Chapter 17

Knowledge Networks: Lessons of a Professional Development Process for In-service Teachers in Education for Sustainable Development

Andre Grant and Ben Roche
FBE OutThere, Faculty of the Built Environment, University of New South Wales

1. Introduction

Knowledge Networks is a pilot project developed by the Sustainable Living Project at the Faculty of the Built Environment, University of New South Wales. The project was created to explore pathways for building the capacity for Education for Sustainable Development (EfSD) with in-service high school teachers. The project explored two pathways. These were:

1. the development and application of a professional development model; and
2. the initiation of an online resource sharing database to support existing 'teacher change agents'.

The project was funded by the NSW Environmental Trust and commenced in May 2004. As a key activity the project ran three sequential focus groups of six to eight teachers engaged in a combined professional and resource development process based on action learning. These three focus groups comprised of teachers in different Key Learning Areas of the NSW curriculum – Technology (FG1), Human Society and Its Environment (FG2), and Science (FG3) respectively. The project ultimately sought to develop a precise step by step professional development (PD) process. This is presented as the Professional Development Model (PDM) in this paper. While Knowledge Networks is not a research project, certain questions have framed the way in which this project has been conceptualised:

- How can teaching practice be situated in the context of sustainability?
- Can we integrate EfSD within the NSW curriculum?
- How do we support teachers through a process of professional development in order to change their practice?

By exploring these questions throughout the project key reflections and outcomes have been drawn and are presented here as critical success factors associated with the PDM.

The project developed its online resource sharing database, namely www.teachsustainability.com.au using an open source database programming language to ensure cost effective maintenance, scalability and accessibility. This database has been flexibly developed to allow for future applications and will have longevity through partnerships and affiliations, namely with the Sustainable Living Challenge at the University of New South Wales. This database allows teachers across the state to submit and retrieve resources that assist in delivering learning outcomes related to sustainability with in the NSW curriculum.

2. Rationale

Education for Sustainable Development is emerging as a key concern for the formal education sector as we progress through the United Nations Decade of Education for Sustainable Development (UNDESD). While national policy instruments are being

fashioned to support EfSD in schools, many state systems and curricula are also in the process of reshaping their foci to recognize the genuine role that education can play in creating a sustainable future (e.g. Learning for Sustainability in NSW, Environmental Education Strategy and Action Plan in WA). These outcomes are encouraging, yet the translation from policy to practice in the classroom, remains a challenge for professional development both in terms of content and process.

If policy goals for EfSD are to be realized, they will require the active and wholehearted engagement of teachers currently in the classroom. This project sought to start from the ground up in an exploration of the challenges of working with in-service teachers in a professional learning process. The aim was, in collaboration with teachers, to develop a model for professional development that situates the participants learning in the context of sustainability. As a pilot project, Knowledge Networks has provided some valuable insight into these pathways and the potential for future application and research.

3. Professional Development and Action Learning

The project utilised action learning as a tool and methodological basis for effective PD. While research and understanding of PD processes and their impact on teachers are still not adequately understood (Borko, 2004), there is recognition that effective PD incorporates certain key characteristics associated with action learning and action research models (Porter et al., 2000).

In particular the OECD Environment in Schools Initiative (EnSI) has demonstrated the critical importance of reflection in practice for in-service learning (OECD, 2001). Furthermore, action learning characteristics such as collaborative learning (cluster) groups, critical friends, mentoring and task oriented learning have been identified by the Australian Government Quality Teacher Program (DEST, 2004) as effective in facilitating a change in teaching practice. Concepts such as ‘Communities of Practice’ or ‘Professional Learning Communities’ are being positioned in community, organisational and teacher education as effective frameworks for in-service collaborative and group learning (Lave and Wenger, 1998; Wenger, 1998; Roberts and Pruit, 2003). As such these principles and frameworks have guided the development of the professional development model that emerged in this project.

Action learning has been used effectively for PD in similar contexts (Gayford, 2001; Fien et al*.,* 1997; Robottom and Hart, 1993; Tilbury and Scott, 2003). Furthermore, action learning and mentoring have been demonstrated as effective tools for PD of local government environmental educators in EfSD (Tilbury et al., 2005) and are identified as key tools for EfSD in the recent national review of Environmental Education (Tilbury, Coleman and Garlick, 2005). However, there exist few documented models for application in the formal education sector with in-service teachers in the context of EfSD. This project has therefore sought to draw upon these examples of leading practice to develop a model of action learning for in-service PD of teachers in NSW. A key outcome of this process is to explore the place that EfSD has, in and across the mainstream NSW curriculum. In order to realise this outcome, the project’s methodology assumes that teachers themselves are best placed to identify relevant pathways through the syllabus.

The action learning PD process and PDM developed by this project focused participants around the self-directed production of a *teaching and learning project.* The process aimed to provide a vehicle to combine what were identified as four key elements that comprised the participants learning context. These are presented in Figure 1 as Significance, Tools, Processes and Obligations. In this way, the PDM aims to provide a space for teachers to develop a teaching and learning project that drew on various tools associated with EfSD, the significance of using sustainability as a context and quality educational processes while still meeting the obligations of syllabus outcomes (see Figure 1). These teaching and learning projects were then edited to a transferable quality and are now available for distribution via the www.teachsustainability.com.au website.

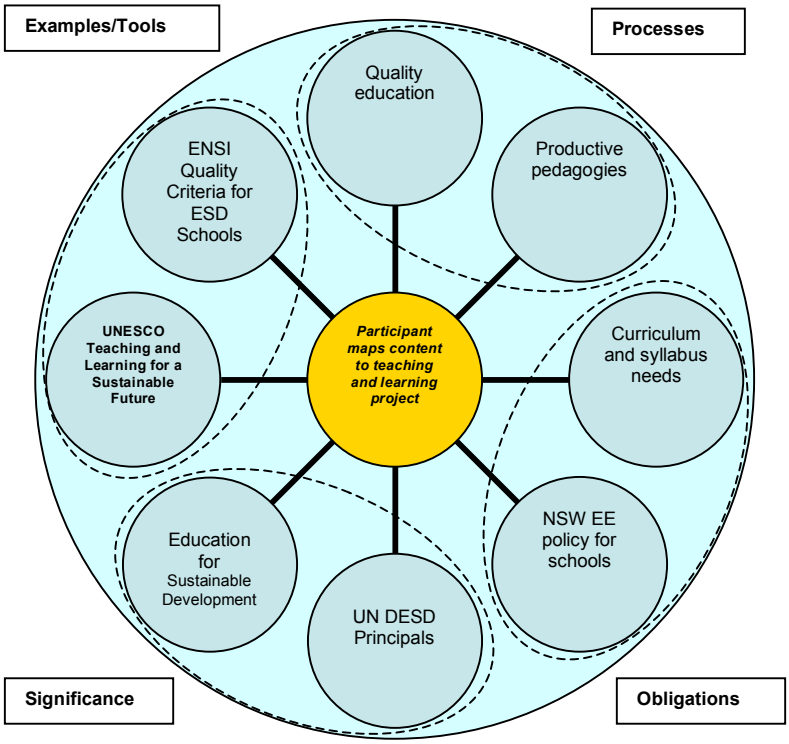

Figure 1: Professional learning context of Knowledge Networks

4. Key Activities

Two nested action learning cycles comprised the methodology of the project. It facilitated learning within focus groups and within the project and identified project level and participant level action learning. Combined with the learning dynamics of the focus groups, this provided a learning system that surrounds and ultimately supports the participants (see Figure 2) while allowing the ongoing development of the PDM.

Project level action learning cycle

The project level action learning was used to iteratively develop the PDM and was separated into distinct stages of action, evaluation and reflection over the three focus groups. The project was structured in order to allow for learning to be captured after implementing and evaluating each focus group. Using data collected from

participants and project facilitators the engagement process of each subsequent focus group was enhanced. Finally, a summative evaluation was conducted to draw on the lessons of this process and formalise the project level action learning and collate this into the PDM.

Participant level action learning

Within each of the three focus groups, participants underwent a series of discrete learning cycles exploring themes of sustainability and its place in their chosen syllabus. These cycles were undertaken over a period of three to six months. Five days relief time was made available to the participants, two of which were used for group workshops held at the University of New South Wales. Each focus group commenced with a one day workshop exploring broad themes of sustainability and followed with a self-directed 'homework' day. Each group would then reconvene for a further workshop day to explore learning and develop ideas for their teaching and learning project.

The scale of each developed differently for each group, but was generally a documentation of a teaching resource covering a minimum of five weeks of class time. Working in pairs or as a group, the participants collaborated to produce the resource. Mentoring was provided to support the teachers to develop this resource over a period of between three and six months. The final products were edited to allow publication on the project website. Seven teaching and learning projects in all were published. Each focus group experienced different challenges as the project evolved. These challenges have been captured to some extent in the critical success factors discussed below.

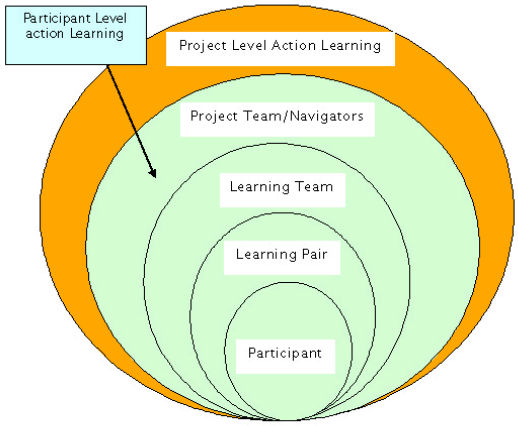

Figure 2: Learning system and dynamics of PDM

5. Conclusions

Data collected from evaluations over the course of each focus group were combined with semi-structured interviews with participants to provide an appraisal of the professional development experience. From this appraisal process a number of lessons and critical success factors were identified.

This project has indicated that professional development of teachers in EfSD can be achieved through emerging innovative approaches to PD. These innovative approaches are encompassed by action learning and mentoring techniques that focus teachers on *how* they are teaching more specifically than *what* they are teaching. In other words the specific delivery of sustainability content was less important than the processes utilised to engage students. This provides an opportunity to actively work with teachers to transform practice towards EfSD, while also aiming for quality teaching goals. The project therefore has identified strong links for EfSD with the Australian Government Quality Teacher Program (AQQTP) (DEST, 2004) and the NSW Quality Teaching Model (DET, 2003). The Knowledge Networks PDM may contribute a level of significance, purpose and context to quality teaching through a focus on EfSD - effectively situating quality education in a real world context.

Critical Success Factors

Many teachers considered the project to be a rich and highly rewarding professional development experience and have effectively integrated components of education for sustainable development into their teaching practice. Critical success factors contributing to this experience were identified through evaluation. These are summarised below as 6 key characteristics, or '*themes*' within the PDM.

Theme 1 Commitments

Commitment levels of participants were found to be crucial to ensuring engagement in actively reflecting on and altering practice. In particular, the participants' output or 'action focus' of (i.e., the development of a teaching and learning project) needs to be highly situated in a teacher's existing obligations rather than being seen as an added commitment. Teachers should at all times be programming for their own use according to the requirements of their school and as such, see the process as assisting to reduce their workload.

Theme 2: Time and relief management

Efficient use of paid relief time by participants (supply of funds by project for a relief teacher to cover participants' involvement in programme) is an important component but needs to be carefully managed to avoid a negative impact on commitment levels. A contribution to relief funds by the participants themselves or a related third party (e.g., their school) may help increase levels of commitment and ownership. Increased commitment levels from teachers combined with an extended time span over which the PDM operates will improve effectiveness of the model.

Theme 3: Phased PDM

The proposed PDM is a formalised action learning process initiated by group workshop sessions and supported by external university and curriculum mentors. This is expanded into a series of cycles or phases of learning as the framework of the PDM. Figure 3 below illustrate the phases of the PDM as a flow diagram. The phases guide the participants through cycles of enquiry that allow them to reflect on their practice while exploring education for sustainable development and its relationship to their practice. Over these phases teachers will slowly refine their teaching and learning project with the support of mentors. The phases alternate

between group learning (learning together) in collective workshops or with mentors and self-directed learning in pairs or alone (learning away). Participants continue to use these cycles until their teaching and learning projects are completed and documented to satisfaction.

Theme 4: Mentoring and facilitation
The roles of mentors and facilitators provided critical support in assisting and guiding participants on their learning journey. For simplicity these roles have been commonly termed as 'navigators'. Two key navigator roles were identified as having distinct functions that needed to be performed by separate individuals: **Sustainability navigator** – facilitates and mentors to assist in contextualising concepts in sustainability and education for sustainable development. **Curriculum navigator** – facilitates and mentors to assist teachers to navigate syllabus needs, Quality Teaching elements and coherent writing and communication of ideas into a teaching and learning sequence.

Theme 5: Outputs
The 'teaching and learning projects' (what teachers produce as an output from their involvement) need to be identified by the teachers themselves as tools for realising existing syllabus obligations. As much as possible the participants' action focus should be situated in a personal context that is perceived as assisting in the achievement of a professional goal or easing their existing workload. The easiest way to do this is to actively programme for an upcoming class with a view to permanent inclusion in the teacher's own annual programme.

Theme 6: Learning dynamics
The dynamics within the learning team were found to be important in maintaining motivation of participants. The PDM proposes teachers work in 'learning pairs' as part of a larger 'learning team'. This learning team is focused around sharing experiences and learning around education for sustainable development. Structured group processes facilitate these outcomes. The learning pairs operate as co-critical friends within the action learning experience and can make a significant difference to motivation and especially during 'learning away' sessions. The use of teacher pairing was found to be a keystone of the PDM. Evidence from evaluation suggests that participants without pairs found it very difficult to devote time to the project outside of the 'learning together' group workshop days. Figure 3 illustrates the learning dynamics as a nested system of learning cycles within the project.

Future Directions
The emergent outcomes of the Knowledge Networks project can be applied to a variety of contexts related to the use of the PDM and the active promotion of the online facility. The development of a professional development programme incorporating the model is being explored with state accreditation bodies as a potential application. The PDM is also being incorporated into engagement activities of the Faculty of the Built Environment as a tool for capacity building with individual schools. Other applications may include a range of scenarios from developing professional learning communities of teachers around EfSD to discrete applications in the development of targeted resources. However, there remains a need to build upon the learning of this project in a formalised research project. Such a project

would specifically measure the impact of the professional development processes proposed and modelled by this pilot phase of the Knowledge Networks project.

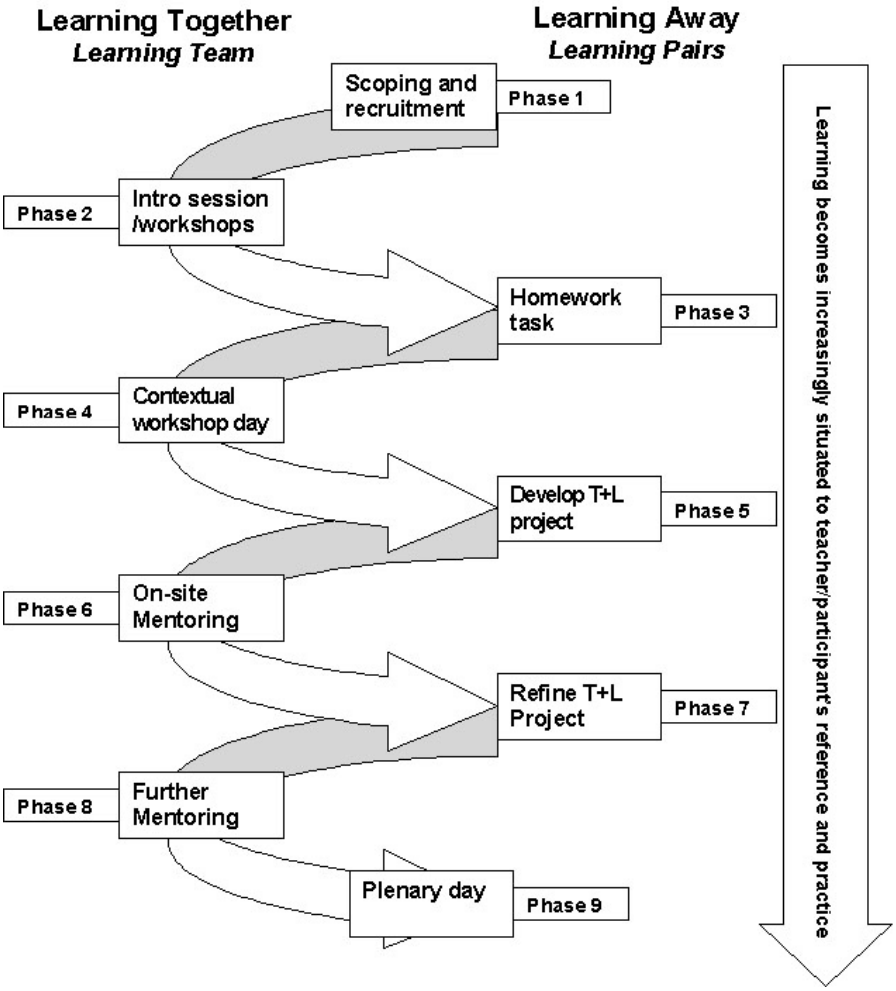

Figure 3: Knowledge Networks PDM flow diagram

References

Borko H, (2004). Professional development and teacher learning: Mapping the terrain, University of Colorado Bolder. *Educational Researcher*, 33(8), 3-15.

Department of Education, Science and Technology (DEST) (2004). *Australian Government Quality Teacher Programme (AGQTP): Final Report on the Evaluation of the AGQTP*, DEST, Australia http://qualityteaching.dest.gov.au/.

Fien, J., Heck, D., Ferreira, J. (1997). *Learning for a sustainable environment: A professional development guide for teachers*. Brisbane: Griffith University.

Fien, J. (2001). The learning for a sustainable environment project: A case study of an action network for teacher education. *Australian Journal of Environmental Education*, 17, 77-86.

Gayford C. (2001). Education for sustainability: An approach to the professional development of teachers. *European Journal of Teacher Education,* 24(3), 313-327.

NSW Council on Environmental Education (2002). *Learning for Sustainability, NSW Environmental Education Action Plan 2002-2005,* Sydney: Author.

NSW Department of Education and Training (DET) (2001). *NSW Environmental Education Policy for Schools*. Sydney: NSW DET.

NSW Department of Education and Training (DET) (2003). *Quality Teaching in NSW Public Schools: Discussion paper*, Sydney: NSW DET.

Organisation for Economic Co-operation and Development (OECD) (2001). *Environment and Schools Initiative (EnSI): Quality Criteria for ESD Schools.* http://www.ensi.org/.

Porter, A.C., Garet, M.S, Desimone, L., Yoon, K.S. and Briman, B.F. (2000). *Does Professional Development Change Teaching Practice? Results from a three year study*, American Institute for Research in the Behavioral Sciences, Washington DC.

Robottom, I. and P. Hart. (1993). *Research in environmental education: Engaging the debate*. Geelong: Deakin University Press.

Roberts, S.M. and Pruitt, E. Z. (2003). *Schools as professional learning communities, collaborative activities and strategies for professional development.* Thousand Oaks, California: Corwin Press.

Tilbury, D. and Scott, P. (2003). *Action Research for Sustainable Development.* Gibraltar, Ministry of Environment and Minister for Education, Government of Gibraltar.

Tilbury, D., Coleman, V. and Garlick, D. (2005). *A National Review of Environmental Education and its Contribution to Sustainability in Australia: School Education – Key Findings*. Australian Government Department of the Environment and Heritage and Australian Research Institute in Education for Sustainability.

Tilbury, D., Garlick, D., Henderson, K. and Calvert, F. (2005). *Mentoring as a Tool for Workplace Change: outcomes and lessons learned from the "It's a Living Thing" education for sustainability professional development program*, http://www.environment.nsw.gov.au/resources/tilburygarlickhendersoncalvert.pdf.

United Nations Education and Scientific Cooperation Organisation (UNESCO) (2005). *UN Decade of Education for Sustainable Development, International Implementation scheme.* www.unesco.org/education/desd.

Wenger, E. (1998), *Communities of practice: Learning, meaning and identity*: Cambridge: Cambridge University Press.