Listening to the learners:
Mentee's perspectives of a mentoring program for first-year science teachers

By Mary Oliver, Andrew McConney and Dorit Maor

Mentoring teachers during their early career induction has the potential to pay long-term benefits in respect of improved teacher effectiveness and retention. To add to our understanding of mentoring beginning teachers, this paper documents the experiences of thirty-eight teachers in their first year of teaching Science or Mathematics who participated in an innovative mentoring program. Data gathered through applications, surveys and focus groups reflecting the views and voices of these thirty-eight teachers support the notion that carefully-designed mentoring, including subject-specific, trained mentors can indeed have substantial positive impacts on the success of beginning teachers in Science and Mathematics.

The case for mentoring

There is concern about the relative scarcity and high rates of attrition from the profession of qualified Science and Mathematics teachers in Australia. However, the facts are sometimes difficult to determine. For example, research conducted by the Deans of Science of Australian Universities found that most schools surveyed had difficulty recruiting qualified science teaching staff and that one third of male science teachers are at least fifty years of age (Harris, Jensz, & Baldwin, 2005). Furthermore, other Australian research has shown that a substantial proportion of current teachers in Mathematics and Science do not have appropriate training for, or are underqualified in, those subjects (e.g. Ingvarson, Beavis, & Kleinhenz, 2004; McConney & Price, 2009). There also are indicators of a disturbingly high attrition rate for beginning teachers of Physical Science and Mathematics over their first two years of teaching (e.g. STAWA, 2000).

Are there fewer teachers than there were, or are teachers leaving the profession at an earlier stage in their careers? We know that the workforce is ageing, that high attrition rates impact negatively on student achievement and that some classes are being taught by teachers unqualified in those 'hard-to-staff' subjects. A report released last year by the Australian Education Union showed that about 33% of new teachers in Australia have been asked to teach outside their area of expertise and less than half of all beginning teachers had access to mentoring programs (AEU, 2008). Why are teachers leaving? According to the AEU report, teachers' primary concerns seem to be workload, pay, managing disruptive students and class sizes. Thus, working conditions seem to play a substantial role in teachers' decision-making around staying in or leaving the profession.

For instance, few other professions have the expectation that initial training adequately prepares them to take on a full-time load of work—newly qualified lawyers and doctors continue their training as they work alongside their more experienced and qualified colleagues. Indeed, teaching is probably the only profession where 'beginning teachers [are] assigned heavier workloads than their veteran colleagues' (David, 2000, p. 135). Many are assigned their first teaching positions in difficult circumstances, some far from friends and family, with the same teaching load as their experienced colleagues. In the Australian context, teaching placements in remote areas where there is little support may also contribute to stress and early exit from teaching (Hudson & Hudson, 2006).

Mentoring: a friendly face or a program of support?

Perhaps there are specific strategies that can help retain beginning teachers in Science and Mathematics?

We know from the research and professional literature, for example, that mentoring beginning teachers as a part of their early-career induction experiences pays substantial longer-term dividends in terms of their success as teachers and in better teacher retention outcomes (Ingersoll & Kalik, 2004). However, it would also seem apparent that not all mentoring programs are created equal and not all approaches to new teacher mentoring result in improved teaching or improved retention in the profession.

Therefore, to add to our understanding of mentoring for beginning teachers, this paper documents the experiences of thirty-eight mentee teachers—in their first year of teaching Science and/or Mathematics in Western Australian schools—who participated in an innovative mentoring program. The pilot mentoring program for beginning Science (Chemistry and Physics) and Mathematics teachers was designed and managed by the Centre for Learning Technology at the University of Western Australia (UWA) as a recommendation of the Science Council of Western Australia, with funding support from the WA Department of Industry and Resources (DoIR).

All eligible teachers of Science and Mathematics were invited to participate in the program, with incentives such as funding for a 20 per cent reduction in their teaching loads, specific professional development opportunities to meet the needs of newly - qualified teachers and subsidised attendance at a professional

conference organised by the Mathematical Association of Western Australia (MAWA) or the Science Teachers' Association of Western Australia (STAWA). Most significantly, each participating graduate teacher was provided with his or her own fully-trained mentor. Beginning Science and Maths teachers from all three school sectors (Government, Catholic and Independent) were included and, importantly, there was cross-system support for the pilot program.

Mentors were chosen by their mentees/schools, or volunteered themselves. Consistently, the mentors were highly experienced leaders in their fields of Science and Mathematics in Western Australia, often with years of teaching experience and substantial records of continuing their own professional development. On an interpersonal level, the mentors were routinely described as altruistic and caring.

To be able to document and share their experiences of the program, we asked the thirty-eight mentee teachers to share with us some information–where they taught, work experiences at school, why they wanted to join the mentoring program, what they enjoyed about teaching and what they needed in the way of professional support. These data were collected through written application forms, surveys and focus group interviews that took place at the beginning and end of the mentoring period.

Why Science and Mathematics teachers wanted to be in the mentoring program

The program offered a number of supportive components: access to a mentor, the possibility of a reduced teaching load, professional development and attendance at a state conference such as CONSTAWA or Future Science and opportunities to exchange ideas with colleagues. Schools were reimbursed for releasing the mentee teachers from a line of teaching and for attendance at the program of professional development at UWA. Mentees were largely enthusiastic and hopeful about participating in the mentoring program, valued their mentors' experience and expertise and in particular appreciated the opportunity to reflect on and discuss classroom practice with experienced mentors:

> *Already I have found that the pressures of applying learned knowledge in a classroom setting is more difficult than expected.*
>
> *As a graduate teacher I recognise that my learning curve is going to continue as I apply what I have learned in University to a fully-operational school setting.*
>
> *As a beginning teacher I value the expertise and experience of more experienced teachers. To have a mentor that has taught the same subjects and be able to use their ideas to base your lessons around, gain background knowledge on [a] subject you are unsure of is one of the best resources available.*
>
> *It is valuable to have an experienced teacher to help you with reflecting and debriefing lessons you have implemented in the classroom.*
>
> *One of the most important benefits of this mentoring program will be to discuss successes and failures, receive guidance and advice from teachers who have more experience than I do.*
>
> *There are many areas to my teaching that need improvement and I think that working with an experienced mentor can benefit me greatly.*
>
> *There are times when I have felt lost and overwhelmed, so I think the program would be a very beneficial experience.*

Most importantly, the mentees had formal access to their mentors for rwo hours per week. Typically, partnerships were established between mentee and mentor teachers at the same school but there were many variations on this. In some regional or remote schools, the mentee was the only teacher of Science or Physics in that school, but had had especially requested some subject-specific assistance. Some long-distance partnerships were formed between experienced teachers in particular schools, and their mentee teachers in other, sometimes very remote, schools.

School principals were typically quick to recognise the benefits of the mentoring program, recalling a time when new graduates were automatically given a reduced teaching load for their first year:

> *Hopefully things go well with the trial and it will become a permanent thing. The 0.2 release is something we have done in the past when we have the staffing and it makes a huge difference to the grads.*

The benefits of the program were also acknowledged by mentors who were altruistic, reflective and visionary:

> *I struggled in my first couple of years of teaching by being the only Mathematics teacher in the District High School in which I worked and understand the isolation that many new graduates feel. Even in larger schools, teachers have a greater workload so many experienced teachers do not have as much time to spend with graduates. As I am on leave, I have time that I can use to assist the mentees and it gives me an opportunity to feel as though I am a part of the classroom again.*
>
> *I also [have] a certain empathy for the graduates thrown into a difficult situation as I know what it is like and would have benefited from having someone to ask for assistance or bounce ideas off when I first started teaching. I know some people hold the train of thought that graduates have to work hard at the start of their careers before it gets easier but they needn't re-invent the wheel if it has been done before.*
>
> *I can credit my success as a classroom teacher to the support of the teachers at crucial stages of my development ... such as advice how to format Year 12 Physics tests correctly, delivering Lenz's Law so as not to establish misconceptions. I had the benefit of being mentored by a number of teachers. Getting new teachers to be 'self-assessors' in an open and constructive way can only be done through modelling.*

Indeed, enabling reflective practice was central to the mentoring conversations between mentees and mentors. Mentees were able to focus on their needs: reflecting on their experiences, gathering information and resources, working through instructional and assessment options with the mentor and setting goals. The literature suggests that learning through reflection is typically the most common aspect of the mentoring process (Lopez-Real & Kawan, 2005). Thus, the mentoring relationships became a conduit for ongoing review, reflection and planning, or *guidance mixed with professional space* (Carter & Francis, 2000, p. 5).

What mentee teachers enjoyed about teaching

Beginning teachers bring enthusiasm, optimism and a desire to make a difference to the lives of students in their care. All of the mentee teachers were able to identify a number of enjoyable aspects of teaching. For some it was the relationships developed with students and/or other teachers, while for others it was the 'buzz' gained from teaching groups of able students. Developing good relationships with students was identified by many mentees as rewarding and essential for learning to occur. Additionally, many described the professional satisfaction of working with students and seeing connections being made, when you know you are making a difference as a teacher:

> *Seeing the students develop over time, learn and understand something new.*
>
> *Structuring the class for learning, initiating their curiosity.*
>
> *Seeing [students'] faces when they learn something they didn't know before.*
>
> *Being involved with student learning and exposing them to various activities they would not usually be able to do.*
>
> *Planning and facilitating meaningful lessons – those ones where you can see in their eyes they have picked up something new.*

A new working environment can be stimulating but sometimes challenging, and starting teaching can be very daunting. These beginning teachers also recognised how supportive their colleagues were:

> *[I am] appreciative of the communication of the department in the school.*
>
> *Support from other staff [is great].*
>
> *Professional relationships formed with colleagues.*
>
> *[I enjoy the] collegiality and support.*

What mentee teachers found difficult at first

From the outset, mentee teachers identified student behaviour management, classroom management and time management as common areas in which they needed support. However, as depicted in Figure 1 below, content-related instructional and assessment methods, the location and use of appropriate resources for Science and Mathematics, and the use and integration of ICT in teaching also loomed large in the list of mentees' self-perceived areas of need.

Mentees further explained that:

> *I'm inexperienced in behaviour management, have little resources and am finding the job very overwhelming.*
>
> *I find it a challenge to keep a class on track, engaged in a particular lesson and motivated to learn.*
>
> *I am following a very rough program (it's something I've had a lot of problems with as I just don't know what to cover, in what order, to what depth, and how to link it all together)….. I feel completely lost.*

All the mentee teachers were provided with two days of professional development around these main areas of concern. These sessions also provided the mentees with an opportunity to develop closer ties with their professional organisation. For its part, STAWA extended complimentary membership to all the mentees enrolled in the program. In addition, we ran a workshop for the science teachers on assessing students' understanding in practical ways, as well as how to provide opportunities for students to make progress in their learning. There were also other gains from the two-day PD. It was an opportunity for teachers to network socially and professionally:

> *[over these two days] I have met people who are in the same boat as me. It was good having the two days at UWA, not only was I in awe with the uni but the strength the speakers instilled in me. I came away feeling a little more confident and with a list*

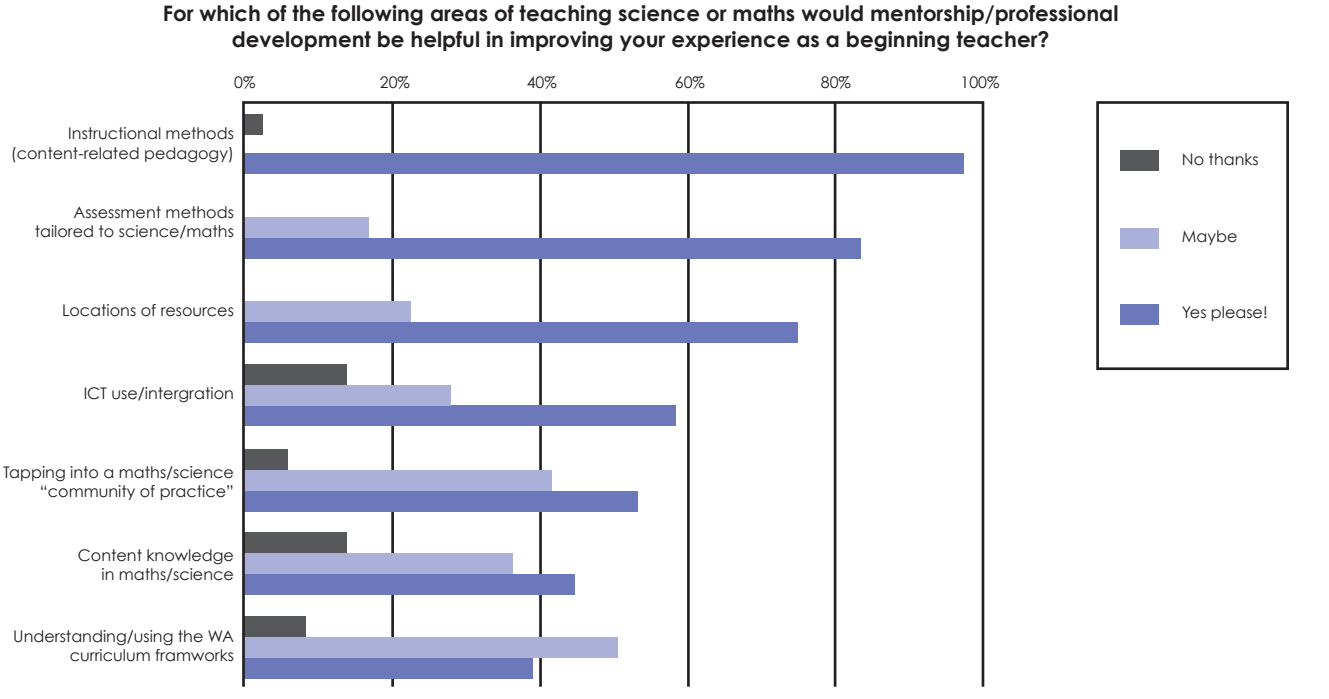

Figure 1) Self-perceived areas of mentee teachers' need in mentoring/PD.

of email addresses of new friends and colleagues I had met. It was amazing how easy it was to talk with colleagues and speakers who were all willing to share experiences and offer help.

It has certainly opened new doors for me and introduced me to numerous people in the science education network.

How did things work out for the beginning teachers?

Following the mentors' training, all the participants in the program were sent mentoring conversation protocols for guidance during mentoring meetings. The emphasis was very much on the graduate teachers to set the agenda for the meetings with their mentors and to identify and articulate their needs and goals. These might include some observations by the mentee, who could see how other teachers managed the same group of students.

Further, the mentoring program team kept in touch with all the teachers in the program, sending emails on classroom management, links to good websites with interactive and stimulating material (such as the Royal Society of Chemistry), ready-made worksheets, PowerPoints etc. Most of the time, mentors and mentees were able to arrange some common time to touch base with each other at school and one supportive mentor notes that:

I deliberately seek out [my mentee] each day (this is not hard as we share an office) to see how things are going.

However, experiences varied across the program. In another school, the mentee reported that even a month later:

[My mentor] and I have not done a great deal of mentoring in the structured sense. We have done a great deal of discussing about teaching various topics and setting tests etc. as the need has arisen of course, but we are yet to sit down with the structured sheets that were provided.

Most school administrators were very supportive of the program from the beginning. However, some teachers experienced considerable difficulties because school administrators needed all the paperwork completed before agreeing to teacher release to attend the PD, or reducing the teaching load of mentee teachers. Very few mentee teachers benefited from having their teaching loads reduced. Some did have their load reduced only to have an extra class added later, or increased relief rostered. Teacher shortage or availability, geographical location, and access to resources all seemed to play a role in determining whether mentee teachers were protected during this first year of teaching:

We have had HUGE problems in getting the administration of this school to release [the mentee] from one line on his timetable in order for us to have structured meetings. Unfortunately we are not free at the same time and we need the assistance of the admin department here, but it has not unfolded as it should.

I am concerned that the lack of action from admin is sending the wrong message to [the mentee] and others in his position... namely that the admin do not care about such a program... this would be incredulous [sic] especially here... a school that lost a young physics graduate last year as he left the profession.

I have spoken to deputies at our school and they cannot cover the relief for sick staff at the present. We have a number of staff on long-service leave and our relief pool of teaches is very low. They will not be able to provide mentees with time. Even though we all know it is important.

For those who were mentoring at a distance, emails, phone calls and meetings outside school time worked well. Some schools were creative in enabling the mentee teacher to observe the mentor teaching at another school:

[We have been meeting] fortnightly on Sundays for roughly 2.5 hours. I have also spent a day observing [my mentor teaching at his school], which was fantastic. I felt so inadequate; he is such an amazing teacher.

I have never met [my mentor] as he is a heck of a long way away [1600km] but we have emailed at least 10 times and spoken on the phone at least five times. Every time we have been in contact I have felt at ease and totally grateful to have his experience and expertise on my side in this first tough year of teaching.

My main issue is a direction for the Science course to take out here, and [my mentor] has armed me with fabulous frameworks that I then build lesson plans around. His frameworks are clear and concise but also leave me free to explore different tangents if they become available. His knowledge and ideas for my future plans have been tremendous also. I always come away from our conversations with renewed energy and excitement for the Science I am to teach.

One mentee teacher was lacking in confidence in preparing materials for laboratory use but there was no technical support in the school. She was the sole Science teacher at a remote school and was required to prepare material for moderation by the Curriculum Council of WA. Following the visit, she delightedly reported:

Moderation went really well, [the moderator] said my documentation was the best he had seen in the last six years of moderating. I was very pleased.

Was this a useful experience for the beginning teachers?

The mentee teachers found the mentoring experience very useful as the mentors helped them professionally with a range of issues such as enhancing their teaching strategies and classroom management, keeping students on task and classroom questioning and assessment techniques. Mentee teachers put it in this way:

Totally useful!!!!!!!!!! [My mentor] has been an absolute saviour. He has armed me with frameworks for units of study in Science as there was no direction or plans here when I arrived.

It has been fantastic. My meetings with [my mentor] have proven to be invaluable and I can't believe I survived prior to the program! He has helped me with my teaching methodology, provided tips for TEE students, the list goes on.

Yes, my mentor has given me many strategies for dealing with my difficult class, and some tips for my other classes too.

We have been able to identify and address a number of issues. My mentor has been extremely helpful with regard to:

1. *winning over the students.*
2. *settling them down by getting them to line up before entering the classroom.*
3. *capturing their attention at the beginning of a session ('hooking' them in).*
4. *breaking the lesson up into short segments for students with a short attention span.*
5. *producing my own worksheets and other material so the lesson is targeted to the class's requirements.*
6. *ending the lesson with a quick quiz to reinforce the lesson content and*
7. *keeping the students on task till the end of the lesson.*

Yes, we have discussed a number of issues, including behaviour management and discipline, extending talented kids, assessment writing and coping with stress. I have taken ideas back into the classroom and I think that I am a better teacher for it.

Having the time to spend with my mentor and be able to ask questions about many different aspects of teaching has streamlined the process of settling into classroom routines and given me great insight into how other teachers work.

Even though it is common practice by the experienced teachers to provide support to beginning teachers, it was great to have this formalised. I was always certain that I was not bothering anyone with all my questions regarding school and students. It was really helpful to have someone to turn to in case of any problems I was facing with the students. Also it was great to have someone to bounce ideas off and discuss strategies to make activities more suited to each level.

Many mentees described how the mentoring program had enabled them to survive their first year in the classroom, become more skilled as teachers and be drawn into the community of Science and Mathematics practitioners.

The program has been extremely beneficial and I will be sad when it comes to an end, although I will hopefully continue to develop a professional relationship with my mentor.

I would not have made it through this year without being a part of this program. This was the first time I had been away (750 km) from my fiancée and family. The isolation and change of lifestyle played havoc on me personally, plus the pressure of the job itself got the better of me. Although my department is very supportive, the ability to bounce ideas off a mentor, or just vent, has been invaluable.

This is a very good program and should be expanded to include all beginning teachers. Unfortunately, due to staff shortages, it has been difficult to do everything I would like (observe other teachers, programming, etc.) but this should improve next term.

How does this program compare with others?

Empirical data from a number of studies confirm that mentoring programs typically have a positive effect on newly-qualified teachers, as well as improving their retention rates (Ingersoll & Kralik, 2004). Bianchini and Brenner (2009) showed that whilst a formal induction program on its own does not guarantee teacher retention, having a mentor in the same field is essential for that deep knowledge to be shared and developed. As well as mentors and mentees teaching the same subject, Ingersoll and Smith (2003) demonstrated that common planning time with teacher colleagues, and networking with teachers outside the school, all add up to considerable support and result in reduced attrition at the end of the first year. Moreover, the more components the mentoring program had (such as specific beginning teachers' seminars, school support, collaborative developments on instructional issues etc.) the higher the retention rate of teachers (Ingersoll & Smith, 2003).

So, how to reduce attrition? Did this mentoring program help? In the words of the mentee teachers:

He [the mentor] has been an invaluable source of inspiration and strength to try out new things and just keep plugging away when needed.

I still want to come back and teach next year!

I feel confident in what I am teaching and I am able to research and learn what I need in order to teach subjects I was originally not confident about. I am still positive about students, despite the bad times, and I still believe they are all capable of good things. I still believe I am capable of good things despite the bad times.

I made it!

I know that the learning process will continue, and that my mentor will continue to help me.

I found that the mentoring I received often crossed into personal issues stemming from my work. My mentor recognised that my state of mind on a professional and personal level could not be separated.

Elsewhere, beginning teachers *identified improved classroom management skills, programming and assessment ideas...confidence and higher self esteem* as some of the benefits of effective mentoring (McCormack, 2007, p. 6). Additionally, it may be that new teachers participating in mentoring programs are already demonstrating their commitment to teaching and the improvement of their practice (Ingersoll & Kralik, 2004). For us to answer these sorts of questions about new teachers and mentoring, it would be interesting to follow these Science and Mathematics graduate teachers for years to come. In part, we would wish to witness whether and how the benefits of mentoring that we observed are sustained into the future.

We need to do all we can to support the teaching profession, including carefully inducting, developing and retaining the graduate Science and Mathematics teachers of today. One aspect of such support is our own ongoing learning about effective early career mentoring through listening carefully to the voices and experiences of our graduate teachers. Ultimately, our careful listening to, and support of, our new teachers can only improve school students' performance in Science and Mathematics.

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