THE USE OF STUDIO PEDAGOGY IN ENVIRONMENTAL PLANNING EDUCATION

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Abstract

Teaching environmental planning is challenging at the best of times with wicked learning and teaching issues such as diversity of skills and knowledge required, the role of science and values in environmental decision making and political viability but periods of rapid political and economic change can present additional difficulties. This paper overviews the current state of environmental planning education and the challenges it is facing as well as suggestions on how and what to teach environmental planners. While the benefits of studio pedagogy which involves a student-centred, collaborative, inquiry/problem-based approach based on a 'real world' project is well documented, particularly in the United States and Australia these courses are becoming less prominent in the planning curriculum. We argue that studio pedagogy is an ideal learning and teaching environment and approach to overcome the challenges of environmental planning education in particular because studio pedagogy teaches students how to work successfully, in a collaborative way, with 'wicked', complex issues. Evidence from planning studios are used to illustrate how studio pedagogy can be useful in overcoming the wicked learning and teaching issues that arise in environmental planning education and producing successful environmental planning graduates that are leaders in their field.

1. Introduction

The interdisciplinary nature of urban planning requires basic knowledge in many different fields and involves difficult choices in curriculum planning. Environmental planning education is even more complicated as it requires high level understanding of biophysical sciences. While there is substantial amount of literature on urban planning education in general there is little on the environmental component of urban planning education or teaching environmental planning in particular.

Designing environmental planning courses pose particular challenges in planning curricula (Deknatel, 1984) as it requires great diversity of skills and knowledge (Niebanck 1993). In addition to the number and diversity of topics that need to be covered in an environmental planning course, including the basic science behind environmental issues, two other problems complicate environmental planning education further (Vos, 2000). The first of these problems arises from the fact that scientific information is much more important for environmental decision making than other policy arenas and the science behind environmental issues is not only complicated but also continuously changing and quite often involves uncertainty. The second problem is related to the tension between the triple bottom line of sustainability, namely environmental quality, economic growth and social equity. The values that underlie the trade-offs between these add another layer of complexity to teaching environmental planning. There is no easy way to prepare the students to handle the conflict between environmental, economic, and equity values but they need to be able to understand all three perspectives and consequences of proposed actions on each. Another challenge of teaching environmental planning is related to the political viability of proposed solutions. Students feel frustrated when they realise political realities might not allow what they as planners

think is the right course of action. What if you cannot communicate the consequences of actions and choices to the decision makers or the society in general effectively (e.g. what is happening with climate change at the moment in many countries)?

This paper argues that studio pedagogy is an ideal learning and teaching environment and approach to teach students environmental planning. Secondary data from environmental planning and studio pedagogy literature are used to construct our argument. First, a review of the literature relating to environmental planning establishes the context and illustrates the complexities of the discipline area. This then leads into a review of the Australian planning education curricula to identify the degree to which environmental planning is incorporated into it. Next, the wicked learning and teaching issues related to environmental planning education are highlighted and the knowledge and skills necessary for an environmental planner is identified. The paper concludes with a discussion on the beneficial links between studio pedagogy and environmental planning education.

2. Environment in the Australian Planning Education Curricula

Environmental planning has a substantial impact on social, economic and environmental welfare and getting it right is a complex challenge facing governments, the private sector and communities around Australia. Over time, the complexity of planning has grown and planners today are asked to address a wide range of pressing problems in a context of constantly changing community preferences and demands. Some of the issues confronting planners include managing and responding to significant population growth, an ageing population and demographic change, urban congestion, transportation of goods and services, ensuring adequate energy and water supplies, adapting to climate change, managing hazards, responding to disasters, preserving natural and cultural heritage and the growing expectation that residents should be consulted on changes to their neighbourhood (Productivity Commission, 2011, p.XXI). Complex environmental planning problems present significant challenges for policy, institutions and management. Environmental problems are multi-dimensional and often not well understood. They involve spatial and temporal disparities between cause and effect and the effects of planning interventions on people and environments and decision making in complex systems are difficult to predict. Environmental planners need to find ways of dealing with complex problems in multi-scalar natural and human systems (Rittel and Webber, 1973; Holling, 1973; 1995).

In complex policy and institutional contexts such as this, scholars and practitioners advocate for innovative arrangements that are holistic (Berkes et al., 2003; Folke et al., 2005); integrated across public and private sectors and decision-making at multiple scales (Lane and Robinson, 2009); and collaborative to engage different kinds of knowledge for social learning and build mutual understandings of problems and solutions (Pahl-Wostl et al., 2007; Armitage et al., 2009). Scholars and practitioners also emphasise adaptive ecosystems-based approaches to deal with issues of uncertainty (Walters, 1986; Williams, 2011). These approaches accept that the suitability of policy and management approaches are unknown, treat interventions as hypotheses to be tested and learned from, and employ policy ‘experiments’ to trial, evaluate, and adapt institutional arrangements (Johnson, 1999). Although widely advocated, adaptive approaches have had limited implementation in practice (Walters, 1986). This is because there is little information available to planners on how to actually undertake adaptive management (Eberhard et al., 2009). The quality of biophysical, social and economic benchmarks and evaluative information against which to assess the performance of planning arrangements is poor (Kenward et al., 2011). Multiple forms of knowledge (e.g. scientific, local, customary, traditional owner, policy) are often not effectively integrated into decision making at various stages of adaptive management cycles (Hillman et al., 2005; Hill et al., 2010).

Concepts of resilience, particularly social-ecological resilience are also gaining momentum in environmental planning to better understand the social, economic and governance vulnerabilities, adaptive capacity of communities in managing and overcoming the environmental problems facing them (NOAA Science Advisory Board, 2009; Marshall et al., 2010). Resilience and related concepts however are conceptualized in a number of different ways according to the different disciplines, problem contexts, scale, and objectives (e.g. resisting change, bouncing back, or transforming in response to environmental or social perturbations).

Thus, environmental planning, which is characterised by complex problems, requires planners to integrate multiple forms of data to make decisions transparently under conditions of uncertainty. As described above, the theory about how to resolve environmental problems points to adaptive ecosystems based approaches, which build social and ecological resilience, and take a holistic, flexible, collaborative and dialogic approach to planning and decision-making. Achieving this requires considerable reorientation of current planning and decision-making systems. Current systems are not flexible or holistic across scales and issues. Planners need skills in big picture thinking and analysis to support systemic reform and critical research and evaluation skills to address current shortfalls in the evidence base. Planners need to have the capacity to build and analyse information to undertake adaptive planning and to understand and monitor the impact of planning interventions on social and ecological resilience. They require skills in managing complexity. They need to be able to evaluate planning options in the context of decisions and actions at multiple-scales of decision making to ensure that strategies help rather than hinder solutions. Planners also need to know how to work with stakeholders to negotiate reforms within and across political systems. Finally, environmental planners need coping skills to deal with personal and professional fatigue in dealing with difficult and contested problems, which can seem never-ending, and to deal with ethical dilemmas. So how well do we prepare young planners to this kind of work environment?

To ensure professional graduate outcomes the professional body, Planning Institute of Australia (PIA), implements a stringent accreditation policy. The objective of this policy (PIA, 2011, p.4) is ‘to encourage and support students … to become planning professionals, who can think creatively, analytically and critically, undertake independent research, communicate effectively, and act ethically.’ In addition, the accreditation policy (PIA, 2011, p.7) ‘identifies core and desirable capabilities, competencies, skills and knowledge, and ethical standards, which are expected to be demonstrated in all accredited planning programs.’ Three components related to skills and knowledge defined in the accreditation policy include generic capabilities and competencies, core competencies and supporting knowledge areas. *Generic skills* include problem identification and the formation of creative solutions; critical thinking and spatial analysis, understanding and the application of theory to practice and written, verbal and graphic communication and team work. *Core skills* include professionalism, practice and ethics; plan making, land use allocation and management, and design; and governance, law, plan implementation and administration.

Inclusion of environmental issues and sustainability into the planning curricula has been limited in Australia and New Zealand (Gunder, 2006; Hurlimann, 2009). Gunder and Fookes (1997) found that on average in 1995, accredited planning-school curricula in Australasia focused less than 5 percent of their total programs on environmental issues. While over a quarter of all programs had no environment-orientated courses the most any program had was only 12 percent of overall course content focused on environmental issues. Sandercock (1997) called for a paradigm shift in the role of planners to prepare them for the twenty first century and included ecological literacy among the needs of planners to work effectively in the changing environment. In contrast to Australia the

percentage of accredited planning programs in North America offering environmental planning as an area of specialization increased from 48% in 1984 (Deknatel 1984) to 86% in 2000 (White and Mayo 2005) and Association of Collegiate Schools of Planning (2000) describes environmental planning as one of the five primary areas of planning practice.

A more recent survey of planning professionals in Australia (Hurlimann, 2009) identified perceived gaps in environmental knowledge of planners in the areas of climate change and water management and skills gaps of critical thinking and independent inquiry. This is not surprising if we consider how little environmental planning is emphasized in the Accreditation Policy of PIA (PIA, 2011). The only allusions to environmental issues in core competency areas is in performance outcomes: 'Capacity to make appropriate choices in ethically ambiguous situations based on knowledge of social, economic, *environmental*, and cultural aspects of planning' and 'Knowledge and theories of urban and regional planning and systems, including but not restricted to principles of land use, urban form, infrastructure, *natural systems*, transport, the integration of land use and transport, heritage conservation, landscape and human settlement patterns' [p.11, emphasis added]. This level of focus on environmental concerns does not go beyond using environmental planning as an element of land use planning to increase sensitization of land use planning to natural systems variables (Deknatel, 1984).

Environmental planning is one of the five main supporting knowledge areas PIA Accreditation Policy identifies and elaborates on, however, it is made clear that these areas are not intended to be mandatory and individual planning programs may include all or some of these areas or substitute others if they see fit. The competency objective PIA (2011, p.20) identifies in environmental planning is: 'Planners take a collaborative role in the production and implementation of environmental plans, whether these are discrete plans, components of other plans, or by providing environmental planning analyses of others' plans or actions.' The four performance outcomes expected include:

1. Knowledge of the main principles of sustainable development, ecological systems and key issues such as climate change.
2. Knowledge of natural hazards and planning approaches to managing those hazards.
3. Capacity to produce basic environmental plans at a level demonstrating understanding of broader principles and policy implementation.
4. Capacity to practically and critically link plans into wider frameworks of environmental action and influence at a variety of scales (PIA, 2011, p.20).

In 2007 the Australian Research Institute in Education for Sustainability (ARIES) published a report entitled *Shifting towards Sustainability: Education for Climate Change Adaptation in the Built Environment Sector* that focussed on planning, engineering, architecture and landscape architecture and was supported by the relevant professional organisations including PIA (Lyth et al., 2007). It suggested that graduates in the built environment area should have nine competencies that would enable them to:

1. think about problems holistically and through the 'prism' of climate change
2. understand principles of sustainable development
3. problem solve using lateral and integrated thinking
4. comprehend the significance of the climate change problem
5. interpret information about climate change from a range of sources and disciplines
6. effectively interpret information about impacts and vulnerabilities specific to the locality, region or sector they are working in to develop appropriate problem solving strategies for climate change adaptation

7. make judgements for decision making based on interpretations of degrees of uncertainty associated with scenarios for local and regional impacts
8. think beyond social and professional practice norms to develop creative climate change adaptation strategies
9. demonstrate resolve to make decisions despite uncertainties about local and regional climate change impacts (Lyth et al., 2007, p.7).

With regards to the current state of climate change adaptation knowledge and skills around the country, the ARIES research found that planning graduates had an 'inconsistent level of knowledge and skills' and they gained these skills in something of an ad hoc manner; there was a lack of professional development programs for existing planners; and teachers needed more training, resources and experience with climate change adaptation (Lyth et al., 2007, p.26).

3. Wicked Learning and Teaching Issues of Environmental Planning

The scant literature on environmental planning education highlights a number of challenges: diversity of skills and knowledge that needs to be covered, the role of science and values in environmental decision-making, and political viability of solutions.

3.1 Diversity of Skills and Knowledge

Linking of planning and science is one of the central dilemmas in designing environmental planning programs (Deknatel, 1984). While pure science courses such as ecology are not within the scope of most planning programs, the need for increased scientific and technical knowledge for environmental planning is acknowledged and these types of courses may be the most appropriate foundation for environmental planning education (Deknatel, 1984). When there is such a variety of subjects to be covered tough decisions need to be made regarding what to include in the curricula. In environmental planning education the key question is whether environmental knowledge or general skills of implementation and analysis are more important (Hurlimann, 2009) as including courses from other fields would reduce the coverage of traditional planning subjects (Cardew, 1999). *Environmental or foundational knowledge* includes theoretical principles and provides scientific and ideological perspectives to analyse the issues. White and Mayo (2005) identify five foundational knowledge topics in environmental planning as ecological concepts, environmental economics, environmental philosophy, environmental psychology, and sustainability. They also identify areas that have *general skills or implementation methods* to apply these principles as environmental design, geographical information systems, environmental impact assessment, environmental policy and law, and site planning. Foundational topics are usually taught at the beginning of the program and applied skills are toward the end.

Which one of these is more important for an environmental planner depends on a number of factors such as the type of job a planner is likely to have. Hurlimann's (2009, p.655) study found that 'for a significant number of respondents, skills are more important for planners to possess than specific knowledge in order to address environmental problems... However, it could also be argued that planners must have sufficient environmental literacy to be able to adequately and accurately apply their skills to these issues. It is argued that possession of research and analytical skills, accompanied by specific knowledge in one or two environmental areas will equip planners well with the skills to address environmental challenges.' White and Mayo's (2005) findings for North American planning schools are similar: For students, applied knowledge skills are more important for getting employment and succeeding initially in practice since most new planners are expected to perform as technicians. However, as they move toward management positions foundational knowledge (i.e. understanding of

ecological concepts), philosophical knowledge and political skills gain importance. The changing needs of the practicing planner in time indicate that the challenge does not finish within tertiary education but continue throughout their career. Like all professionals continued education is crucial for a successful career.

3.2 The Role of Science in Environmental Decision-Making

Understanding ecological processes is a prerequisite to identifying solutions to environmental problems (White and Mayo, 2004). While planners will not necessarily undertake environmental research themselves they should have enough environmental literacy to understand the technical and science-oriented members of the interdisciplinary teams they need to work in as well as understand and recognize key issues in technical reports (Vos, 2000). Cardew (1999) argued for the importance of integrating environmental management into urban planning education focusing on the key questions of how much environmental science planners need, how is it to be taught, and by whom (generalists or specialists). Generally science courses are taught independently from planning courses but discussion of the role of science and uncertainty in environmental decision-making is also necessary. Hurlimann (2009) noted the two major approaches of design of specific courses versus integration throughout the curriculum and challenges to each approach.

3.3 The Role of Values: Balancing Environment, Economy, Equity

One of the earliest challenges environmental planning education faced was to incorporate normative and social factors in what was viewed as a technical field and including public participation into the planning process (Deknatel, 1984). One of the toughest challenges planners face every day is balancing the competing claims of environment, economy and social equity. This requires knowledge in all three areas of environmental decision making (Vos, 2000), environmental science, economy and the actual costs of all the decisions made, and equity, the social implications of the decisions and how they affect people. But having this knowledge does not mean value-free, scientific and objective decisions will be made, ultimately the decision is based on which one of the values weighs heaviest at the moment the decision is made. Gunder (2006) reminds planning educators of their responsibility to ensure that the tension between market efficiency and environmental protection is not resolved at the expense of social justice.

Back in the 1970s Ian McHarg (1978) claimed that planner's most important role is to elicit the value systems of the people who are seeking to solve a problem because these values would ultimately determine the planning solutions. Planner's job in this sense is to help the community make its values explicit. McHarg further defined an ecological planner as one who identifies alternative solutions with attendant costs and benefits based on an understanding of both biophysical and social systems. Planning is not a value-neutral applied science but 'an inherently social, communicative, and ethical undertaking' (Klosterman, 1995, p.247). A planner is not a value-neutral technician and it is important for planning students to understand the importance of values in planning decisions as well as planner's own values. Hence, one issue to discuss with students in the classroom is their own values, the roles they may take as a professional planner and their ethical responsibilities in upholding planning principles. Are there going to be some that become the advocate planner and do advocacy on behalf of certain groups or certain issues?

3.4 Political Viability

Planning students are challenged particularly by looking for realistic and politically viable yet effective solutions. We try not to stifle their creativity and expect them to stick to their principles and

invariably face with questions such as what is the point of this exercise if the recommendations are not politically viable. They may feel particularly hopeless and discouraged during periods such as now when planning is not looked at all that favourably. What tools can we equip them with to deal with these situations in real life?

The political nature of planning is an important issue planning students need to come to terms with. Planners are not decision makers but they advise the decision makers. In their capacity as advisors they can influence events through their capacity to articulate viewpoints and develop consensus and coalitions (Levy, 2003). Discussing the kinds of powers planners have (persuasion, logical argument, communication skills) with planning students will prepare them for the realities of the workplace.

4. Toolbox of the Environmental Planner

So how do we prepare future planners to deal with this complicated work environment and the challenges they will face at their work place? The scant literature on environmental planning education contains plenty of suggestions in terms of specific knowledge and skills an environmental planner should have. The literature reviewed highlights a number of foundational knowledge topics that are important including environmental ethics (Martin and Beatley, 1993; Niebanck, 1993; Beatley, 1995), environmental justice (Washington and Strong, 1997; Gunder, 2006), and sustainability (Martin and Beatley, 1993). The skills that are identified to be important for environmental planners include negotiation, arbitration and conflict resolution (Deknatel, 1984; Niebanck, 1993; Susskind, 2000), and critical inquiry (Gunder, 2006).

4.1 Environmental Ethics

Beatley (1995) views an understanding of environmental values and ethics as an essential underpinning not only for environmental planners but all planners since ‘value-neutral discussions of management tools and techniques such as environmental impact assessment, growth management, or carrying capacity are simply not possible’ (Martin and Beatley, 1993, pp.123-124). As such, Beatley (1995, p.321) argues that environmental ethics is ‘an especially important component of any environmental planning curriculum or concentration.’ However, Martin and Beatley’s (1993) survey of planning curricula in North America found that in the early 1990s only three out of 87 responding programs offered a separate environmental ethics course, though 64 percent indicated that the subject was covered to some degree in other courses.

Beatley (1995) claims that tertiary education is one of the last opportunities for students to engage in informed moral reflection and to clarify and critically assess their personal values and moral convictions before entering the ‘world of professional practice, political compromise, and economic expedience’ (Klosterman, 1995, p.248). As such, exposure to ethical literature is necessary to help students develop their own personal ethical frameworks (Beatley, 1995). He further suggests that rather than relegating environmental values and ethics to a single course, consideration of ethics should be injected wherever possible.

4.2 Environmental Justice

Washington and Strong (1997) argue for an emphasis on environmental justice in the planning curriculum as the issues raised by the movement are within planners’ professional responsibility, yet neither planning practice nor education has paid much attention to it. They claim that planning education should provide students with an understanding of planner’s role in decision making (i.e. they are not neutral experts) and values, norms and rules of professional practice. Washington and

Strong (1997) suggest that environmental justice can provide a framework for examining both planner's own personal and professional values as well as those of the stakeholders. Gunder (2006, p.218) points out planning educators' additional responsibility to ensure that 'social justice is not swept aside in the dualistic tension between market efficiency and environmental protection, even if economic growth always continues to seem to prevail'. His suggestion is to achieve this through developing core skills of critical inquiry and ethical judgment in planning students.

4.3 Sustainability

Martin and Beatley (1993) argue that given the focus of planning on managing land use and human settlement patterns, coverage of sustainability in planning curricula in addition to environmental ethics is essential for providing normative guidance to planners. Their survey of planning programs in North America found that only two-fifths of the programs offered courses that explicitly addressed issues of sustainability at that time. In conclusion they suggested in the early 1990s that sustainability needs to be incorporated into the planning curricula more explicitly and directly. White and Mayo's (2004) research found that sustainability was considered to be one of the most important knowledge topics by the faculty in environmental specialization of North American planning programs. With sustainability becoming a dominant concept in planning education by the new millennium concerns on its conceptualization arose and led to warnings that triple bottom-line based sustainable development is quite different than ecological sustainability (Gunder, 2006). This shifted the focus of the discussion to which sustainability planning education should emphasize.

4.4 Negotiation, Arbitration and Conflict Resolution

The roles and skills an environmental planner needs have to go beyond procedural organisation to structuring and coordinating decision making processes involving many interests much like a mediator or a coordinator. An environmental planner needs to have increased substantive knowledge as well as ability for interdisciplinary teamwork (Deknatel, 1984).

Niebanck (1993) suggests previously neglected skill areas of negotiation, arbitration and conflict resolution should be included in environmental planning education. He argues that one form environmental planning takes is targeted action and in addition to negotiation and communication skills this needs advocacy planning. Ethics and values underlie planning as principled action.

4.5 Critical Inquiry

The importance of balancing environment, economy and equity values in making environmental planning decisions has already been discussed. Gunder's (2006) warning of the dangers of the way sustainability is perceived and taught in planning schools has also been mentioned. His specific concern is that even though economic growth always continues to seem to prevail in particular social justice may bet swept aside in the dualistic tension between market efficiency and environmental protection. To prevent this he suggests that planning education must develop in its students core skills of critical inquiry and of ethical judgment.

5. Studio Pedagogy and Environmental Planning

Adding to the complexities of the special requirements and challenges of environmental planning education is the significant shifts in advanced economies from manufacturing and knowledge services which create demand for a different set of skills in the workforce compared to what came before.

Binkley et al. (2012, pp.18-9) provide a list of ten a list of twenty-first century skills across four categories:

Ways of Thinking
1. Creativity and innovation
2. Critical thinking, problem solving, decision making
3. Learning to learn, Metacognition

Ways of Working
4. Communication
5. Collaboration (teamwork)

Tools for Working
6. Information literacy (includes research on sources, evidence, biases, etc.)
7. ICT literacy

Living in the World
8. Citizenship -local and global
9. Life and career
10. Personal and social responsibility- including cultural awareness and competence

How can environmental planning educators respond to the challenges they are facing while delivering the twenty-first century skills Gen Y needs? In designing environmental planning program curricula the tough choice between environmental knowledge and general skills/implementation methods can be overcome by striking a good balance between them. However, this is easier said than done. Experiential learning and project-based courses such as studios can deliver environmental knowledge and principles along with the practical skills that will lead to jobs while stimulating ways of thinking, and working, tools for working and living in the world. Properly conceptualised, designed and delivered, planning studios can provide students with substantive knowledge about environmental planning and a range of generic skills including communications skills, creative problem solving and critical thinking. The feedback received from students in Mid-semester Student Experience and Student Evaluation of Course Surveys for studio courses taught at Griffith University indicate that studio pedagogy is effective in overcoming some of the challenges of environmental planning education and delivering twenty-first century skills.

One of the difficulties of environmental planning education is integrating environmental science content into the curriculum. As foundations of the advanced planning content, these courses are usually delivered in the initial years of the degree and this may put off students who have a particular understanding of what planning is and what it involves. Even students who persist in the degree complain about the perceived irrelevance of these subjects. Alumni who work in resource management agencies or environment focused jobs appreciate that knowledge later on but one way to illustrate its relevance early on is integrating it with planning knowledge in studio projects. One of the key benefits of studio is integration and synthesis of knowledge and skills in a field example (Hollander and Thomas, 2009). Planning studios require students to draw upon personal knowledge and experiences as well as their academic learning from all their courses. Testimonials from students confirm that students acknowledge and appreciate the studio pedagogy because it gives them opportunity to see the linkages between the knowledge they gained through their previous coursework and allows them to integrate these in a studio project and put it into practice: ‘Through the studio course the lecturer was able to link the information we had received and the skills we had developed in our degree and put them to use in the development of a professional document.’

Studio projects also provide the perfect opportunity to illustrate the role of science and scientific information in environmental decision making. Using real world problems in hypothetical or real settings also allow students to see the role of values and the need to balance competing claims of environment, economy and equity. Discussions on political viability of proposals illustrate the difficulties planners face in the workplace to planning students in the studio.

The literature highlights negotiation, arbitration and conflict resolution (Deknatel, 1984; Niebanck, 1993; Susskind, 2000), and critical inquiry among *generic skills* important to environmental planners. Plan making, evaluation and related tasks that are at the heart of planning studios involve creative and critical thinking and analysis (Higgins, 2009; Balsas, 2012). Developing critical thinking ability is among the learning outcomes of studio courses (Németh and Long, 2012). Furthermore, studio pedagogy often involves team-based learning through which students learn to collaborate, understand group dynamics and develop interpersonal cooperation skills (Németh and Long, 2012; Senbel, 2012). Problem solving element of the studio pedagogy helps students develop skills in negotiating oppositional viewpoints and dispute resolution (Higgins, 2009; Németh and Long, 2012) and 'dialogical experience' in the negotiation of solutions within and across teams (Senbel, 2012).

Studio courses may include dealing with ethical issues as a learning outcome (Balassiano, and West, 2012) and aim at teaching students to assess planning outcomes based on a set of values such as justice or sustainability (Németh and Long, 2012). As such, through the selection of projects, *foundational knowledge* areas of sustainability, environmental justice and environmental ethics may be explored through a studio course. Project discussions are a valuable way of discussing role of values in decision making. Through the projects in a planning studio students are challenged to balance the competing claims of environment, economy, and equity and how science is included in the process. In this simulated planning environment they understand the various roles of the planner and develop their personal professional ethics (Németh and Long, 2012).

Studio pedagogy is also effective in integrating the twenty-first century skills. Planning studios are student centred learning and teaching environments characterised by problem based learning and learning by inquiry pedagogies which emphasise active independent student-focused learning. Students are required to work collaboratively with input from the profession and staff where the staff: student ratio is typically high (see Zehner et al., 2009). The main value comes from shifting the role of the student from passive receiver of information to an active and engaged learner. Studios provide the opportunity for teachers and students to explore problems and identify and reflect on solutions in a reiterative way. Students learn from their teachers' experience, from their peers, their application of concepts and they develop deep understanding by doing. While the learning by doing nature of the studio projects can initially be frustrating to students who are used to being told how to do things, once they get used to it they appreciate the freedom this gives them and enjoy being creative and innovative: 'I found the detailed, useful, and carefully-selected feedback regarding projects beneficial to my learning, as feedback would guide and develop my thinking as opposed to provide me the "correct" answer'. Students also enjoy the practical nature of the studio projects that allow them to 'problem solve real and relevant issues' and 'require critical and strategic thinking'.

Studio pedagogy relies on group work and through this teaches communication and collaboration skills (Higgins, 2009; Hollander and Thomas, 2009, Long 2012). When groups work students enjoy the experience and cite group work as one of the things they enjoyed most about the studio: 'Group work as you get to have different people's opinions and ideas you might not have thought off'.

One essential learning outcome of studio courses is improving students' research and communication skills (Long, 2012). Project based nature of the studio and its focus on a real project makes the learning directly relevant to the professional workplace and makes students highly employable.

6. Conclusions

The scant literature on environmental planning education highlights a number of challenges: diversity of skills and knowledge that needs to be covered, the role of science and values in environmental decision-making, and political viability of solutions. Added to this is changing economic structure and the rising need for a workforce equipped with a different set of skills. Studio type courses relying on project-based learning where foundational knowledge and planning principles can be integrated as well as practical skills and principles are applied to a real project can provide an efficient way of teaching the two sets of knowledge and skills necessary for an environmental planner.

Recommendations on dealing with the other challenges focus on the topics and skills that should be included in the environmental planning curriculum. A review of the literature on suggested emphasis in the curriculum shows agreement on the core themes that are deemed important in environmental planning education. Social and environmental justice forms one of the three pillars of sustainability. Both environmental ethics and environmental justice emphasize the importance of values in planning. Planner's role in the process is also a recurring theme. The skills that are emphasized include critical inquiry, negotiation, arbitration, and conflict resolution.

While recommendations are aplenty in terms of what should be included in the curriculum, there are no studies that confirm or reject the importance of these topics and skills in relation to environmental planning education. This points to a need for additional studies that can not only test these suggestions but also evaluate them. It is notable that of the three foundational knowledge areas of sustainability, environmental justice and environmental ethics found to be cornerstones of environmental planning education PIA accreditation policy mentions only principles of sustainable development in its discussion of supporting knowledge are of environmental planning and does not mention environmental ethics or justice at all.

In this paper we have argued for the importance of a studio teaching and learning environment as an important and valuable component of environmental planning education. The studio, we suggest, is just as relevant today for teaching environmental planning to Gen Y students as it ever was in previous times, as a method of teaching planning to generations of Boomers and Gen X students. And it will remain core to educating environmental planners in future generations.

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