Assess to Learn professional development: impact on teacher learning

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Introduction
The ultimate purpose of professional development (PD) in education is to impact on the learning of teachers and students, given that teachers and their practices have the most effect on student learning (Lingard, Hayes, Mills & Christie, 2003). Yet the process of professional development is a complex one, particularly the challenges involved in implementation, sustainability, and measurement of change. Lack of skills to implement, and teacher resistance to change are frequently cited as barriers to successful PD (Orgland, 1997). Other commonly cited factors include lack of attention to student learning (Guskey & Sparks, 1996), school culture and leadership (Fullan, 1990, 2005; Hargreaves & Fink, 2006), perception of limited participation in decision making processes, and misunderstanding processes of change particularly building mutuality and trust (Senge, Kleiner, Roberts, Ross, Roth & Smith, 1999).

Speck and Knipe (2001) argue that there are six fundamental elements of successful PD: focusing on improving student learning, assessing needs and establishing goals, centring on the learner, sustaining growth, acquiring resources and evaluating goals. Effective PD requires attention to all six elements, but in the realities of multiple demands, schools frequently neglect one or more elements. Speck and Knipe (2001) lament poor PD planning, inadequate opportunities for teachers to participate in-depth and limited time in which to master new strategies, as key reasons why professional development has limited impact on teacher learning. Writers, such as Borko (2004), Ingvarson, Meiers, and Beavis (2005) argue the need for inclusion of professional reading and research to develop teacher content and pedagogical knowledge.

Whilst it is acknowledged that teacher learning occurs in a context (such as international and national policies, stipulated curriculum, prevailing theories and practices related to andragogy, pedagogical and assessment practices, school culture, social milieu and so on), the focus of this paper is on the teacher, particularly the impact of the Assess to Learn professional development programme (hereafter referred to as AToL) on New Zealand teacher learning. The paper firstly explores understandings about teacher learning and considers the background to AToL, the methodology, resulting research data, and the impact of AToL on teacher learning.

Exploring understandings about teacher learning
According to Zwart, Wubbels, Bergen and Bolhuis (2007), teacher learning is understood as change in teachers' cognition and or behaviour. Zwart et al argue that teachers' professional growth is dependent on change occurring in four distinct domains of the teacher's professional world: the personal domain, domain of practice, domain of consequence and the external domain. Change in one domain does not always lead to modification in the others but when changes across domains occur teachers' knowledge, understanding and practice are transformed. Attempts to promote these across domain changes often underlie proponents' advocacy of professional learning communities.

Teacher learning communities arguably foster teacher collaboration and make practice public (Little & Veugelers, 2005). However, this type of professional development depends on teachers taking more control over their work, reflecting on and critiquing tacit knowledge and expertise, developing critical judgement and

taking fuller responsibility for their own learning and that of their students (Wood, 2007). A degree of external 'input' and new professional knowledge is necessary, according to Lopez-Real and Kwan (2005) who proposed several constructs leading to professional development, learning through: self-reflection, mutual collaboration and from university academics, of which the most important was deemed to be learning through self-reflection. Reflection is often considered pivotal to professional development, where the rethinking of experience provides added personal meaning and hence learning for teachers (Hoban 2002). However, reflection relates to only the personal domain; and teachers' professional worlds are wider, requiring interaction with many others particularly colleagues.

Orland-Barak (2006) researched professional learning conversations between teachers, investigating the process and content of mentors' professional conversations as opportunities for collaboratively constructing knowledge. Her analysis revealed three forms of dialogues: convergent (where understandings converged into learning about potential solutions to a professional problem), parallel (in the conversations participants developed their own ideas, similar to children engaged in parallel play) and divergent (where participants explored, compared and made connections across practices, thus shifting the conversation to a level of theorising). The success of professional conversations is dependent on the type, depth and form of conversation or dialogue that occurs. Whilst conversations present opportunities for participants to clarify, question and extend their professional understandings, it would appear that divergent conversations have the greatest potential for professional learning for teachers. However, few teachers have the time, opportunity, and possibly skill, to engage in conversations at this level.

Teacher learning is more complex than engaging in professional dialogues. For example, Aseltine, Faryniarz & Rigazio-DiGilio, 2006, p.131) state that,
> Like all adult learners, teachers need to connect new learning to previous learning; to develop deep understanding of new content and skills; to receive relevant feedback about the application of their new learning; to have the opportunity to interact with colleagues as a learning community; and to view their professional development activities as part of meaningful, lifelong learning.

These authors are essentially combining a cognitive perspective (the importance of personal conditions for learning, such as prior knowledge) and a situated perspective that highlights the importance of social and contextual conditions for learning. Sfard (1998) argued the need for both perspectives, coining the cognitive perspective as 'acquisition metaphor' and situated perspectives as 'participation metaphor', believing that these metaphors expanded understanding about the complexity of learning. Putman and Borko (2000), and Hoban (2002), argue for a systems thinking approach that links together various natures of learning: personal, social, classroom context, distributed nature of cognition. Effectively these authors acknowledge a relationship within and amongst personal, social and contextual elements so that individuals influence each other, the context and vice versa. This understanding of teacher learning underpins the current paper.

As argued, conceptualising teacher learning is not simple, perhaps signalling the complex environment in which teachers' work, the ill-structured nature of

pedagogical problems encountered and the uniqueness of individual students with whom teachers interact. Capturing the *impact* of teacher learning is consequently multifarious. Using Hoban's (2002) systems thinking of teacher learning, this paper explores the impact of AToL on teacher learning. Before considering the research data, it is necessary to provide the reader with background to the nature of the assessment PD programme in which teacher learning occurred.

Background to the study
The *Assess to Learn* Professional Development Project (AToL) is delivered across New Zealand by eight providers, including six Colleges of Education and two private providers. All providers have a director supported by a team of facilitators. Although there are some variations, the majority of participating schools respond to advertisements or invitations to be involved in the project and typically participate for two years. A range of schools are involved, covering the variables of decile, school size, rural and urban location, state and integrated, contributing and full primary, intermediate and secondary schools, albeit the highest proportion of schools are primary. The focus of the project is on professional development of teachers in assessment literacy, with four key outcomes, to: improve student learning and achievement; shift teachers' knowledge and assessment practice; develop coherence between assessment processes; practices and systems in classrooms and in schools so that they promote better learning; and demonstrate a culture of continuous school improvement.

Whilst the content, delivery and context (such as literacy, science) for assessment vary according to specific school needs, the following model is commonly used. Having initially met with the principal (and possibly a school-based PD team), a facilitator co-constructs assessment practice in a staff meeting discussion. The facilitator and teachers then negotiate an aspect (of the discussion) to trial in the classroom, co-plan with teachers strategies for implementation, observe the implementation in the classroom and follow this with another facilitator-led individual or group meeting to discuss feedback from the classroom observation. Normally at AToL staff meetings teachers engage in professional reading, sharing of practical ideas, trialling of resources (e.g., layout of learning intentions/success criteria developed in other schools for adaptation by the implementing school) and future planning. The model is similar to that of Joyce and Showers (1995) which demonstrated the effectiveness of PD practices that incorporated five elements: presentation of theory, demonstration, practice, feedback and follow-up coaching in classrooms. Further to this model, Hall & Scott (2007), in their investigation of the professional development and learning of history teachers, found that professional development was most meaningful and effective when the content of teacher learning was strongly linked to the curriculum students were learning.

Methodology
AToL has been externally evaluated since 2003, using a responsive evaluative case study design (Poskitt & Taylor, 2007). A case study is an exploration of a bounded system, in which detailed data are collected. The case study was bounded by topic and time in that schools involved in an AToL contract in 2006 were included in analysis for this paper. All participating AToL schools (180), ensuring a range of decile rating, regional location, school type, size and time since participation in AToL (i.e. some began in 2004), were invited to participate. A total of 99 teachers

responded to a national teacher questionnaire, although 40% of the schools also participated in facilitator planning analysis, facilitator classroom observations and researcher interviews. These data are referred to for purposes of triangulation, but the main data sources for this paper were the national teacher questionnaire and classroom observations. The latter were conducted by facilitators who had developed rapport with the teachers, and were in a professional relationship to provide feedback and coaching to teachers (after the observation). Observational schedules had been co-constructed between the research and facilitation team, as well as matrices on which to summarise teacher progress in formative assessment practice. Training in observations and moderation exercises were conducted at the national facilitator meeting to ensure some degree of validity and reliability. Each provider sent collated matrices to the researchers, on which data the researchers conducted further analyses.

Guskey (2002, as cited in Richards, 2005) argues that teachers' self-reports, supported by visits to the school and document analysis, are sources of potentially trustworthy information. Given the demands on teachers in the October/November period it was impossible to visit all schools in the programme and thus a national teacher questionnaire was sent to two teachers in all participating schools; the wider sample size addressing issues of representation and reliability of data. The context was exploration of the impact participation in AToL made on teacher learning; in effect an instrumental multi-sited case study (Creswell, 1998). For the AToL facilitators and their directors, the case study was responsive in that feedback of emerging research trends occurred at the two-monthly director meetings and bi-annual facilitator meetings upon which changes were made to their programmes and practices (refer to Poskitt & Taylor, 2007).

Content analysis of interview and open-ended questionnaire data, using a deductive approach, was conducted. Topic coding, labelling text according to its subject, and analytical coding (coding that leads to theory 'emergence' and affirmation) were used (Richards, 2005). Coding categories were derived predominantly from the data but also informed inductively from literature related to change management, professional development and teacher learning. Factors converged, relating to the impact of teacher learning - a process of developing 'fuzzy generalisations' (Bassey, 1999). Bassey explains fuzzy generalisations as qualified generalisations that carry the idea of possibility but no certainty. To validate the emerging theory, the data were checked against negative theories. Popper (1963) argued the need for theoretical ideas to produce hypotheses that are falsifiable, that no theory can be proven but a single failure in the course of testing establishes its falsity.

A simpler, related process is that of triangulation. In this study, emergent themes were checked from several data sources: questionnaire, interview, document analyses and observation (although only questionnaire and observational data are cited in this paper, due to space restrictions). Multiple perspectives were included with the involvement of two researchers and a research assistant, facilitators (their planning analyses and classroom observations – having received national training, feedback and monitoring for consistency) and teachers. Where data were not consistent in any of these data sources they were 'put aside' from theory development.

Impact of AToL on teacher learning
Although the impact of learning for teachers can be difficult to measure, indicators of its effects may be portrayed in various ways. This paper reports predominantly on: teacher perceptions, and observations, of changes in knowledge, skills and practice.

Teachers' experiences and perceptions of the delivery (processes) and the content of the professional development programme were the context in which their learning occurred and their perceptions are important to examine because they relate to systems approaches to teacher learning. A national questionnaire to teachers participating in AToL in November 2006 asked teachers, "What aspects of the professional development have been most useful to you in terms of the way it was delivered and the content?

Questionnaire data
There were 99 respondents to the question (55% response rate), 46 of whom were in their first year of the professional development programme. Some respondent comments related to more than one aspect and therefore the number of comments exceeded the number of respondents.

Table 1 Teacher respondent comments on most useful aspects of AToL delivery
Programme organisation (59)
Particular facilitator (24)
Interactions with other teachers and colleagues (15)
Other positive effects (5)
Not satisfied (3)
N.B. Bracketed figures refer to the number of comments coded in each category.

As explained in the methodology section, teacher comments were analysed into categories. In relation to programme organisation, respondents referred to "excellent delivery", variety and well balanced programme (combination of theory and practical strategies), the content being designed to meet their school needs and being relevant for classroom practice, one to one mentoring that stimulated reflection and extension of practice, being observed and receiving feedback either individually or in small groups. Facilitators were appreciated for their enthusiasm, friendliness, inspiration and integrity in that their own practice reflected the promoted theory. Interacting with other teachers and colleagues was valued for the collegial dialogue, sharing of ideas and feedback, shared planning and opportunity to work together to achieve a project such as development of a school-wide marking schedule, and the feeling of mutual support. Other positive effects included working with inspirational leaders, gaining renewed enthusiasm for teaching and satisfaction with changes made to student reports. However, for three respondents, difficulties were experienced in confusion around the purpose of some discussions and activities, and the duration of professional development sessions.

These teacher comments reflect the across domain categories to which Hoban (2002) referred, namely personal, social, development situated in the classroom and distributed nature of cognition. Teacher learning appears to occur in a web of interaction within and across these domains and perhaps most meaningfully when linked to the curriculum of the classroom. It was important therefore to seek teacher comments on the usefulness of the *content* of the programme, as reported in table 2.

Table 2: Teacher respondent comments on most useful aspects of AToL content

Integrating assessment, teaching and learning (51)

Flexibility of facilitator/AToL to adjust to school needs (22)

Development of knowledge and strategies in formative assessment (26)

Use of national assessment tools (11)

In the category of integration of assessment, learning and teaching, respondents commented on their extended professional knowledge, provision of new strategies to enhance their teaching, learning and assessment practices, professional readings that they found thought-provoking, practical and relevant strategies for the classroom, and usefulness of information in planning and in reporting to parents. The flexibility of the programme content and facilitator approach in their school was appreciated for its adaptation and relevance to their classroom needs, mixture of challenge and support, classroom observations and feedback, combination of theory and practical strategies, pertinent resources and addressing of teacher questions. Development of knowledge and strategies in formative assessment related to changes in their thinking and practice, development of more cohesive learning programmes for students, an increase in teacher understanding about the creation of learning intentions and related success criteria, provision of specific feedback to learners, practical strategies and examples for implementing content knowledge into classroom practice. Finally, use of national assessment tools exposed teacher respondents to the range available and techniques required in their use and analysis.

It appeared that the *content* of the programme had more *personal* value to teachers in terms of their increased knowledge and practice in the classroom, while the *process* of the PD impacted more on their *social and distributed cognition of teacher learning*.

Exploring further domains of teacher learning, it was important to ascertain to what extent learning was reflected in *teacher practice*. Consequently, teachers were asked in the national questionnaire, "In what areas of formative assessment have you most improved as a result of involvement in AToL?"   Table 3 reports the results.

Table 3 Areas of formative assessment in which teacher respondents state they have most improved as a result of AToL

Involving students in learning/assessment process (51)

Using assessment to inform planning/teaching (50)

Clarifying learning/assessment criteria (44)

Quality feedback/identification of next step learning (20)

Involving students in the learning and assessment process took several forms, such as more self and peer assessment, students talking about their learning in a reflective manner, setting goals and formulating success criteria. Teacher use of assessment to inform planning and teaching was reported in terms of analysing student work to identify next learning steps or highlighting specific skills and knowledge to work on, grouping students for learning, awareness of what to measure student performance against and greater emphasis on quality learning. Developing learning intentions and success criteria with students clarified expectations for learning and assessment for teacher respondents, thus leading to more specific and useful feedback to students about their learning.

Classroom observational data were collected by facilitators, under guidance (and training) of the researchers who had randomly selected 40% of participating schools. Observations occurred in school terms one and four, focusing on key aspects that teachers may demonstrate when practicing effective formative assessment: teachers constructing with students what they are learning and why, how they will achieve the learning, what the learning might look like, how well the learning has been achieved, initiating classroom discussions about learning and progress, using feedback, prompts and questioning to support student learning. Although secondary teachers also participated in the study, only data on primary teachers are reported here, due to space restrictions.

Classroom observational data
The researchers and PD providers co-constructed a matrix of descriptors for each aspect of formative assessment (informed by such writers as Black & Wiliam (2005) in the field of formative assessment). These aspects have been described as a progression using the descriptors beginning, developing, developed and extended.

Table 4: Facilitator classroom observations of formative assessment practice by teachers in first year of AToL
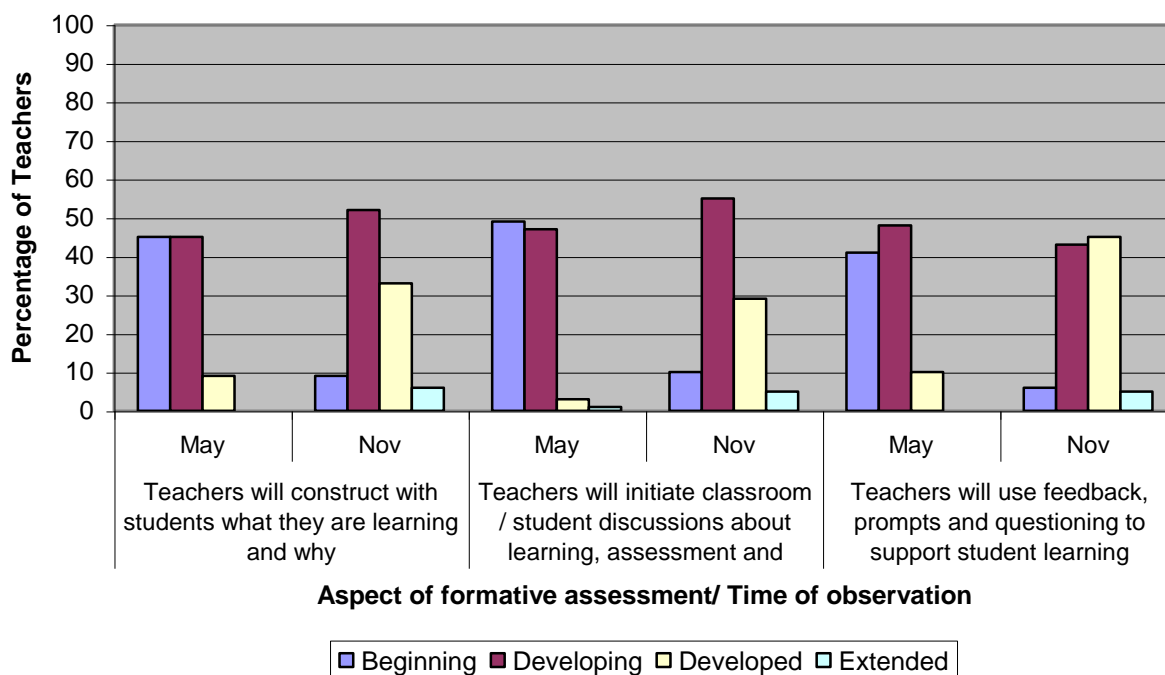

Table 4 shows the percentage of first year AToL primary teachers engaging in developed or extended formative assessment practice increased in all aspects from May to November. At the end of their first year, 33% of observed AToL primary teachers were distinguishing between what was learnt and why it was important to learn. These teachers demonstrated clear links between planning, learning experiences and the intended learning. Another 6% of observed teachers engaged and supported their students in developing (and evaluating) learning intentions as the learning progressed. Evident is the degree to which first year AToL primary teachers engaged

their students in discussions about their learning. By the end of their first year, 29% of observed AToL primary teachers were regularly reflecting with students about their learning and introducing reflective strategies into their programmes. Another 5% of these teachers were able to routinely reflect and talk with students about their learning and use effective strategies in their programmes. Displayed also in table 4 is the extent to which teachers use feedback and prompts to support student learning. Forty five percent of first year AToL primary teachers co-construct feedback with students and use prompts that relate to the learning intention and success criteria. Questioning also relates to the learning intentions and requires students to think more deeply about their learning. Improved teacher formative assessment practice is evident in the first year of AToL. However, continuation of support for teachers is necessary when they enter their second year of AToL as between 59% and 65% of observed AToL primary teachers were still at the beginning or developing stage of formative assessment.

Table 5 displays observational data from second year AToL teachers, indicating the extent to which formative assessment practice was evident. Fifty seven second year AToL primary teachers were observed in May and 61 observed in November.

Table 5: **Facilitator classroom observations of AToL second year teacher practice in formative assessment**
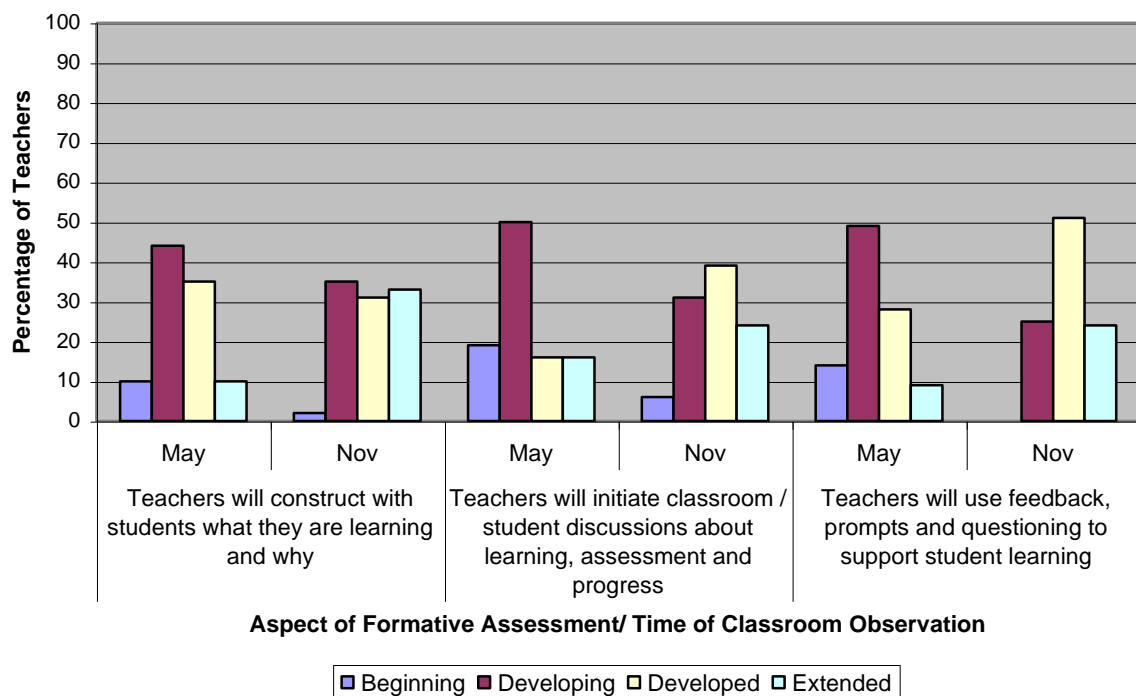

Table 5 indicates the percentage of second year AToL primary teachers engaging in developed or extended formative assessment practice increased in all aspects from May to November. In November 31% of second year AToL primary teachers were distinguishing between what was learnt and why it was important to learn. These teachers demonstrated clear links between planning, learning experiences and the intended learning. Another 33% of second year AToL primary teachers engaged their students in developing learning intentions and supported students to evaluate these as the learning progressed. Furthermore, table 5 indicates the degree to which second

year AToL primary teachers engaged their students in discussions about their learning. By November, 39% of second year AToL primary teachers were regularly reflecting with students about their learning and introducing reflective strategies into their programmes. Another 24% of these teachers were able to routinely reflect and talk with students about their learning and use effective strategies in their programmes. Displayed also in table 5 is the extent to which teachers use feedback and prompts to support student learning. Fifty one percent of second year AToL primary teachers co-construct feedback with students and use prompts that relate to the learning intention and success criteria. Questioning relates to the learning intentions and requires students to think more deeply about their learning. These data indicate progress in improving teacher formative assessment practice in the second year, but also the need to enhance teacher learning as clearly not all teachers were operating at the developed or extended levels. Further research is needed to investigate aspects of the PD and advance notions of teacher learning.

Conclusion

Like students, teachers are individuals with differing learning needs, preferences and approaches. The results cited above (only a small sub-set of the total research data), indicate that AToL has varying effect on teachers, in terms of the degree of influence of particular elements (such as the role of the facilitator, professional reading and conversations with colleagues) and the extent to which learning is applied in the classroom. For the majority of participants the impact was of a positive nature. Time (sequencing and duration) is a key element in teacher learning, as indicated by the differences in practice by teachers in their first and second year in AToL.

Teacher learning occurs in multifaceted dimensions and this paper has explored only a few dimensions. Elements of both the process and the content of AToL were influential, aligning with Hoban's (2002) system level domains of teacher learning. Too often however, the value and impact of PD is measured primarily on student learning outcomes. This paper has argued that teacher learning is complex and requires further research and conceptualisation. Seeking information directly from teachers and analysing the effects of their knowledge and skill development in their classroom practice are central dimensions to understanding and ascertaining the impact of, and providing direction for, ongoing *teacher learning*.

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