy in mathematics lessons with older students.

Another graduating preservice teacher, Jane also intended to provide good examples and help children replicate them in 75 per cent of her numeracy lessons. During a focus group discussion (number 3), she explained her use of the strategy:

> Jane: Probably more with maths it has been more open ended, sometimes you don't show examples for it. I have seen examples [of lessons] where you let them discover and then show them the examples at the end. Whereas, when you are reading a book, you point out where you use the grammar etc. With the structure of the [mathematics] lesson you are supposed to do a little bit of a discussion first with the whole group and then at the end you can do most of your explaining. I did an elective in numeracy and I got a lot of ideas about how to structure a maths lesson from that.

At first, it appeared that Jane and others who had participated in the numeracy elective were more aware of the different approaches used in teaching mathematics. Even though

Jane intended to use good examples and help children replicate them, her comments suggest that she did not intend beginning the mathematics lesson with an example. She intends beginning mathematics lessons with children exploring possibilities, which contrasts her approach in a literacy session in which she highlights the author's use of grammar.

Some of Jane's comments are open to interpretation. Without the opportunity to interview further, one can only speculate about Jane's intentions. Perhaps, as part of the conclusion of the lesson, Jane may show some children's work as examples during share-time and use these to highlight the key features of the lesson so that children will replicate these processes in future lessons. It is possible that Jane intends explaining how it is done at the end in an attempt to clarify and summarise the lesson's focus. The former of these suggests an attempt to help children build on each other's strategies and understandings. The latter implies the teacher demonstrates the process and makes links about the lesson's content for the children.

In sum, preservice teachers interviewed intend to use the strategy in numeracy lessons for various reasons, three of which address preservice teachers' needs: a personal preference, an opportunity to communicate expectations and standards, and, a measure of their effectiveness. To some extent, their reasons for using the strategy in literacy lessons indicate a better understanding of their role in literacy than in numeracy lessons.

Conclusion

Data from 349 preservice teachers' written responses to PTIQ indicated about 80 per cent of participants intend providing children with good examples and helping them to replicate them in more than 75 per cent of their literacy and numeracy lessons. Comments from 17 of the preservice teachers surveyed suggest they understood the strategy and they described situations in which they believed the teaching strategy was useful. These included: a prompt for similar tasks; a focus for a whole class discussion; an opportunity to model desirable behaviours and standards; an attempt to cater for some children's preferred learning style; and, an indication of children's success with the task.

Preservice teachers drew on their experiences and observations both from memories of their schooling and more recent contexts. Their intentions are consistent with advice from research in literacy education (Ainley, Fleming & McGregor, 2002; Luke, 1993). However, using the same strategy in the same manner may be less appropriate for teaching mathematics. Therefore, it seems that there is value in discussing the different uses of teaching strategies in light of current advice from mathematics education; otherwise, preservice teachers may believe the same application of what works well in the literacy block must also be good for teaching mathematics.

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