

You Mean I Have to Teach Sustainability Too? Initial Teacher Education Students' Perspectives on the Sustainability Cross-Curriculum Priority

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Abstract: In this paper, we report on an investigation into initial teacher education students' (ITES) understandings of sustainability and the Australian National Curriculum Sustainability Cross Curricular Priority (CCP). We also explore their willingness and capacities to embed the CCP into their own teaching practices. The ITES (N=392) completed a quantitative survey with a series of Likert Scale questions and were asked to list "5 words" when they think of sustainability. Analysis reveals that ITES have generally limited to moderate understandings of sustainability and education for sustainability, but lesser understandings of the Sustainability CCP and the 9 organising ideas. Understandings of sustainability were dominated by an environmental focus. We conclude this paper with a discussion of the implications of narrow environmental understandings of sustainability. We explore factors that limit and enable teacher educators to embed sustainability education more explicitly. We note the importance role teacher educators play in supporting ITES to better understand sustainability.

Introduction

We begin this paper with a fictitious (but perhaps not uncommon) story about Jane, a primary school focused initial teacher education student (ITES) at a regional Australian university. Approaching graduation in her final year, Jane is asked to consider how she will weave the Sustainability Cross-Curriculum Priority (CCP) into her content planning and pedagogies for every learning area she has so diligently worked to gain competence in. Her response: a deep sigh, followed by "well, I think sustainability is really important but I just don't know enough about it or feel confident that I can effectively integrate it into my teaching. Besides, when I get into a school I will really be focusing on making sure my students develop strong numeracy and literacy skills and do well in NAPLAN."

Of course Jane's story could equally be written with the other two cross-curriculum priorities or seven general capabilities in mind. The focus of this article, however, is on research which investigated how ITES at a regional university in Australia were being supported in their initial teacher education (ITE) program to understand and gain the capacity to embed the Sustainability CCP into their teaching. We were particularly interested in this, given recent national curriculum developments in the Australian context and our own experiences as academics working in a teacher education program which was characterised by a range of competing priorities in terms of time, course structures, accreditation compliance and pedagogical approaches.

The task of preparing high quality teachers to contribute meaningfully to the collective goals of education in our society is of vital importance. Yet the current social context presents multiple, complex, and often competing demands for schools, teachers, and particularly ITE programs. On the one hand, equipping ITES with the pedagogical and

curriculum content knowledge and skills required to be effective teachers is substantial and time consuming. Engaging with theories of teaching and learning, understanding implications for practice, dealing with issues of ethics and teacher identity, in addition to the curriculum content presented by the Australian National Curriculum is no easy task and must rightly be central elements of ITE programs. On the other hand, the transformative role of education in society, dealing with ‘meta-issues’ such as justice/injustice, democracy, citizenship, and sustainability, has long been championed as an important part of education (see for example, Apple, 2009; Beckett, 2012; Dewey, 1938). Indeed the 2008 Melbourne Declaration (MCEETYA, 2008) recognises the role of education in equipping people to contribute to a better world and sets the stage for introduction of cross-curriculum priorities (CCP) such as sustainability in the national curriculum to address such ‘meta-issues’. How then do ITE programs negotiate these often conflicting and competing demands (Korthagen, Loughran, & Russell, 2006)? Seen in this light, perhaps it is understandable that some have even argued that teacher education is inevitably inadequate (Northfield & Gunstone, 1997).

Further burdening an already full curriculum in Australian ITE courses are a number of recently launched federal policy, framework and curriculum documents. By way of example, the Australian Institute for Teaching and School Leadership (AISTL) standards and the Australian Quality Framework (AQF) set clear benchmarks and standards for graduates that place teacher education programs under increased professionalization, standardization, scrutiny and rigour. In terms of curriculum, a new National Curriculum was rolled out from 2012 (Australian Curriculum Assessment and Reporting Authority (ACARA), 2010). ITES must learn to teach to and within the new curriculum document, which is comprised of eight learning areas (e.g., English, Mathematics, Science, etc.), seven general capabilities (e.g., Literacy, Critical and Creative Thinking, etc.) and three cross-curriculum priorities (i.e., Sustainability, Asia and Australia’s Engagement with Asia).

It is the equipping of ITES to teach the Sustainability CCP, within the new National Curriculum, which is the focus of this paper. Broadly speaking, the Sustainability CCP seeks to support students to develop “the knowledge, skills, values and world views necessary for people to act in ways that contribute to more sustainable patterns of living” (Australian Curriculum Assessment and Reporting Authority (ACARA), 2010). It is intended to be “embedded in all learning areas” and will have a “strong, but varying presence, depending on their relevance to the learning areas.” We were curious about if and how ITES at a regional university in Australia were being supported in their ITE program to understand and gain the capacity to embed the Sustainability CCP into their teaching. We were particularly interested in this, given the context described above that finds teacher education programs seeking to deliver on a range of competing priorities on ITES’ time while enrolled in a teaching degree. An additional contextual element to this study was the ITE course structure which devoted little, if any, curriculum space to sustainability education.

This research was prompted by the intersection of the contexts described in this introduction: first, a crowded curriculum generally in ITE programs; second, a broader educational policy context that has a mandate to embed the Sustainability CCP across learning areas within schools across Australia; and, third, a faculty of education that has no compulsory unit in sustainability education. Given this complex (yet all too familiar) context for ITES enrolled in ITE courses, a number of questions guided this research:

1. What are ITES’ knowledge and understanding of sustainability, education for sustainability and the Sustainability CCP?
2. What learning opportunities have ITES been provided in their ITE course in relation to the Sustainability CCP?
3. What are ITES’ perceptions of the importance of the Sustainability CCP and what is their willingness, competence and confidence to implement it?

Literature Review

Sustainability and Education for Sustainability

A decade into the 21st century, the world faces significant, complex and interlinked development and lifestyle challenges such as growing social inequities, climate change, water quality and shortages, food security, deforestation and species loss. The speed and magnitude of these challenges makes the situation critical as highlighted by the recently released 5th Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC, 2013, 2014a, 2014b). There are numerous national and international reports that point to the importance of enacting immediate, dramatic and transformative changes to society to avoid a substantial ecological, social and economic disruption (Millennium Ecosystem Assessment, 2005; United Nations Environment Programme, 2012; Wilkinson & Pickett, 2009).

The transformative role of education in society has been valued since the ancient Greeks, whilst in modern times it has been championed by influential educational thinkers and writers such as John Dewey, Paulo Freire and Michael Apple. The tradition of transformational education, often expressed in terms of working towards the goals of more equitable and just societies, can now be weaved with ecological perspectives to help 'reorient' society to a more sustainable future. More than 40 years ago, Schumacher (1973, p. 64) described education as the "greatest resource" for achieving a just and ecological society. In subsequent decades, a strong and rich field of scholarship has emerged in environmental and sustainability education which continues to explore intersections between sustainability, environment, justice, and education (Fien, 2001; Orr, 1994; Sterling, 2001; Stevenson, Brody, Dillon, & Wals, 2013).

The role of education in addressing the sustainability imperative has also been supported and promoted through international bilateral agreements and conferences driven by the United Nations (UN). The inaugural 1972 UN *Conference on the Human Environment* in Stockholm, produced a set of agreed principles, including Principle 19 that pointed to the importance of environmental education. Subsequent UN meetings and conferences related to the environment and sustainable development have recognized and advocated for approaches to education which equip people with the values, knowledge and skills to participate in making the major personal and structural changes that are required for the transition to sustainability. A key element here was the 1992 *UN Earth Summit* in Rio de Janeiro and subsequent Agenda 21 Report (World Commission on Environment and Development (WCED), 1993), which presented a plan to address broader, more complex, ideas of sustainability including specific strategies and goals pertaining to education. In March 2005, the *UN Decade of Education for Sustainable Development* (2005-2014) was launched (UNESCO, 2006). The UNDESD provided a comprehensive framework for educational reform, and emphasized the role of experiential learning and the complex ethical and social context of schooling. It advocated that sustainability be embedded in curriculum at all levels of education.

Australia has contributed to international endeavours in education for sustainability (EfS) since the field's inception. *Caring for our Future* outlined the government's commitment to embed EfS in formal schooling throughout Australia, and reinforced the importance of communicating concepts of EfS and developing suitable training and professional development (Australian Government, 2007). This initiative was followed by the *National Action Plan for Education for Sustainability* (Australian Government, 2009), which placed education at the core of creating a sustainable future for the nation and outlined principles such as education for all, lifelong learning, critical thinking, participation, and

partnerships for change. Such recent education policy has focused on broad understandings of sustainability which include social, economic and environmental dimensions.

As we noted in the introduction, the Australian National Curriculum now includes sustainability as one of three Cross-Curriculum Priorities (CCP) which emphasises “developing and sharing knowledge about social, economic and ecological systems and world views that promote social justice” (ACARA, 2010). This is further explicated and conceptualised through nine ‘organising ideas’ which are framed around systems thinking, understandings of worldviews, and a futures orientation. We contend that a multidimensional approach to education for sustainability (EFS) underpins the Sustainability CCP. This is most demonstrated by examining the organising ideas that unequivocally interpret sustainability beyond the ‘environmental’ domain, extending richly into the domains of systems thinking, worldviews, futures and ethic of care. As we interpret the Sustainability CCP and the organising ideas, we note some tensions: on one hand, they seem to be sophisticated, complex, highly involved and ambitious; on the other hand, they could be seen to be complicated, overwhelming, and confusing. Whilst not entirely unproblematic, we believe the Sustainability CCP has the potential to position EfS more centrally and explicitly into teaching and learning in Australian schools.

Pre-Service Teachers and Teaching Sustainability: Barriers and Enablers

There have been many national and international calls for teacher education providers to embed sustainability more explicitly into the curriculum (UNESCO, 2005a) with a view to developing “sustainably literate teachers” (Nolet, 2009). The UN recognised the importance of ITE programs to support education for sustainable development with the publication of *Teaching and Learning for a Sustainable Future: A Multimedia Teacher Education* (UNESCO, 2002) as well as *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (UNESCO, 2005a).

It appears as though these calls are being responded to, with Nolet (2009) providing an overview of integration across ITE programs internationally, noting trends that are “probably harbingers of a broader movement in teacher education to engage with the sustainability discourse” (p. 431). Nolet provides strategies for integrating sustainability education into ITE courses through the use of a framework for teacher learning that considers issues related to curricular vision, understandings about teaching, dispositions and professional practice. Importantly, Nolet acknowledges the context of teacher education programs and some of the commonly reported barriers, and argues that:

Integration of sustainability education into the pre-service preparation need not entail development of new programs or courses, although this is the approach that some programs will choose...Sustainability education simply cannot add more content to an already overfull and often incoherent teacher education curriculum. If it is to be transformative, sustainability education must serve the broader purposes of the teaching profession and be fully integrated into the warp and weft of teacher preparation. (p. 431)

Despite international calls from UNESCO and promptings from authors such as Nolet, it seems there remain many challenges for the integration of sustainability into ITE programs. Indeed, the literature is replete with evidence of the challenges for in-service teachers and ITES to respond to the calls for prioritizing and implementing sustainability education. A mounting body of literature points to both the limiting and enabling factors that have been encountered with efforts to deliver sustainability in the formal education system in schools (N. Evans, Whitehouse, & Gooch, 2012), in ITE programs (Buchanan, 2012; Mills & Tomas,

2013) and in higher education generally (Cotton, Warren, Maiboroda, & Bailey, 2007; Jones, Selby, & Sterling, 2010). While it is beyond the scope of this paper to review all of these barriers and enablers for the three sectors, a recent Australian study provides a helpful framework for understanding the barriers and enablers to implementing sustainability education (N. Evans et al., 2012). The authors identified what they classified as grassroots, administrative and conceptual barriers. Grassroots barriers include an overcrowded curriculum, insufficient teacher knowledge, a lack of training opportunities in sustainability education. The authors categorise barriers at the administrative level as including the focus on quantitative testing of numeracy and literacy. Conceptual barriers are described as involving conflicts between sustainability education theory and school practices. Another helpful framework for understanding the scope of barriers and enablers in ITES education and higher education comes from the work of Mills and Tomas (2013), who identify a series of factors that operate at the level of schools or disciplines (e.g., perceived relevance and priority of EfS), the level of the wider university (e.g., institutional ethos of sustainability practices), as well as the level of external stakeholders/collaborators (e.g., collaboration between stakeholders in teacher education).

We, like others, believe that ITE programs should be supporting beginning teachers to graduate with the readiness and capacity to teach sustainability education in schools (Mills & Tomas, 2013; Nolet, 2009; Summers, Childs, & Corney, 2005; UNESCO, 2005a). But there is much variation in regards to the prioritizing of sustainability education in teacher education programs specifically and higher education programs generally. By way of example, the content and pedagogical knowledge an ITES will acquire during a teaching degree will depend a great deal on the answers to the following questions: Can ITES enrol in units within their education degree, and even wider university, where they explicitly learn about sustainability education? Are these units electives or compulsory? If specialized content units are not available, is sustainability embedded across all units of study (e.g., mathematics, languages, arts, etc.)? How do the teacher educators and other academics understand, interpret, prioritize and teach ideas around sustainability? How does the broader university support the teaching of sustainability? Of course the answers to the above questions vary considerably from institution to institution and stand to have considerable influence on the preparedness of teachers in relation to sustainability education. We unpack some of these complexities in this paper.

Methods

Research Design

This paper reports the results of an empirical case study that utilized a mixed methods pragmatic methodology (Cresswell & Plano-Clark, 2010). We adopted an instrumental case study (Stake, 1994) approach, whereby we examined a particular ‘case’ (in this study, the ITES at a regional Australian university), to provide insight into issues that have relevance beyond this particular case. While this research is based only at one institution, we believe it provides insights that can be interpreted and adapted to inform developments in relation to ITES’ training in relation to sustainably and cross-curricular learning beyond this university. The case study approach offers a strong grounding in reality, utility to practitioners, and high resolution data that enables learnings to be transferred to other similar contexts (Stake, 1994; Yin, 1989, 2011).

Context and Sample

The research presented here was undertaken within a Faculty of Education at a regional Australian university. Students within the faculty who were enrolled in three 'core' units were invited to participate in this study. There were approximately 200 students enrolled in each unit. At the time of conducting this study, the ITES were not required to take any compulsory units in sustainability

Questionnaire

The results presented in this paper emerged from a series of likert-scale questions that explored ITES' levels of understanding, capacity and concerns relating to sustainability, and the Sustainability CCP. By way of illustration, they were asked "I rate my general understanding of the Sustainability CCP in the Australian Curriculum as..." with 1 = very poor and 7 = excellent. To analyse this quantitative data, we performed descriptive statistics to examine participants' level of understanding, capacity and concerns in regards to the various dimensions of sustainability.

This paper also presents the results of a question in which ITES were asked to "list five words you think of when you consider the word sustainability." It was anticipated that this question would offer further insight into ITES' conceptualisation of sustainability. The "list 5 words" approach can be used to generate implicit associative responses that in turn influence memory encoding (see Bryant, 1990) and has been used in previous studies exploring early childhood educators' understandings of sustainability (Dyment et al., 2013).

The five words were coded on several occasions by members of the research team with a view to gaining familiarity and intimacy with the five words. After this initial coding, the literature and existing EfS frameworks (e.g., UNESCO, 2005; Australian Government, 2009b) were consulted to support our coding. We re-coded the words, based on this consultation with the literature, and words were placed in one of eight themes (see Table 2). While initially an "intuitive process" (Burns, 2000, p. 471), the words eventually were coded according to the "...purpose of the study, the researchers' knowledge and the constructs made" (p. 471).

Results

Overall Perceptions

In total, 392 ITES participated in this study. Table 1 profiles their understandings of the four dimensions of sustainability and illustrates how understandings decreased from 'limited/moderate' to 'poor' as sustainability moved from a broad concept (for example, understanding of sustainability, $M = 3.74$, $SD = 1.16$) to a more specific concept (for example, understanding the 9 organising ideas of sustainability, $M = 2.39$, $SD = 1.15$). There were significant differences among levels of understanding among each of the four dimensions of sustainability (Table 1).

Sustainability Constructs	<i>M</i>	<i>SD</i>	Sustainability	EfS	CCP
Sustainability	3.74	1.16			
EfS	3.52	1.01	.127 to .299*		
CCP	2.99	1.18	.635 to .851*	.437 to .622*	
9 Org. Ideas	2.39	1.15	1.222 to 1.460*	1.025 to 1.237*	.514 to .678*

Table 1: Initial Teacher Education Students’ Self-Rated Understandings of Sustainability Constructs and 95% Confidence Intervals of Pairwise Differences in Mean Changes in Understandings

Note: An asterisk indicates that the difference in means is significant at the .000 significance level. Means are based on a 7 point likert scale with 1=“very poor understanding” and 7 = “excellent understanding.”

ITES were asked a number of questions related to their learning opportunities, competence, confidence, and willingness in relation to the Sustainability CCP (answers based on a 7 point Likert-scale, with 1 = very poor and 7 = excellent). They reported that their learning opportunities in relation to the implementation of the Sustainability CCP as limited ($M = 3.15$, $SD = 1.36$). Their competence ($M = 3.97$, $SD = 1.37$) and confidence ($M = 3.81$, $SD = 1.35$) to implement the CCP were limited to moderate. Despite their low reported opportunities and capacities, they felt the importance of integrating the Sustainability CCP into teaching and learning was very important ($M = 5.58$, $SD = 1.18$) and they reported a willingness to implement it ($M = 4.99$, $SD = 1.24$).

5 Words Analysis

To broaden our awareness of ITES’ understandings of sustainability, respondents were asked to ‘list five words you think of when you consider the word sustainability.’ As noted in Table 2, over half of all words related to the ‘environmental’ theme ($n=907$, 59.2% of all words) and examples of words that were coded into this theme include ‘nature’, ‘environment’, and ‘recycling.’ The ‘future focus’ theme represented the second largest number of words ($n=238$, 15.5% of all words) and included words such as ‘future’ and ‘lasting.’ Each of the remaining themes was represented by less than 5% of the words.

Theme	Count	% of total	Explanation	Illustrative Word	Theoretical Underpinning
Critical thinking and reflection	76	5.0	Principle of EfS	Necessary, change	Australian Government, 2009
Economic	59	3.9	4 dimensions of sustainable futures	Economy	UNESCO, 2005
Education	42	2.7	Principle of EfS	Education	Australian Government, 2009
Environment/Natural	907	59.2	4 dimensions of sustainable futures	Environment, Recycling, nature	UNESCO, 2005
Ethic of care	74	4.8	Semantic theme	Preservation, care, consistent	Noddings, 1984
Future focus	238	15.5	Principle of EfS	Future, lasting	
Participation	21	1.4	Principle of EfS	Community	Tilbury & Cooke, 2005
Political	22	1.4	4 dimensions of sustainable futures	Politics, policy empowering	UNESCO, 2005
Social	52	3.4	4 dimensions of sustainable futures	Society, social justice, humanity	UNESCO, 2005
System thinking	38	2.5	Principle of EfS	Cycles of life, interconnected	Australian Government, 2009

Table 2: Initial Teacher Education Students’ Understandings of Sustainability as Represented by the ‘Five Words When You Think of Sustainability’ Question

Discussion

Although tentative in terms of their generalizability beyond this instrumental case study, these findings raise a number of issues concerning ITES' understandings of sustainability and their readiness to incorporate the Sustainability CCP into their teaching.

Understandings of Dimensions of Sustainability and the CCP

Understanding of both pedagogical and substantive content knowledge is one important aspect of quality teaching and learning as reflected in both educational research (Hattie, 2009) and quality assurance processes such as the Australia Professional Standards for Teachers (Australian Institute for Teaching and School Leadership (AITSL), 2014). The findings of this research, therefore, give us some cause for concern about how the Sustainability CCP might be skilfully and successfully integrated into teaching and learning in schools. Table 1 shows how ITES in this research reported only 'limited-moderate' understandings of general sustainability issues. Analysis of the '5 words' sheds more insight here, revealing that their understandings were dominated by environmental dimensions of sustainability. Over half of the '5 words' data reported by ITES (Table 2) focused on 'environmental' themes (59.2%). This suggests that respondents' understandings were largely limited to environmental notions of sustainability, with notable lack of reference to other dimensions of sustainability, such as economic, social, or political, which are considered key interrelated aspects of sustainability in the literature. While the ITES reported limited to moderate understandings of sustainability issues and EfS, they reported significantly lower levels of understanding of the Sustainability CCP and the 9 organising ideas (Table 1). It comes as no surprise then that ITES identified that they had limited learning opportunities to acquire the competencies to embed the Sustainability CCP into their teaching and that they also lacked competence and confidence in relation to teaching sustainably.

In many ways, ITES' understandings of sustainability that are framed around the natural environment are understandable. The "environment to sustainability" shift is relatively recent, and has been written elsewhere (Elliott & Davis, 2009). Furthermore, the plethora of contested definitions that permeate both popular culture and academic circles about sustainability and EfS (Stevenson et al., 2013; Tilbury & Cooke, 2005; UNESCO, 2005b) may also play a role in ITES' narrow understandings. We wonder if ITES may feel overwhelmed and/or confused by these topics and their apparent complexity, and in turn draw on images of sustainability that are often infused with an environmental focus. Furthermore, in many schools where ITES will have studied themselves (as children) and where they have done their practical teaching placements (or practicums), we expect they would have seen sustainability been embedded in teaching and learning in primarily the environmental domain (Dyment, Hill, & Emery, 2014), with notable attention on school gardens, recycling, reusing, tree-planting initiatives. It comes as no surprise then, that their understandings would be positioned in the environmental dimension of sustainability.

These findings add to a growing body of literature that points to teachers in a range of educational contexts having limited understandings of sustainability and EfS which primarily evoke an environmental bias (Læssøe, Schnack, Breiting, & Rolls, 2009). The work of Dyment et al. (2013) suggested that many Tasmanian early childhood educators held limited understandings of sustainability. This finding is supported more broadly in studies conducted with in-service teachers in Australia by Skamp (2010) and in Greece by Spiropoulou and colleagues (2007). Studies involving ITES in New Zealand (Birdsall, 2013), Israel (Yavetz, Goldman, & Pe'er, 2013), Turkey (Kilinc & Aydin, 2013), and the UK (Summers & Childs,

2007; Summers et al., 2005) found a similar tendency for ITES to equate sustainability primarily with environmental concerns or issues. Whilst we would not argue that conceptualising sustainability primarily in environmental terms is a global phenomenon, there is sufficient evidence to suggest that this is an emergent if not extant issue for educators in a number of different contexts.

Given these findings, it is entirely reasonable to imagine that ITES would take their own understandings of sustainability, which appear to focus on environmental themes, and transpose those onto the Sustainability CCP. Such a contention aligns with finding of previous research studies (Curtner-Smith, 2007; J. Evans & Penney, 1993; Laws & Aldridge, 1995) where it has been noted that teachers “re-created and adapted the new curriculum so that it was congruent with their existing perspectives and ideologies” (Curtner-Smith, 1999, p. 92). Regrettably, this can lead to what Sparkes (1991) refers to as superficial changes in practices, pedagogy and curriculum delivery after new curriculum is rolled out.

If ITES are interpreting the Sustainability CCP through an environmental lens, then important opportunities for teaching and learning about the multi-faceted and complex dimensions of sustainability might be lost. The Sustainability CCP interprets sustainability well beyond the environmental dimension and points to importance of acknowledging and attending to the political, social and economic dimensions of sustainability. How can the broader visions of sustainability, as represented in Table 2, be grasped by ITES if their understandings are so strongly focused on the environmental domain? What educative role, if any, should ITE courses play in facilitating this learning? With these questions in mind, we turn to an exploration of how ITE education courses might attend to these misunderstandings and work towards supporting ITES to have capacities and confidence to understand and then teach sustainability, the Sustainability CCP and the nine organizing ideas.

The Role of Initial Teacher Education and Higher Education

The implications of these findings point to a need to examine how ITE programs teach sustainability education and the Sustainability CCP. We, like others (e.g., Buchanan, 2012; Mills & Tomas, 2013; Nolet, 2009; Summers et al., 2005), believe that teacher education programs must play a critical role in this endeavour. However, it is insufficient and perhaps even neglectful to simply tell ITES they have to embed this CCP (or any CCP, for that matter) across learning areas whilst assuming that somehow ITES will figure this out by themselves. We are wary of the focus we observe in our faculty to prioritize teaching and learning on the mechanics of teaching (such as behaviour management) and key learning areas (such as Mathematics, Science and English), at the expense of the CCPs and general capabilities. We contend there is a need to actively and explicitly support ITES to develop sophisticated understandings of sustainability that allow them to move beyond environmental conceptualizations. Support must be provided to help them to understand the Sustainability CCP, the 9 organizing ideas and the teaching and learning strategies to delivery this cross-curriculum priority. We can predict that these learning opportunities would be received well by ITES, given that they believed strongly that the Sustainability CCP was important and that they were very willing to implement it.

How do we move towards providing this support to ITES? As a starting point, the curriculum structure within faculties of education must be examined. Important decisions need to be made around how to teach ITES about sustainability generally and the CCP specifically. How this happens is not uncomplicated or lacking contention, especially in an already crowded curriculum with competing demands in education degrees (Korthagen et al., 2006; Loughran, 2006; Northfield & Gunstone, 1997). A number of questions must be

considered, including: What is the best way to support ITES to first learn about sustainability (content knowledge) and then help them to know how to best teach the CCP (pedagogical content knowledge)? Should this content be delivered through a stand-alone unit? Should this unit be compulsory or optional? Or, should this content be infused and integrated across other teaching and learning areas within the course structure? Put more simply: is the best way to teach ITES about a cross-curricular priority to teach it in a cross-curricular way in their teacher training?

The latter interdisciplinary approach would certainly align with the philosophical underpinnings of cross-curricular approaches (irrespective of content) which argue for a “fusion of ideas and concepts within and across subject areas...to make education more relevant and meaningful” (Hayes, 2010, p. 383). The advantages of cross-curricular teaching and learning (in higher education, and beyond) are well known (see for example, Barnes, 2011; Beane, 1995, 1997). Proponents of cross-curricular approaches advocate for the merits of constructivist approaches to learning and content. They argue that the approach “offers a creative way to develop ... knowledge, skills and understanding, while motivating them to learn through stimulating, interconnected topics” (Hayes, 2010, p. 383). Moreover, Beane (1995) notes that this approach “begins with the idea that the sources of the curriculum ought to be problems, issues and concerns posed by life itself” (p. 616) – seen from this perspective, the Sustainability CCP aligns strongly with this perspective.

But the risks and challenges of cross-curricular teaching are also well known. Summers et al. (2005) note “while the theoretical arguments for interdisciplinary implementation are strong...such approaches are problematic for...teacher education” (p. 624). Hayes (2010) speaks to many of these problematics in his provocatively titled article “*The seductive charms of a cross-curricular approach.*” He notes a number of practicalities in relation to planning and implementation might cause “enthusiasm to diminish” (p. 384). He also argues that this approach can be “insufficiently rigorous” and points to how the fit is more natural in some learning areas than others. The concern in relation to this situation is that the Sustainability CCP that is supposed to be ‘embedded’ across other units within a program of study, might simply end up being invisible or unattended to. Hayes also points to the implications of cross-curricular approaches for teacher educators. He highlights the demands that cross-curricular teaching makes on educators as it can often increase workload and challenges educators to embed something they may not be overly familiar with themselves (in this case, sustainability) into their own teaching and learning. Mills and Tomas (2013) allude to some of these concerns as they note, “teacher educators may not perceive EfS to be relevant to their particular subjects of curriculum areas, or know how to best integrate EfS into their teaching” (p. 161). Indeed, many teacher educators pride themselves in, and therefore prioritize, teaching content and pedagogies for a specific curriculum area. Moreover, some learning areas are, as Buchanan (2012) notes, “relatively artificial sites for the inclusion of sustainability” (p. 111).

The role of the teacher educator in supporting ITES to understand sustainability and the CCP cannot be underestimated. Yet despite this important role, there is evidence suggesting that university lecturers (in higher education generally) and teacher educators (specifically) have a wide range of understandings of sustainability that are often dominated by environmental understandings, just like the ITES’ understandings (Buchanan, 2012; Cotton et al., 2007). If teacher educators’ understandings are narrow, and this is what they are teaching ITES, then it seems urgent that the cycle be broken in terms of simply content knowledge. In relation to teaching and pedagogy (distinct here from knowledge), it appears that many teacher educators do not know how to best integrate sustainability into their curriculum area or their teaching practice (Mills & Tomas, 2013). This finding points to the need for teacher educators to be upskilled in how to use subject content, pedagogies and

assessments to integrate EfS into their teaching and learning area. Buchanan (2012) and Mills and Tomas (2013) offer specific strategies that are helpful in facilitating this integration in ITE programs. Furthermore Nolet (2009) highlights successful models for faculty development in the area of sustainability and contends that “faculty development may be an important early step for teacher education programs to undertake as they integrate sustainability education into the curriculum” (p. 435).

Conclusion

This paper has revealed some troubling findings in relation to the ITES understandings of sustainability and their current capacity to teach the Sustainability CCP. Given these findings, how can we possibly hope that the Sustainability CCP will be delivered in a thoughtful, complex and enriching way, as it is intended? While we do not wish to generalize overly beyond this sample, we do suspect that this instrumental case study sheds insights that are somewhat transferable to other contexts within Australia. These suspicions of transferability arise from our reading of the recent related Australian research in teacher education programs (e.g., Buchanan, 2012; Mills & Tomas, 2013) and our own professional dialogue with our colleagues around Australia.

In this paper, we have examined a number of possible ways forward, with a view to remedying the situation. We have examined issues related to ITE courses – and highlighted the opportunities and challenges of teaching sustainability through both cross-curricular and stand-alone approaches. We have pointed to ways that curriculum, pedagogy and assessment can be designed to support the learning of these complex issues. We have noted the important role teacher educators can assume in upskilling ITES and the possible need for professional learning to support this. These various approaches, of course, need not operate in isolation, but rather can be implemented in concert. What is of critical importance here is that *something* shifts to allow ITES to acquire these understandings and competencies. We feel strongly that this issue cannot be left in the ‘too hard’ basket. We believe there is an ethical imperative to have ITES, like Jane who opened this paper in the introduction, graduate with the competencies to facilitate student inquiry and action into working towards a more sustainable future.

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