Mentors Report on Their Own Mentoring Practices

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Abstract: Implementing an Australian National Curriculum will require targeting both teachers and preservice teachers. Classroom teachers in their roles as mentors are well situated for developing preservice teachers. This mixed-method study presents mentors' reports on their mentoring of primary preservice teachers (mentees) in mathematics (n=43) and science (n=29). Mentors claimed they mentored the teaching of mathematics more than the teaching of science; 20% or more indicated they did not provide mentoring practices for 25 out of 34 survey items in the science and 9 out of 34 items in the mathematics. Mentors also claimed that professional development on effective mentoring can enhance their skills. Implementing an Australian National Curriculum necessitates professional development for mentors on effective mentoring practices in order to increase the quality and quantity of mentoring for enhancing preservice teachers' practices.

The last attempt at implementing a national curriculum failed in the 1990s largely because it was not followed through with the enactors of reform (Collins, 1994; Ellerton & Clements, 1994). From personal experience as a principal of a NSW school at the time, the national curriculum documents arrived in schools and were left on shelves. There was no professional development provided. In the current era, teachers and preservice teachers require development to ensure the Australian National Curriculum is implemented according to its documentation. Importantly, where teachers and preservice teachers meet becomes a rich environment for pedagogical discussions about new developments that can further advance the implementation of national agendas.

Supporting the need for an "Education Revolution", as part of the $42 billion stimulus package (Department of Education, Employment and Workplace Relations, 2010), is the list of critical reviews into Australian education over the last decade or more (see Nelson, 2002; Ramsey, 2000). Most reviews highlight the necessity to improve Australia's education system (e.g., Bradley, Noonan, Nugent, & Scales, 2008; Masters, 2009). Many reviews focus specifically on teacher education within school settings and tertiary education for those about to enter the profession (e.g., Bradley et al., 2008; House of Representatives Standing Committee on Educational and Vocational Training [HRSCEVT], 2007). Indeed, the latest results from NAPLAN (2009) and the Queensland Premier's Green Paper (Department of Education and Training, 2010) further emphasise the need for educational reform. The Green Paper highlights the need to improve the quality of teaching, as the "quality of this training and support can impact on student learning. Bad experiences can mean that potentially talented teachers leave early in their careers" (p. 19). Surprisingly, this paper does not mention mentoring as a way to facilitate the development of preservice teachers.

There are only two ways to reform an education system, namely through inservice education of existing teachers and preservice teacher education. An education revolution will need to be enacted by teachers and preservice teachers if change is to filter throughout a system. In addition, the Australian National Curriculum is intended as part of the education revolution fabric to connect Australian states and territories more cohesively (Australian Government, 2008). This uniformity is also intended as a way for education to be more accountable across states and territories, where students who graduate in one location can be measured at the same educational standards as any other student in Australia.

The National Curriculum Board has provided many documents in a consultative manner towards developing an Australian Curriculum across the range of subject areas (e.g., English, mathematics, science, and history). It also advises that there will be "sufficient flexibility and support so that educators can adapt its contents and processes according to their students' needs" (National Curriculum Board, 2008, p. 5). However, to implement the Australian Curriculum will require targeting the key enactors of such reforms, viz: teachers and preservice teachers. Most importantly will be the dialogue that occurs between these two parties to gather cohesiveness. Consequently, mentoring is where these two enacting parties (preservice teachers and teachers) meet within school settings. Indeed, classroom teachers in their roles as mentors have a significant role to play for developing preservice teachers, where approximately one sixth of the time allocated in a 32-unit degree is held within the school setting.

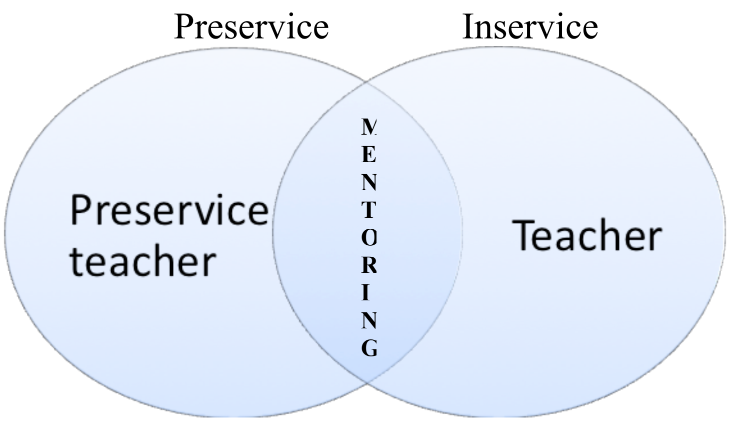

Figure 1. Enactors of educational reform

It appeared that the enactors of reform were not supported sufficiently with professional development in the 1990s attempt at a national curriculum (Marsh, 1994). Furthermore, mentor-mentee interactions were not considered in this reformation. Teachers would need to develop their practices in line with current documents in order to dialogue with mentees. Hence, a learning community could come together through purposeful discussions around new innovations such as the Australian Curriculum.

Teaching is an interpersonal, emotional and social profession. Similarly, mentoring requires "real-time" interactions, and although 21st Century technologies may be used to support mentoring (e.g., Maxwell, Harrington, & Smith, 2010), the personal relationship between the mentor and mentee and timely interventions are pivotal to the mentoring process (e.g., Ganser, 1996). To have an understanding of how mentors would operate in this new endeavour requires investigation of how they have worked with preservice teachers (mentees) in the past. Recognising mentoring patterns, gaps, and affirmative actions can assist to plan more effectively for mentors' involvement in curriculum reform.

The literature has grown significantly in the area of mentoring with journals dedicated to such works (e.g., Mentoring & Tutoring: Partnership in Learning; International Journal of Mentoring & Coaching), and empirical evidence has been gathered to present effective mentoring practices for guiding a preservice teacher's development. There is value in mentoring about school culture and infrastructure, which includes knowledge about the school, staff, wider community, codes of conduct, emergency operations, and information about school traditions and procedures; however this study focuses on classroom practices and mentoring for effective teaching. A five-factor model of mentoring for effective teaching has previously been identified, namely, Personal Attributes, System Requirements, Pedagogical Knowledge, Modelling, and Feedback (Hudson, 2007, Figure 2). There are mentoring attributes and practices associated with each factor, which have been justified statistically with empirical evidence in previous works (e.g., see Hudson, 2007, Hudson, Skamp, & Brooks, 2005); these attributes and practices are summarised as follows.

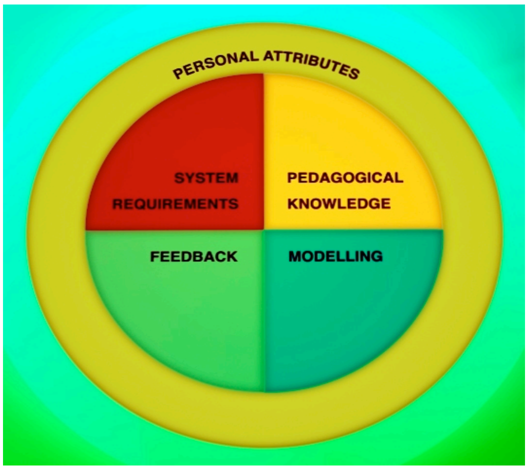

Figure 2. Mentoring Model

Personal Attributes: This includes being supportive of the mentee, comfortable in talking about teaching practices and attentive listening to the mentee. The mentor's personal attributes are used to encourage the mentee's reflection on practices, and instil confidence and positive attitudes in the mentee.
System Requirements: In its simplest form, the mentor needs to articulate the aims, policies, and curricula required by an education system. However, the complexities for implementing system requirements may be noted in the pedagogical knowledge mentors need to articulate for effective teaching.
Pedagogical Knowledge: Effective mentors articulate how to plan for teaching; they timetable or schedule lessons for the mentee. Preparation for teaching needs to be discussed, particularly with the location and use of resources. Teaching strategies are key to effective lesson delivery for which an effective mentor can provide experienced perspectives. A mentor needs to check on the mentee's content knowledge to ensure it is in keeping with the system requirements and appropriate to the grade level. There are incidental problems that arise during lessons for which the mentor can assist in explaining how to problem solve. Classroom management strategies, including managing student behaviour must be discussed with the mentee, especially as the mentor has insight into the various student personalities and behavioural traits. Effective teaching requires astute questioning skills for which a mentor can discuss higher and lower-order questions along with distributing the questions in equitable ways. Lessons have a structure and so an effective mentor can discuss the implementation processes (e.g., ensuring key learnings or concepts are apparent in the introduction, body, conclusion of a lesson). Mentors can provide pedagogical knowledge about assessment and also viewpoints about effective teaching practices that link curriculum, pedagogy, and assessment.
Modelling: The mentor's enthusiasm as a teacher can present desirable teaching traits. Importantly, the teacher-student relationship is central to teaching and demonstrating a positive rapport with students can show the mentee how these behaviours can facilitate learning. The mentor also needs to model appropriate classroom language suitable for student

learning, teaching (if not what to do what not to do), effective teaching, classroom management, hands-on lessons, and well-designed lessons.
Feedback: Effective mentors articulate expectations and provide advice to the mentee, they review lesson plans, observe the mentee teach, provide oral and written feedback, and further feedback on the mentee's evaluation of their teaching and the learning environment.

Each of the aforementioned attributes and practices linked to the five factors can be located within the survey instrument (Appendix). The research question that guided this study was: What are mentors' reports on their mentoring of preservice teachers in primary science and mathematics?

Data Collection Methods and Analysis

This mixed-method study uses two surveys with five part Likert scales and a questionnaire that involved written responses. The "Mentoring for Effective Mathematics Teaching" (MEMT) survey instrument evolved through a series of preliminary investigations on Mentoring for Effective Primary Science Teaching (MEPST; Hudson, 2003; Hudson, 2004a, 2004b; Hudson et al., 2005; Hudson, 2007), which also identified the link between the generic mentoring literature and the items on the survey instrument. The MEMT survey instrument was designed to gather data about preservice teachers' perceptions of their mentoring for teaching primary mathematics (Hudson, 2009).

This study re-designs the survey instrument so that mentors can report on what they perceived they facilitated as mentoring practices within the five factor model. For example, the first item on the MEMT instrument was "During my final professional school experience (i.e., field experience, internship, practicum) in mathematics teaching my mentor: was supportive of me for teaching mathematics". The mentors' version of the instrument was re-designed to reflect the mentor's perspective. Hence, the first item on the instrument used in this study was, "During the preservice teacher's final professional school experience (i.e., field experience, practicum) in mathematics teaching, I believe I: was supportive of my mentee for teaching mathematics". Changes therefore occurred to the initial lead sentence and to each of the 34 items only to have the mentor's perceptions visible. Similarly, the MEPST (science) instrument was changed to reflect the mentor's perspectives (see Appendix). That is, there was only one word change from the MEMT instrument for mentors to the MEPST instrument for mentors, that is, "mathematics" was replaced by "science". SPSS was used to analyse data and provided descriptive statistics with percentages for each item (Hittleman & Simon, 2006). Data were used to compare mentors' perceptions of their mentoring in both science and mathematics.

The qualitative part of this study presents mentors' reports on mentoring primary preservice teachers (mentees) in mathematics (n=43) only. The questionnaire focused on: (1) the mentors' rapport with their mentees, (2) successful mentoring strategies, (3) aspects that may lead the mentee to feel unsuccessful, and (4) ways to enhance their mentoring skills. Data were coded for commonalities (Hittleman & Simon, 2006). The qualitative data about mathematics teaching aimed to provide further insight into how mentors work with mentees, and identify other avenues for developing mentoring practices. In summary, 29 mentors were administered the science (MEPST) instrument for mentors (Appendix) while 43 mentors were administered the mathematics (MEMT) instrument and the questionnaire for extended written responses.

Backgrounds of Participants

The mentors in this study were located in schools around one Australian university campus. Surveys were posted with stamped addressed returns. Mentors in primary mathematics (*n*=43) comprised of 12% males and 88% females with 67% claiming that mentoring in mathematics was a strength and 9% indicating this was the first time for mentoring. Mentors in primary science (*n*=29) involved 21% males and 79% females with 72% who had mentored 5 or more preservice teachers during their careers. It was the first time for 7% of these mentors though 41% claimed that mentoring in science was a strength (Table 1).

Characteristics	Science (*n*=29)	Mathematics (*n*=43)
Males	21	12
Females	79	88
30-50 years old	52	74
Mentored >5 mentees	72	63
First time mentoring	7	9
Subject is a strength	41	67

Table 1: Percentages indicating mentors' characteristics in this study

Results and Discussion

Mentors provided insights into their practices on mentoring preservice teachers in primary science and mathematics. Their responses to their mentoring were registered on items associated with five factors for mentoring, namely: personal attributes, system requirements, pedagogical knowledge, modelling, and feedback. The differences in mentoring practices become apparent when compared between the mentoring of science and mathematics. For instance, mentors agreed or strongly agreed that they were more supportive with mathematics than science. They also indicated that all other personal attributes for facilitating mentoring were provided more for mathematics than science. Only 62% of mentors believed they had instilled confidence for teaching science compared with 78% for mathematics. More also claimed they instilled positive attitudes in mathematics (93%, science=79%) and assisting the mentee to reflect on mathematics teaching (91%, science=79%, Table 2). This reflects the reviews on science education in Australia that science is generally not taught frequently enough in primary schools (Goodrum, Hackling, & Rennie, 2001). It may also indicate the level of mentor-mentee interactions as a result of how often science and mathematics was taught in the classrooms. That is, if they had more mathematics lessons then they may well be more supportive, as there were more opportunities to be supportive.

Attributes	Science (*n*=29)*	Mathematics (*n*=43)*
Supportive	79	93
Comfortable in talking	86	98
Attentive	72	76
Instilled confidence	62	78
Instilled positive attitudes	79	93
Assisted in reflecting	79	91

* Percentage of mentors agreeing or strongly agreeing that the specific mentoring practice occurred.

Table 2: Mentor's reports on their personal attributes for mentoring

Mentors recorded their responses on items associated with addressing the educational system requirements. Less than a quarter of mentors claimed they provided mentoring practices focused on the aims, curriculum and policies of either mathematics or science. In addition, mathematics mentoring in curriculum and policy areas occurred about 20% or more than in science (Table 3). This infers that the classroom teachers focus on mathematics more than science, though an education's system requirements must be made more explicit for preservice teachers at all levels of engagement. All of the mentors in this study were supervising final-year preservice teachers who need to know about the practicalities of an education's system requirements (e.g., aims, curriculum and policies). Considering the Australian Curriculum has new learning material and structures that require mentor and mentee discussions, such dialogue about system requirements may not occur in the school setting for more than a quarter of mentees. Furthermore, mentoring in schools equates to approximately one sixth of the duration of a preservice teacher's 32-unit degree; therefore many preservice teachers may not be dialoguing about critical praxis connections within the school setting for advancing national agendas.

Mentoring Practices	Science (*n*=29)*	Mathematics (*n*=43)*
Discussed aims	66	71
Outlined curriculum	55	74
Discussed policies	45	72

* Percentage agreeing or strongly agreeing that the specific mentoring practice occurred.

Table 3: Mentor's reports on mentoring system requirements in science and mathematics

Most mentoring practices take place around the mentor's pedagogical knowledge. Despite 90% or more of mentors indicating agree or strongly agree for facilitating mentoring practices around preparation, timetabling, classroom management, teaching strategies, planning, and implementation of mathematics in the primary classroom, more than 30% claimed they did not do this for mathematics content knowledge, viewpoints or problem solving (Table 4). Nevertheless, responses about mentoring in mathematics were generally high on items associated with the pedagogical knowledge factor. Science had a lower response rate across all 34 items except one, that is, where mentors indicated that they agreed or strongly agreed they provided that practice for science more than mathematics (discussed content knowledge 69% for science and 64% for mathematics; Table 4).Content knowledge for science may be considered more difficult by these mentors or they may ascertain that the mentee appears more competent with the mathematics content knowledge than the science knowledge. Another possible scenario, and one that was alluded to by national reviews (e.g., Goodrum et al., 2001), is that science content knowledge is not a strength of teachers and hence in their roles as mentors they may feel they need to articulate this science knowledge to the mentees as they themselves are not as confident in this field.

Mentoring Practices	Science (*n*=29)*	Mathematics (*n*=43)*
Guided preparation	77	95
Assisted with timetabling	72	91
Assisted with classroom management	86	98
Assisted with teaching strategies	72	91
Assisted in planning	79	90
Discussed implementation	76	91
Discussed content knowledge	69	65
Provided viewpoints	52	65
Discussed questioning techniques	76	72
Discussed assessment	79	84
Problem solving	52	68

* Percentage agreeing or strongly agreeing that the specific mentoring practice occurred.

Table 4: Mentor's reports on mentoring pedagogical knowledge in science and mathematics

Mentors perceived themselves as modelling practices in both science and mathematics more so than the other factors. In the science mentoring less than 90% of the mentors could strongly agree or disagree they provided this attribute or practice for each factor other than modelling. Indeed, 90% or more mentors agreed or strongly agreed they modelled teaching, classroom management, having a good rapport with students, and enthusiasm for science education. These recordings were as high or higher for mathematics (Table 5).The dissonance between science and mathematics occurred when mentors reported about using the syllabus language and modelling a well-designed lesson (Table 5). Mathematics has more time allocation in primary schools than science, which can provide more opportunities for mentors to model the teaching of mathematics rather than science. Paradoxically, percentages show that mentors will model the teaching of science but do not provide pedagogical knowledge or system requirements at the same level. Further qualitative research may elicit details on why mentors model science but can refrain from providing pedagogical knowledge and system requirements.

Mentoring Practices	Science (*n*=29)*	Mathematics (*n*=43)*
Modelled rapport with students	93	93
Displayed enthusiasm	93	95
Modelled a well-designed lesson	72	93
Modelled teaching	90	98
Modelled classroom management	93	97
Modelled effective teaching	83	88
Demonstrated hands-on	88	95
Used syllabus language	76	95

* Percentage agreeing or strongly agreeing that the specific mentoring practice occurred.

Table 5: Mentor's reports on their modelling of teaching in science and mathematics

Feedback is essential for preservice teacher growth in the subject area. Yet, only 55% provided written feedback on the preservice teacher's science teaching and 57% articulated expectations about teaching science in the classroom (Table 6). Considering these reports about mentoring in science and mathematics are according to the mentors, who may well indicate higher responses than the reality, the essential mentor-mentee dialogue advocated in the literature may not be occurring for many mentees. Despite the difference in time allocation for each subject, if curriculum documents advocate minimum teaching durations for subjects then there should have been more opportunities for mentees to receive feedback on science during their field experiences. However, providing feedback for developing mathematics teaching was reported as much stronger than for science teaching, with most practices in mathematics equal or above 90%. Conversely, all feedback practices reported for science mentoring were below 80% except providing oral feedback (Table 6).

Practices	Science (*n*=29)*	Mathematics (*n*=43)*
Observed teaching for feedback	79	95
Provided oral feedback	86	98
Reviewed lesson plans	79	90
Provided evaluation on teaching	79	95
Provided written feedback	55	83
Articulated expectations	57	86

* Percentage agreeing or strongly agreeing that the specific mentoring practice occurred.

Table 6: Mentors reports on providing feedback to their mentees

The following qualitative data provides results and discussion from 43 mathematics mentors only, and includes: the mentors' rapport with their mentees, successful mentoring strategies, aspects that may lead the mentee to feel unsuccessful, and ways to enhance their mentoring skills.

Mentor-Mentee Rapport

It appeared that developing a desirable mentor-mentee rapport relied not solely on personalities but also professional attributes. To illustrate, most mathematics mentors claimed they had a good rapport with their mentees mainly because the mentee was open to ideas, accepted feedback, questioned comfortably with the mentor, and had adequate planning and content knowledge to teach mathematics. For example, the following two comments were representative of most mentors' responses: "She was very open to learning as much as she could in the 4 weeks and asked lots of questions about all areas" (Mentor 17) and "She listened well and took on suggestions in her planning" (Mentor 22). Nevertheless, there were 6 out of 43 mentors involved with primary mathematics who claimed they did not have a good rapport with their mentees. Reasons included a lack of confidence and knowledge, disinterest, or reluctance to teach mathematics. To illustrate: "She wasn't confident in the subject and lacked 'line of attack' type thinking" (Mentor 25); "The student was disinterested, lacked prior knowledge and had little intrinsic motivation" (Mentor 29); and "She was quite nervous and somewhat reluctant to teach a maths lessons (Mentor 36). Indeed, one student withdrew from practicum halfway though as a result of a perceived inability with mathematics.

Making the Mentee Feel Successful with Teaching

Mentors comments on what may make the mentee feel successful with teaching were closely aligned with the attributes and practices indicated in the five-factor mentoring model (see Hudson, 2007). Mention was made of the mentor's personal attributes, and addressing system requirements was also a focus. There were many who indicated they had articulated pedagogical knowledge, which also included teaching strategies and classroom management. Mentor 2 outlined the strategy of having "rotational group work" and "learning objects" through Information Communication Technology (ICT).These strategies provide the mentee an opportunity to observe school students engaged in activities. Considering the mathematics context, some mentors made mention of mentees targeting the sequential development of students' conceptual understandings such as "begin with concrete--visual clues--symbols" (Mentor 5). Mentor 6 suggested commencing with "simple lessons as the mentee felt her maths knowledge was poor", yet this mentor continued to write, "This was not the case". Confidence building needs to be part of making the mentee feel successful. In some cases, mentees lack confidence in their own ability to teach mathematics, however, careful scaffolding by the mentor can help to build this confidence. It may be necessary to "Start with small groups before teaching whole grade" (Mentor 8).

Many mentors emphasised modelling of practices as important towards making the mentee feel successful. For instance, Mentor 12 stated, "modelling well structured hands-on activities" while Mentor 1 extended this notion: "Role modelling strategies following explicit discussion on progress of lessons and the check points of student understanding". Finally, most mentioned feedback, particularly linked with observation of practice and then encouraging the mentee to reflect on teaching. It was well articulated by these mentors that "positive and meaningful feedback" (Mentor 13) must be in place. It was recognised that feedback and dialogue can occur across the whole range of teaching and learning matters. For instance, Mentor 18 proposes, "Discussion before and after lessons – objectives of lesson; learning outcomes; strategies to use; provision of types of resources; language suitable for class; abilities of students. Written comments". A few mentors wrote about providing extra support to mentees where circumstances require it. To illustrate, Mentor 32 suggested the mentee "feels free to ask questions" after feedback while Mentor 31 stated that mentees may need “a chance of repeat lessons to improve techniques”. Only one mentor reported on the difficulties of ascertaining how to make the mentee feel successful because “Difficult to determine with the last student because they were not open to advice” (Mentor 43).

Aspects that May Make the Mentee Feel Unsuccessful

Mentors were asked as a result of their interactions and observations of their mentees whether there were any aspects they thought made the mentee feel unsuccessful. Out of 43 mentors of primary mathematics 21 indicated they did not know of anything that would make the mentee feel unsuccessful at teaching mathematics. However, others explained that difficulties with behaviour management of students, planning the timing of lessons, and inadequate content knowledge of mathematics concepts may contribute to mentees confidence for teaching mathematics. Indeed, six mentors emphasised how ineffective behaviour management can play a role in the mentee’s discussions with the mentor. Other aspects noted by these mentors included: not having sufficient time for mentor-mentee dialogue; mentees’ limited understanding of primary students’ levels of learning in relation to the syllabus; lack of preparedness to enter practicum with curriculum knowledge; and, not understanding how to cater for individual differences.

Enhancing Mentoring Skills

Mentors were asked to record ways they believe would enhance their mentoring skills. Suggestions for enhancing mentor skills were forthcoming, which included effective professional development, familiarity with the latest curriculum developments, and sharing strategies and content knowledge with colleagues and academics. In addition, familiarity with the syllabus, knowledge of university coursework delivered to preservice teachers, more experience and time teaching, and “specific training in mentoring skills” were the most reported suggestions for improving mentoring skills. There were individual responses of interest such as “Feedback from student teacher or uni about my mentoring” (Mentor 23), “Being aware of how [the subject] is taught at university, more student data and information given to/discussed with prac teacher prior to commencement of practicum” (Mentor 36), and “To be more explicit in designing lessons” (Mentor 18). There were also further suggestions on inservicing and professional development for teachers in the subject area as a way to enhance their knowledge towards mentoring more effectively (Mentors 4, 7, 39, & 40).

There were concerns and issues about mentoring preservice teachers in mathematics teaching. One concern was the one-year Graduate Diploma where Mentor 1 claimed, “There is very limited maths content in the Grad Dip Primary Ed. As a teacher, maths is my weakest Key Learning Area (KLA) but one of the most important. There needs to be a greater emphasis on maths within degrees on offer”. Another concern was around the very different teaching practices and that mentees need to be exposed to a variety of practices, for instance, “Every teacher teaches maths differently so they (mentees) need to see different styles of teaching and different age groups” (Mentor 8). Of course, time management presented itself and this has consistently been an issue in the literature (Hansford & Ehrich, 2006). However, the strongest concerns were around ensuring successful classroom management, particularly behaviour management, and adequate content knowledge for teaching. For instance, Mentor 25 stated, “This mentee has little mathematics knowledge herself and was readily outpaced by the year 7 students”. There were suggestions of “pre, post and self assessment as very important for the preservice teacher’s development” (Mentor 38). More suggestions included professional development for the mentor and standards of operation: “I feel the preservice teachers and mentors require an extremely explicit list of standards and responsibilities" (Mentor 43).

Conclusion

The quantitative part of this study investigated mentors' reports on their own mentoring practices for developing preservice teachers' teaching of science and mathematics. Mentors claimed they mentored teaching mathematics more than science. Despite mathematics provided more time within usual class timetables, many of these preservice teachers may not have had opportunities for effective mentoring in science education compared with mathematics. Indeed, 20% or more indicated they did not provide mentoring practices for 25 out of 34 items in science and 9 out of 34 items in mathematics. Educational advancements in key subject areas such as science will require mentors to be more proactive in their mentoring practices. Educational reform will necessitate mentors to be educated on effective mentoring practices so the mentoring process can be more purposeful for both mathematics and science. Mentors who have knowledge of such practices can more readily address the potential issues of which, according to the mentors, more than 20% of mentees in this study did not receive these practices.

The qualitative part of this study explored aspects that may make the mentee feel successful or unsuccessful and ways to enhance their mentoring skills in mathematics only. These mentors believed that mentoring that facilitated success included the mentor's personal attributes, addressing system requirements, articulation of pedagogical knowledge, modelling teaching practices, and providing constructive feedback. Possible feelings of not being successful may be the result of poor behaviour management, lack of preparedness, inadequate content knowledge, and limited mentor-mentee discussion.

When noting the discrepancies in how mentors facilitate their mentoring practices, it is clear that the quantity of mentoring is random. It is also clear that the quality of mentoring is variable. McCann and Johannessen (2009) ask, "Where are the good mentors?" The majority of mentors in this study appear to provide mentoring practices in keeping with current trends. However, there were many who stated of themselves they do not. To have good mentors would be similar to having good teachers. Graduates for the teaching profession have undergone a four-year degree in Australia to become teachers who have met advocated teaching standards. Mentors, on the other hand, do not require any training or further qualification whatsoever. Indeed, there is *no* standard for mentoring in Australian education systems (or elsewhere). There was inconsistency in the mentoring standards between the mentors in this study, and those not mentoring to current practices need to align their standards with theoretical underpinnings and empirical evidence. Effective mentors have personal attributes that support the mentee for enhancing classroom practices. Mentoring must include the articulation of pedagogical knowledge and further advance teaching by modelling desirable professional attributes and practices. Societal behaviour is learnt (Burton, Weston, & Kowalski, 2009); hence modelling teaching practices would be essential for learning how to teach. Importantly, providing timely feedback after observations of practice would assist a mentee at the zone of proximal development.

Mentors in this study claimed that professional development on effective mentoring can enhance their skills. Mentoring has long been considered as a way to professionally develop teachers (Blank & Sindelar, 1992). Targeting mentors with professional development can allow them to engage with advocated educational reform documents while advancing their own mentoring skills. It is claimed that teaching others can further help the teacher to understand the content. Therefore, a mentor who learns about new reform measures can provide further evidence of understanding such documents by articulating these to mentees.Eliciting the greatest success from an "Education Revolution" will require the professional development of mentors, which will aid reform on two fronts: teacher inservice education and preservice teacher education in school settings. Mentoring must be seen as pivotal to educational reform for which both the quality and quantity of mentoring in key subject areas needs to increase. Mentors can be capacity builders for implementing reform as they simultaneously enrich their own practices in both mentoring and teaching and the mentee's teaching practices, which can ultimately address the learning needs of students in their schools.

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MENTORING FOR EFFECTIVE PRIMARY SCIENCE TEACHING – FOR MENTORS

INSTRUCTIONS: The following statements focus on mentoring for effective primary science teaching during your mentee's (student teacher's) field experience (practicum). Please indicate the degree to which you disagree or agree with each statement below by ***circling only one response*** to the right of each statement.

Key: SD = **Strongly Disagree** D = **Disagree** U = **Uncertain** A = **Agree** SA = **Strongly Agree**

During the preservice teacher's final professional school experience (i.e., field experience, practicum) in science teaching, I believe I:

1. was supportive of the mentee for teaching science.	SD	D	U	A	SA
2. used language from the current science syllabus.	SD	D	U	A	SA
3. guided the mentee with science lesson preparation.	SD	D	U	A	SA
4. discussed school policies with the mentee for teaching science.	SD	D	U	A	SA
5. modelled science teaching.	SD	D	U	A	SA
6. assisted the mentee with classroom management strategies.	SD	D	U	A	SA
7. demonstrated how to develop a good rapport with school students while teaching science.	SD	D	U	A	SA
8. assisted the mentee with implementing science teaching strategies.	SD	D	U	A	SA
9. displayed enthusiasm when modelling science teaching.	SD	D	U	A	SA
10. assisted the mentee to timetable the mentee's science lessons.	SD	D	U	A	SA
11. outlined science curriculum/syllabus documents to the mentee.	SD	D	U	A	SA
12. modelled effective classroom management when teaching science.	SD	D	U	A	SA
13. discussed evaluation of the mentee's science teaching.	SD	D	U	A	SA
14. developed the mentee's strategies for teaching science.	SD	D	U	A	SA
15. was effective in modelling the teaching of a science lesson.	SD	D	U	A	SA
16. provided oral feedback on the mentee's science teaching.	SD	D	U	A	SA
17. was comfortable talking with the mentee about teaching science.	SD	D	U	A	SA
18. discussed with the mentee questioning skills for effective teaching.	SD	D	U	A	SA
19. used hands-on materials for teaching science.	SD	D	U	A	SA
20. provided written feedback on the mentee's science teaching.	SD	D	U	A	SA
21. discussed with the mentee the knowledge the mentee needed for teaching science.	SD	D	U	A	SA
22. instilled positive attitudes in the mentee for teaching science.	SD	D	U	A	SA
23. assisted the mentee to reflect on improving science teaching practices.	SD	D	U	A	SA
24. gave the mentee clear guidance for planning to teach science.	SD	D	U	A	SA
25. discussed with the mentee the aims of teaching science.	SD	D	U	A	SA
26. made the mentee feel more confident as a teacher of science.	SD	D	U	A	SA
27. provided problem solving strategies for the mentee's science teaching.	SD	D	U	A	SA
28. reviewed the mentee's lesson plans before teaching science.	SD	D	U	A	SA
29. had demonstrated well-designed science activities for the students.	SD	D	U	A	SA
30. gave the mentee new viewpoints on teaching science.	SD	D	U	A	SA
31. listened to the mentee attentively on science teaching matters.	SD	D	U	A	SA
32. showed the mentee how to assess the students' learning of science.	SD	D	U	A	SA
33. clearly articulated what the mentee needed to do to improve science teaching.	SD	D	U	A	SA
34. observed the mentee teach science before providing feedback.	SD	D	U	A	SA