



Strengthening the Research, Learning, Teaching Nexus through Mentoring Relationships

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Executive Summary

Introduction

Increasingly, in all sectors of education, there is an expectation that teaching practices are informed by research. However, research (Fleer, 2001) has shown that many teachers eschew research in favour of practical methods when seeking ways to improve their practices. Research (Harrison, Dunn & Coombe, 2006) also indicates that many students, participating in teacher education programmes, lack the academic skills to analyse, synthesise and evaluate research.

To strengthen the links between research, learning and teaching practices, within an early childhood undergraduate teacher education programme, a research mentoring programme was introduced. In contrast to the traditional transmission approach, where students are typically seen as audience and teacher educators as knowledge experts, this project used a socio cultural approach, where reciprocal learning relationships between students and teacher educators were encouraged.

Aims

- To develop research knowledge and research capacity of students and teacher educators, through research mentoring relationships.
- To evaluate the impact of the mentoring programme on the research literacy skills of students.
- To identify ways in which reciprocal and responsive learning occurred between teacher educators and students.

Methods

Twenty-one year three undergraduate students and seventeen teacher educators in an undergraduate early childhood teacher education programme were invited to participate in a mentoring programme. A mixed method approach using questionnaires, focus groups and journal entries provided both qualitative and quantitative data.

Phase 1: A quantitative baseline measure of students' research skills was taken before the mentoring programme was introduced. Students self-rated their research skills, using a 3 point Likert scale. Further data was gathered to measure the students' ability to critique a research article, using a content analysis scale based on Bloom's Taxonomy of Thinking. To ensure reliability an inter-rater reliability test was conducted using two independent assessors.

Phase 2: The research mentoring programme was introduced. Twenty one year three undergraduate students and seventeen teacher educators were matched according to topics of mutual research interest. Meeting for six times, over three terms, they discussed, analysed and critiqued research articles related to their chosen topic.

Journal entries provided a source of qualitative data. All students and teacher educators were asked to record their reflections following each of the six mentoring meetings. Incidences of reciprocal learning were noted during the analysis of these entries. The same baseline measures used in phase 1 were repeated at the end of the mentoring programme so that the impact of the programme could be assessed.

Findings

At the end of the mentoring project students' ability to analyse and critique a research article was reassessed. In all areas: comprehension, application, analysis and evaluation, there was a significant increase in the mean score. The majority of students were able to make valid judgements about the strengths and weaknesses of research articles. Some students were able to use research findings to critique current practices in New Zealand early childhood centres and identify gaps in policy and practice.

Journal entries showed that throughout the mentoring programme both students and tutors began to reconsider their roles and shift their positions as teachers and learners. By the second meeting teacher educators became aware of dominating the meeting through operating as knowledge expert, over-eager to share their expertise about the topic. By the third meeting many teacher educators attempted to move from a didactic approach to one which encouraged the contribution of the students. One teacher educator, with no previous knowledge on the topic she was discussing with her students, recognised that **not** being a knowledge expert had advantages. She considered that the skills she had developed in her recent academic study were of more value in guiding the students' analysis and critique of research articles than specific knowledge about the topic. Students quickly shifted from being passive learners to taking a more proactive role, through the necessity to source research articles and prepare an analysis of the article for each mentoring meeting. Both students and teacher educators were able to gain a firsthand experience of the reciprocal learning relationships, which are advocated in the New Zealand early childhood curriculum (Te Whāriki) as the basis of quality interaction and teaching practice with children. A closer analysis of specific instances of reciprocal learning, through further research, could offer more insight into this important principle of learning.

A further development of this research mentoring programme would be to track the student graduates who participated in this programme to investigate if the mentoring has made any impact on their current teaching practices in early childhood centres.

What could a research mentoring programme offer to other undergraduate teaching programmes?

A mentoring programme can be a time efficient and cost efficient way to further the research knowledge and literacy of both teacher educators and students. Working alone with a mentor, or in small groups, requires students to be more proactive in their learning. Through discussion with experienced teacher educators, students increase their awareness of the relevance and practical application of research findings to their own teaching practices. Students can contribute to the learning and teaching of teacher educators through their role in providing recent research articles around topics which they may be currently teaching, studying, or researching themselves. Research mentoring programmes could also be used to strengthen the research, teaching and learning nexus within pre-service teacher education programmes for primary and secondary education and other sectors of tertiary training (e.g. medical training) where research informs practice.

Introduction

While traditionally research has been a core element of graduate education, there is now in undergraduate tertiary education, an increasing expectation that research is integrated within the teaching curriculum. The New Zealand Tertiary Education Strategy requires “a research culture within which undergraduates learn to take a research-based approach to their lifelong educational development (Ministry of Education, 2002, p.60). However, within institutions, there is considerable variance in the ways that teachers and students conceptualise the linkage between research, teaching, learning and research (Healey, 2005; Hoddinott, 2005; Brew, 2006; Robertson & Blacker, 2007; Wareham & Trowler, 2007).

In New Zealand early childhood teacher education, research is an integral component of undergraduate programmes. There is a rapidly growing body of New Zealand research related to early childhood, and a “renewed vigour in international research” (Kilderry, Nolan, & Noble, 2004). Advocates for quality in New Zealand early childhood education emphasise the importance of evidence-based practices which are informed by research (Farquhar, 2003; Meade, 2008). It is argued that through research knowledge “early childhood professionals will be empowered to make advancements in professional, educational and service provisions” (Kilderry et al., 2004, p.25). In an Australian study, Gray and Campbell-Evans (2002, p.47) argue that “teachers need to see the importance of engaging in and using research so that they can confidently make data driven decisions related to the processes of teaching and learning.” Fleer (2001) however, has highlighted the issue that, in Australian early childhood centres, many teachers “eschew research in favour of practical methods when seeking ways to improve their practices” (p.43).

According to Harrison, Dunn & Coombe, (2006) many students, in Australian early childhood education training programmes, are challenged by the idea of reading or conducting research. Further, they claim that some students appear to lack the academic skills to analyse, synthesise, and evaluate research. This claim resonates with my own experience as a teacher educator of early childhood students within a New Zealand initial teacher education setting. From my position as a teacher of research, I have observed that many students have viewed research as “something academics do”. They can be daunted by the idea of reading a research article and they lack understanding in how research can be used to support teaching practices. If research is to be used to support evidence-based practices that improve the quality of teaching and learning within early childhood centres, then teacher training programmes have a responsibility to prepare students appropriately.

The New Zealand early childhood curriculum (Te Whāriki) is underpinned by social socio-cultural principles. Te Whāriki “emphasises the critical role of socially and culturally mediated learning and of reciprocal and responsive relationships” (Ministry of Education, 1996, p.6). Learning is seen to be socially-constructed. Both the context in which learning occurs and the social contexts that learners bring to their learning environment, are viewed as crucial aspects of learning. This approach enables intersubjectivity, a “shared understanding based on a common focus of attention and some shared pre-suppositions that form the ground for communication” (Rogoff, 1990, p.71). Knowledge is shaped and evolved through negotiation within a communicating group. Intersubjectivity enables people to extend their understanding of new information and activities among the members of the community to which they belong (Rogoff, 1990). An

important pedagogical implication, for early childhood teacher training, is that students develop a sound understanding of socio-cultural principles.

The value of a socio-cultural approach to children's learning has been highlighted in the Quality Teaching Early Foundations Best Evidence Synthesises Iteration (Farquhar, 2003). In this report Farquhar identifies features of quality teaching linked to learning outcomes for the child. Two key features identified were "pedagogy which promotes a co-construction method of learning" and pedagogy where "children are supported to change roles between teacher and learner as their learning is scaffolded and as they scaffold the learning of others" (Farquhar, 2003, pp.2, 3).

Because socio-cultural theory underpins the expected practices of early childhood teachers in New Zealand, it can be argued that initial teacher educators need to model this approach so that their teaching practices are consistent with the theory that they teach. During their training, early childhood students could benefit from the opportunity of engaging in reciprocal and responsive relationships and socially and culturally mediated learning with their tutors and peers. However, teaching in many tertiary institutions still tends to be based on the traditional model of transmission "associated with the transfer of information" by teachers (Sterling, 2002,). Under this approach, Healey (2005) argues that students are seen as audience and tutors/lecturers as the knowledge experts. A transmission style of teaching contradicts the practices early childhood teachers are expected to follow in accordance with the social cultural emphasis of Te Whāriki, where a co-constructed, participatory approach to learning is emphasised.

If early childhood students are required to use socio-cultural practices within their teaching, then their training needs to model socio-cultural practice. To understand inter-subjectivity and experience how learning can be enhanced through reciprocal and responsive relationships, teacher training programmes could offer opportunity for students and tutors to interact in the kind of teaching/learning relationships that we advocate as good practice between teachers and children in early childhood settings.

Aims and Background

Similar to the students reported in previous studies (Gray & Campbell, 2002; Harrison, Dunn & Coombe, 2006), many students I had taught in previous years had approached their year three research course lacking the confidence and skills to engage with research articles. Instead of using a traditional, transmission approach to teaching students about research, I wanted to try an approach which supported socio-cultural principles. I saw mentoring as an approach which could offer this opportunity to tutors as well as to students. Therefore, I planned a mentoring programme designed to engage students and tutors in research discussions and provide opportunity for shared learning and making meaning (co-construction) of research articles together. I hoped that tutors and students might scaffold each other's learning and exchange roles as teacher and learner, therefore supporting the approaches advocated by Farquhar (2003) as key aspects of quality teaching in early childhood education. As an approach to teaching and learning within the teacher education programme, mentoring also provided the opportunity to model the socio-cultural philosophy of the College and Te Whāriki.

The mentoring programme also aligned well with the Maori concept of ako, which describes a teaching and learning relationship as one "where the educator is also learning from the students and where the educator's practices are informed by the latest research and are both deliberate and reflective" (Ministry of Education, 2008, p.8).

Throughout the mentoring programme tutors and students were encouraged to engage in critical reflection about the research they had read and to consider how this research could be applied to teaching practices within early childhood.

I designed the research mentoring project with two broad aims. The first aim was to develop the research knowledge and the research literacy skills of students and teacher educators within an initial teacher education setting. My second aim was to use mentoring relationships to encourage reciprocal and responsive learning between teacher educators and students.

Methodology

To evaluate the impact of the mentoring programme in building a research culture and the research capability of students within the College, I used a mixed method approach. Quantitative data was used to measure the impact of the mentoring programme on students' ability to understand, apply, analyse and critique research. Qualitative data was sought through questionnaires, focus groups and journal entries. These methods were used to gain insight into the nature of different mentoring relationships and to assess whether intersubjectivity did occur as the mentoring relationships developed throughout the programme.

Setting

The project was conducted in a private New Zealand tertiary training institution for early childhood teachers.

Participants

Seventeen staff members of the institution (twelve tutors, four administration staff, and the College director) and twenty one year three undergraduate students volunteered to participate. None of the students had received formal tuition about research prior to the mentoring programme. Five of the tutors had a Masters degree (two had written a thesis) and seven tutors had a Bachelors degree. The tutors with a Bachelors degree had read research articles as part of their study. Six of the tutors were engaged with further study to gain higher qualifications. While initially the project was designed for tutors and students, interest was shown by other staff members of the institution and they were therefore included as mentors. Because they acted in the same role as tutors for the purposes of this project, this term has been used for all staff members throughout this report.

Data Gathering

A baseline measure of research skills was taken before the mentoring programme was introduced. Both student and teacher educators participants completed questionnaires which asked them to consider their research proficiency, their use of research, and their hopes for what the mentoring programme might offer. Quantitative data was sought through three point Likert scales where students self-rated their research skills, according to how much improvement they believed they needed.

Further data was gathered to measure the students' ability to write a critique of a research article. Students were given a research article which reported on socio-cultural practices within a New Zealand early childhood centre. They were asked to identify the key focus of a research article, to apply this research to early childhood practices, to

identify the methodology used and the strengths and limitations of the research. Students were asked to write a critical summary of the same article at the end of the mentoring project

Journal entries were a key source of qualitative data. All students and tutors were asked to record their reflections following each mentoring meeting in a research journal. Participants were not given specific guidelines for their journal entries but left free to write about anything they considered relevant to the mentoring project.

After the third mentoring meeting data was also gathered through audio-recording of discussion from student and tutor focus groups. Students and tutors met separately to discuss the progress of the mentoring project. At the end of the project, focus groups for tutors and students provided opportunity for participants in the project to evaluate the impact the mentoring project had on their understanding and use of research, and the value of the teaching/learning relationships. Discussion from the focus groups was written on a white board so that participants had the opportunity to clarify or amend their comments. A participant from each group volunteered to copy the key ideas written on the white board. Discussion from each of the focus groups was also audio-taped for further analysis.

Data Analysis

Student questionnaires

Answers for each item on the students' questionnaire were tallied and a mean score was calculated so that an overall score was obtained. The same questionnaire was repeated at the end of the project. Students' self-rating mean scores at the pre-mentoring phase of the project were then compared with the post mentoring mean scores. Because the sample group was small (21 participants) a statistical analysis was not conducted.

Research article critique

A content analysis was used to rate their written responses against an assessment scale based on a revised framework of Bloom's Taxonomy of Thinking, by Anderson and Krathwohl, (2001) - see appendix (1) for the measurement scale used. Two markers scored the students' capacity to demonstrate each of the criterion using specific descriptors for each criterion. Comprehension was scored according to the student's ability to identify the research focus, while application was scored according to the student's ability to relate the research findings to teaching practice. Analysis required the student to analyze the method and theoretical perspective of the article and evaluation required a judgment of the strengths and limitations of the research article. A score between 0 and 3 was allocated to each of the four levels of thinking and a mean score was then calculated. The possible range, 0-3, represented no critical analysis (0), to very good critical analysis (3). A mean score was then given for each of these levels.

To ensure reliability, an inter-rater reliability test was conducted. The responses of all student participants were independently marked by two assessors. A consistent assessment was attained for each of the areas assessed: understanding, application, analysis and evaluation. Clarification was made to the marking criteria of the analysis segment of the critique to ensure consistency. This assessment tool was then repeated at the end of the mentoring project so that a comparative analysis could then measure any change in the students' capacity to engage in the process of research article critique. The same research article was given to students to critique at the end of the mentoring programme and the same measures were used to assess their level of critique. Mean scores from the pre-mentoring phase were then compared with findings from the post-mentoring phase.

Journal entries

All student and tutor journal entries were subjected to content analysis. Particular themes, related to the aims of the project, were recorded. Evidence of intersubjectivity, changes in the learning/teaching relationship between students and tutors, application of research to early childhood practice and critical thinking, were color coded in each of the journals.

Ethical Considerations

The project was submitted for approval to the ethics committee within the institution where the project was conducted. Participation in this project was voluntary and anonymity was assured. Pseudonyms have been used for all participants quoted in this article. A key issue in the initial planning of this study was to separate the teaching and assessment of the compulsory research paper the students were taking, from the mentoring programme. Therefore it was important to clarify the roles of the tutor of the research paper, and the roles of tutor/mentor and student/mentee. Written guidelines were given to clarify these differing roles. Mentors were asked to resist involvement in supporting students with writing their research assignment. Instead, mentors were asked to discuss research articles with students, and to help develop their understanding, analysis, application and critique of each article. The research paper was marked by an outside marker who had no contact with the students.

Research Design

The mentoring programme

Following ethical approval of this project, tutors and year three students were invited to participate in a research mentoring programme. Tutors were given a list of the students' nominated research topics and then invited to choose a topic to support. Tutors and students were matched according to a topic of mutual research interest and then invited to meet, throughout the year, to discuss research articles related to their chosen topic. Six one hour meetings, two per term were arranged.

Students were expected to be proactive participants of the mentoring partnerships. Rather than rely on tutors to provide research articles, they were instead asked to source quality articles and give these to the tutor one week before their mentoring meeting. This enabled both student and tutor the opportunity to read the article and prepare a summary, reflections and questions. Students and tutors were given a mentoring booklet with written guidelines for each meeting so that there was a common focus. For further guidance, throughout the project, tutors were briefed in staff meetings and students were briefed in class.

The findings of this report will focus on the use of research and research skills of students at the pre-mentoring phase of the project and the post mentoring phase. Additionally, this paper describes the shifting positions between tutors and students as they shared research knowledge through mentoring relationships based on socio-cultural principles and the Māori concept of ako.

Findings

The student questionnaire sought to assess the extent to which student participants were inclined and able to access research literature to help explore problems of practice. It also required students to self-report on their proficiency with respect to their research skills; and to document their hopes for what the mentoring programme would bring. I

have used this questionnaire's framework as a structure to report findings. The same procedure is repeated with respect to the tutor questionnaire.

How did students rate their research skills?

To explore students' perceptions of their research skills before beginning the mentoring programme, they were asked to self-rate their ability to undertake basic research activities. They were also asked to consider how much improvement to their research skills they considered necessary, using a scale of "much improvement" "some improvement" and "no improvement" (with 1 being the need for no improvement and 3 the need for much improvement). From these ratings it was possible to produce a mean score for each of the questionnaire items. Students' responses are summarized in Table 1. Their responses show that analysis and critique of research articles (identifying the strengths and limitations), identifying current debates and writing a literature review were the areas they identified as needing most improvement.

Post mentoring

Following the mentoring programme the mean scores (in Table 1) show that students reported an improvement in all research skills. The mean scores show a particular improvement in critique of research, identifying current debates and gaps in research, and use of Te Whāriki to support their rationale for their own research.

Table 1: Student perceptions of their research proficiency

| When thinking about your current research skills how would you rate your ability to: | | Mean* Pre-mentoring | Mean* Post mentoring |
|---|---|----------------------------|-----------------------------|
| a) | find a research article using a data base | 2.2 | 1.8 |
| b) | limit your data base search if you get too many hits | 1.8 | 1.7 |
| c) | understand what a research article is about | 2.1 | 1.4 |
| d) | identify the methodological orientation of your research topic | 2.4 | 1.4 |
| e) | identify the strengths of a piece of research | 2.2 | 1.6 |
| f) | identify the limitations of a piece of research | 2.5 | 1.5 |
| g) | identify key researchers in the topic that you are researching | 2.1 | 1.3 |
| h) | use Te Whāriki to support the rationale for your research | 2.2 | 1.2 |
| i) | identify similar and dissimilar themes across research articles related to your topic | 2.3 | 1.4 |
| j) | identify current debates within the topic you are researching | 2.5 | 1.6 |
| k) | use research articles to produce an academic literature review | 2.4 | 1.6 |
| l) | identify gaps in current research about the topic you are researching | 2.4 | 1.5 |
| * | 1= no improvement needed, 2 =some improvement needed, 3=much improvement needed | | |

How did students apply research?

Pre mentoring

To further explore their familiarity with and use of research, students and tutors were asked to name the latest research article they had read and to identify where it was published. Almost half of the students gave no response. Only four students could identify a research journal or data base in their answer. Students were also asked to rate the impact of this research article on their teaching practices, using a scale of 1-3 (3 being a lot, 2 a bit, 1 not at all. Refer to Table 2). Almost half the students indicated that the research article had made them think about their teaching practice and make changes to their practice. However, few respondents were able to give specific examples of changes they had actually made to support their teaching. Nine students offered vague links e.g. "I did drama", "I used instruments", "I was more careful and open minded in cultural practices", "I encouraged the use of private speech". The majority of students (12), however, did not attempt to answer this question.

Post mentoring

Mean scores following the mentoring programme show that students considered that they had been more influenced by the research article they had recently read since the mentoring programme. An increase was shown in all areas except wanting to change their teaching practices. The most impact reported was discussing the article with someone else (most likely their mentor).

Table 2: Student use of a research article recently read

| | To what extent did this research article: | Mean * Pre mentoring | Mean * Post mentoring |
|----|--|-------------------------------------|--------------------------------------|
| a) | make you think about your teaching practice | 2.5 | 2.8 |
| b) | make you want to change your teaching practices | 2.2 | 1.9 |
| c) | lead you to trying something new on practicum | 1.9 | 2.1 |
| d) | lead you to discuss any of the ideas with someone else | 1.5 | 2.3 |
| e) | give you new ideas about how to teach | 2.1 | 2.4 |
| * | 3 =a lot, 2=a bit, 1= not at all | | |

Students' critique of a research article

Pre mentoring

To assess their ability to critique a research article and apply the research findings to teaching practice, students were asked to analyse a research article provided to them and to write a critical summary of that article. Their responses were assessed according to: understanding, application, analysis and evaluation; criteria devised by Anderson and Krathwohl (2001). Twelve of the twenty one students accurately described the focus of the research article, nine students were able to make a link between the article and teaching practice, and two students attempted to analyze the article. Only one student attempted to evaluate the article.

Post mentoring

At the end of the mentoring project students' ability to analyse and critique a research article was reassessed with the same research article and assessment measure used at the pre-mentoring phase. Table 3 shows that in all areas of thinking: comprehension, application, analysis and evaluation, there was an increase in the mean score. There was a significant increase in the number of students who attempted to evaluate the article and make valid judgments about the strengths and weaknesses of the article.

Table 3. Assessment of students' capacity to critically analyse a research article

| Level of critique | Mean score Pre-mentoring | Mean score Post mentoring |
|--------------------------|-------------------------------------|--------------------------------------|
| Understanding | 1.00 | 1.7 |
| Application | .57 | 1.5 |
| Analysis | .09 | 0.9 |
| Evaluation | .04 | 1.3 |
| 0 = no critical analysis | 3 = very good critical analysis | |

Journal reflections following mentoring meetings

Reflections on the content and value of their research discussions were written by tutors and students following each of the six meetings. Content analysis of the research journals reflected a growing confidence in the ability of students to understand, apply, analyse and evaluate research. This was consistent with the trends shown in the quantitative measure (Table 3) of students' ability to critically appraise a research article.

Shifting positions

Mentoring meetings led most tutors to reconsider their roles as knowledge experts and think instead about reciprocal learning. When reflecting on the first meeting many tutors were aware that they had dominated the discussion, often due to their enthusiasm and prior knowledge of the topic. For some tutors, with particular expertise around a topic, this was challenging e.g. as tutor Chris reflected:

A really interesting session with the student which I know I dominated but couldn't really help it. Well I could have stopped myself but I didn't want to. I had so many things I wanted to ask. I think if I was honest I was far too influential in the session but I found it so interesting.

By the third meeting several tutors had reconsidered their role as mentor e.g. Kay wrote:

The biggest impact has been to re-evaluate the student/tutor relationship. It has been both enjoyable and enlightening to step out of those didactic shoes. Two short meetings had been enough to shift our positions quite noticeably and once I'd learned to shut up I also learned that V was more than capably filling the silences.

Many students reported that during the mentoring meetings they learned how to express their ideas. In contrast to being a passive and silent member of a large class, they found that in a mentoring relationship they had to be more active and vocal. As one student admitted: "When it's just you and the tutor there is no one else to bail you out." Students found that they had to know the content of the research articles well enough to articulate their ideas.

Tutors noticed how students came with a different orientation to the discussion of their research articles. Following the first meeting Tutor Kay had noted that the student had seen the meeting in terms of her own benefit: "I would describe the student's approach as quite utilitarian...she had looked for clarification of her own understanding...I had looked for challenges and new ideas and questions I wanted to pose." After the second meeting, her student Val reflected that she had been "viewing her [tutor's] role as an aid for me rather than being an equal and reciprocal relationship."

By the third meeting, some had begun to describe themselves as "co-learners" rather than mentors. Tutors, discussing their experiences in the final focus group, also reflected this shift in awareness. Tutor Jan stated: "I started with the mentor attitude but spent most of the time in a co-role which brought like minds together." Tutor Kim reflected:

The process changed over time with the mentor and mentee levelling out after the first meeting...We came together... It was not mentoring, just three people coming together to share a passion, a collaborative sharing together... almost selfishly enjoying the topic... We were a community of learners.

Clearly some students had rekindled tutors' interest in the research topic. Helen explained: "It was wonderful reciprocal stuff. It really fired me up to continue researching. It was exciting to see students learn to think critically." Mel added: "They inspired me; I'm taking a university paper next year due to this." She found that the mentoring had "made her reflect" and gave her the opportunity to revisit a topic she was interested in, but didn't get to teach.

Through sharing research knowledge with tutors, students also discovered that they contribute the content of future courses in the College. Three students were asked if their literature reviews could be used as unpublished papers for readings to support a new course recently introduced at the College. Student Arna became aware that her own learning could contribute to the knowledge of future students. In her journal she wrote:

Kim asked me if we would give permission to use our literature review for her new course next year. I felt empowered and I felt honoured to be able to share my work with others to help them in their learning process.

The need for tutors to have specific knowledge or expertise around the research topic was reported, by some students, to be relatively unimportant. Some tutors and students, who had worked with a topic they were unfamiliar with, found that their lack of knowledge could support a more reciprocal relationship. As Tutor Lyn reported:

I really enjoyed working alongside the students. The area of Private Speech was new territory for me, but I was delighted / reassured that the skills I had developed through study and practice were so readily transferable.

These reflections show that it was not necessarily knowledge and expertise of tutors that constituted a successful mentoring relationship, but the experience of learning together. The ability of the tutor to utilise skills e.g. analysis, critique gained from their own academic study appeared to be more important than knowledge of the topic.

Using research to critique current practices in early childhood education

By the third and fourth meetings students and some tutors began to critique current practice in early childhood centers e.g. Kath wrote: "It made me think deeper and to be a bit more critical of some of the practices which are being implemented." Some

students noted the lack of specific reference to their topic (e.g. the natural environment) in current early childhood policy. Tutor Kim wrote:

We critiqued the original articles and said they were more of a “noticing” than a piece of research. This led us into a conversation about why there is no policy to support the natural environment preschools and we asked ourselves why?

Following the same meeting the student Anna reflected:

Kim has been really supportive by sharing her opinions and questioning our ideas. It makes me think deeper and to be a bit more critical about some of the practices which are being implemented in centres. I had the idea there was some magic policy, but found there wasn't.

Other students commented on how little the child's voice was represented in many areas of research, while others became more aware of the common themes and links between research articles and limitations of some studies.

Making a difference: Applying research to practice

By the fifth and sixth mentoring meetings some students had begun to consider how the knowledge they had gained from research articles could be applied to their teaching practices in early childhood centres. Tutors observed that many students had grown in confidence and ability to articulate their knowledge around their research topic. Reflecting on the growing confidence of one of her students, Kim had noted in her journal that:

*One of them has chosen to work in a centre because she wants to make a difference in her choice of employment. She will be able to say **why** a natural environment is a good idea. She wants to work in a centre not well set up for the natural environment so that she **can** make a difference. She definitely has the clarity. She can go into any centre and say why it is a good idea.*

Another student had made a link with a centre promoting a sustainable environment and found that she had found the confidence to share ideas and talk with other people in the field. For her first teaching position she hoped to find a centre where she too could make a difference.

Conclusion

Overall, the findings of this project show that the mentoring project helped develop the research literacy skills of the students, while rekindling the research interest of several tutors. Both qualitative and quantitative data showed that students improved in their ability to comprehend, analyse, apply and evaluate research. It was anticipated that six mentoring sessions may be required for these skills to develop. However, journal entries by both students and tutors showed that, already by the second meeting, analysis and critical thinking had begun to develop. If the project were repeated it could be possible to achieve similar results in fewer than six meetings. This could be tested by future research.

Underpinning this project was the Māori concept of ako, which highlights the value of a reciprocal teaching/learning relationship. It was hoped that, through mentoring meetings, students and tutors could experience being a teacher and a learner, an expert and a novice. Although not all mentoring relationships did evolve in this way, many tutors and

students found that they could be both teachers and learners. At the beginning of the mentoring programme some tutors became aware of their tendency to dominate the meeting and act in the role as knowledge expert. However, by the second and third meetings they recognised the need to be less didactic and hold back their own knowledge so that the students were given more opportunity to contribute. Most students made significant contribution to the knowledge of tutors through providing current research articles. Three students contributed their own literature reviews to support a new course being planned by their tutor mentor. For these students and tutors, the original concept of mentoring changed as they shifted from their traditional positions and discovered the value of reciprocal learning. Through “a sharing of minds” they were able to experience a learning relationship which reflected the concept of ako.

Previous research (Fleer, 2001; Gray & Campbell-Evans, 2002; Harrison, Dunn & Coombe, 2006) has criticised the lack of application of research findings in early childhood centres. Findings from this project suggest that mentoring could help prepare students to use research-based evidence in their teaching practices. Mentoring gave many students the opportunity to rehearse and articulate their research ideas and gain the confidence needed to make a positive difference to current practices. Some students were able to use research findings to critique current practices in New Zealand early childhood centres and identify gaps between policy, research and practice. Further research, to investigate how the research knowledge students gained through the mentoring programme might impact on their future teaching practices in early childhood centres would be useful.

Through sharing research knowledge and its application to practices within early childhood settings, students and tutors had the opportunity to experience a socio-constructivist approach to learning. As tutors and students made meaning of research terminology and the content of research articles together, some recognised the value of shared learning. Through scaffolding each other’s learning and co-construction of research knowledge, students and tutors were able to experience approaches advocated by Farquhar (2003) as a feature of quality early childhood teaching practice. This approach underpins Te Whāriki, which highlights “the critical role of socially and culturally mediated learning and of reciprocal and responsive relationships” (Ministry of Education, 1996, p.6). Mentoring projects, using socio-cultural principles and the concept of ako as a way to develop research knowledge and research capability, could contribute effectively to other teacher education programmes.

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