Collaborative Team Writing of Assessment Tasks as Professional Development

Shelley Dole, Tom J. Cooper and Robert E. Bleicher
Centre for Mathematics and Science Education, QUT
Steven Nisbet, School of Education, Griffith University, Brisbane
Elizabeth Warren, Australian Catholic University, Brisbane

Teachers were brought together to produce a package of exemplary assessment tasks, rich in their potential to provide data on students' mathematical understanding and knowledge, and thus link with the national profile as a reporting framework. Through involvement in the writing team, it was found that teachers actually guided their own professional development. The writing team situation provided teachers with (i) support, (ii) feedback, (iii) opportunities for reflection; as well as assisting them gain (iv) confidence in using, and (v) knowledge and understanding of, the national profile.

The national mathematics profile (Australian Education Council, 1994) is a framework for recording and reporting student performance in mathematics. It follows from the national mathematics statement (Australian Education Council, 1990), and organises the mathematics curriculum into 6 strands (space, number, measurement, chance and data, algebra, and working mathematically) with 8 performance levels spanning the school years 1 - 10. The national profile document was adopted completely by the Queensland Education Department, and retitled Student Performance Standards (SPS) (Department of Education, Queensland, 1994). SPS as a reporting framework was partially utilised by Queensland state school teachers in 1995, with Years 3 - 8 teachers reporting on students' level of mathematical performance for the three strands of number, space and measurement.

The organisational structure of the SPS framework, while aligning the structure of the national statement, is fundamentally different to the Queensland mathematics syllabus for Years 1-10. Also, teachers found that mapping student assessment data to SPS levels was not a simple translation task. Alternative forms of assessment were required (Bleicher, Cooper, Dole, Nisbet & Warren, 1996). Thus, by its nature, SPS as a reporting framework required teachers to view the mathematics syllabus from a different perspective, and to change assessment practices.

This paper reports on the efficacy of collaborative writing of assessment tasks as a professional development activity. In particular, it evaluates the effect of the collaborative writing program on teachers' knowledge, beliefs and confidence with respect to assessment.

Professional development and teacher change

Implementation of SPS, in requiring change on two major fronts, met with a lot of teacher resistance (Bleicher, et al, 1996). Change in teaching practice comes about when teachers' beliefs and attitudes about aspects of their practice change (Clarke & Hollingsworth, 1992). Similarly, resistance to change is also due to attitudes, beliefs and experience (Grimison, 1993; Mousley, 1991). Berliner (1986) has suggested that teacher beliefs and attitudes change when student outcomes to teaching are observed to improve. It could be argued that teachers' beliefs and attitudes towards their current practices in mathematics would not lead to greater student understanding as a result of implementing SPS; hence resistance to SPS.

Overcoming teacher resistance to SPS required teacher change. A common method of effecting teacher change is to encourage teachers to participate in professional development programs involving various forms of inservice activities. As Guskey (1985), Guskey and Sparks (1991) and Smylie (1988) have shown, the effectiveness of

inservice is enhanced if teachers have opportunities to share their best practices, trial new ideas in their own classrooms , assess student understanding and bring feedback to the next inservice session to share with colleagues. This is supported by deLange (1992) who argued that an integrated approach, which provides teachers with time to experiment, gain experience and build confidence and focus on assessment was crucial to the success of inservice projects. Research into effective professional development that promotes change in teaching practice (e.g. Clandenin & Connelly, 1991; McLaughlin, 1990) has identified the following as essential:

(1) teachers' prior beliefs and attitudes are important elements in the change process;
(2) worthwhile and enduring change is a slow process that requires commitment and risk from teachers;
(3) collegial support in the form of regular meetings and discussions is an important factor to the change process;
(4) experience and reflection are necessary for effective change and input is needed from sources outside the schools to facilitate this reflection and to clarify and introduce different ways of considering situations;
(5) teachers' perceptions of successful and improved student learning is crucial to the success of the change process;
(6) teachers need experience with new strategies before they will change their attitudes and beliefs to them (awareness and knowledge of new strategies is not sufficient for their adoption to the classroom); and
(7) senior school staff support and commitment is a crucial component of successful school change.

Clarke and Hollingsworth (1994) have suggested that teacher change can be viewed from six different perspectives: (i) change as training, where professional development programs provides teachers with appropriate teaching skills and/or where inappropriate teaching practices are identified and corrected in an 'evangelistical' manner (p. 154); (ii) change as adaptation, where teachers change as a result of a change to the working environment (e.g., increased class size, new school policy); (iii) change as personal development, where teachers themselves identify their own needs and seek to develop additional skills and strategies to improve their classroom performance; (iv) change as local reform, where teachers work together to change their working environment; (v) change as systemic restructuring, where teachers must respond to and implement change imposed by external bodies; and (vi) change as growth or learning where teachers come together as a group to discuss, work through, issues of significance to initiate and sustain change.

From Clarke and Hollingsworth's six change perspective categories, it can be seen that the introduction of the national profile for report student achievement in mathematics aligns with the change as systemic restructuring perspective, where the location of change is external, the teacher's role is that of implementer, the object of change is the curriculum and the inservice character is systemic (p. 160). However, as Clarke and Hollingsworth have suggested, the categories are not mutually exclusive, and it could be argued, that as a result of change through systemic restructuring (as with the adoption of the national profiles) may actually cause teachers to change in accordance with other change categories. For example, a teacher may be provided with systemic in-service on the national profiles and this may cause the teacher to reflect upon his/her own further professional development needs (change as personal development) and seek such professional development. Certainly, it appears that the implementation of the national profiles would cause many teachers to go through an adaptation process (change as adaptation).

Rich assessment tasks and collaborative writing

To adopt SPS, teachers required professional development at 3 main levels: (i) familiarisation with the structure of the SPS document; (ii) experience in using various and varied methods of mathematics assessment; and (iii) practice in recording student

assessment data using the SPS framework. Systemic inservice was provided for state school teacher, in the form of systemic restructuring category of professional development (Clarke and Hollingsworth, 1994). In an effort to further support teachers to implement the national profile, the Queensland Association of Mathematics Teachers/Professional Development Project (QAMT/PDP) sought to produce a package of assessment tasks which had been trialled in classrooms and found to provide rich data on students' mathematical performance, and thus align with SPS. The purpose of such a package was to provide teachers with ideas for assessment and to exemplify how mathematical activities, alternative to pen and paper timed tests, could be used in the classroom for assessment purposes. The trialing of the activities would enable the richness of the task to be evaluated. For this initiative, practicing classroom teachers were brought together for the purpose of writing rich assessment tasks; tasks which had been developed and trialled at a 'grass-roots' level by teachers for students in their own classroom. A sub-purpose of this project was to provide participants with an opportunity to become more familiar with SPS and thus guide their own professional development. This professional development aligned with the Clarke and Hollingsworth (1994) category of change as growth or learning.

There have been many professional development programs implemented in the Unites States that involve teachers in collaborative writing (e.g., Blau, 1988). The central features of these programs are that teachers work together in groups with a mentor, supporting each other as they write. When these programs focus on the development of curriculum ideas, they generally involve the teachers in trialing their ideas in classrooms and, therefore, in receiving feedback from both the students and the group. The sharing and discussion involved in the collaborative act ensures that the participating teachers reflect on their writing both before and after the trials.

Research has shown that teachers are able to establish communities of collaborative writers and that these communities have produced effective curriculum materials and increased general confidence in teaching (e.g., Santa Barbara Classroom Discourse Group, 1995). The question is can the collaborative writing process enable effective professional development of mathematics teachers and promote change in teaching practice, particularly with respect to assessment.

Method

The methodology used in the study was participant observation (Spradley, 1980). One member of the research team established this role with a group of teachers. She organised and facilitated the group's meetings. The level of involvement was what Spradley called "active participation" - in this case, the researcher interacted fully with the participants in her official role of group facilitator. Participants in this study were 12 primary school teachers, 6 female and 6 male, and two group facilitators, one of which was the researcher. Data were collected through fieldnotes based on researcher observations combined with ad hoc group interviews, plus an end of inservice survey to ascertain effect of the program on participants.

The writing team met together four times over a four month period during the school year. Meetings were for the whole day and were organised in a three session format:

(1) an opening session where participants discussed assessment issues in the first meeting and shared their experiences in trialing the assessment tasks with other teachers in the second, third and fourth meetings;
(2) a second session where the teachers brainstormed new assessment ideas and techniques in small groups in the first, second and third meetings and refined tasks in the last meeting; and
(3) a final session in which individuals or dyads planned the trials of the assessment ideas from the second session in the first, second and third meetings and organised final writing and publishing in the final session.

This format afforded the opportunity for teachers to share their classroom experiences of trialing new ideas and techniques of assessment with critical friends/colleagues. At the end of the final session, participants completed a feedback survey which covered positive and negative aspects of the program, changes in teaching and assessment practices, attitudes to SPS, support networks, suggestions for improvement, and confidence in running similar programs.

Results

Data were collated and discussed by the research sub-committee (composed of the authors of this paper). A constant comparative method of analysis (Guba & Lincoln, 1989) was employed with these data. Through the discussion and re-examination of the entire corpus of data, there emerged themes that helped explained the relationship between the inservice activity and the kinds of classroom experiences and attitudes reported by participants.

This analysis is reported in six parts. First, to contextualise the analysis, the teachers' responses to the collaborative writing process in the *meetings* are briefly described. Second to sixth, to structure the reporting of the results, the teachers' reactions to the collaborative writing as a professional development are presented under the five major components of the process. These components are inherent to the structure of the collaborative writing process, that it provides teachers with *support*, offers *feedback*, allows opportunities for *reflection*, particularly with respect to classroom practice, increased *confidence* in their own ability to write their own assessment tasks, and increased *knowledge and understanding of SPS.*

The meetings: Overall, participants reported that their knowledge and confidence grew in richness and depth as meetings progressed over time. Participants felt that the meetings were worthwhile and were important as learning experiences. They also appreciated the opportunities to trial ideas in their classrooms. They valued both the meetings and the trials, and stated that the good experiences in previous meetings provided a good measure of the motivation to attend subsequent meetings. They were able to prepare assessment tasks that they were happy to use in their own classrooms (Dole, 1996). In the third and fourth meetings, teachers expressed feelings of belonging to a valued group of colleagues. In the final meeting, the unanimous feeling of the group was the wish that such meetings could continue throughout the whole school year. For example, one participant commenting on how she felt about working with colleagues, said: "to recognise the wealth of collective knowledge is exhilarating".

Support: All participants indicated that having the opportunity of sharing both their successes and difficulties from their own classroom experiences was a highly appreciated aspect of the activity. For most, this was a new experience - they very rarely had been afforded the opportunity of sharing their teaching experiences with colleagues at any length in the past. This support for such sharing became a highly valued aspect of the model. All participants agreed that the genuine interest shown by their colleagues in listening to each other's classroom experiences was highly motivating and supportive.

The following comments from participants illustrate this theme and indicated how participants perceived the collegial support provided at meetings:

- meeting and working with teachers from other schools was a highlight
- the relaxed atmosphere made it easy to express all concerns about mathematics teaching and learning
- within a professional environment being able to share resources ideas and concerns was very supportive

It was evident that teachers developed increased self-efficacy and confidence in their teaching and assessment skills. They also stated that they now believed they could successfully add new teaching and assessment techniques to their repertoire.

Feedback: Participants consistently expressed their appreciation of the advice and constructive criticism they received from colleagues at the meetings. They felt that receiving immediate feedback through the meetings not only helped future planning, but further added to the belief that colleagues were interested in one another's work. They stated that they would have been disappointed if the sharing of experiences had stopped.

Participants clearly expressed that the bottom line for them was whether their practice made a difference to student learning in their classrooms. The time element turned out to be important - it was optimal for teacher's to be able to perceive an improvement in student outcomes during classroom activities, be they especially highlighted for assessment or otherwise. Instances where student interaction during an assessment activity was immediately perceived as positive were particularly motivating for the teachers. The teachers perceived interactions as positive if they felt there was an improvement on the kind of student interaction formerly elicited in such situations.

The following comments from participants illustrate the importance they gave to feedback:

- provided an opportunity to obtain feedback advice on assessment tasks
- re-affirmed my beliefs about teaching learning and assessing
- my ideal was always that teaching and learning tasks could be used for assessment, but that "nervousness" of "that it may not be enough" has been allayed more
- I'm more selective - willing to discard activities which are limiting in results
- feedback made me think more carefully about what I am assessing and adjust tasks to suit
- has given me more ideas on how to assess and set tasks that are relevant

Reflection: Participants were clearly changed by the collaborative writing process. The aspect of the collaborative writing program that seemed to produce these changes was the reflections that were an essential component of the group activities. The structure of the program was such that participants were given opportunities to share with their colleagues the tasks they had written and their students' responses to these tasks. This sharing encouraged reflection, both on the assessment practices and on the collaborative writing process itself. This had two outcomes. The reflection on assessment provided the participants with a depth of understanding that they would not have otherwise gained and improved the quality of the written products. The reflection on the process highlighted the positive role of the other teachers and the success of the program. This in turn improved the morale of participants and promoted confidence and self esteem. The following comments from participants lend support for this:

- I am aware of not limiting the students to what they can demonstrate they are capable of doing (i.e. certain forms of writing assessment as those which appear in the sourcebook)
- while trying to ensure the basic facts and concepts are thoroughly covered, I am introducing more varied and challenging task - not all for assessment
- I have gained more of an insight into assessment and how it affects me and my teaching style

- I'm more aware of varying abilities
- I now have the children write more of what they verbalise during maths lessons because I see this skill as being vital part of documentation and it must be taught so that children gain experience in it
- I am aware of children's difficulties when writing response - this is a whole new ballgame for them
- I use more ways in which students are given opportunities to verbalise and explain the outcomes of math situations.

Confidence: The project also appeared to provide participants with a sense of reassurance that their own personal feelings of insecurity in implementing SPS were common amongst fellow teachers, as the following comments show:

- Realisation that you are not alone (mathematics wise)
- the ultimate ego boost of seeing that what you're doing is OK
- appreciating that the same difficulties are faced by others
- to discover that people have same concerns as I have
- to know that other teachers were experiencing the same difficulties as oneself is encouraging and supportive
- exchanging fears and frustrations [the meetings] have increased my awareness of fellow teachers problems in applying SPS to their teaching

Knowledge and understanding of SPS: Participants commented that they found this professional development exercise had had a positive influence on their attitude to SPS, as supported by the following comments:

- definintely clarified the link between the syllabus and SPS outcomes
- demonstrated a more effective method of data collection
- I have oscillated from negative to positive to negative to positive to reserved positive as I have had more involvement with SPS
- probably my attitude is more positive than previously
- because I am much more familiar with SPS, I no longer find it threatening
- reaffirmed (rather than changed) I'm on the right track. [Meetings have] certainly made [SPS] less ominous, not to be dreaded; boosted confidence, even raised enthusiasm.
- I understand the positive aspect of SPS, ie children's control over assessment, children's responsibilties for assessment; assessment of what children can do.
- a broader understanding of SPS levels and strands, and therefore confidence in assigning levels to students work.

Discussion and Conclusions

The findings above support the conclusion that participation in the collaborative writing activity was an effective means of changing teacher practice and increasing confidence. In particular, participation in collaborative writing professional development appears to be a viable means for effecting change in practice while, at the same time, nurturing teacher confidence. The reasons for this are that all seven factors from the research of Clandenin and Connelly (1991 and McLaughlin (1990) that promote effective professional development are satisfied by collaborative writing. Especially prominent were the following: collegial support in the form of regular meetings and discussions is an important factor to the change process; experience and reflection are necessary for effective change and input is needed from sources outside the schools to facilitate this reflection and to clarify and introduce different ways of considering situations; teachers' perceptions of successful and improved student learning is crucial to the success of the change process; and teachers need experience with new strategies before they will change their attitudes and beliefs to them (awareness and knowledge of new strategies is not sufficient for their adoption to the classroom).

Participants were clearly influenced by whether their practice made a difference to student learning in their classrooms. The time element turned out to be important - it was optimal for teacher's to be able to perceive an improvement in student outcomes during classroom activities, be they especially highlighted for assessment or otherwise. Especially motivating were instances of students interacting directly with the teacher in the context of activity based assessment tasks in ways perceived by the teacher to be an improvement on the kind of interaction formerly elicited in such situations.

Therefore, the results support the following three conclusions:

(1) the collegial support of the collaborative writing process resulted in increased confidence for the participants with respect to teaching and assessment;
(2) the collegial feedback from the classroom trials and discussion with other teachers improved the teaching and assessment ideas of the participants; and
(3) the reflection encouraged by the process on classroom practice improved the teaching and assessment practices of the participants and improved students' learning outcomes.

Factors that were strongly affected throughout the program were the attitude and beliefs of the participants, particularly confidence and self-esteem. Therefore, the program supported the findings of Clarke and Hollingsworth (1994) that changes in teaching practice is preceded by changes in attitudes and beliefs. As well, the program supported the findings of Berliner (1986) that beliefs and attitudes change when student outcomes are seen to improve, and the findings of Guskey and Sparks (1991) that trialing and sharing are crucial for effective inservice.

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