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Studios for sustainability in higher education

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Abstract

This paper explores how flexible learning studios contribute towards sustainability students' ability to critically engage with the sustainability challenges of their time. Higher education institutions with a sustainability focus have the potential to play an important role in training graduates with the ability to comprehend and address the complexity of sustainability problems. Sustainability educators need to meaningfully emphasise critical thinking within the classroom for students to build new knowledge around the problems being explored. Throughout the paper, we draw from our experiences of learning studios as both students and educators in the Fenner School of Environment and Society at the Australian National University. We argue that the development of appropriate *studios* for sustainability is important for gestating critical thinking and new ideas, and that the studio can be developed within a tutorial environment. Through discussing the conceptual and physical aspects of a learning studio, we argue that an appropriate studio for sustainability education involves a blended learning space which emphasises the importance of a flexible learning environment; develops critical understandings of complex sustainability issues; and promotes collaboration through peer learning. Such studios can be designed in a way that engenders an effective approach to sustainability education.

Introduction

The severity of sustainability challenges faced by societies across the world has been well documented (Fischer et al., 2012; Steffen et al., 2011). Such challenges have been observed to be complex, dynamic and have multiple root causes that defy simple solutions (Brown et al., 2010), affecting social and ecological systems. To address this, working across and between disciplines is required to identify a range of possible solutions (Brown et al., 2010). Higher education institutions, and specifically the sustainability focused faculties within them, have the potential to play an important role in contributing to the development of graduates who can conceptualise and address these complex problems in an interdisciplinary manner (Cortese, 2003; Harris, 2009; Jones, Trier and Richards, 2008; Kubiszewski, Constanza and Kompas, 2013; McNamara, 2010). However, universities face a range of challenges in providing appropriate learning environments to achieve this potential.

These challenges have been well documented. At a broad level, Marginson (2006) observed that universities have become more corporatised and are increasingly expected to train graduates for specific industry and market skills. Miller, Munoz-Erickson and Redman (2010) note higher education institutions often have narrow disciplinary foci when dealing with the complexity of sustainability. Similarly, Jabareen (2011) observes a tendency for the holistic nature of sustainability to be overlooked in favour of technocratic aspects of human-environment interactions. Thomas (2009) observes that the sum of these challenges potentially undermines the graduates' ability to comprehend the complexity and dynamics of sustainability problems as a whole.

To partially address these challenges, notions of flexible learning have emerged. These learning spaces form a fundamental part of sustainability education in creating an environment for transformative learning (Wals and Corcoan, 2006). These spaces can offer opportunities for student-teacher and peer learning. Gibbons (1994) contends that learning spaces can contribute towards the generation of new knowledge. Furthermore, Sloan, Davila and Malbon (2013) pose that a facilitation approach to learning where there is not a subject matter expert, but rather a facilitator of knowledge in the classroom, offers opportunities for

new knowledge generation.

In this context, our paper explores the importance of learning spaces for sustainability education. To frame our understanding of the characteristics of appropriate learning *studios* (defined below) for sustainability education we draw on our position as concurrent students and university tutors, in the Fenner School of Environment and Society (FSES) at the Australian National University (ANU). In Sloan, Davila and Malbon (2013), we refer to this position as a 'student facilitator' – that is, a person who is enrolled as a student at undergraduate or Masters level and employed as a university tutor. To maintain clarity and consistency, in this paper we will use the term 'educators' to refer to our experience as both learners and teachers. To guide our analysis we pose the question: *to what extent can the studio facilitate an appropriate space for sustainability education?* We aim to create a fusion of ideas that blends education theory with approaches to solving sustainability problems, grounded in our experience of sustainability education. We argue that an emphasis on developing appropriate learning studios is crucial for sustainability education.

Our understanding of a studio represents a face-to-face space where students and educators can share ideas and collectively learn about sustainability problems and their possible solutions. Such a studio is not solely confined to its physical elements but also constitutes a conceptual space where students can critically reflect on their place in the world and challenge the way in which they understand its sustainability.

The next section provides the background for our research by characterising the FSES and how our experiences there have shaped our perceptions of appropriate studios. An outline of the relevant academic literature regarding sustainability education and the types of studios that are part of it are introduced. These studios are then contextualised through the use of our experience as learners and educators at FSES.

Background

The Fenner School of Environment and Society

The FSES is a sustainability focused faculty at the ANU. In both research and education the FSES places an emphasis on an interdisciplinary and integrative approach to addressing "the big environmental problems facing contemporary society" (FSES, 2012, para. 1). Interdisciplinary education at the School requires educators to constantly explore new ways of ensuring that students' knowledge from different disciplines is adequately integrated into the sustainability problems being explored. This ranges from interdisciplinary course curriculum development through to in-class assessments, activities and facilitation styles aimed at promoting student engagement with sustainability issues (Baker and Lupon, 2003; Dyball and Carpenter, 2006; Sloan, Davila and Malbon, 2013; van Kerkhoff, 2013). These learning environments have contextualised our experiences as both students and educators. Although a broad range of courses exist within the FSES, our experience is limited to the School's human ecology, geography and integrative science streams of study.

We started our studies at the FSES in 2008, both undertaking a Bachelor of Interdisciplinary Studies (Sustainability) ¹. Since, we have completed further studies at fourth-year Honours (Sloan) and Master (Davila) levels. During this time we were both employed as university tutors for first and later year undergraduate courses. Since 2010 we have collectively tutored 14 courses in the FSES. It is the blend of these experiences as learners and educators which frame our position and arguments throughout this paper.

It is important to note that our experience from a teaching perspective is limited to the tutorial context. Course design is the responsibility of the academics who convene the courses and the broader FSES academic leadership. Our focus has been on the delivery of that course content in the classroom (i.e. *the studio*). Although we have a passive role in course content generation, we work collaboratively with convenors to design the approaches taken towards facilitating learning around that content. It is this experience as educators that is the focus of this paper.

Critical Self-Reflection

A core element of our thinking and practice is the ongoing self-assessment and critique of our own work. Ulrich (2001) observes it is important for researchers to be aware and critical of their own work. Similarly, Thomas (2009) highlights the importance of critical teachers in reflecting on how to improve their practice with the objective of achieving better teaching environments. Without doing this, educators are unable to fully grasp where their work is situated within the broader area of study they are exploring, and where it can be improved. The process of critical reflexivity, which is the ongoing self-conscious scrutiny of one's work (Hay, 2008), underlines the analysis of our practice throughout this paper.

We have both used critical self-reflection for the past two years since our initial paper on this issue was written. In an iterative manner, we used the article writing process as a way to thoroughly explore the benefits and criticisms of our teaching approach. This process has allowed us to better inform our teaching practices for the last two years, contributing to the ongoing process of critical self-reflection. As this article is a critical reflection on our own practice and experience, we present the arguments below in the first person.

Literature Context

It is difficult to claim that there is a lack of knowledge regarding what many sustainability problems are (Fischer et al., 2012). Rather, sustainability students with the capacity to critically engage with complex issues and collaborate across disciplinary boundaries are needed. In regard to sustainability education, Thomas (2009) notes that knowledge transfer alone is not sufficient and there is a need to focus on the process of learning. This has implications for the type of learning studios that might be considered appropriate for sustainability education.

Sustainability Education

Sustainability focused faculties within higher education institutions have the potential to play an important role in addressing sustainability challenges (Cortese, 2003). Universities can provide a platform for students to challenge and question the status quo (Moore, 2005) through exploring and identifying the underlying socio-economic drivers of sustainability issues (Harris, 2009). In the process of questioning the world's modus operandi, Thomas (2009) contends that, reflecting the complexity of sustainability challenges, sustainability education should first and foremost aspire to promote critical thinking among the student body as a means of facilitating transformative learning.

Critical thinking, in essence, is the practice of extending one's thinking beyond describing and knowing facts towards a type of thinking that is active, evaluative and ever-changing (Bailey, 2012). Developing opportunities, both through meaningful practical experience and conceptual diversity, is essential for students to grasp sustainability problems from different perspectives. In other words, given that sustainability challenges will usually defy simple solutions, sustainability educators should encourage students to engage in reflection regarding how to think (i.e. the process), not simply what to think (i.e. specific knowledge) (Thomas, 2009).

Problem-based learning, focused on the process of 'doing', not only plays an important role in generating engagement in the subject matter, but also in terms of emphasising critical thinking (Thomas, 2009). For example, Dyball and Carpenter (2006) argue that educative approaches that situate students within sustainability problems and allow them to reflect on the complex nature of these problems, are crucial to sustainability studies. Similarly, in her recent publication, van Kerkhoff (2013) builds a framework where researchers (in this case, students) are placed within the complexity of the situation being studied, rather than seeing complexity as a characteristic of the issue (van Kerkhoff, 2013). Through allowing students to carry out collaborative interdisciplinary group project, they had the capacity to be part of the complexity of the problems being explored and develop their own critical understanding of possible solutions (for more details see van Kerkhoff, 2013).

Experiential learning, where the learning process regarding a sustainability issue is grounded in real experience and draws on emotion, is important in promoting critical reflection (Dieleman and Huisingsh, 2006; Warburton, 2003). Dieleman and Huisingsh (2006) contend that the use of certain activities, such as role-plays, can make learning much more real for students. Building on this, Sloan, Davila and Malbon (2013) identify a series of key teaching practices that allow students to develop critical thinking and potential for transformative learning experiences. Core to these practices is the notion of facilitation of knowledge, rather than just knowledge transfer. Through allowing students to critically reflect on their worldview and role in sustainability problems, deeper understandings of the complex problems being addressed can be achieved.

These approaches, however, are not without their challenges. Sterling (2011) notes that transformative learning and the promotion of critical thinking are not easy to facilitate as they are not short term learning objectives but develop over time. Similarly, he notes that it is difficult to judge the extent to which these have been promoted, particularly within the context of single university courses. However, it is possible to contribute towards the process of facilitating critical thinking and transformative learning, through the learning environment created at the classroom, or *studio*, level (Dieleman and Huisingsh, 2006; Sloan, Davila and Malbon, 2013; Warburton, 2003). This highlights the importance of exploring the type of *studio* that sustainability education takes place in.

Studios at the FSES

The learning environment that is created, the activities which are run and way in which issues are framed in a learning context, are important in terms of the design of an appropriate studio for sustainability education. Based on our experience of sustainability education as learners and educators, we contend that the current studios at FSES generate learning environments that can contribute to effective sustainability education. Our role as non-experts in subject matter, we contend, strengthens the opportunities to develop open and critical discussion opportunities to critique and reflect on the knowledge provided through lectures and readings.

From reflecting on our experience, we consider that these studios can exist in two forms: physically and conceptually. Importantly, these cannot be separated, but rather a learning studio should aim to integrate both elements.

Physical Studios

We consider the physical studio to be where learners and educators interact with the material elements of their immediate surroundings. Such physical spaces can be confined to classroom spaces or beyond it through field trips and outdoor learning environments. A flexible physical space, for example, would maximise the use of resources, such as tables and white boards, to design the structure of the classroom in a way that facilitates greater flexibility and student-to-student interaction. In our own practice as educators we have found that breaking up hierarchical classroom designs (e.g. in a standard student facing the teacher set-up) facilitates diversity in the physical studio.

An additional element of the physical studio is the educators' capacity to optimise the use of learning opportunities outside the classroom. As students, some of our best learning experiences occurred in an outdoor setting where theoretical understandings of an issue were contextualised through a real world interaction. In the context of sustainability problems, it is particularly pertinent to have a studio where students can physically see and interact with the environment they are learning about.

Conceptual Studios

Physical studios need to be complemented by adequate conceptual diversity for genuine learning to take place. Previously, we contended that conceptual studios require the facilitation of opportunities for "a collaborative, open space for discussion and learning" (Sloan, Davila and Malbon, 2013, p85). Educators play a pivotal role in the creation of such a conceptual space, particularly in framing themselves as facilitators,

rather than providers, of knowledge. We contend that this facilitation of knowledge in a critical and collaborative manner is core to the conceptual studio.

As educators, we have found that a key part of this process is giving students ownership in creating their own learning environment. At the start of each semester, we engage students in a discussion regarding what makes a good tutorial experience. This process involves establishing clear, class-generated expectations of both the students and the tutor and clarifies what we collectively want to get out of the tutorials during the semester (see Sloan, Davila and Malbon, 2013). The underlying intention is to develop a studio where all students are comfortable participating in open and critical discussion. It also provides an opportunity for students to think about what a good learning environment is, while also identifying the different learning styles of the students in the class. This is a practice we use for both first and later year courses because each studio – with different students, social dynamics, classroom and topic – is unique.

Blended Studios

The education literature and our own experiences point towards elements of learning studios that should be incorporated into sustainability courses. In the following section, we explore the extent to which the studio can be an appropriate space for sustainability education through highlighting core elements of learning studios that we have found to be the most effective for sustainability education.

Flexibility

For an appropriate studio to exist, a flexible and open approach to both the physical and conceptual studio is important. Sustainability education requires learners to critically examine a situation and pursue imaginative lines of inquiry to find possible ways of acting to address particular elements of the problem. Sustainability education should thus facilitate opportunities for students to share ideas, critique them and generate new ideas. Such collaboration can generate a shared understanding of how the problem is being framed. Importantly, ongoing critical engagement with sustainability problems in the classroom allows the expression of different worldviews surrounding the issue. Given that sustainability issues often require compromise between different worldviews, such shared opportunities are essential.

Physical and conceptual studios are required to offer students the flexibility to explore different issues involving the diverse elements of a particular sustainability problem. Physical flexibility can be achieved quite easily, for example: through re-arranging the classroom, using multiple white boards and butchers paper for highlighting different ideas and activities, and maximising the available classroom equipment and space for students to discuss and learn from each other's understandings of the problem. In addition to providing the physical opportunity for students to re-define what the classroom should be like and how it can be used, this flexibility offers opportunities for expression of conceptual diversity. An environment which allows for both physical and conceptual diversity can lead to new ways of understanding and thinking about solutions to the sustainability problems being explored.

As educators, we have attempted to blend physical and conceptual diversity as an education tool for sustainability. This has been done partly through the use of game-based activities (Sloan, Davila and Malbon, 2013). Such activities are designed in collaboration between course convenors and tutors as a tool to break up the class, create a fun learning environment while at the same time allowing students to explore the weekly content through a different medium than the basic discussion (see Box 1 for an example).

Box 1: International climate change negotiations and a ball of string For an international climate change policy course, groups of 20 students were taken outside and required to stand in a large circle. A ball of string was passed around the class, with each student taking hold of the string before passing it to the next class member. This was done until all students had hold of the string at a different point, creating a complex and interconnect web.

The class was then presented with the challenge of untangling themselves as to make an unbroken circle, without dropping their piece of string at any stage. Different iterations of this activity were

conducted. For example, where students were not allowed to verbally communicate and where 'moles' were planted among the students whose task it was to work against the group.

From our perspective as educators, the key outcome of this activity was to demonstrate the challenges addressing a complex problem, specifically when components of the system were working against the 'solution'. However, in running the activity it was notable that, with each different group of students and iteration of the activity, different explanations emerged regarding the perceived significance and purpose of the activity, and in terms of how to best solve the problem the group was faced with. The usefulness of this activity, and others like it, is that they provide a means to explore an issue from a different angle and generate new understandings beyond what might be expected.

Through using game-based activities and other means of interacting in a physical studio, students get an opportunity to explore alternate conceptual studios. That is, flexibility in the physical studios offers an opportunity for students to expand their understanding of an issue and creatively engage with it. For this reason, we consider educators to play a crucial role in facilitating the student's capacity to navigate their thinking in a creative and critical manner.

The Box above highlights the blended nature of physical creativity (the physical studio) and critical thinking (the conceptual studio). The blending of these is of relevance in the current context of the solutions to sustainability problems being designed by policy makers. At present, dominant societal thinking has largely been confined to disciplinary siloes, which fail to conceptualise these problems in an integrated and holistic manner (Jabareen, 2011). Lawrence (2010) argues that human compartmentalisation of knowledge and failure to collaborate among researchers, professionals and policy makers has led to a lack of action in addressing sustainability challenges. The integration of specialised scientific knowledge with other disciplines can build a community of transdisciplinary thinking groups needed for addressing sustainability problems (Brown, 2010). The use of blended studios can act as the inception of group of ideas that can contribute towards addressing these sustainability problems.

Critical Understandings

Further to learning about the drivers and context of sustainability problems in learning studios, students should also be allowed an opportunity to critically examine their own worldview regarding a particular problem. In this respect, the previous indication that physical studios can allow students to situate themselves in the natural environment and critically analyse problems and possible solutions is an important element of our understanding of sustainability education. As Dyball (2010) highlights, rich experiences lived by students in the form of field trips require frameworks and lines of inquiry that allow learners to make the link between their immediate experience and the broader nature of why the experience is important for understanding and solving sustainability problems. Providing conceptual studios in the classroom can present ways of thinking and frameworks for students to take out into outdoor physical studios to critically engage with sustainability issues (see Box 2).

Box 2: Mini-field trip – reading the history of landscapes A major component of the first year sustainability science course at Fenner is drawing the connection between theoretical understandings of sustainability problems and how they emerged in a real world context. As part of developing this, a mini-field trip was conducted of the ANU campus. This was undertaken within a two-hour tutorial, including up to 20 students, with a key learning outcome to develop students' ability to read the surrounding environment. Specifically, how different social and cultural factors have influenced that environment and how they influence the way it is currently managed. During the walk, the class moves along a pre-planned route, stopping at specific points to observe their surroundings. Points vary, but include 'natural' ecosystems as well as built environments. For example, human-constructed wetland systems, sporting ovals (synthetic and grass), along a storm-water drain (named Sullivans Creek) and in the main student hub of the university. At each stop, students asked questions such as, 'what can you see, smell or hear?' 'what physical artefacts can you see that might indicate previous land-uses?' 'who might have an interest in how this environment is managed?' 'what does your observation of this environment tell you about the dominant priorities of management?'. This walk culminates in a synthesis which aims to draw together the different observations that students have made throughout the tutorial, with students then using that as a basis for developing a sustainability management plan for deal with the conflicting values that exist among stakeholders on campus.

Collaboration and Peer Learning

Flexibility and critical understandings need to coexist with notions of collaboration among students. Collaboration, rather than competition, needs to be encouraged in the studio. From our experience working with first year students, we have found this particularly important. The high school experience encourages a highly competitive learning system, in which students compete against each other. This competitiveness often eventuates itself in first year university students, however it wanes as collaborative opportunities are encouraged by educators. Through this process, we have found that notions of power in real world sustainability situations emerge as students' understanding of problems develops. This is important as, in a world with ever-changing power dynamics, students should experience the need to working collaboratively to acknowledge and understand the diversity that exists and to seek solutions to complex sustainability issues.

Another important element of collaboration is the disciplinary diversity that is present among students undertaking sustainability courses. Particularly in our experience, undergraduate courses are generally open to students from a range of degrees and disciplines – although generally bias towards having a degree of interest in sustainability or environmental based issues. Collaborative approaches allow for different technical disciplines to combine their understanding and build a shared understanding of a particular problem. In our experience, identifying at the start of each course the diversity that exists in each tutorial is a useful way of facilitating interaction among different disciplines. The diversity of disciplines offers sustainability educators with an excellent opportunity to maximise peer learning through collaboratively framed tutorials and lectures.

Beyond Studios?

From our experience, learning does not have to be, and is not, confined to the contact hours and the assignments that are formal parts of university courses. The physical and conceptual studios we have discussed are part of the formal pedagogies of higher education institutions. However, we have found that informal relationships promote a learning network that we have found fruitful as both students and educators. In our experience at the FSES, a community has existed where interactions take place between students and educators (including tutors and course convenors). Close relationships can develop throughout a student's undergraduate courses and challenge their way of understanding and interacting with sustainability problems.

As students, we found it inspiring to have educators take an interest in our learning process, including in our decisions after completing our undergraduate degrees. Throughout our work as educators, we have had the opportunity to support and monitor students' transitions from first year university to their final undergraduate years. The informal community of learning we observe at the FSES reflects what Garrison and Anderson (2003) called a 'critical community of learners'. In this community, all involved in a university course can validate their unique understanding of a situation and create new learning and knowledge.

The process we have undertaken over the last two years, reflecting on our time at FSES as both students and educators, demonstrates the presence of this critical community of learners. Through critically exploring teaching practices with course convenors and students, we were able to develop a set of ideas surrounding what makes effective class facilitation for sustainability education.

Challenges

While we have painted a positive picture of studios throughout, challenges do exist that can undermine the achievement of desired learning experiences. On a basic level, pragmatic challenges exist in regards to constructing an appropriate physical learning environment. For example, there may only be a certain number of rooms or other physical resources available for a range of different course demands. Potentially this means that not all tutorials will have access to the same resources and there can be competition among

courses for the best learning spaces.

Challenges have emerged as barriers to meaningful blended studio experience for students. Throughout the semester, it is important to maintain a structured way of achieving learning outcomes within the tutorials. The emphasis we have placed on a flexible learning environment, while important, needs to be carefully managed so that learning objectives for the course are effectively achieved. Similarly, clear communication between course convenors and tutors must occur to ensure that the studios generated in the tutorial context reflect the broad course aims and pedagogy. As alluded to previously, an additional challenge can be that too great an emphasis could be placed on the fun side of tutorials. While it is important to develop a positive dynamic within a class, educators need to be aware that this does not have priority over a critical discussion space where difficult questions are debated. It is also crucial to understand that transformative learning is challenging and may not suit all students. It requires commitment from the educator to create spaces for students to challenge their worldview. There is, however, a certain level of commitment and effort that students need to contribute to understanding the theoretical elements of courses for the studios to have a meaningful and positive outcome.

Conclusion

Our experiences as students and educators this peer-learning environment at FSES has contributed towards our understanding of interdisciplinary learning and practice. Working with a range of students from across different disciplines presented the challenge of ensuring that the notions of sustainability being explored were understood by students used to different learning styles. The facilitation practices used for teaching have had to allow students from other disciplines to meaningfully engage with reflective thinking and the conceptual elements of sustainability. Although a challenge at first, through the use of flexible studios students were encouraged to surpass these challenges and learn from both peers and the educator.

Sustainability focused faculties within higher education institutions can play an important role through the development of graduates able to comprehend the complexities of sustainability challenges. As we have discussed throughout this paper, effective approaches to sustainability education that facilitate critical thinking and move towards transformative learning, are important. Throughout this paper, based on our experience as students and educators at the FSES, we have presented our perspectives on what an effective studio is for sustainability education. Reflecting the broader literature, we have highlighted that steps can be taken, within a tutorial context, to move towards the type of sustainability education needed.

We have argued that a studio for sustainability involves both physical and conceptual components, but a blended studio is considered to provide the best learning experience. Within this studio space, we contend that an emphasis should be placed on creating a learning environment that are flexible, critical and collaborative in order to best achieve sustainability education aims.

Although our arguments and experiences are based on the FSES, we believe that using this approach to the studio can be transferred across disciplines. The approach focused on knowledge exchange and student participation can contribute towards building confidence in students and enhance their ability to exchange complex ideas with people from different disciplinary backgrounds.

This paper is limited to our own experience in the defined context of tutorials at the FSES. While we consider this to be an effective place for sustainability studios, future research should explore how long-term educators conceptualise the studio. The informal learning environments that exist between students, their peers and their educators, including tutors and course convenors also pose an opportunity for exploring the nature of informal learning studios into the future. This paper has provided an insight into how sustainability learning studios are perceived from the perspective of concurrent learners and educators. Further research could also usefully focus on how studios could exist across institutions and disciplines with the greater goal of generating collaborative and transdisciplinary solutions to pressing sustainability problems. A more detailed exploration of how non-experts can facilitate knowledge between different disciplines with the purpose of exploring possible solutions to sustainability problems would also

add value to the field of sustainability education.

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1. Both authors completed a Bachelor of Interdisciplinary Studies *Sustainability*. At its core, this degree challenged students to understand the systemic drivers of sustainability problems while integrating knowledge from other courses and disciplines throughout the university. ↩