

A Collaborative Work-Embedded Approach to Professional Development in Engineering Education.

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1. Introduction

An ever increasingly diverse age, cultural and socio-economic student population has created a need for Australian Universities to reassess the educational processes that become part and parcel of the daily internal concern of the university. These processes can be summed up as teaching and learning effectiveness. Until the late eighties professional development for academics remained as a low priority, the long standing tradition being that specialised subject expertise was enough to qualify a person to teach at a university level. Presently professional opportunities have been made readily available for Australian engineering academics through the Centre for Higher Education Development. However the focus has generally been on content rather than teaching and learning. Therefore the appropriateness and effectiveness of some professional development has become a significant cause for concern. It is not surprising to find that the majority of Australian engineering educators have no formal teaching qualifications, having entered into the world of academia as a postgraduate student or directly from industry. This has also accentuated the misalignment of some current professional development with educators' individual teaching needs.

Effective learning and teaching in higher education can not possibly evolve satisfactorily in an isolated context. Yet formal, ad hoc., adjunct courses are frequently held off campus. Consequently these courses often have not assisted with the identification and understanding of individual teaching needs as well as the learning needs of tertiary students. Due to this, a collaborative work-embedded professional development approach to enhance the growth of effective teaching practices, has been undertaken by a group of Monash University engineering educators together with academics from the Language and Learning Services Unit and teachers from an adjacent secondary school. This collaborative initiative was voluntarily undertaken by these educators to maximise their teaching effectiveness in order to minimise first year undergraduate transitional issues. Therefore, this paper seeks to promote the strengths of this alternative approach to professional development in relation to the implementation of a common first year civil engineering subject ENG1201.

2. The short comings of linear professional development.

As the need to address the effectiveness of learning and teaching has become a national concern, The Monash Learning and Teaching Operational Plan [1] has been created to redirect academic staff to personally assess their current teaching practices in conjunction with the professional development short courses currently offered. In this way academics will be suitably rewarded in their career path. Yet reflection upon the effectiveness of teaching and learning has not always been a crucial practice for engineering academics and consequently

attendance at formal courses has continued to be infrequent or non-existent. Staff development activities have also previously been boycotted by Australian academics for reasons of “lack of time available”, “anyone can teach” or “teaching is a personal matter”. It appears that the Kugel Model of Development [2] can assist to explain this reasoning further. As the academic has been focussed purely on the teaching of a subject, it is not until there is a paradigm shift, as indicated by Figure1, that attendance at formal professional development courses concerning teaching and learning may be considered a priority or a skill to be furthered. This was the case for the three engineering academics involved in the implementation of ENG1201. A move had been made to stage three, as one academic commented:

“It’s [teaching] a bit like shooting in the dark in a sense because I know we looked at different learning styles..while intellectually I can understand that, experientially I can’t...it’s hard to pitch to a person who may have quite a different learning style to myself. I can recognise that it is rather like throwing a handful of wheat at the barn door and hoping that some of it will hit. So you think to yourself it is not a terrifically thought out process.”

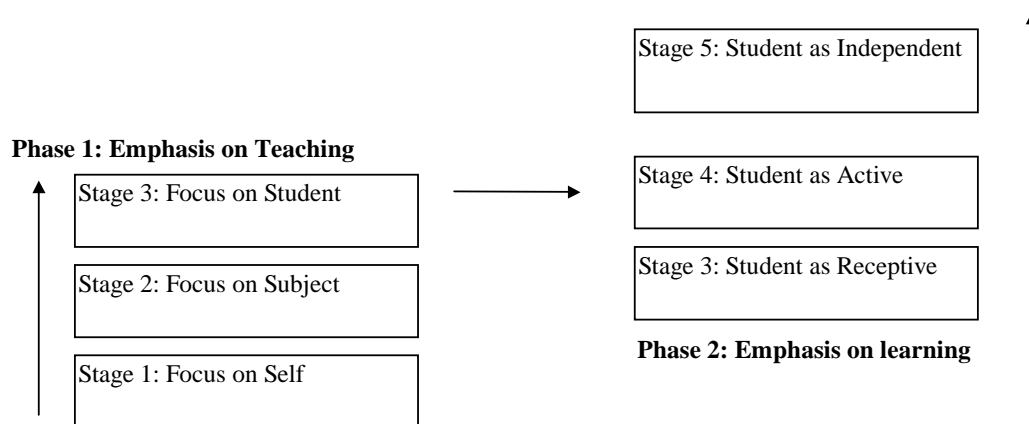


Figure 1. Kugel Model Of Development (1993)

On the other hand, those who had already participated in formal adjunct courses found them to be inadequate. As the agenda had been often set with little consultation with the prospective participants, inappropriate pedagogical jargon had been used, often there had been little subsequent follow up support or the decision to attend had not often been a personal one. Zuber Skerritt [3], Cranton [4] In this way course presenters had maintained complete ownership which lead to participants becoming increasingly dissatisfied that their personal teaching needs were not being met due to the neglecting of individual’s core beliefs and values. As commented by one engineering lecturer;

“The six hour model (Linear type Professional Development) isn’t effective unless they have got one hour of presentation and five hours of interaction. I need tools I don’t need more information. I’ve got stuff in my tray three inches thick. I need to take the information and have someone to help me structure it in a way that is going to help me in tomorrow’s lecture.”

Further to this, factors including the lack of indication as to which teaching skills are the most essential and the little confidence invested in those conducting the workshops had also contributed to subsequent in attendance. It had also been suggested that ignorance kept academics at bay, as evaluation of the effectiveness of such short courses was most commonly measured by participant satisfaction at the time of completion rather than in context of the work place.

Moreover, this type of professional development can be described as a Linear Approach [5] outlined in Figure 2. Note that a ‘change in teacher’s classroom practice’ and ‘beliefs and

attitudes' may be interchanged. This traditional linear approach assumes that it is only a formal short course that can act as a catalyst for professional growth. This is indeed a tunnel view of professional development.

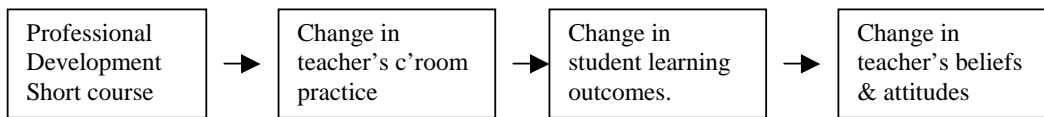
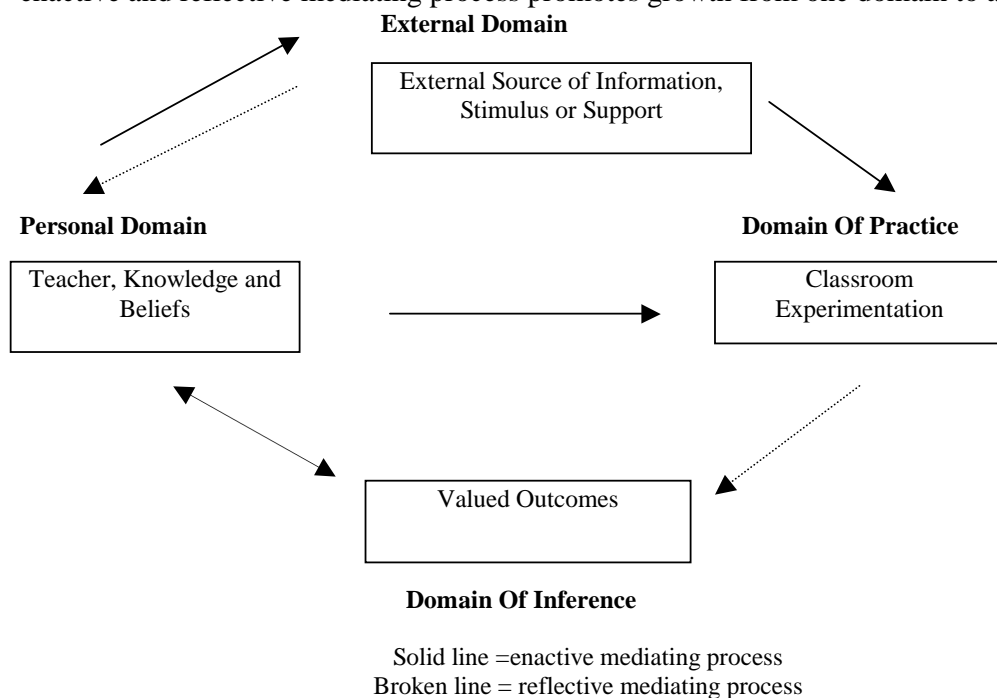


Figure 2 Linear Approach to Professional Development (Clarke & Peter 1993)

3.The strengths of a collaborative work embedded approach.

Overall the notion of professional development is complex and it must be understood that effective professional development is much more than a rehearsed or learned skill. In fact it is an internalised personal growth requiring changes in values and beliefs. Furthermore it is an activity that maybe solitary in nature or stimulated by others, but ultimately it is a process directed and controlled by the individual. Ironically even though higher educators are expected to be independent, self -directed professionals who are required to initiate or implement innovations, traditional linear professional development strategies have not encouraged or allowed such an autonomous approach. Therefore these complexities of professional development are beginning to signify that a collaborative work embedded approach may have a greater effect on the achievement of a developing a more effective teaching practice. The Cyclical Approach to professional development [5] as outlined in figure 3, embraces these aforementioned complexities. This model being less restrictive considers alternative formal and informal avenues as a catalyst for professional growth. The enactive and reflective mediating process promotes growth from one domain to another.



**Figure 3 Cyclical approach to Professional Development
 The Clarke-Peter Model of Professional Growth 1993**

4. The implementation of a work-embedded approach.

Professional development should no longer rely entirely on the attendance of formal conferences, seminars and workshops as suggested by the Linear approach. More specifically for example, self reflective learners such as the three engineering academics from the Monash Gippsland School of Engineering have been eager to maximise their teaching practice to meet the learning needs of their students. Initially a transition issue involving a high attrition rate as well as a directive to implement a Problem Based Learning (PBL) approach acted as an external stimulus for these academics to elicit professional development assistance from the Language and Learning Services Unit. Furthermore a realisation that simply passing on content knowledge to satisfy surface learning had become an inadequate teaching practice. This commonly held teacher centred approach of imparting information as a one way process indicated an ignorance of students' individual learning styles. In this way lectures and tutorials did not address the learning needs of most students as the humanistic approach used in most Australian secondary and primary schools. However once the belief that students possess individual learning styles and that learning occurs through the connection of information rather than simply storing facts for regurgitation for projects and exams had been established, a volition to seek assistance and consequently the notion of classroom experimentation initiated a work embedded approach.

Previously, it was assumed by Heads of Faculties that a sound content/knowledge background was equally supported by a similar teaching practice. This was not the case for many academics particularly, those with no formal teaching qualifications, as commented by one of the three engineering academics;

“I wasn't aware of teaching practice in that sort of sense. Look when you started, you might as well have been talking Greek, honestly. What's your teaching strategy? My what? What's your learning strategy? It's a set of concepts which are not on our planet.”

Teaching practices at the Monash Gippsland School of Engineering were previously not given priority to be discussed formally at staff meetings. Such discussions could cast assertions of inadequacy. [6] Fortunately this was not the case for this particular group of educators but could explain why invitations for others to join were graciously declined. Consequently, regular formal and informal discussion involving Language and Learning and these Engineering academics occurred during and after teaching periods to raise concerns and teaching strengths. Later these discussions involved two teachers from the secondary school to further address transition problems. Participation in the common first year subject ENG1201 assisted to pinpoint problem teaching practices and further develop areas of strength. All participants in this work embedded approach found the exercise enlightening, particularly as teaching practices had been rarely addressed since their commencement at the University over ten years ago.

“Discussions with the group helped in decision making about the course structure. Discussions with secondary teachers revealed that the students have little or no experience in teamwork...One of the main things I learned is that my idea of what interests the students is significantly different to reality... One comment made by [the secondary teacher] has been in my mind throughout the semester and was proven to be true on a number of occasions “They are still kids!” and we can't turn them into budding engineers in one semester.”

5. Areas of concern involving this work embedded approach.

Overall those involved found the work embedded approach beneficial. As personal teaching problems arose they could be discussed within a supportive environment to develop alternative practices for experimentation. Teaching strengths from tertiary and secondary

educators were also discussed, to provide further insight into the development of appropriate teaching practices. Most importantly this collaborative approach was ongoing and focussed upon the immediate needs of teachers and learners, which later were related to other subjects and year levels. Students enrolled in ENG1201 supported the observation work which occurred in their classes and openly supported the lecturers initiative to consider the effectiveness of their teaching practice. However it became apparent that time management played a crucial factor for a work-embedded approach to succeed. Coordinating discussions with educators from different university faculties as well as institutions was difficult. It became a necessity for the faculty and individual academics to recognise, give priority and integrate these sessions into the academic lifestyle, particularly as teaching is not the only commitment. "What I need is to make the decision that I am going to give it a higher priority or I need an external decision made for me."

Therefore in the light of the collaborative work embedded approach, academic staff can develop as teachers in a way that alters not only their conception of what teaching is, but in a way the subject has to be developed and taught so that students can learn effectively. Practising the activity of teaching, or gaining some knowledge of research on teaching and learning are not enough in themselves. The knowledge, the skill and student behavioural patterns are some of the important concepts that must be integrated for effective teaching and learning. A collaborative work embedded approach can strengthen this integration process.

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