

Productive Pedagogy as a Framework for Teacher Education: Towards Better Teaching

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Not all graduates of teacher education programs become great teachers. Critiques of teaching quality consistently point a finger at teacher education, implying that if only teacher preparation was improved then better teaching would be more common. Teacher educators quite rightly identify all kinds of external factors that undermine their best efforts such as the poor funding of teacher education, class sizes larger than the average in secondary schools, and the socialising effects of school cultures. But most teacher educators can also accept that there are weaknesses and spaces for reform within their programs and that the countless reviews of teacher education (see Ramsey, 2000) have made some reasonable observations and recommendations. The long history of reform in teacher education is indicative of teacher educators' own commitment to the seemingly never-ending quest for the preparation of better teachers. Nonetheless, and despite these initiatives, most teacher educators would acknowledge that there is still a long way to go in ensuring that graduates become great (or at least good) teachers.

Part of the weakness of teacher education has been its relatively weak knowledge base and the paradigmatic differences that have led to weak socialisation effects (e.g., Zeichner and Tabachnick, 1985), and to fragmentation and lack of coherence (e.g., Gore, 2001; Tom, 1997). This paper explores whether "Productive Pedagogy" (PP) provides a framework with potential for enhancing the quality of teacher education and the quality of teaching subsequently produced by graduates. Does PP, with its identification of four fundamental principles, namely intellectual quality, relevance, supportive environment, and recognition of difference, provide a framework for bringing greater coherence and a firmer, more confident knowledge base to the work of teachers and teacher educators? Can it help produce better teachers?

Specifically, this paper reports results from a pilot study involving final year, teacher education students attempting to apply the principles of PP during their internship. The study introduced PP to a group of student teachers, and subsequently rated nominated lessons for PP and conducted interviews with participants. Based on these data, and some comparison with a larger set of observational data involving practising teachers, some provisional conclusions are made about incorporating PP into teacher education.

The paper begins with an overview of the concept of Productive Pedagogy, of current research into its prevalence among in-service teachers, and of arguments for PP as a framework for quality teaching and learning. Next, we outline the pilot study and provide a summary of the data. A more detailed analysis of the data follows, leading to two main arguments in relation to the use of PP as a framework for teacher education: first, that PP needs to come earlier and be more fully integrated into the teacher education program; and, second, that PP requires a reassessment of teacher education priorities.

Productive Pedagogy

In community, policy, and academic arenas, the state of teaching and teacher education is being called into question. Reform of both teaching and teacher education is widely advocated (e.g., Ramsey, 2000). Major concerns centre on both the quality of teaching and the quality of learning for all students. Teacher education, both preservice and inservice, is often targeted as the site of reform. Like similar documents before it, (e.g., MACQTET, 1994 ; NPQTL, 1996) the recent National Standards and Guidelines for Initial Teacher Education report, *Preparing a Profession* (ACDE, 1998), provides a comprehensive account of the range of skills, knowledge and values required of beginning teachers. However, as Gore and Morrison (2001) point out, such lists of desirable attributes can be overwhelming both for the teacher educators who are to produce such graduates and for the students who are to acquire these competencies. Comprehending and synthesising lists of over 100 attributes and translating those into planning and practice often proves unwieldy to the extent that teacher educators and their students tend to focus on only a section of the list, governed by what they already know and value. One central dilemma of such proposals remains the

tendency to raises issues of the overall quality of teaching separately from questions of addressing social justice, each of which are heralded as primary virtues for teacher education.

This study explores whether (PP) provides a feasible alternative to existing frameworks for teacher development. With its four dimensions of "intellectual quality", "relevance", "social support" and "recognition of difference", PP explicitly attends to both intellectual and social justice outcomes. Productive Pedagogy, developed by the Queensland School Reform Longitudinal Study (QSRLS) research team, built upon a very large body of extant research into the production of socially equitable student learning outcomes (QSRLS, 1999; Ladwig, Luke and Lingard, forthcoming). In particular, the QSRLS extended the ground-breaking work of Newmann and Associates (1996). Their less comprehensive construct, known as 'Authentic Pedagogy,' was found to promote both overall increases in student learning outcomes *and* significant improvements in terms of social justice through a lessening of traditional equity-based gaps in student achievement.

While research into 'Authentic Pedagogy' has offered significant general insights into how teaching practice might be improved, the generic quality of 'authentic pedagogy' does not readily translate into practical models of pedagogy (Ladwig, 1998). The more comprehensive and multi-dimensional construct of 'Productive Pedagogy' provides an analytical framework for more descriptive models of teaching practice that can be developed theoretically and applied in the professional development of pre- (and in-) service teachers. The twenty items making up the four dimensions of PP provide a reasonably comprehensive account of teaching practice, while the four dimensions capture the critical elements (see Table 1). One of the crucial questions in terms of the potential impact of this study is whether or not the research-based construct 'Productive Pedagogy' is indeed viable in the preparation of pre-service teachers.

To answer this question, the study was designed to provide information on: a) the degree to which high levels of PP are evident in the classroom practices of student teachers well versed in PP; b) the nature and degree of ease with which PP was applied by student teachers in the development of their lesson planning; and, c) the nature and degree of any difficulties experienced by these student teachers. Since PP is not a restrictive and singular model, this enterprise is far from a technicist one that simply trains teachers to replicate a formula for successful teaching. Highly complex decisions need to be made by teachers who employ PP, both in their preparation of lessons and in their momentary decisions in the classroom, in relation to the specific social and cultural context of their teaching.

Table 1. productive pedagogy dimensions, items and key questions addressed

<i>INTELLECTUAL QUALITY</i>	
Higher order thinking	Are higher order thinking and critical analysis occurring?
Deep Knowledge	Does the lesson cover operational fields in any depth, detail or level of specificity?
Deep understanding	Do the work and response of the students provide evidence of understanding of concepts or ideas?
Substantive conversation	Does classroom talk break out of the initiation/ response/ evaluation pattern and lead to sustained dialogue between students, and between teachers and students?
Knowledge problematic	Are students critiquing and second-guessing texts, ideas and knowledge?

Metalanguage	Are aspects of language, grammar, and technical vocabulary being foregrounded?
<i>RELEVANCE</i>	
Knowledge integration	Does the lesson range across diverse fields, disciplines and paradigms?
Background knowledge	Is there an attempt to connect with students' background knowledge?
Connectedness to the world	Do lessons and the assigned work have any resemblance or connection to real life contexts?
Problem based curriculum	Is there a focus on identifying and solving intellectual and/or real-world problems?
<i>SUPPORTIVE CLASSROOM ENVIRONMENT</i>	
Student control	Do students have any say in the pace, direction or outcome of the lesson?
Social support	Is the classroom a socially supportive, positive environment?
Engagement	Are students engaged and on-task?
Explicit Criteria	Are criteria for student performance made explicit?
Self-regulation	Is the direction of student behaviour implicit and self-regulatory or explicit?
<i>RECOGNITION OF DIFFERENCE</i>	
Cultural knowledges	Are diverse cultural knowledges brought into play?
Inclusivity	Are deliberate attempts made to increase the participation of all students of different backgrounds?
Narrative	Is the teaching principally narrative, or is it expository?
Group Identity	Does teaching build a sense of community and identity?

Citizenship	Are attempts made to foster active citizenship?
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Productive Pedagogy as a framework for teacher education: The pilot study

Thirty students in their final year of a four year teacher education program undertook an elective subject titled 'Teaching Better' in Semester I, 2000. This elective subject introduced students to the concept of Productive Pedagogy, through a series of seminars (amounting to around 18 hours total). Participants developed an understanding of the observation scoring manual that was developed to code classroom practice in the QSLRS and subsequently used to score their own practice. They had opportunities to code the teaching episodes of others, as well as substantial practise in planning lessons or units and assessment tasks designed to maximise intellectual quality, relevance, supportive learning environments, and recognition of difference.

Following this 'training,' ten students agreed to have some of their internship lessons observed and coded by the research team, using the scoring manual. Eight of the interns were in primary schools, with five of these in public and three in Catholic schools. Both of the secondary participants were in Catholic schools. Each participant nominated two to three lessons for observation purposes (yielding a total of 25 observations). When agreeing to participate in the study, participants were reassured that their participation would not require any additional work on their part during what most perceived as a demanding internship experience. The elective subject had promoted the idea that PP could become a 'normal' part of students' everyday planning and teaching by being mindful of the four dimensions. Hence, students were not asked specifically to try to maximise PP, only to nominate lessons for observation. Means and standard deviations were calculated and a 2-tailed t test (unequal variance) was used to compare the PP scores of the project sample with those of the larger sample of teachers from the QSLRS.

Approximately two weeks after the classroom observations were completed, participants were asked, in a semi-structured interview, about their experience of applying PP in their teaching. The interviews asked participants about their understanding of PP and, while reflecting on their own scores, about factors that facilitated and limited their achievement of high scores on individual PP items. Interviews were taped and transcribed and the data analysed, through the categorising and contextualising processes of qualitative research, to check the relationship between comprehension, translation into practice, and observed success.

To help answer our central question about the viability of PP in the preparation of preservice teachers, the study had the following specific aims:

1. To investigate the feasibility of introducing a group of student teachers to PP over a relatively short course,
2. To assess the quality of PP subsequently produced by these teachers, as compared with the larger sample of experienced teachers in the QSRLS sample,
3. To analyse the relationship between participants' comprehension of PP, their claims to have translated PP into their lesson plans, and their observed success in producing PP.

Summary of observation scores

Overall, students' scores across the twenty PP items were close to those of the much larger Queensland sample of experienced teachers (see Table 2). On the surface, such a finding is quite heartening, given that much lower scores may have been expected given the lack of experience of the study sample. On the other hand, given the 1-5 rating scale for each item, the scores could be taken to be disappointingly low for both samples, and indicative of the need for better teaching. With the exception of four items, the mean score was under 3 suggesting, at face value, some problems in preparing pre-service teachers in PP through a final year, one semester elective subject. We return to this issue in our discussion.

Of the four dimensions, participants in the study scored highest on the 'Supportive Classroom Environment' dimension. This finding is consistent with the data we have gathered in other studies, and demonstrates that teachers are better at producing a supportive classroom environment than they are at producing intellectual quality, relevance, or recognition of difference. Even so, the scores for this dimension are not high, and below the theoretical mean of 3. Differences between the interns and the Queensland teachers were statistically significant for the items of 'social support', 'self-regulation', and 'academic engagement'. In each case the experienced teachers, not surprisingly achieved higher scores.

Table 2. Comparison of PP scores for Participants and Queensland sample

Dimension	Items	Mean (SD) Newcastle (n=25)	Mean (SD) Queensland (n=975)	Sig.
Intellectual Quality	Higher order thinking	2.40 (1.00)	2.55 (1.11)	.45
	Depth of knowledge	1.96 (0.61)	2.71 (1.07)	.01**
	Depth of students' understanding	1.88 (0.44)	2.60 (1.02)	.01**
	Substantive conversation	1.48 (0.71)	2.27 (1.20)	.01**
	Knowledge as problematic	1.76 (0.72)	1.74 (1.06)	.90
	Meta-language	1.48 (0.59)	1.75 (1.02)	.04*
	<i>Mean for Intellectual Quality</i>	<i>1.83 (0.41)</i>	<i>2.27 (0.82)</i>	<i>.01**</i>
Relevance	Knowledge integration	2.24 (1.61)	1.75 (1.10)	.15
	Link to background knowledge	2.64 (0.91)	2.62 (1.17)	.90
	Connection to world beyond the classroom	2.16 (1.34)	1.91 (1.10)	.39
	Problem-based curriculum	2.20 (1.04)	2.02 (1.31)	.40
	<i>Mean for Relevance</i>	<i>2.31 (0.95)</i>	<i>2.07 (0.88)</i>	<i>.23</i>
	Students' direction of activities	1.44 (0.65)	1.60 (0.85)	.25
	Social support for student achievement	3.32 (0.56)	3.66 (0.96)	.01**
	Academic engagement	3.44 (0.65)	3.73 (1.02)	.04**

Classroom Environment	Explicit quality performance criteria	2.16 (1.03)	2.13 (1.11)	.90
	Student self-regulation	3.56 (0.71)	4.04 (0.97)	.01**
	<i>Mean for Supportive Environment</i>	2.78 (0.36)	3.03 (0.69)	.01**
Recognition of Difference	Curriculum knowledge values cultures	1.12 (0.33)	1.35 (0.80)	.01**
	Public representation of inclusive participation	4.72 (0.89)	4.04 (1.20)	.01**
	Narrative	1.88 (0.67)	1.95 (1.14)	.62
	Group identities in learning community	1.32 (0.56)	1.19 (0.62)	.27
	Active Citizenship	1.12 (0.60)	1.18 (0.58)	.58
	<i>Mean for Recognition of Difference</i>	2.03 (0.33)	1.94 (0.54)	.19

Students did perform better than their experienced peers on the dimensions of relevance and recognition of difference, but not statistically so. For the recognition of difference dimension, the student teachers scored more highly on inclusive participation and group identities, and worse on valuing other cultures. In terms of relevance, the experienced teachers were best at making some connection to previous school learning, while the students produced teaching that made stronger connections with something beyond the classroom, and with other subject areas. They also provided students with more problems to solve, that is, problems without a single solution. This finding might suggest that the students were on track to engaging their own students in quality thinking. But, as the results for intellectual quality show, the student teachers performed at a significantly lower level.

Of the intellectual quality items, "problematic knowledge" was the only one in which the students (barely) outscored the experienced teachers, while their scores on "higher order thinking" were comparable and not significantly different. These results suggest that the student teachers were able to engage students in reasonable thinking processes and help them see that knowledge is constructed, but that they were (much) more likely to treat knowledge superficially and thus develop only fairly superficial understanding among their own students. That is, they were better at the processes than the substance of their lessons. Of particular concern is their relative inability to ensure that deep rather than superficial knowledge is addressed in the classroom. As Seymour Sarason says "The overarching goal of a teacher is to light intellectual fires, to make the world of learning and ideas interesting and self-propelling; that is, to engender in students the desire to know more." While teachers are unable to deal with knowledge in any depth, they are unlikely to achieve this goal, and their students will continue to be engaged in low level, unstimulating, and in many cases, unchallenging work.

These results indicate that the semester long intervention using PP was insufficient in producing high scores. They also indicate that these graduates were not great (or even good) teachers, according to the model. In the final section of the paper, we elaborate what it might mean to enhance teacher preparation in PP, but turn, first, to a summary of the interview data.

Summary of interviews

Three key themes were identified from the interviews with participants about their experience of applying PP

to their teaching. First, participants tended to see PP as additional rather than integral to teaching. Second, and related, they saw PP as having specific rather than universal applicability. Third, they spoke of PP as a valuable framework that came too late in their teacher education program. Each of these themes is developed below and discussed in more detail in the subsequent analysis of data.

PP as additional not integral

In general, the interns saw PP either as an add-on and/or as something that was only in the back of their minds. In both cases, PP was seen as a time-consuming luxury when it came to thinking about their teaching. Time constraints were widely cited as limiting their ability to explicitly plan for, and apply, PP principles and specific items in their teaching. These time constraints were linked to the everyday pressures of teaching (up to a 50% teaching load) alongside ongoing University work. Some, like P8, claimed that the initial shock of teaching on internship – with a bigger teaching load for a longer period of time than that experienced in other practicums – made it even more difficult to incorporate PP explicitly into her planning. She added that once she had "settled down" she would be / was more able to make use of it:

Say in the first four weeks of my internship it was survival. I'd never had a class with so many different ability levels. I'd never had one with so many behaviour problems, so it was survival, doing whatever worked (P8, p. 2: 55-57).

This participant also noted that students were not accustomed to the "type of teaching strategies and activities" associated with PP, further complicating the implementation of PP in her teaching (P8, pp. 2-3: 66-86). This perception of PP as requiring a particular style of teaching is addressed further below.

Other participants also expressed views indicating that, despite explicit attempts to instil in student teachers the idea of using PP to guide everyday lesson planning, they continued to perceive it as an add-on, as something additional, to normal lesson planning.

It's really time consuming, so when it comes to adding, to thinking about productive pedagogy, it doesn't come high on the priority list (P4, p. 4: 142-44).

I thought, yeah, I can put in this element, I can put in that element, just adding on top of the lesson to make it more on the theme of productive pedagogy (P4, p. 2: 78-80).

Hence, under pressures of time they stopped consciously planning for PP in their teaching.

I just felt pushed constantly time-wise, and that's the only reason why I didn't get as much done as I wanted to. I took my Productive Pedagogy books to school, they're sitting there, but I just didn't get a chance to ... It sounds like a weak excuse, but it really was difficult time wise (P10, p. 2: 78-82).

Following from these comments, participants consistently claimed that while not always, or often, explicitly planning for PP, the principles and dimensions of PP, and in some instances particular items, were in the 'back of their minds' during both their planning and teaching. When asked for more details about this process, participants primarily referred to the four dimensions, rather than particular items within the PP model. Examples of such implicit incorporation of PP include the following:

I just keep the main points, the main ones that we looked at, that I can remember myself from the course in the back of my mind, trying to use, that I thought were relevant (P1, p. 2: 69-71).

... so far as integrating it into the internship lessons, it wasn't really like at the forefront of my thinking at all, because you have all these things that you are trying to get over in the class (P2, p. 1: 28-30).

... from that [the previous study of PP and the manual in the elective] I kind of work out what would be some general things that would promote productive pedagogy (P4, p. 2: 63-64)

I guess I have the twenty items, or most of them, in the back of my mind all the time. I probably planned my lessons more ... I know when one of my lessons isn't representing Productive Pedagogy and when it is (P7, p. 2: 52-54).

... it was just in a mental form, I didn't actually do it in a written form like write out a certain lesson plan ... I didn't go through the criteria [items] at all, it was just kind of from what I could remember from class. (P9, p. 1: 34-35 and p. 2: 49-50).

I did try to think about it, and in terms of mental processes, I tried to keep it in the back of my mind ... things like 'integration of the curriculum' and 'knowledge integration', I tried to think, okay I must remember it's not just PE or Community Family Studies here, and how can I integrate that or integrate the two of them (P10, p. 1: 36-39).

In general, these comments indicate that PP had not become integral to the participants' conception of teaching. While many participants claimed to have PP in the back of their minds, it seems they did not get over seeing it as additional, something else to think about, another device to be employed occasionally or for specific purposes. Even though the participants saw PP as a valuable guide for their teaching, as demonstrated later, it wasn't understood as something that could readily be employed to enhance every lesson. The effort involved in doing PP was not seen as worth it. A more effective intervention using PP would need to shift these perceptions so that PP became integral to participants' understanding of teaching.

PP as specific not universal

Related to these views about PP as something additional to teaching, was the perceived incompatibility of PP with some year levels, some teaching styles, or some content. For instance, some participants with classes in the lower primary years expressed the view that achieving PP outcomes, particularly the intellectual quality items, was especially difficult, if not impossible, given the age of students. For example, P8 noted:

It depends on the year you've got. Say for example, I was in kindergarten for my last prac, while we were doing the [elective] subject, and a lot of the things I said: 'You can't do this with kindergarten'. A lot of the intellectual quality indicators require you to brainstorm and discuss. Brainstorming with kindergarten is very, very difficult (p. 5: 188-192).

Similarly, P3 claimed that it was particularly difficult to apply PP to the KLA of PDHPE, in a high school (p. 1: 39-48). Another participant openly acknowledged that she overlooked items in the Intellectual Quality dimension, based on her understanding that the teaching of drama to a year 5 primary class was incompatible with items in this dimension:

I kind of gave the first group a miss, which is kind of wrong, like all the higher order thinking, and knowledge integration, and those ones, because I kind of thought there was no way I could do that when all they were doing was acting and reading out the roles anyway (P9, p. 2: 39-42).

When asked about content, some participants claimed that since this was officially prescribed in syllabus documents it was something beyond their control as teachers. This was most strongly expressed by P2:

You are taking the content from the syllabus, so you can only really address it as a way that you're going to teach it, rather than bringing something new. You know, you could have some brilliant idea, but it's not going to cover the syllabus. It's not going to cover the requirements of the syllabus, so I think that's the only way it can be done (P2, p. 2: 66-69).

Related to this issue was the tendency of participants to discuss PP in terms of teaching strategies, rather than a combination of strategies and content. Indeed, some equated the whole concept of PP with the use of group work:

Instead of looking at each thing or individual element I saw that a lot of the elements were connected to group work (p. 2: 64-66).

As noted below, while this perception is arguably a function of their limited teaching experience, participants consistently talked about their application of PP in terms of teaching strategies. Examples of this included group work, problem solving activities, seating arrangements in the class, and the general set-up of the classroom and program of activities.

PP as valuable but "too late"

Participants stressed what they perceived as the value and importance of PP as a framework for teaching and/or a teaching tool. Half of the interns expressed the idea that more PP was needed in their teacher training for it to become a central or underlying part of their teaching. Some examples of these included:

I think that it would help when you started off [teacher education] to use some of these ideas (P5, p. 4: 156-7)

Like I said, it should be, I believe, the basis of the whole four years, because even though it's stuff that you do, just to have that reinforced in your head all the time, each of those things, you'd get to the stage where we are now in the internship and then next year, where you wouldn't even have to have the sheet anywhere near you (P6, p. 5: 194-97).

I'd say that using these particular dimensions, and these items, is just a good way of creating a base for these things to take place (P2, p. 5: 193-94).

Even though it came late in the degree, it was kind of good to just get you thinking about, you know, what, actually improves student achievement which is the basic aim (P4, p. 8: 353-355).

I think it's important that it is used. I think it's quite valuable not only to myself, but all beginning teachers . . . well, all teachers (P9, p. 5: 210-11).

These and other participants directly cited the importance of PP as a concept, (in some cases noting the need for teacher / whole school involvement in PP to facilitate its effective application).

Analysis

Two main arguments are developed below from the observation and interview data. First, as a framework for teacher education, it is argued that PP needs to be more extensively and consistently integrated into existing programs, across all years. Some potential impact for the elective subject model used in the pilot study is argued for, both in terms of students' observed use of PP and their reflections on its value for quality teaching. However, problems of students viewing the application of PP as something additional to their 'normal' teaching, and simultaneously characterising PP in terms of teaching strategies (group work), are identified as key factors in the low scores of students, and linked to the limited model of PP preparation. In order to make PP a fundamental and constant part of students' teaching practice, it is argued that PP needs to be made a fundamental part of their teacher preparation, such that it becomes a starting point, rather than an add-on, in students' subsequent teaching. To achieve such a shift, we argue that PP must be introduced earlier in the teacher education program and be integrated throughout.

Second, the understanding of PP demonstrated by participants, both in terms of its reduction to 'group work' and beliefs that it is not compatible with some year levels and subject areas, is addressed to argue for the re-shaping of the teacher education program more broadly, based around Productive Pedagogy principles. Two central points are developed here. First, following from the argument cited above, the overly shallow understandings of the concept of PP and its potential application across teaching specialisations support the call for its extended integration into teacher education. Second, and related, it is argued that this understanding of PP is linked not only to the late and limited preparation via the elective course, but also to current emphases in the teacher education program. That is, the current priorities on generic teaching methods and strategies, coupled with an emphasis on the management of student behaviour lead to a view of transmitting relatively unproblematic and fixed content to students. Here, we suggest a need to address preconceptions and dominant discourses in teacher education.

On the question of the impact of the PP based elective subject on participants' observed performance in schools, making conclusions based on this relatively small number of observations would clearly be problematic at best. Our intention is not to claim definitive evidence of the value, either way, of this particular model. Given that participants were explicitly trained in the principles and application of PP, and agreed to participate in a study intended to measure their application of PP following the training, our aim here is to put forward some propositions with respect to the impact of the elective subject, based on the observed scores and reflections of participants on the experience.

As noted above, in overall terms, the student teachers' scores could potentially be interpreted in two opposing ways. On the one hand, the student teachers achieved comparable and, for some items and dimensions, higher, scores when compared to teachers in the Queensland sample with many years of teaching experience. As can be seen in Table 2, the mean scores were generally comparable, with some

significant differences. From this perspective, it could be argued that the model had some positive effect on the student teachers' performance in PP.

The student teachers scored higher for the dimensions of 'Relevance' and, to a lesser extent, 'Recognition of difference'. The mean scores suggest that they were more effectively integrating knowledge that was explicitly linked to other knowledge within and beyond the classroom, and setting problems for their students to solve, a significant achievement for beginning teachers.

From the interviews with interns (and a survey of first year students subsequently undertaking a semester length study based on PP principles) there is strong evidence that pre-service and beginning teachers highly value the concept of PP as a framework to guide their teaching. All participants in the study spoke favourably about the value of PP for their teaching, with many directly citing its importance as an underlying basis for their future work.

Many participants also raised the issue of including more PP in their teacher education program, from an earlier stage in their training. A course evaluation by the first year teacher education students (mentioned above) adds support for the PP component of teacher education. Many students saw PP, at this early stage of their teacher education, as being an "integral" part of their preparation, providing a "solid framework" for their future work as teachers. The PP component of the course was rated by many students as "very important", and well connected to teaching practice.

An alternative reading of the observation and interview data, however, highlights the need for a revised model of integrating PP into teacher education. Despite having participated in a ten week elective course specifically aimed at developing understanding of PP and how to apply it during their internship, and despite ostensibly having more time to plan for the implementation of PP compared with regular teachers, participants' scores were very similar to those of the Queensland sample involving practising teachers with no explicit training in PP.

Participants' incomplete understanding of PP is well illustrated in the perception that items in the 'Intellectual quality' dimension were restricted by the age of students and subject content being taught. Expressed problems with this dimension can be linked to an understanding of PP primarily in terms of teaching strategies, rather than the content of their teaching. As noted above, some participants effectively equated PP with the use of "group work" or some other student-centred approach to teaching practice, while others claimed to have little, if any, control over the content of their teaching. Participants working from this basis helps to account for the low scores achieved on the 'intellectual quality' items, such that the interns tended to give little explicit attention to these items.

At one level then, the low scores in general suggest that an alternative, more integrated and detailed, model is needed to incorporate PP as a framework for teacher education. This is well supported by the data on the 'intellectual quality', and other perceived and identified problems in students' application of PP while on internship. The perception that applying PP was something to be done in addition to regular lesson planning and teaching adds more weight to the argument, and clearly indicates that students had not reached a point where PP was an authentic basis or overarching framework for their teaching.

The inclusion of PP from the beginning of students' teacher education program, as the basis from which planning and associated decisions proceed, could potentially address this problem. For example the systematic incorporation of PP principles could emphasise, and more deeply entrench in students, the capacity for PP outcomes to be achieved across all year levels and subject disciplines. Similarly, the scope for multiple teaching strategies and styles, around different content, to achieve PP outcomes may also be strengthened. Without detailing this alternative here, clearly the single elective subject in the final year contributed to the 'add-on' understanding of PP and, in turn, its abandonment once time and other pressures were applied, and to the subsequent low scores.

The issue of PP being considered and applied by students indirectly, working from the 'back of the mind', is also relevant here in accounting for low scores, and supporting an alternative model of PP for teacher education. There is value in a 'back of the mind' approach, provided that PP becomes a (possibly sub-conscious) basis on which planning and teaching decisions are made. For this to happen, the principles of PP, characteristics of the dimensions and items, and criteria by which to achieve them, would need to be an integral or core part of students' whole approach to and understanding of their teaching. They would also have to be developed over the entire teacher education program, rather than in a short optional final year course.

Participants in the study claimed to be incorporating PP on such a level, whereby their background

knowledge of PP influenced their everyday planning and teaching decisions. Their scores and expressed difficulties with some items and whole dimensions (like 'Intellectual Quality'), however, suggest that their understanding of and preparation in the application of PP was not sufficient for this to be achieved. To achieve this type of influence a more comprehensive model for PP in teacher education would be required, so that, over a sustained period of time, students incorporated the principles and approach of PP into their everyday, back of the mind, teaching practice.

Finally on this point, it should be noted that a couple of participants did claim that they had moved beyond efforts to simply think about PP and keep it in mind, to more systematically plan their teaching to achieve PP outcomes. For example, P7 noted that:

I probably planned my lessons more ... I know when one of my lessons isn't representing Productive Pedagogy and when it is ... I look over the items ... and try to think of how I can achieve Productive Pedagogy using these areas (pp. 2-3: 52-54 & 98-99).

This sort of conscious application of PP also indicates the extent to which for these participants PP required work in addition to their normal planning, making it an unsustainable practise over the long term. This connects also with students' expressed difficulties using PP due to heavy demands on their time. A strong argument can be made that if PP was more entrenched in students' thinking as the basis around which everyday planning and thinking took place, their capacity to centre lessons around the principles of PP, even without detailed lesson plans, would be enhanced.

Conclusion

Productive Pedagogy needs to come early in the teacher education program in order to be more fully integrated into students' knowledge base for teaching. If it is just another framework, just another theory, just another list, then students are likely to draw on it as they might any other approach. Instead, if students are to treat PP as foundational to all of their efforts in teaching, it needs to be: (1) clearly positioned in that way from the beginning of the teacher education program; (2) used as a device to guide all aspects of the teacher education curriculum; and (3) modelled in the pedagogy of teacher educators. Some students who were introduced to PP in the first year of the program are now using the language and applying the concepts in second year courses which have no explicit connection with PP, demonstrating the potential of integration if PP is to be successfully applied.

More broadly, PP principles challenge conventional understandings about what is important and what should be emphasised in teacher education programs. It suggests a re-thinking of what is offered and what is valued. In particular, the principles of PP require teacher educators to address:

1. The overemphasis on classroom environments and processes rather than on substance and purposes
2. The relationships between foundational studies, curriculum studies and field experiences which are currently insufficiently connected
3. The purpose and structure of field experiences which centre too often on practising teaching techniques with relatively little concern for what is being taught and the quality of learning produced
4. The focus on student management relative to student learning, which mistakenly assumes that management should be addressed first and separately
5. The emphasis on syllabus content and constraints of the formal curriculum relative to identifying central concepts and producing depth of understanding.

These points will be further developed in a subsequent paper. Students' complaint during the elective course that they had "to think" and that PP made their "heads hurt" highlights the all-too common experience of teacher education as relatively low in its intellectual demands on students. We continue in the quest for better teaching

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