Preservice teachers' perceptions of sustainability as 'professional practice'

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Abstract

Preservice teachers in the School of Education, James Cook University are provided with productive opportunities to develop beliefs, values and practices about sustainability at different points in their education program. Education for sustainability is core practice within the recently refreshed teacher education program at the university. Preservice teachers were asked about their conceptions of sustainability, and familiarity with a range of approaches to teach sustainability education. Data were collected through focus groups, in each year of a four-year (Bachelor of Education) and a one-year program (Graduate Diploma of Education). This paper reports on preservice teachers' familiarity with, and exposure to, a range of approaches that characterize sustainability education, during both on-campus studies and practicum. Their views on the importance of learning how to 'teach sustainability' within these approaches are described. Results from this study provide information on preservice teachers' perceptions of what sustainability means; and the gap between seeing it as important and the extent of opportunities they recognize as contributing to their professional practice as sustainability educators. The paper also explores the confounding effect of preservice teachers' limited views of what constitutes sustainability education, which can result in the rejection of experiences, which program planners saw as explicitly developing environmentally attentive learning.

Introduction

Australia is in the fortunate position of having a strong suite of national and state educational policy supporting the inclusion of education for sustainability (EfS) in preservice teacher education. The Australian Government's Department of the Environment and Heritage (2005) publication *Educating for a Sustainable Future: A National Environmental Education Statement for Australian Schools* promotes education for sustainability as "a concept encompassing a vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future" (p. 3) and explicitly promotes the inclusion of environmental education in all school curriculum. The Australian Government's Department of the Environment, Water, Heritage and the Arts (2009) *Living Sustainably: National Action Plan for Education for Sustainability* specifically identifies teacher education as a "key profession" for sustainability (p. 23) and that, ideally, EfS be "integrated into all university courses/subjects areas" (p. 21). In Australia, all teacher education takes place at universities, and what happens within schools and faculties of education strongly influences teacher professional practices. Teacher education can be seen as a systemic leverage point for promotion and implementation of sustainability (see Ferreira, Ryan & Tilbury, 2006; Steele, 2010).

EfS in teacher education at James Cook University

The value of including EfS in teacher preparation has been recognised at James Cook University's (JCU) School of Education. Since 2001, an elective subject covering contemporary approaches to environmental education with an emphasis on the Australian tropics has been run as a fourth year elective. There are other opportunities for preservice teachers to engage with EfS in the Science, Studies of Society and the Environment, and Technology curriculum; in pedagogical subjects where the lecturer has knowledge and interest (Gooch, Rigano, Hickey & Fien, 2008; Hickey & Whitehouse, 2010); and in a cross-faculty Masters of Education for Sustainability. The one-year Graduate Diploma of Education offers rich engagement with EfS in second semester through a local

wetland restoration project that combines information communication technologies with community wetland education (Hickey, 2009).

In 2008, School of Education staff on the Cairns campus participated in the Australian Research Institute in Education for Sustainability (ARIES) and Commonwealth Government supported pilot project (Ferreira, et al., 2009, p. 27) called *Investigating Queensland Educating for Sustainability in Teacher Education* (IQuEST). Ferreira et al. (2009) argue that moving EfS from the margins to the centre in schools will "not be achieved without the preparation of teachers for this task" and report that, "in seeking to mainstream sustainability into preservice teacher education in Queensland it becomes clear that one needs to build capacity for change" particularly in terms of developing "knowledge of education for sustainability, conceptual skills in systemic thinking ... and organizational change and leadership skills" (p.1). Involvement in IQuEST refined our understanding of how teacher educators in Australian universities can do more to effectively support environmentally attentive learning across educational systems.

Coincident with our participation in IQuEST, a curriculum refresh process was instigated by the Vice Chancellor, and academics were asked to find ways of re-engaging with tropically focused teaching and learning. In the School of Education, a decision was made to engage with EfS and Indigenous perspectives as foci for our teacher education program. A core subject *Foundations of Sustainability in Education* will be introduced for first-year students in 2010. The subject explores topics related to climate change, energy, water, biodiversity, agriculture, and population health with the intention of engaging intending teachers in aspects of systemic and critical thinking, problem solving, active citizenship and community educational partnerships. Consolidating this foundation, a final-year subject *Service Learning for Sustainable Futures* will have preservice teachers participate in learning partnerships projects within schools and classrooms and with local and state community agencies, industry and business. Such curriculum innovations pay attention to the nation-wide education sector's need for education graduates with sustainability knowledges and skills. The Australian Curriculum's (ACARA, 2009) selection of "sustainability" as a "unifying idea" (p. 9) with "ecological sustainability" as part of "contemporary science" (p. 5) indicates that sustainability can no longer be ignored by the school education sector, and therefore, needs much greater attention in the university education sector.

Preservice teacher professional practice

One effect of our participation in both IQuEST and the concurrent curriculum refresh was the realisation we had little knowledge of how education students, as preservice teachers, actually experienced EfS in terms of their professional development as future teachers. We didn't know whether preservice teachers recognised the EfS learning opportunities presented in our programs. And we were also concerned that, in Shephard's (2010, p.14) words, "graduates may know much about sustainability and possess many of the skills needed ... but, unless they choose to put this knowledge and these skills to sustainable ends, their education (for sustainability) will have in some sense failed."

Our paper reports on an exploratory research project conducted with preservice teachers in 2009. The findings provide insights into professional practice in EfS, and suggest directions for further research and strategic change in our program offerings. We are fortunate in that we researched preservice teachers' perceptions of EfS not from a position of curriculum deficit, but within a context of increasing curriculum and pedagogical emphasis on EfS.

Given the emerging need for graduate teachers with knowledge of, and skills in, EfS our analysis specifically looks for indicators of preservice teachers' professional practice. Our use of the term *professional practice* refers educators' intentions, actions and curriculum delivery. It includes planning lesson sequences, assessing student learning, maintaining productive collegial relationships, and enacting education policy. This last point is important. In Queensland there is a raft of national, state and organisational policy supporting the implementation of EfS in schools. Therefore, we argue, EfS can be included as part of professional practice. Preservice teachers' professional practice develops though a combination of both on-campus and practicum experiences. We see professional practice as an expression of professional identity (Hickey & Taylor, 2010). Once preservice teachers graduate, they will refine their existing professional practice into a full professional identity. Ideally, graduate teachers' professional identity will include an understanding of, and a willingness to engage in, EfS.

Research questions and method

The research purpose was to describe preservice teachers' understandings and experiences of EfS in their on-campus program and (off-campus) practicum. The scope of the project is within Bachelor of Education (BEd) and the Graduate Diploma of Education (GradDipEd) at the School of Education at JCU's campuses in Cairns and Townsville.

There were three research questions:

1. What opportunities do preservice teachers recognise, from their on-campus and practicum, to learn *about* environmental matters, to take action *for* an environmental matter, or to experience education *in* natural environments, such as rainforests, reefs, mangroves and urban conservation zones?
2. What beliefs and values are held by preservice teachers about EfS, and what do they see as the impact of these on their professional practice?
3. How important do preservice teachers regard learning how to "teach sustainability"?

Data were participants' responses, based on self-reported experiences, observations or reflections, which were categorised to reflect the extent to which they recognised EfS during on-campus or practicum placements. Extracts from responses are used as qualitative data to illustrate the range of responses.

The research method used focus groups, each of 1-6 members, of 30 volunteer preservice teachers who were recruited through invitation at lectures and follow-up emailed invitation. Richer data were obtained through groups, when participants could comment, clarify, inter-act, and reflect at length, than could be obtained by a larger sample, using written surveys. Volunteers were organised into groups within their year of study (e.g., all first year). Groups represented each year of the four-year BEd at both campuses, and the Cairns' one-year GradDipEd. Groups met during mid-year 2009 with a researcher, who conducted the sessions. Higher rates of participation for Cairns were due to recruitment difficulties in Townsville. Groups represented between 2% and 7% of the internal enrolment for each cohort.

Table 1
Focus Group Membership

	Cairns campus	Townsville campus	Participants (30)	Cohort (participants as %)
First year	5	2	7	282 (2%)
Second year	3	3	6	138 (4%)
Third year	6	1	7	123 (5%)
Fourth year	5	2	7	153 (4%)
GradDipEd	3		3	41 (7%)

Participant welfare dictated that focus groups were voluntary, not linked to assessment, were confidential, and all responses de-identified. Sessions were audio-taped and transcribed. At the start of each 30 minute session, participants wrote notes about their experiences in sustainability education. The researcher then encouraged discussion on these notes, and of the terms *sustainability* and *environmental education for sustainability* as an orientation activity. Participants then engaged in a group discussion about their experiences. Further questions stimulated critical reflection of preservice teachers' experiences to identify their recollection of opportunities to engage with sustainability education, during on-campus and during practicum. A set of posters showing images of three approaches to teaching EfS was used as stimulus material:

- *About* environmental matters (e.g., images of students listening to a teacher, a school bulletin board) focusing on building knowledge, awareness, and understanding of sustainability issues.
- Experiential activities *in* natural environments or outside *in* school grounds (e.g., images of water quality testing and local creek studies) was taken to mean having experiences outside the classroom. We reproduce the category *in* for consistency with established literature which holds that outdoor learning experiences constitute being *in* an ecological environment.
- *For* environmental matters (e.g., images of students planting trees, using recycling bins) means taking action at school. This includes promotion and participation of recycling, reduction and reuse regimes, gardening and biodiversity conservation, and community outreach, where there is evidence of systemic thinking about the complexity of socio-environmental matters beyond the school fence.

We understand these three approaches, *about*, *in* and *for* (Lucas, 1979; Linke, 1980; Gough, 1997; Australian Government, 2005) are now seen as somewhat mechanistic, but they do provide a relatively clear way of describing approaches to EfS delivered across complex programs on two campuses, and we saw these categories as serviceable for our reflections on program quality.

Results

Results are presented in three sections. The first identifies participants' perceptions of opportunities to develop EfS as professional practice. The second focuses on participants' views of EfS and how these views impact on professional practices; the third reports on their sense of the importance of EfS for their professional practice. To assist interpretation, categories are ordered by similarity, as well as magnitude, shown in a series of tables.

Opportunity to develop professional practice in EfS

Participants were asked to recall their exposure EfS and whether they were provided with opportunities to develop EfS as professional practice. Exposure was differentiated into the contributory elements of on-campus lectures/tutorials, or (off-campus) practicum. Analysis of transcripts resulted in nine categories (see Table 2) reflecting the three *about, in* and *for* approaches.

When reflecting on university experiences, 57% of participants could not recall an opportunity, were unsure of their exposure to EfS, or their response was unclear. Thirty percent of participants reported opportunities to learn *about* environmental matters, with fewer (13%) reporting combinations of *about*, *in* and *for* approaches.

When considering practicum, 40% provided no recognised experiences (26%) or no experiences (14%). The balance of 60% of participants, recognised EfS experiences as sole or combinations of *about*, *in* and *for*; however, this was typically limited to *about* environmental matters.

Table 2
Reported opportunity to develop EfS as professional practice

	On-campus		Practicum	
Category	Number (30)	Percent	Number (30)	Percent
Unclear/unsure	8	27	8	26
None	9	30	4	14
About	9	30	6	20
In	3	10	2	7
For			3	10
About & In			4	14
About & For			1	3
For & In			1	3
About, For, In	1	3	1	3

Note. An empty cell denotes no responses.

Overall, results (Table 2) suggest a strong sense of participants' unfamiliarity with EfS as professional practice. Typically, preservice teachers appeared unsure, or unable to identify whether they had experienced EfS either on-campus or during practicum, or recalled no exposure at all. When participants did recognise opportunities, they reported consistently higher levels of exposure to EfS which was limited to the *about* approach. Opportunities to develop a broader understanding and appreciation of EfS through combinations of the three approaches (i.e., *about*, *in* and *for*) were located to practicum, with fewer occasions identified during on-campus education studies.

Opportunity to change professional practice in EfS

Participants were asked to consider whether any of their experiences (on-campus or during practicum) had changed their professional practice about EfS. This was analysed as two aspects: a focus on the way they are *thinking* about EfS (i.e., perceived changes in views and/or beliefs) and the way they are *teaching* (i.e., perceived changes in their inclusion of content or learning activities when planning lessons and units of work).

Analysis of transcripts resulted in six categories (see Table 3) for the thinking aspect. Less than half (43%) reported that they were unsure, or recognised no change in their thinking about EfS. Over half the participants (57%) reported changes in their way of thinking. Some changes related mostly to personal views about sustainability. For example, one student remarked, "It's changed my perceptions because it's making me consider what I'm wasting at home. It's making me think 'don't put that in the bin because it should really be recycled' whereas before I used to think 'whatever'." Other students identified changes in ways of thinking about social responsibility, for example,

"There is more social awareness of [sustainability] therefore we have to be more socially responsible in our choices."

One participant explained a change in thinking, that related more to her professional practice as she could more clearly see how EfS "could be integrated" across the whole curriculum. There was evidence of a realisation of the potential impact teachers and education can have. As one participant explained, "I never realised how much impact teaching has on our whole society. It's all filtered through the education system". A fellow participant extended, "You are filtering everything they [governments] want you to, to the future society."

Table 3
Reported changes in thinking and teaching with EfS

	Thinking		Teaching	
Category	Number (30)	Percent	Number (30)	Percent
Unclear/unsure	7	23	6	20
No change	6	20	6	20
Raised awareness	6	20	11	37
Changed profess. views	5	17		
Changed personal views	3	10		
Changed profess. & personal views	3	10		
Changed profess. practice	n/a	n/a	7	23

Note. An empty cell denotes no responses. n/a indicates responses did not relate to 'thinking' changes.

Participants also reported on changes for the teaching aspect, as a result of exposure to EfS. Analysis of transcripts resulted in four categories (see Table 3).

Forty-percent of participants reported that exposure to EfS has not changed their teaching (i.e., professional practices), or were uncertain. For some, this was due to a perceived lack of impact from on-campus and/or practicum; however, one reported a history of involvement in community-based EfS activities prior to entry to JCU, was an ardent supporter of EfS, so it was more a case of already being one-hundred percent committed.

Some (37%) reported that exposure to EfS had raised their awareness about the possibilities and potential benefits of integrating EfS. Their reflections were forward-looking, taking into consideration that they may only have had limited practicum opportunities (e.g., first-years at the time, had only one week in one school). One expressed eagerness to integrate EfS in her future teaching practices, saying, "I think I would like to do a whole term focusing on sustainability." Another commented that, "I think I'd also try to model being a good environmental citizen. Make sure I'm recycling in the classroom and use pencils right up–until they are tiny."

A smaller number (23%) reported they had changed their professional practice as a result of experiences of EfS. One captured the essence of this: "Once you have [EfS] brought to your attention and you start looking into it and start thinking, then I saw it as being really important part of my role [as a teacher]." A few participants connected EfS with the importance of teaching students to be critical thinkers.

Importance of EfS for professional practice

Participants were asked how important it is for preservice teachers to learn how to teach for sustainability. This question relates to preservice teachers' perceptions of the value and place of EfS in curriculum. Analysis of transcripts resulted in three categories (see Table 4).

Table 4
Perceived importance to 'teach for sustainability'

Category	Number (30)	Percent
Unclear/unsure	5	17
Important	23	76
Integral	2	7

The majority of participants (76%) viewed EfS as an important component of being a teacher. For some, EfS was rationalised as valuable in terms of employability. For example, one participant commented that learning how to teach sustainability is "especially [important] if the school you're planning to teach in is really big on that [sustainability] issue – if you are not up to their standard, then that's a problem for you. Similarly, Education Queensland [a major employer] are pushing it so if we turn up to our interview and they ask 'What is something you have taught on sustainability?' and we go 'I have no idea ...!'"

For two participants (7%) the value of EfS was integral and pre-existing, as something that preservice teachers should know how to teach. As one explained, "It's a natural thing. As a teacher, they are the values you have anyway. So you would teach those values because you wouldn't have your kids throw rubbish all over the floor."

Discussion

Our research describes the recollections of a sample of volunteer preservice teachers, about their views of the importance of EfS, the extent to which they recognised teaching for sustainability as part of their experiences, and how EfS related to their professional practice. All points raised in our discussion should be tempered by consideration that views and experiences of volunteer participants may not represent those of the cohort, and are indicative of recollected experiences rather than observations of practice. Our small study supports our institution's organisational "capacity for change" through reflection on practice (Ferreira, et al, 2009, p. 57).

The need to establish clarity of understanding of EfS

Preservice teachers' lack of clarity about EfS was a consistent finding. Too many were unsure if they had been exposed to EfS, and too many were not aware of any changes in their professional practice (of thought or action). This indicates that what constitutes education for sustainability may be conceptually diffuse and was not clearly identified in preservice teacher programs at JCU prior to 2010. In the absence of a systematic approach to EfS learning–at university, in schools and between the two–preservice teachers cannot be expected to be clear about EfS in their professional practice.

Problematic too is that when preservice teachers affirmed engagement with EfS, they reflected very limited views of what constitutes EfS. Only low-impact, social actions such as "using the whole pencil", "picking up rubbish" or "recycling the toner" were mentioned by study participants indicating our teacher education program needs to address the prevalence of simplistic perceptions of EfS. A richer, more informed socio-ecological conception of EfS is likely to be necessary to support

productive professional practices over the long term. As teacher educators we need to ensure exposure to EfS reflects a systemic approach to teaching and learning which explicitly links ecological and social system understandings. The explicit naming of key subjects in first and fourth year will indicate what can and does constitute EfS in our version of teacher education (though this will differ from other tertiary institutions given JCU's emphasis on learning for living in tropical environments, which the Vice Chancellor calls living in the torrid zone).

EfS as a shared experiential partnership between on-campus and practicum

As shown in this study, preservice teachers more often experienced worthwhile combinations of the three EfS approaches (i.e., *about*, *in* and *for*) during practicum. This suggests that university-based teacher educators should recognise these rich opportunities for preservice teachers to experience EfS, and value these through strategic partnerships.

Since on-campus experiences were typically limited to *about* environmental matters, these should continue to contribute content knowledge and conceptual growth in this approach. However, enriched on-campus experiences will allow preservice teachers to develop professional practice *about*, *in* and *for* EfS. These guaranteed opportunities could include: organised site-visits to environmental education centres and exemplar EfS schools; active citizenship by involvement in university-based sustainability initiatives that require student participation; citizen science (Jenkins, 1999) through site restoration or on-campus species listing with recognised organisations; and through involvement in decision making in school environmental management planning through formal fourth-year internships (Queensland Government, 2010; Government of NSW, 2010).

When exploring ways to develop learning linkages between schools and university, teacher educators should also recognise the non-linear nature of opportunities preservice teachers have to develop professional practice in EfS. During data analysis, it became apparent there was little evidence of a gradual, developmental increase from first-year through final-year in engagement with EfS. This was partly due to wide variations in preservice teachers' entry-level, for example, one first-year was already very active in community-based EfS; compared to a fourth-year who was unsure of what EfS even entailed. A second contributing factor was the wide range of experiences during practicum: some second-years reported EfS during school placements, while others in final-year could not report any exposure during 100 days of placements.

Acknowledging cynicism

Program planners should not underestimate the stringent expectations of preservice teachers as high-demand clients. University experiences have led some to be critical about sustainability and skeptical about teaching sustainability-related issues. A few students rejected as superficial, those same experiences which we saw as explicitly developing environmentally attentive learning. One student, blended personal and professional views, which are likely to result in a negative impact on professional practice:

> "Sustainability hasn't really been explained ... I don't feel like I have done anything towards education for sustainability ... at university ... I think sustainability is political hypocrisy of western countries, of wealthy people who really don't understand the implications of what they're doing. I think the economic and social issues haven't been thought through and I'm not agreeing with the sustainability approach we're undertaking. I think it's misguided and wrong. It has made me not want to have anything to do with [it]."

Building on hopefulness

As a final comment, the majority (83%) of preservice teachers' in this study demonstrate a high regard of EfS as an important or integral component of their teacher education program. Preservice teachers evidenced a high hope factor–that they can make a difference–through their professional practice. Unfortunately, results indicate a paucity of opportunities for them to develop a rich understanding of EfS as multi-faceted, complementary components of knowledge *about* EfS, doing EfS *in* outside the classroom, and undertaking actions *for* change.

As sustainability educators in the School of Education at JCU, the disparity between preservice teachers' high hopes and the low reported rate of exposure (3%) to all three approaches (see Table 2) is a salutary starting position from which to consider our hoped-for effects of the curriculum refresh changes. However, with this small study we have set a benchmark that all graduating students can report sufficient exposure to EfS, through on-campus and practicum, so they are confident to convert these hopes into professional practice. We have some work to do yet before future studies will show that EfS responsibility will genuinely be in the repertoire of preservice teachers' professional practice.

Acknowledgement: This research was funded by a Research Infrastructure Building Grant provided by JCU School of Education in 2008. Our thanks go to Professor Bob Stevenson of the Cairns Institute for assistance with this paper.

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