Comparing mentors' reports on their own mentoring of primary preservice teachers

Peter Hudson
Queensland University of Technology

Abstract

Implementing the Australian Curriculum will require targeting both teachers and preservice teachers as enactors of reform. Classroom teachers in their roles as mentors have a significant role to play for developing preservice teachers. What mentors do in their mentoring practices and what mentors think about mentoring will impact on the mentoring processes and ultimately reform outcomes. What are mentors' reports on their mentoring of preservice teachers for teaching science and mathematics? This quantitative study presents mentors' reports on their mentoring of primary preservice teachers (mentees) in mathematics (*n*=43) and science (*n*=29). Drawing upon a previously validated instrument (Hudson, 2007), this instrument was amended to allow mentors to report on their perceptions of their mentoring. Mentors claimed they mentored teaching mathematics more than science. However, 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. Educational reform will necessity mentors to be educated on effective mentoring practices for mathematics and science so the mentoring process can be more purposeful. Indeed, mentors who have knowledge of such practices may address the potential issues of more than 20% of mentees not receiving these practices. To ensure the greatest success for an Australian Curriculum mentors may need professional development in order to assist mentees' development into the profession.

Keywords: mentoring, mentors, reform, five factor model

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; Marsh, 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 professional development to ensure the Australian Curriculum is implemented in the spirit of its portfolio. 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.

Most reviews highlight the necessity to improve Australia's education system (e.g., Bradley, Noonan, Nugent, & Scales, 2008; Masters, 2009). Many reviews focus more 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 National Curriculum Board has provided many documents in a consultative manner towards developing an Australian Curriculum across the range of subject areas.

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.

To have an understanding of how mentors would operate requires investigation of how they have worked with preservice teachers (mentees) in the past. Recognising mentoring patterns, gaps, and positive actions can assist in planning more effectively for mentors' involvement in curriculum reform. The literature has grown significantly in the area of mentoring, and empirical evidence has been gathered to present effective mentoring practices for guiding a preservice teacher's development. A five-factor model for mentoring has previously been identified, namely, Personal Attributes, System Requirements, Pedagogical Knowledge, Modelling, and Feedback (Hudson, 2007), and items associated with each factor have also been identified and justified with the literature (see Hudson, Skamp, & Brooks, 2005). The research question that guided this study was: What are mentors' reports on their mentoring of preservice teachers for teaching science and mathematics?

Data collection methods and analysis

This quantitative study uses two surveys with five part Likert scales and two questionnaires 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 & McRobbie, 2003; Hudson, 2004a, 2004b; Hudson et al., 2005), 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, 2007).

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. Similarly, the MEPST instrument was changed to reflect the mentor's perspectives. 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 provide descriptive statistics with percentages for each item (Hittleman & Simon, 2006). Data were used to compare mentors' perceptions of their mentoring in both primary science and mathematics.

Backgrounds of Participants

The mentors in this study were located around one Australian university campus. Surveys, which were anonymous, were posted with stamped addressed returns. Mentors in primary mathematics (n=43) comprised of 12% males and 88% females with 74% between 30 and 50 years old. There were 63% who had mentored 5 or more preservice teachers during their careers. However, this was the first time for 9% of these mentors. Finally, 67% claimed that mentoring in mathematics was a strength. Mentors in primary science (n=29) involved 21% males and 79% females with 52% between 30 to 50 years of age, 31% were over 50 years old. There were 72% who had mentored 5 or more preservice teachers during their careers with 48% claiming they had mentored more than 10 mentees. It was the first time for 7% of these mentors. Finally, 41% claimed that mentoring in science was a strength.

Results and discussion

Mentors provided insights into their practices on mentoring preservice teachers in primary science and mathematics. 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. More than 20% of mentors claimed they had not instilled confidence or positive attitudes for teaching science with a further 21% not assisting the mentee to reflect on primary science teaching (Table 1). This reflects the reviews on science education in Australia that science is generally not considered a valued subject (e.g., Goodrum et al., 2001).

Table 1: *Mentor's reports on their personal attributes while mentoring in primary science and mathematics*

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.

Mentors recorded their responses on items associated with addressing the educational system requirements. Surprisingly, 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, science mentoring in curriculum and policy areas was about 20% less than occurrences in mathematics (Table 2). Considering the Australian Curriculum has new learning material and structures that require mentor and mentee discussions, such dialogue 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 in science and mathematics.

Table 2: *Mentor's reports on mentoring system requirements in science and mathematics*

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.

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 3). 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 3). 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.

Table 3: *Mentor's reports on mentoring pedagogical knowledge in science and mathematics*

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.

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 4). The dissonance between science and mathematics occurred when mentors reported about using the syllabus language and modelling a well-designed lesson (Table 4). 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.

Table 4: *Mentor's reports on their modelling of teaching in science and mathematics*

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.

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 5). 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. 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 5).

Table 5: *Mentors reports on providing feedback to their mentees*

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.

Conclusion

This quantitative 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. However, 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 reform will necessitate mentors to be educated on effective mentoring practices, including articulating pedagogical knowledge, so the mentoring process can be more purposeful. Indeed, 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. Comparing mentors' perceptions of their mentoring with mentees' perceptions needs to be investigated, particularly as it appears mentors' perceptions of their mentoring may be higher than mentees' perceptions (e.g., see Hudson, 2005, 2007).

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?" As indicated by the items on the survey instrument, the majority of mentors in this study appeared to provide mentoring practices in keeping with current trends. However, there were many who stated of themselves they do not. Mentoring is a developed skill not a practice that is inherent. Mentors are not required to have any training or further qualification apart from their initial teaching qualification. Indeed, there is *no* standard for mentoring prerservice teachers in Australian education systems. Mentoring standards need to be aligned with theoretical underpinnings and empirical evidence.

Mentors in this study may require professional development on how effective mentoring can enhance their skills (also noted elsewhere, e.g., Ganser, 1996). Indeed, mentoring has long been considered as a way to professionally develop teachers (Blank & Sindelar, 1992). 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. Mentors can be capacity builders for implementing reform as they simultaneously enrich their own teaching and mentoring practices and the mentee's teaching practices, which can ultimately address the learning needs of students in their schools.

References

Blank, M. A., & Sindelar, N. (1992). Mentoring as professional development: From theory to practice. *Clearing House, 66*(1), 22-27.

Bradley, D., Noonan, P., Nugent, H., & Scales, B. (2008). *Review of Australian higher education: Final report.* Canberra: Australian Government.

Collins, C. (1994). *Curriculum and pseudo-science: Is the Australian national curriculum project built on credible foundations?* Occasional Paper No. 2. Canberra: Australian Curriculum Studies Association.

Department of Education and Training. (2010). *A flying start for Queensland children: Education green paper for public consultation.* Retrieved 4 April, 2010, from http://deta.qld.gov.au/aflyingstart/pdfs/greenpaper.pdf

Ellerton, N. F., & Clements, M. A. (1994). *The national curriculum debacle.* West Perth, WA: Clements Meridian Press.

Ganser, T. (1996). Preparing mentors of beginning teachers: An overview for staff developers. *Journal of Staff Development, 17*(4), 8-11.

Goodrum, D., Hackling, M., & Rennie, L. (2001). *The status and quality of teaching and learning in Australian schools*. Canberra, Australia: Department of Education, Training and Youth Affairs.

Hittleman, D. R., & Simon, A. J. (2006). *Interpreting educational research: An introduction for consumers of research.* Upper Saddle River, NJ: Prentice-Hall.

House of Representatives Standing Committee on Educational and Vocational Training. (2007). *Top of the class: Report on the inquiry into teacher education*. Canberra: The Parliament of the Commonwealth of Australia.

Hudson, P. (2003). Mentoring first-year preservice teachers. *Action in Teacher Education*: *The Journal of the Association of Teacher Educators, 15*(3), 91-99.

Hudson, P. (2004a). Specific mentoring: A theory and model for developing primary science teaching practices. *European Journal of Teacher Education*, *27*(2), 139-146.

Hudson, P. (2004b). Toward identifying pedagogical knowledge for mentoring in primary science teaching. *Journal of Science Education and Technology, 13*(2), 215-225.

Hudson, P. (2007, July). *Benchmarking preservice teachers' perceptions of their mentoring for developing mathematics teaching practices.* Paper presented at Mathematics Education Research Group of Australasia (MERGA) Conference, Hobart, Tasmania.

Hudson, P., & McRobbie, C. (2003, November). *Evaluating a specific mentoring intervention for preservice teachers of primary science.* Paper presented at the annual meeting of the Australian Association of Research in Education (AARE) Conference, Auckland, NZ.

Hudson, P., Skamp, K., & Brooks, L. (2005). Development of an instrument: Mentoring for effective primary science teaching. *Science Education, 89*(4), 657-674.

Marsh, C. J. (1994). *Producing a national curriculum: Plans and paranoia.* Leonards, NSW: Allen & Unwin.

Masters, G. N. (2009). *Improving literacy, numeracy and science learning: Preliminary advice. Assessment and Reporting Projects.* Retrieved 6 March, 2010, from http://research.acer.edu.au/ar_misc/4

McCann, T. M., & Johannessen, L. (2009). Where are the good mentors? *English Journal 98*(4), 120-122.

National Australian Program Literacy and Numeracy. (2009). NAPLAN 2009 tests. MCEECDYA. Retrieved 6 March, 2010, from http://www.naplan.edu.au/naplan_2009_tests.html