

Lost in transition

Secondary school students' understanding of landscapes and natural resource management

In 2007, a study titled 'Living in the landscapes of the 21st century' was conducted in 11 high schools in metropolitan and rural Victoria. The research team investigated Year 10 students' conceptions of landscapes in order to explore their understandings of natural resource management (NRM), including agriculture, food, land and water management. The aim of the project was to consider how students' career and future aspirations connected with their understandings of landscape futures. There was no discernible difference in the results for metropolitan and rural students with the majority of students expressing a generalised concern for the environment; however, this concern did not translate into career insights associated with NRM. The researchers concluded that there is a need for a stronger emphasis on NRM education as it relates to essential life-sustaining services for all citizens. In addition, it is suggested that university recruitment strategies utilise word selection/description and visual imagery associated with landscapes in order to engage future managers of our natural resources.

by Tarnya Kruger &
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In Australia and internationally, most universities are gradually withdrawing from the teaching of agricultural sciences and natural resource management (NRM). They are instead moving towards broader undergraduate degrees as they face what McSweeney and Rayner (2011) describe as "a different and less certain future" for agriculture (p.415). More recently, in the Victorian context, the closure of agricultural campuses, in response to changing demographics and demand, has created a deficit scenario (Roush 2007). In addition, the steady urbanisation of rural localities and the movement of rural people to regional service towns have opened up other opportunities for young people from rural areas.

In the last 30 years, the Australian landscape has experienced what Lobao and Meyer (2001) refer to as an "agricultural transformation". The overall population of rural areas has declined, there is an increase in aggregated corporate farms, and there is a decline in middle-sized family farming. The conditions for farming have changed, in terms of enterprise management. Earlier providential economic times have allowed the children of farming families to choose other professions and parents to want a different life for their progeny.

A number of factors have influenced young people's expectations about staying on the land including complications with family succession planning; funding retirement out of the farm; the transfer of social services, such as aged care, from small towns to regional centres; and the

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economic pressure for farms to keep scaling up to survive. Universities with agricultural faculties have gradually lost their stream of “grounded” entrants – those that would return to the land. At the same time, and increasingly into the 21st century, the realities of drought, flood, fire, invasive plants and animals, as well as the difficulties of being a farmer, have reinforced popular ideas of how hard it is to farm. Coupled with the media coverage of these issues and physical realities, the increasing urbanisation of the Australian population reinforces this disconnect for those growing up in cities away from the sources of food production. It is therefore unlikely that many urban people would choose agricultural studies, even if such programs were available.

Dyer, Breja and Wittler (2000, p.490) have argued that the best predictors of student retention in degrees at an agricultural college are “students’ prior experience in agriculture and their enrollment in high school agriculture programs”. Indeed, agribusiness considers these types of experienced students to be the most desirable as potential employees (Lawson 2002). Therefore, the critical question remains: how can we engage Australian youth in the future of land, water and food production and thus encourage their involvement in environmental management careers?

Partridge (2008) suggests Australian youth have a complex relationship to environmental issues and points to a report for the National Youth Affairs Research Scheme which found that 90% of Australians aged 12 to 28 were either “concerned” or “very concerned” about the environment (Bentley, Fien & Neil 2004, quoted in Partridge 2008, p.18). However, Denniss (2005, pp.4-5) argues that: “Young Australians are among the least likely to see themselves as environmentalists.” This disconnect between concern for environmental issues and action is a kind of paralysing enigma. Partridge considers this the “hallmark of young people’s relationship to environmental issues” (p.22); however, she further suggests that there is indication of a growing concern among young people, particularly around issues of climate change.

Understanding of landscape

McCormack’s (2002) study of two New Zealand primary schools, one metropolitan and one rural, investigated students’ understandings of rurality and found most students conveyed ideas about rural life through descriptions of agriculture and nature. McCormack points to Halfcree’s (1995) study in England, which explored people’s understandings of rurality and found nearly two-thirds of interviewees linked rural with “the natural”. Similarly, Rye’s (2006) study of rural youth in Norway looked at what youth perceived as the key characteristics of rurality and found “nature” as the most accurate way to describe “rural” in this study group.

The geographer Yi-Fu Tuan suggests that “natural settings have, at different times and places, appealed strongly to the human imagination”. These are “the forest, the seashore, the valley, and the island” (1990, p.115). Cresswell (2005) points out that the countryside is often seen as a place of tranquillity away from the problems of urbanity. Raymond Williams, writing of England’s transition from agricultural to industrial society during the 1880s, describes the creation of cities which gave rise to a dualistic city–country divide that is still prevalent in literature:

Powerful hostile associations have also developed: on the city as a place of noise, worldliness and ambition; on the country as a place of awkwardness, ignorance, limitation (1985, p.1).

These conceptions of rural landscapes potentially limit understandings of agriculture and natural resources associated with land, food and water.

Bridging the divide

Australian youth also face issues relating to the connection with and categorisation of landscape. To address this divide, a number of programs deliver information on NRM and rural life to school students. For example, Western Australia’s Kondinin group, which was established in the 1950s to provide practical and independent research and information to assist farmers,

has also, since the 1980s, developed a range of school curriculum resources (Kondinin Group n.d.). In 1989, Wooragee primary school in northeastern Victoria became the first Landcare School and, since then, many hundreds of schools across Australia have developed programs and/or linked with their local Landcare groups to build an understanding of the land and other natural resources (Junior Landcare Program n.d.). For two decades, the LandLearn program, supported by the Department of Primary Industries, Victoria,¹ worked with both rural and metropolitan schools hosting career information days, developing a website of resources for teachers and students, producing newsletters and linking schools. The LandLearn program, which ceased in 2011,² introduced sustainable agriculture and natural resource management to schools including the “paddock to plate” concept, whereby students, particularly in metropolitan areas, developed an understanding of food beyond the supermarket (LandLearn 2007).

Connection to landscape versus career choices

Universities anticipate that the rising concern among young people globally to “save the planet,” or at least be more conscious users of its finite resources, will herald a return interest in studying disciplines associated with land, food and water management. In reality, there are few undergraduate courses that directly incorporate the words food, water or land management in their titles. “Environment” is an all-encompassing term and one that may not carry specific connections for students. In part, this study grappled with the amorphous nature of connecting food, land and water management with the “environment”, and the role or direction universities take to market and promote these career and research opportunities. There is a need for interdisciplinary programs to overcome what Holling and Meffe (1996, p.329) have referred to as the “pathology of NRM” and its “command and control” management mentality. In this context, making the connection between generic “environment” programs and the study of agriculture in a

broader curriculum remains a challenge.

Lawson (2002, p.ix) has argued:

... a major factor affecting student demand for Higher Education in agriculture is the industry’s generally poor image with the public, reinforced by active guidance toward other career paths by school teachers, career advisers and parents.

Gilmore et al. (2006) found that the main issues affecting USA high school students’ decision to select agricultural science as a degree were problems with the image of agricultural science and misconceptions about what that area of study entailed. Therefore, just changing the name of the program or incorporating agricultural studies into larger programs will not of itself encourage students to study in the field. The question of whether “environmental studies” is more attractive remains.

Background to project and research aims

Our aim was to explore the factors that influence students’ career decision-making and to ascertain the proportion of students with an interest in environmental issues who were considering a career in the NRM area. We were interested in how students’ career and future aspirations connected with their understanding of Australian landscape futures and in any notable differences between students residing in, or surrounded by, agricultural landscapes and those from a city, urban scape.

In Victoria, students select their pathways for their final two years when they are in Year 10 and approximately 15 years old. We hypothesised that, if further study or careers in NRM are sought, students might be expected to have some idea of these domains by Year 10.

Methods

The schools that participated in our study were stratified and randomly selected to incorporate rural and metropolitan, and public and private, co-educational schools. The cohort included young people who were culturally and linguistically diverse,

and approximately equal numbers of males and females from schools across a broad socioeconomic spectrum. The respondents therefore represented a cross-section of Year 10s in Victoria.

The research took place at the classroom level. The sessions incorporated individual and whole-group activities using qualitative methodology, including photo elicitation (Beilin 2005; Hurworth 2007), flipcharts and large posters of landscapes to prompt discussion. Guillemin and Drew (2010) suggest image-based methodologies can encourage participation for those potentially reluctant to engage, such as teenagers. We sought to provide choice and alternative media for students to express their ideas. There was also a short questionnaire comprising eight questions using Likert or table-and-tick selection. The session lasted approximately 90 minutes. The activities were trialled in three pilot schools (N=57 students) and modified accordingly. A total of 198 students participated overall. Pseudonyms have been assigned to students' comments within this paper.

Results

Each student was asked to circle the photograph they considered most appealing and to cross out the least appealing of 12 black and white thumbnail photographs on an A4 sheet, showing a range of unidentified and some iconic Australian landscapes. "Nature" photos depicting a forest and waterfall and a seashore scene were the preferred images,

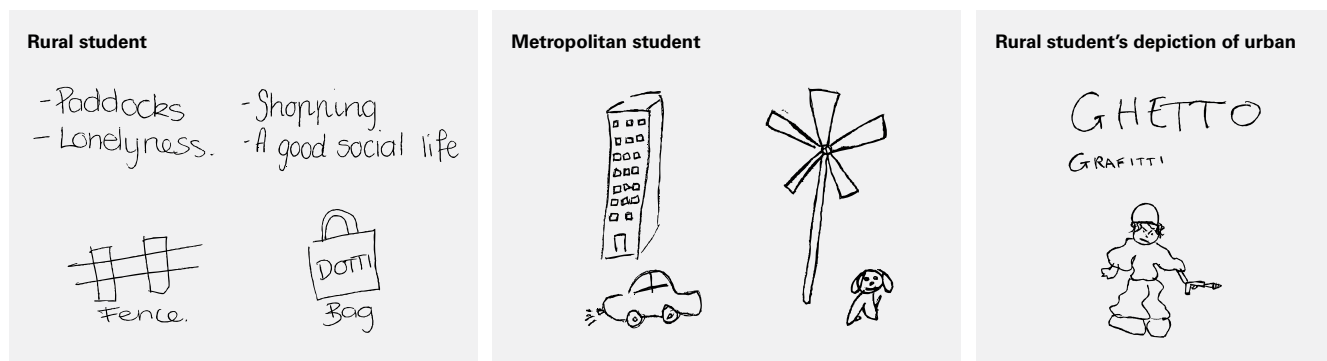
our findings suggest less preference for rural scenes.

Students were also asked to construct a list of words and/or draw a sketch of their interpretation of the two words "urban" and "rural" in a one-minute period. The activity was intended to capture dominant themes and prevailing stereotypes and assess any differences between metropolitan and rural students. Descriptions of urban and rural varied little between the metropolitan and rural school localities and mostly involved stereotypes rather than personal experience. The social construction of landscape and the stereotypical duality of bad (urban) and good (rural) did emerge from the data. The underlying themes in the definitions of urban were associated with crime, sophistication of life and cities being dirty; and for rural they were boring, old, isolated, poor, less technology and safe. Twenty-six students (15%) included a sketch to depict their representation of urban or rural. Sketches typically showed tall buildings for urban, and fences, animals and windmills for rural (Figure 1). One metropolitan student compiled a list, which appeared to evoke memories of rural life:

... verandahs, rocking chairs, scouts, grandparents, swing, slingshots, lamb chops, milk bar. (Kylie, metropolitan student)

Facilitated discussion focused on two themes of "water" and "food" for Australia. The discussion resulted in all schools presenting water as a finite resource and proffering water-saving solutions, for example

FIGURE 1 Samples of students' sketches depicting their idea of 'urban' and 'rural'



water restrictions, desalination, pipelines and recycling sewage. Students from some of the metropolitan schools with a notably higher number of migrants and students from non-English-speaking backgrounds provided critical comments in relation to world food equity and expressed awareness of the abundance of food available here in Australia. For example, in regard to food, one student suggested there was:

Not enough of it for Africans. Australians hog it all and Americans. 75% of Australians are overweight, obese bastards. (Jim, metropolitan student)

Other students raised the issue of the need to import food in the future. Vegetarianism was also raised in some of the discussions as a future option, although few students expressed support for this idea.

Drought and its consequences were linked strongly to rural rather than urban landscapes across all respondents, even though Melbourne was in the midst of drought. Classes articulated an understanding of water and food issues and were generally able to identify current options for water provision and some of the advantages and disadvantages of these options. One rural student commented:

I reckon the city people take it [water] a bit for granted and we sort of value everything in the country, sort of a stronger understanding. (Courtney, rural student)

The activity exploring changing landscapes utilised poster-size photographs showing three different scenes in Victoria: a city/beach, a temperate rainforest and a farm/rural landscape (see Figure 2). Students wrote responses to questions about landscape change and then the class discussed different ideas, which were written on a flipchart.

Nearly two-thirds of the respondents (63%) thought that each of the landscapes would change for the worse. Fifty-two per cent of the rural respondents believed the farming landscape would experience the greatest change. In contrast, 58% of respondents from metropolitan schools thought the forest landscape would experience the most change. One student



FIGURE 2 Three images indicative of those used to explore and discuss change in landscapes

thought farmers are likely to give up in the future:

... [they] decide there is no hope, they have no faith in their farms, and they give up and try and look for a better future for themselves. (James, rural student)

The five-minute questionnaire was intended to elicit students' thoughts about environmental issues, the careers they were

considering and what lay behind these choices. Generally speaking, the students reported pessimistic views about the future of the world. However, in response to questions focusing on the future of water and food, students provided a range of constructive ideas and thought science and technology would likely solve world plights. Students indicated quite strongly that they were thinking about the future and environmental issues; however, in contrast, they thought other teenagers would be thinking less about these issues. Eighty-three per cent of students indicated they were thinking about the future and environmental issues, 10% indicated that they were thinking about environmental issues “a lot”, whereas they felt their counterparts – “other teenagers” – were less interested, that is they felt only 2% of teenagers would think “a lot” about environmental issues.

Students were asked to select three factors, from a group of 20 alphabetically listed factors, which they considered most important when choosing a career (Table 1).

“High salary” was selected as the most important factor for choosing a career, although 93 respondents (46%) did not consider high salary in their top three. “Interesting/enjoyable” was the second most frequently selected factor, followed by “Working with people” and being “Helpful”.

A majority of students (72%) indicated that they had thought about or had decided upon a career. Students were asked to indicate from a list of 36 occupations, first, whether they knew something about the job and, second, whether they were interested in pursuing this occupation as a career (Table 2).

The careers associated with NRM, as indicated by italics in Table 2, attracted a minority of students imagining a career in this area (12%), with no notable difference between urban and rural. The results suggested a preference for traditional careers, for example medicine, law and teaching, and a likely underestimation of skills required, for example some students imagined life as a “sports star”.

Students were asked to comment on “the need for younger people to participate in the future management of natural resources”.

TABLE 1 Factors involved in choosing a career

Administrative, clerical
Artistic
Challenging
Community oriented
Creative
Environmental
Enterprising
Helpful
High salary, well paid
Innovative
Investigative
Interesting, enjoyable
Make a difference
Manual work
Meaningful
Problem solving
Skillful, technical
Social
Well recognised
Working with people

Their written responses were analysed and gave rise to 12 themes. The most frequent suggestion was “increasing awareness”, which was linked to dire consequences. One student foresaw a role he might play:

If I become a scientist, I will help Australia.
(Adam, metropolitan student)

Another student commented: “Make sure every school is learning” [about the environment] (Jenny, metropolitan student). In recent decades, major health and safety campaigns have used graphic imagery in media advertisements (e.g. road safety and tobacco), and much of this campaigning targets younger people. Therefore they suggest a similar campaign is necessary for the environment. One student said:

Tell them we are going to die if we don't stop [wasting resources]. (Mitchell, metropolitan student)

TABLE 2 Students indicated (tick) awareness about any occupations and then selected the one/s they were interested as a career. Occupation types were dispersed throughout the list, unnumbered and not in alphabetical order

Italic = careers closely affiliated with NRM (note: these were not highlighted in the questionnaire)

Building trade – Carpenter, plumber	Law – barrister / solicitor	Administration / reception / clerical
<i>Marine biologist</i>	Tourism	Landscape designer
<i>Agricultural extension officer</i>	<i>Forester</i>	<i>Plant nursery gardener</i>
Chef, catering	School teacher	Accountancy / finance / economics
<i>Environmental educator</i>	Veterinary – Vet, vet nurse	<i>Wildlife officer</i>
<i>Animal health officer</i>	<i>Horticulturist</i>	<i>Natural resource policy analyst</i>
Hairdresser	Medical – Doctor, Nurse	Professional sports person
<i>Park ranger</i>	Scientist	Social worker
<i>Farmer</i>	<i>Rural researcher</i>	Media, journalism
Retail, sales, customer service	Fashion design	Musician
Outdoor recreation instructor	Greenpeace campaign organiser	Information technology (IT)
<i>Food scientist / researcher</i>	<i>Environmental management planner</i>	Engineer

Discussion

The students’ responses indicated preferences for scenes of nature, the photos depicting a forest and waterfall and seashore, and, as Tuan’s (1990) ideas of topophilia suggest, these types of environments have always had a strong appeal for people. In retrospect, it is not surprising that students in regional and rural areas did not differentiate themselves from metropolitan students with regard to their preferred landscape and ideas about urban and rural. Given that many forms of media, such as the internet and television, are widely available, the former isolation associated with rural schooling is significantly diminished. In our sample, most students lived in regional or rural towns or urban environments, not on rural homesteads and country properties. However, Creswell (2005) and Williams (1985) highlight the persistent duality of city and country, and our results indicate a similar duality in views held.

We looked at students’ understandings of land, water and food management systems and the degree to which their understandings of these systems might influence career choices in NRM. The students who participated in this research demonstrated a level of awareness and knowledge of major

environmental challenges confronting the world. Students were able to describe the interrelationship of climate, food and water. In metropolitan Melbourne, new migrant students described the difficulties of food and water provision elsewhere and were interested in careers that may contribute to changing the balance.

A USA study exploring school students’ understanding of agriculture found that terms related to “agriculture” may appeal less to students than language related to the “earth” and the “environment” (Food, Land & People 1996). Our analysis concurs with this finding, which suggests that universities are more likely to reach prospective students by using a broader NRM focus rather than discrete agriculture, horticulture or forestry labels. However, this “muddying of the waters”, and concurrent trends to diversify curricula, may have implications for specialisation and, in turn, the pathways to NRM careers (McSweeney & Rayner 2011).

Our results suggest students’ motivations for future careers are socially framed in seeking enjoyment, working with people and a desire to be helpful. These teenagers’ motivations and aspirations potentially link strongly to tomorrow’s science, which will go hand in hand with social and

Management of the environment is perhaps a task that seems too removed or challenging for individuals to attempt as a career.

environmental issues. While careers within NRM may not be considered as financially rewarding as traditional careers such as medicine and law, they may provide other opportunities for social reward and public and environmental good.

Students' expressed feelings of despair in the face of a future where they saw the world heading towards a "worse" state. The pursuit of an NRM career may provide a useful buffer against despair – in the form of gainful employment and contribution to the broader society. In 2005, Dennis argued that young people did not identify as environmentalists. While the current study did not specifically ask students whether they identified as "environmentalists", a majority did indicate an interest in environmental issues. Partridge (2008) also found a growing concern among young people about current environmental matters. However, the current cohort felt they were not yet in a position to contribute to environmental action. This position is evident in the career choices of the participants – NRM may not be understood or its careers envisaged. There is also a difference in student views associated with speaking as an "individual" compared to what "other teenagers" do. Teenagers may present a "care less" attitude in the classroom where deeper values may not be displayed. Consequently, the ability to interview students one on one could provide further valuable insights around this topic.

Australia is the most urbanised country in the world, which undoubtedly compounds this disconnect between where food and water come from and young peoples' understanding of NRM and careers in this field. Pratley (2008) suggests:

... [the] unattractiveness of agriculture as a career is a result of a poor public image of agriculture despite the importance it plays locally and globally (p.40).

Management of the environment is perhaps a task that seems too removed or challenging for individuals to attempt as a career. Veloutsou, Paton & Lewis (2005) have found that school leavers rate university communication and marketing as the most important and reliable sources

of information when they are selecting a university. This finding emphasises the importance, in university recruitment strategies, of considering imagery and wording to promote NRM and to connect and appeal to prospective students along both environmental and social lines.

Limitations of the study

This study incorporated a representative sample of school types and students as described; however, the number of participants ($N=198$) did not allow for statistically significant modelling. Schools and teachers were generally supportive of the research, although some expressed concerns about time allocation. Researchers have to fit into schools' timelines and requirements, and this can be challenging.

Issues of stereotyping may have had an effect in regard to the listing of career titles. It may be that career titles carry associations that are unfamiliar, and do not represent the reality of the named profession. The listing of 36 occupations, while catering for the scope of choices, could have been significantly scaled back (e.g. to 10 prominent careers). Future researchers in this area may want to provide descriptions rather than just the titles for the careers. Similarly, while the listing of 20 factors involved in choosing a career produced indicative results, it could be scaled back so respondents choose only one factor, thereby simplifying the task.

Conclusion

It is clear from the responses that teenagers from regional urban centres share similar stereotypes to their metropolitan peers about urban and rural environments. The nature of discussion about the future can generate concern and can lead to despair, and we argue that the focus should be on highlighting opportunities and technological advances available to tackle the world's environmental challenges. There is some thought to be given to the issue of stereotyping in constructing scenes that represent "urban" and "rural." This didactic positioning can reinforce stereotypes where few exist. In other words, the expectation in Australian agricultural

faculties that “place” and life on a farm lead to career choice should be replaced by the reality that future candidates can come from anywhere. Universities’ NRM course promotions should reflect this fact by offering an integrated range of subjects that invite students from across university degrees to take these subjects.

Schools can and do provide a platform for discussion and debate about issues at the heart of our survival, reflecting humanity’s basic need for food and water. This research identified opportunities for schools to facilitate greater learning and examination of topical issues, including sustainability, climate change and imminent living conditions. However, discussion of sustainability, resource management and environmental issues may currently be confined to those doing geography or environmental studies. This situation could be addressed by integrating broad themes of landscape and human dependence on natural resources into various curricula.

This study argues that students do have an interest in and a desire to know more about environmental issues. Moreover, the fact that many of these challenges are now at our doorstep presents a tremendous opportunity to facilitate and foster involvement in NRM not only by encouraging NRM as a career, but also by raising students’ understanding of the role landscapes play as we face the uncertainties of the 21st century.

Note

1. The LandLearn program was adapted from the American and Canadian Agriculture in the Classroom programs <<http://www.agclassroom.org>> and <<http://www.aitc.ca>> respectively.

2. Some aspects of the LandLearn program are being incorporated into a new DPI Rural Education program, and some LandLearn resources are still available on the LandLearn website at: <<http://www.landlearn.net.au/resources/index.htm>>.

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