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The *Australian Journal of Adult Learning* (formerly the *Australian Journal of Adult and Community Education*) is an official publication of Adult Learning Australia (ALA). It is concerned with the theory, research and practice of adult and community education, and to promote critical thinking and research in this field. Its prime focus is on Australia, though papers relating to other contexts are also sometimes published. Papers in the refereed section of the Journal have been blind peer reviewed by at least two members from a pool of specialist referees from Australia and overseas.

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FROM THE GUEST EDITOR'S DESK

Our sincere thanks to Roger Harris and ALA, for agreeing to devote this edition of the *Australian Journal of Adult Learning* to one research theme, 'Learning to be drier'. It contains a set of six papers, generated in 2009 through a collaborative University of Ballarat—Deakin University research project. The project involved eight researchers in each university's school of education, working in two person teams, in four sites in the southern Murray-Darling Basin. We sought, in our research, to investigate the interface between public and popular learning, and the protracted drying of the southern part of the Basin in recent decades. In essence, we report on evidence from interviews with adults in four water-dependent communities. We identify people struggling, with limited or problematic access to the necessary adult or community learning opportunities, to understand or adequately respond, in rapidly changing, complex and adverse circumstances, to protracted drought, climate change, or a combination of both.

We were keen to step aside from the usual technical and scientific reports about water and climate, and register the felt experiences of learning about drying of adults located across the southern part of the vast and water-stressed Murray-Darling Basin, widely regarded as

‘Australia’s food bowl’. Our intention was to explore the phenomenon of the drying of the Basin, exploring learned responses to drying, but without presupposing causality. Our method was empirical but qualitative, by listening to people’s stories and constructing narratives in four different sites across three Australian states.

I will not dwell in detail, in this brief guest editorial, on what is in each of our six papers, since the first paper is itself introductory. Our final, joint paper attempts to pull some of the diverse threads together. While created from a common research theme, using common research questions and a shared method, the papers, as a set, illustrate the important point that adult and community learning is not experienced or understood in the same way across different communities. The papers include perspectives from different communities of agricultural, business, adult learning and research practice. While the four ‘site papers’ coalesce around three common themes related to learning about drying, they illustrate that place (including State) *does* matter in this huge and diverse Australian continent. Experiences of and opportunities for learning about drying in the Basin are shown to be different in Victorian Alpine communities, irrigation communities in New South Wales and South Australia, and dryland communities in Victoria. Importantly, drying is learned about, experienced and understood in very different ways across the Basin.

All narratives in our site papers identify the importance of social learning: to be productive, to be efficient, to survive, to live with uncertainty, to be sustainable and to share. They also illustrate the importance of hearing and considering diverse values and theoretical positions about the same problem. This diversity was found between the team as researchers, as well as within the narratives collected from individuals in diverse communities.

Looking beyond these Basin-specific studies, there is evidence that we are at a point in our development as humans, nationally and globally,

where we know too much about the consequences of our actions *not to act* to minimise the consequences of human-induced changes, including but extending beyond climate change. We are perhaps re-learning the difficult truths about global interconnectedness. Theories and predictions about climate change reconnect the old idea of the three, fundamental elements: 'air, fire and water'. Einstein was the first to connect energy, mass and light in a neat, quantitative theory and equation, $E=mc^2$. The atmosphere is too complex to find a similarly uncomplicated equation to connect air, energy and water in the earth's thin lithosphere and atmosphere.

While it is too difficult to predict confidently what will happen and where, as the climate changes, there is a growing realisation of a fundamental interconnectedness, in an atmospheric and community sense. There is also a sense that we are dealing here with a 'super-wicked' problem, as alluded to in the 'wicked' or messy problem literature, referred to in our final paper. This is because time is running out, there is no central authority over the atmosphere, and some of those seeking to solve the problem are also involved in causing it. Our interest in studying four southern Murray-Darling Basin communities, at this very difficult time, is to help us all to learn to care about and respond to changes, in this case, to a climate that is likely to be generally warmer and drier.

Those readers familiar with my own research journey will be aware of my protracted passion for researching equity in, and accessibility to, lifelong and lifewide learning for adults of all ages, across Australia. I have tended to 'graze' from vocational to adult and community education, and most recently to consider learning by adults *through* diverse community contexts. Most recently, my interest has been in learning experienced by men, particularly by older men, including through community-based men's sheds. Most of these studies (unlike the one featured in this Journal) have involved mixed methods, with surveys as well as interviews. What is

common to many of my research designs, as in the current research project, is an emphasis on careful site selection, diverse and multiple sites, and on-site data collection. Wherever possible, my preference is for working closely with local people and organisations, after an initial reconnaissance visit, with a strong emphasis on the ethic of 'going lightly' and 'giving back'. This *Learning to be drier* research involves some grazing back to roots. It connects me back, in some ways, to my earlier interests and qualifications in geology and environmental science, and also to my family roots in the drylands of north-western Victoria, where rain on the corrugated iron roof was always a community delight.

This and other studies of adult and community learning, *in situ*, raise many of the often heard and interesting questions discussed in most papers in this Journal, about what constitutes adult learning, how to collect and report data, and which theoretical perspectives are appropriate to answer particular research questions. My wider interest and particular concern is in what I perceive to be a lack of recognition, in public policy and across the Australian community, of the importance and value of lifelong and lifewide learning to wellbeing. I perceive that accredited education and training 'off-the-shelf' are often irrelevant to, inappropriate for, or inaccessible to the needs and interests of many groups across the community in Australia. My research, in its totality, identifies an almost universal interest to learn through shared participation. It also identifies the significant wellbeing benefits that accrue from ensuring that the diverse members of all communities are somehow connected and participating in learning, for reasons that include, but extend well beyond, paid work.

For all of these reasons, there is a need for fearless and independent research into adult and community learning, and important roles for national organisations like Adult Learning Australia to play. This research and these roles should go beyond the small, publicly funded

remnant, after vocational learning for work has been subtracted. It should be directed towards the huge amount of learning essential for people's personal and family lives, identities, health and wellbeing, community and cultural lives, spirituality, recreation and environment. These needs have become more acute as neo-liberal agendas in all states, nationally, and most recently in Aotearoa/New Zealand, have progressively sought to put adult education either into the workplace, or onto the market, as a 'service' for 'clients' and 'customers'.

It is important to make two important points about the limited availability of community-owned-and-managed adult and community education in Australia in 2009. First, in 2006, New South Wales and Victoria were the only states in Australia where community education, as defined in Bardon's study of *Community education and national reform*¹, still had 'well-developed capabilities across all three tiers' (p. 24). The tiers were defined as community VET (vocational education and training), community participation and community learning. Some of these tiers have recently been further eroded through a range of state 'reforms'. Second, community education provision was found to be around twice as likely, in Bardon's (2006: 5) study, to occur in a rural or remote area than the VET average. However in many such areas of Australia, as in our 2009 men's learning studies², adult and community education was also missing in several tiers and states in regional as well as rural and

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- 1 Bardon, B. (2006) *Community education and national reform*, Discussion Paper, Canberra: Department of Education, Science and Training.
 - 2 *Senior men's learning and wellbeing through community participation in Australia*, B. Golding, A. Foley, M. Brown & J. Harvey, report to National Seniors Productive Ageing Centre, October, Ballarat: University of Ballarat; *Men's learning and wellbeing through community organisations in Western Australia*, B. Golding, M. Brown, A. Foley & J. Harvey, report to the Western Australia Department of Education and Training, October, Ballarat: University of Ballarat.

remote areas. While VET was available in some cases, we concluded that it was often inappropriate for older adults, particularly for adults who were not in work or retired.

Finally, I perceive, as the Director of the Institute of Lifelong Learning within UNESCO³ recently put it, of a need to recognise that we are not simply producers and consumers, but citizens with families and personal lives. We are also participants in diverse communities of practice. We need to learn in these communities: across the lifespan: about health and wellbeing; to re-create lives beyond work; to age, to enhance social, civic and family roles and responsibilities; to strengthen and develop personal identities, family, community, national and international relationships. In the case of this Journal issue, there is evidence of our urgent need to learn about and consider the myriad, downstream effects of changes, that we all make daily, by our own actions, to the global balance between air, fire and water.

**Barry Golding
with Coral Campbell
Guest Editors**

3 A. Ouane (2009). Director UNESCO Institute of Lifelong Learning, Confintea VI 2009, 6th International Adult Learning Conference, Brazil.

Learning to be drier in the southern Murray-Darling Basin: Setting the scene for this research volume

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[Australian history] is like a giant experiment in ecological crisis and management, sometimes a horrifying concentration of environmental damage and cultural loss; sometimes a heartening parable of hope and learning. (Griffiths 2003: 16, cited in Mackinnon 2007: 73).

Overview

We finalised our set of papers for this special edition of *Australian Journal of Adult Learning* in late September 2009. We sought to emphasize and broaden our interest and concern about our *Learning to be drier* theme in this edition to the 77 per cent of Australians who live within 50 km of the Australian coast, the

majority of whom also live in major cities and urban complexes (Prime Minister's Science, Engineering and Innovation Council, PMSEIC 2007: 3). On 24 September 2009, a massive dust storm swept across New South Wales, dumping millions of tonnes of red dust on capital city areas of Australia unaccustomed to dust: Canberra, Sydney and Brisbane. Snow, laced with the same red dust fell the same day in the Australian Alps, as attempts at breaking the historic and prolonged deadlock between the Australian federal government and states about water trading rules, as part of achieving a national 'plan' for the Murray Darling-Basin, again broke down. On 1 October 2009 the New South Wales Office of Water circulated a news release, making 'an initial allocation [in the Murray Valley] to general security users of 1 per cent' of their entitlements, and asking all water users 'to be as conservative as possible with their use in what continues to be the worst drought ever experienced'.

Eight researchers contributed team papers to this special edition from the four sites in the southern Murray-Darling Basin. Collectively, we bring wide and deep academic backgrounds, theoretical perspectives and experiences from a wide range of work, research and life contexts, in mainly rural and regional Australia. While the research plan detailed below was essentially common, each two-person team grappled with and selected its own preferred combination of theoretical perspectives for their paper. The method and the qualitative (mainly interview) data were therefore treated somewhat differently across different sites. While the four site papers were researched, developed and written relatively independently by two-person teams, our joint, sixth paper attempts to 'stand back'. In sum, we collaboratively seek to critically analyse and draw some conclusions about what might be common or different about the diverse approaches to learning about being drier, drawn from four very different land use contexts, in the same Basin, across three different Australian states.

In this first paper we undertake a brief review of the literature related to the background of water in the southern Basin, and of the literature related to adult and community learning about water. We also describe the overall method of the project, in order to set up the context for the four, site-specific case studies that follow. These 'site' papers are presented in terms of their perceived positions in the broad Basin or water catchment. The first site paper, *Water, weeds and autumn leaves: learning to be drier in the Alpine region* (Foley & Grace 2009) examines water-related learning issues in the Victorian Alpine region, particularly from the perspective of diverse community frames of reference (Bekhout, Hertin & Gann 2006). In this alpine 'water harvesting' area, the learning has to do with the many impacts of drying, aside from less snow and water runoff, particularly to do with wildfires, weeds, conservation and tourism.

The second site paper, *Bearing the risk: learning to be drier mid-river* (Golding & Angwin 2009) looks at water-related learning issues in a site centred on the Hay Shire, in the western Riverina of New South Wales. In this site, water from the Murrumbidgee and Lachlan Rivers had, until ten years ago, been critically important in developing new crops and industries for irrigation on the riverine floodplain, in an otherwise very dry natural environment. With progressively lower water allocation percentages in the past decade after a decade of drought, climate change (or possibly both), there is evidence that the options, resources and opportunities for learning to adapt to and bear the risks of further drying in this site, are becoming very limited.

The third site paper, *Learning to be drier: a case study of adult and community learning in the Australian Riverland* (Brown & Schulz 2009), is based in the intensively irrigated Murray River in the South Australian Riverland around Renmark. It identifies a number of forms of new learning: to produce, to be efficient, to survive, to live with uncertainty, to be sustainable and to share. It provides evidence that the people and communities in this site, who are learning to live

with the effects of climate change and less water, are likely to be the forefront of learning to be drier. This and the previous paper raise important issues about how to learn to balance water use equitably in the Basin, by taking account of other uses and users, including the environment, both upstream and downstream.

The fourth site paper, *Learning to be drier in dryland country* (Smith & Campbell 2009) is focused on the modes of learning and particular strategies which people in a 'dryland' site in the northern Wimmera and Southern Mallee use to gain information about living with less water. Unlike the other three sites that have direct access to water from permanent rivers, this dryland area has always had only limited water for stock and domestic purposes via channels, aside from seasonal and relatively low rainfall for 'broad acre' cropping. On 13 October 2009, *The Age* in Melbourne reported, on its front page, that the region will have its severe water restrictions relaxed from level 4 to level 1, courtesy of water savings from 'the nearly 9000-kilometre Wimmera-Mallee irrigation pipeline' (p.1).

Our common presuppositions

Our first, important and common presupposition is that adult, vocational and community education and training institutions and programs comprise only a small sub-set of all learning. In rural and regional areas, the proportion of adults (particularly older adults) who access such institutions and programs, in the small number of places that they exist, is known to be relatively low. Golding, Brown and Foley (2008) reviewed the breadth and importance of informal learning. They concluded that it was important to conduct and value research into adult and community learning in all its forms, well beyond those legitimised by neo-liberal discourses restricted to standardised and government-accredited 'formal' learning. Specifically, Golding Brown and Foley (2008: 52) pointed to the value of examining learning as it occurs 'in particular times, places, communities, relationships and situations'. They agreed with Colley,

Hodkinson and Malcolm (2000), that the task of policy and practice is not to see informal and formal attributes of learning as somehow separate.

All learning situations and sites examined in this *Learning to be drier* research were therefore anticipated to ‘contain elements of in/formality that are interrelated in different ways in different learning situations’ (Golding Brown & Foley 2008: 52). We anticipated that all members of communities in the four sites would be learning, lifelong and lifewide, through experience, by doing, through the media (including the internet), as well through their social, family, work and community networks. In effect, they learn by what they do, read, see and hear. What we did not know, and sought to examine, was how adults learned, made sense of, and adapted to the recent and significant changes towards becoming drier in the past decade. Our interest, therefore, went well beyond the so-called ‘formal’ education delivered and directed by institutions. In all four, relatively small rural communities in which we collected data, post-compulsory education and training institutions including technical and further education (TAFE) and adult and community education (ACE) had a limited presence.

Our interest in the four articles in this special volume is essentially about the modes of learning about living with less water in four highly water-dependent communities in the southern Murray-Darling Basin. We deliberately chose, in our method, not to make presuppositions about causality: about whether the most recent decade is indeed an unprecedented drought, climate change or a combination of both. Rather, we started with the undeniable reality that much of Australia’s southern inland ‘food bowl’ is ‘on its knees’ and being forced to adapt to be significantly drier, as a consequence of a combination of historically low rainfall and runoff in the past decade, combined with a significantly over-allocated and diminishing water resource. Our interviews therefore sought to discover what a diverse range of adults

know, learn and understand about the phenomenon of drying, with researcher assumptions of causality aside, *in order to* theorize the learning that is occurring. In effect, we took a constructivist (Vygotsky in Kozulin 2003) and situated view of learning (Lave & Wenger 1991). We presupposed that there is no right way of learning, knowing about or understanding this phenomenon.

Our method presupposed that adult learning would and should take many forms beyond accredited education and vocational training, particularly in the community. We also assumed, in our site selection, that what people need to know and learn would vary with their location, particularly by their position in the catchment. We deliberately steered away from naming and privileging learning on the basis of its formality (informal, non-formal or formal learning). We acknowledge that our study was conducted in rapidly changing and tightly inter-related physical and community environments. Conceptually and practically, we anticipated that people and organisations were being forced, albeit in different ways, to quickly adjust their lifelong knowledge and assumptions about water with increasingly limited adaptive options. Most were likely to be struggling for solutions to local and regional water shortages, without necessarily understanding, acknowledging or accepting the risks, likelihood or consequences that this might not be a drought, and particularly that the drying might be causally related to climate change and global warming.

Finally and importantly, we made no *a priori* assumptions about causality with our informants. In our field research, we deliberately and consistently used the terms 'drier', 'dryness' and 'drying' to avoid presuppositions about causality. While there is no debate that the southern Basin had dried out, particularly in the past decade, there is debate about causality. At one extreme, the term 'drought', while descriptive of the situation being experienced, has connotations associated with a natural aberration. At the other extreme, terms such

as 'global warming' and 'climate change' presuppose warming and drying associated with human impact, a view that is not universally accepted in the Basin.

Methodology

Our case study approach

Our researchers and teams shared an interest in the learning taking place for adults in the four different sites. In our preliminary discussions we decided that a case study approach would be most appropriate, as our basic intention was to seek to describe and develop an understanding of the setting and the learning, rather than for the research to be an active agent in evaluating or changing anything. Stake (2000: 437) called this approach an *intrinsic case study*, as 'it is undertaken because, first and last, the researcher wants better understanding of this particular case'.

We developed case studies of each of the four settings, gathering data to describe the experiences of the stakeholders and illuminate the approaches to learning. The perspectives of a range of people were sought. The purpose of the research was two-fold. Firstly, we explored the structures, relationships and content of the experiences and the people involved. This entailed engagement of the interpretive categories of the social, educational and professional values, beliefs and attitudes of the main participants. Secondly, we wished to study, in particular, how the participants integrated their learning about water into their everyday life.

Since this represented an interpretive study that was 'bounded' in both time and space, we identified the case study as the most appropriate methodology for its capacity to accommodate the complexity of this situation, as it actively engages the changing dynamics of the settings and its social aspects (Campbell 2000: 80). Additionally, we recognized the validity and compatibility, in this project, of Stake's assertion (Bryman 2001: 55) that '[t]he utility of

case research to practitioners and policy makers is in its extension of experience'; and that case studies centre on '... research on a single case with a view to revealing important features about its nature'.

Each setting or site investigated was a 'bounded system' in a number of ways. From the physical perspective, it was located as a dedicated area and described by the specificity of the water production or use in the area and its position in the water Basin or catchment. One site, in the Alpine area of Victoria, mainly involved water harvesting. Two sites, in mid-river New South Wales and on the lower river in South Australia, involved irrigation where river flow was highly regulated and perennial. In the dryland site in north-western Victoria, local stream flow was minimal and ephemeral. Each site was also bounded in that we collected information over a specific period (April–July 2009)—a snapshot in time. The research methodology needed to be sensitive to the constraints and opportunities that presented within the research project. Stake (2000) discusses how researchers '... aim the inquiry toward understanding what is important about that case within its own world ...' and describes the development of the interpretations of issues and contexts as '*thick descriptions*' (Stake 2000: 439).

We have reflected on the data, providing our interpretation of the learning of the participants within the context of each individual site. Through this we seek to '... describe the cases in sufficient descriptive narrative so that readers can vicariously experience these happenings and draw conclusions' (Stake 2000: 439).

Limitations and ethical considerations

All four case study papers involve similar limitations. We were limited by a very modest research budget to four sites in different parts of the southern Murray-Darling Basin. All sites were pragmatically accessible to Victorian-based researchers. Recent national research had identified the southern Basin as already relatively dry and more

likely to be subject to future drying associated with predicted climate change. The number of people we were able to interview in each site, along with the number of interviewee categories we deliberately selected, was similarly limited by time and expense of transcription. It was not possible to randomise or objectively select interviewees within categories. Rather, the potential interviewees were identified, contacted and selected for interview on the basis of advice, typically by phone, internet or email, from a range of key informants, to try and cover a diverse range of water-dependent stakeholders and viewpoints.

Consistent with our research ethics approvals from both our universities, we are restricted in our reporting to ensure that individuals are not named or identified, so that their confidentiality is respected. In some cases, because we are reporting on data collected in very small communities, we have therefore been unable to identify some organisations, place names or informant roles.

Site selection and our interest in these sites

Our interest was in how adults learn in order to adapt to changes in water availability exacerbated by recent prolonged drought and postulated climate change (Prime Minister's Science, Engineering and Innovation Council-PMSEIC 2007), arguably related to global warming in four rural, inland communities in the southern Murray Darling Basin. We selected four discrete regions and communities (which we call sites) in three Australian states that we describe in our individual papers as Alpine (North-east, Victoria), Mid-River (Western Riverina, New South Wales), Lower River (Riverland, South Australia) and Dryland (Wimmera/Mallee, Victoria). All four sites shown in Figure 1 are in the southern portion of a Basin widely recognised as 'Australia's food-bowl' (PMSEIC 2007: 3). Communities in the lower and dryer parts of the Basin arguably 'have a lower capacity to adapt', and are therefore most 'at risk (PMSEIC 2007: 3).



Figure 1 Sites in south-eastern Australia within the ‘Learning to be drier’ research

In each of these sites, shown in Figure 1 to be centred on the rural towns of Mount Beauty, Hay, Renmark and Birchip respectively (but inclusive, in each site, of several nearby populated localities), we anticipated that livelihoods and communities would be highly dependent on water in different forms for different purposes in different parts of the catchments. This dependency ranges from snow, rainfall, stream flow and water storage towards the top of the catchments, to rivers, irrigation channels, pipelines and groundwater aquifers in the lower and dryer riverine catchments, to highly seasonal rainfall in dryland cropping and grazing areas. In all parts of

the same catchments, there are significant environmental assets that are also dependent on the same limited water. The southern Murray-Darling Basin, according to some commentators, was 'virtually out of water' by 2008 (Young & McColl 2008: 9). They noted that ...

Many wetlands have already been closed and the level of Lake Alexandrina and Lake Albert [at the Murray Mouth] is already below sea level. ... It may not be possible to keep all environmental assets and all irrigation systems going. Parts may have to be abandoned or changed forever.

Our presupposition is that knowledge of how and what adults learn about deciding what to change, what to save and what to lose, is most likely to be found in these water and climate-sensitive communities. We regard learning about the management, conservation, use and availability of water, as the environment becomes drier and warmer in these water-sensitive contexts, as critically important and under-researched issues in inland, riverine Australian communities. These issues are also important for capital city and regional communities to learn about and from. Adelaide and large areas of South Australia (as far Kimba, several hundred kilometres west of the Murray, that it pipes its water from) already draws most of its (increasingly saline) water from the Murray-Darling Basin. Meantime, Melbourne is pinning some of its hopes on future water by tapping into the southern part of the same Basin, via a new (and controversial) 'north-south' pipeline. The plan is to take water from the already stressed Goulburn River, on the assumption of water savings through future, improved irrigation efficiencies. This new pipeline comes a year after the cities of Ballarat and Bendigo in regional Victoria were seen to be 'saved' by a similar 'Goldfields' pipeline.

Our interests included the many mechanisms for the 'learning to be drier' that occur related to water and its availability, through work as well as through community and family networks. We anticipate that this knowledge about learning will be critically important

to government policy makers, as well as to the many community stakeholders whose livelihoods are highly dependent on water, and subject to significant demographic and structural changes in the coming decades. The urgency of understanding this learning is emphasised by climate change research (PMSEIC 2007), that predicts changes likely to further affect atmospheric, evapo-transpiration, catchment, groundwater and community balance across the Basin. Like PMSEIC (2007: 5), we understand that discussions and research about climate change have multiple dimensions: *global*; *mitigation* to reduce sources of atmospheric emissions or increase absorption, as well as *adaptation* to changes in climate. The focus in our research in Basin communities already under severe stress, is on adaptation. While our interest in this suite of papers is in how adults learn to adapt, ‘live, ... do our business [and] protect and sustain our ecosystems’ in the Basin (PMSEIC 2007: 5), we acknowledged that parallel learning and urgent action needs to occur with global mitigation, since ‘global greenhouse emissions will continue to drive climate change across Australia for the foreseeable future’ (PMSEIC 2007: 11).

Context for the research

While Australia generally has a climate-sensitive economy (PMSEIC 2007: 2), our interest was in framing adult learning in the *southern* part of the Basin, where water and climate-dependent agriculture and associated ‘downstream’ industries is most intensive, and where population densities are highest. The best available, recent climate projections in the southern part of the Basin, based on a range of climate modelling and sources, are consistent (PMSEIC 2007; CSIRO 2007; Hennessy, Fawcett, Kirono et al. 2008). They suggest: significant annual warming; increased diurnal temperature range (more hot days, more warm nights, less frosts); less precipitation (rainfall runoffs, stream flow and snow); increased drought

occurrence and severity, and substantial increase in fire weather risk, including more frequent and severe bushfires. In brief, the CSIRO (2007: 4) predicts that the future climate in the 'Lower Murray-Darling Catchment is likely to be warmer and drier [with increased] evaporation, heat waves, extreme winds and fire risk', placing 'human life, property and natural ecosystems at increased risk (CSIRO 2007: 5). Unsurprisingly, the CSIRO predictions are also of significantly less average annual stream flows for all of the main permanent river catchments we were researching (Lachlan and Murrumbidgee in the Hay Shire; upper Murray tributaries in the Victorian Alps; Murray-Darling Basin in Renmark).

The case for concern about drying

The data were collected in mid 2009 in the context of severe (and worsening) water shortages, associated with harsh and prolonged (1997–2009) 'drought' and predictions of climate changes, specifically in the decades ahead. The four sites selected for intensive study deliberately spanned three states (Victoria, South Australia and New South Wales) in the southern Basin, guided by CSIRO (2008) findings about where the relative level of surface water use is already very high, and where climate change is most affecting the reliability of water in the Murray-Darling Basin.

Our original research proposal coincided with the release of the *Water availability in the Murray-Darling Basin* (CSIRO) report in October 2008. This report revealed that by that date, two thirds of Australia was drought-declared and the livelihoods and futures of many farming families were being threatened by very small and diminishing water allocations over much of the southern Murray-Darling Basin in 2008/9, as the Basin total flow was reduced by 61 per cent (CSIRO 2008).

The *Climate change in Australia report* (CCA 2007) had already identified the definite severity, likely urgency and possible future risks

associated with the problem of drying in the Basin. The necessary learning and understanding from the typically complex, technical reports, that consistently point towards increase in atmospheric carbon, global warming and climate change as being implicated, have taken some time to be recognized. While the presenting problem is significantly less rainfall and river flows in the southern Basin over the past decade, many older residents remain sceptical that this is anything other than a protracted drought, based on their lifetime of experience of previous sequences of both severe and prolonged droughts and floods. It is easier to optimistically assume that things will return to normal, than to accept that the changes might be permanent, and particularly to accept, pessimistically, that things may get progressively worse. Mackinnon (2007: 86) concluded that while ‘We have continued to build our cities and our agriculture with a vast cultural amnesia’. However:

... [o]ptimism is not enough to counter the relentless effects of drought and the failure of the River [Murray] to meet our needs. We forget our past at our peril: we mortgage our future to amnesia. (p.87)

Whatever members of the public or experts read, no one is able to compute *for themselves* the risks and probabilities of change coming out of the different and very sophisticated climate change models. The best anyone can do is read widely, understand the drying of the Basin as a complex problem with underlying uncertainties, and make a personal decision about the consequences of accepting the probability of different levels of future risk. As a consequence, the likely, though uncertain consequences of gradual climate change on the Basin have taken much longer to be understood, recognized or accepted. The possible causes (and solutions) have several possibilities, that depend on assumptions and confidence in the climate modelling, and that are used to extrapolate from recent observable changes to likely future risks.

It is important to note despite our concern, that we are not wanting to contribute to what Hulme (2007: 5) calls the ‘contemporary discourse of fear about future climate change’ or global warming as global catastrophe. We wish to avoid blaming people in the Basin for not seeing this change coming and to anticipate its cascading, ‘downstream’ effects. In some ways, both irrigators and wetlands in the areas we have studied are somewhat analogous to ‘canaries in the mine’ in terms of their direct sensitivity to changed climatic, stream flow and water environments. Like Hulme (2007: 13), we acknowledge that three trends have combined to heighten public recognition of the likelihood of anthropogenic (human-induced) global climate change: ‘a material change in environmental conditions, a heightened ecological consciousness affecting public values, and the growing institution managerialism of capitalist economies’.

We also acknowledge that for the first time in history, climate and catchment scientists have been able to analyse data and create complex, multivariate ‘models’ to make pronouncements and predictions about the likely climatic future, decades ahead, based on an increasing recognition of global connectedness, ‘complete with uncertainty ranges, tipping points and probabilities’ (Hulme 2007: 13). This has been achieved by joining a series of previously unconnected ‘dots’, to a point that there is now recognition of a likely ‘link’, for example, between carbon emissions in faraway nations like China, and the amount of water available to Adelaide from the lower Murray River. In this sense, as Boia (2005, cited in Hulme 2007: 13) put it, ‘battles over climate change occur as much in the cultural and individual imagination as in the atmospheric spaces in which physical climates are formed.’

Riding out the drought or adjusting to the risk?

The most optimistic scenario is that the southern Murray-Darling Basin is experiencing a natural but severe, temporary departure

from stable, long-term, average weather conditions (particularly rainfall and temperature): in effect that we have a series of unusually protracted droughts. Governments in Australia had tended, until very recently, to provide ‘drought relief’ (as with flood relief) in the form of financial assistance, to tide farmers over the very dry times seen to be associated with normal and recurrent droughts (and floods). In more recent times, financial support has been for ‘exceptional circumstances’ (widely referred to as EC¹), again on the assumption that these are exceptionally dry departures from the long-term norms. The Productivity Commission (2008), in its recent review, concluded that the existing EC ‘trigger’ of a one in 20–25 year event ‘based on historical records ... is not appropriate under a changing climate’ (p.1).

In the case of both previous drought declarations and Exceptional Circumstances (EC) cases, the government has previously accepted the risk. However it is now likely to shift the EC ‘goalposts’, as exceptionally hot years and exceptionally low rainfall years are now occurring twice as often and over twice the area in all regions. Very recently, there has been a move by governments towards reframing the problem and shifting the risks to water users. Part of this shift towards water users ‘bearing the risk’, incorporated within the mid-river paper title (Golding & Angwin 2009), has involved renaming ‘drought relief’ workers and programs as ‘rural adjustment’ workers. This new term, ‘rural adjustment’, recognizes the perceived value to governments of encouraging farmers to accept the risk and adjust to future climatic likelihood or possibilities, by restructuring, retraining and reskilling, and for some, getting out of the industry and relocating.

Scepticism about climate change (and particularly the wisdom of a global Emissions Trading Scheme [ETS] to address it were front page,

1 The current exceptional circumstances (EC) standard is of a one in 20–25 year event (Productivity Commission 2008, p.1).

political issues in late 2009, with the approaching Copenhagen round of talks. Nevertheless some state governments, and the national government in Australia were committed to build understandings of climate change, as well as to develop the appropriate technologies Australia would need for a less carbon and rainfall-dependent future. It was therefore considered timely to undertake strategic research to identify what role adult learning plays in preparing and adjusting workers and enterprises in the regions and towns most directly affected, for the likelihood or reality of the changing situation and its associated risks.

Method

Research Questions

We framed our research around three broad research questions.

1. How and what do adults learn, formally and informally, in response to changes in water availability in four Australian non-metropolitan communities in the Murray Darling Basin?
2. How is this learning experienced and responded to by different stakeholders (from the perspectives of education & training organisations, water authorities & land managers, farming and other enterprises, community organisations and individuals)?
3. How are these stakeholders learning to respond in ways that are sustainable in the four different water environments where the level of surface water use is already relatively high?

Site selection

After a comprehensive literature review of water-related learning issues, particularly in the southern Murray-Darling Basin, several towns were selected in each of four regions that were identified as being highly dependent on surface water in different ways.

- An *alpine* area in Victoria, highly dependent on snow and melt water for water harvesting, agriculture and forestry, hydroelectric power, snow skiing and nature-based tourism.
- A *mid-river* site in the Western Riverina in New South Wales, dependent on irrigation from the west-flowing Murrumbidgee and Lachlan rivers and aquifers for broad acre crops, including rice and cotton as well as vegetable crops.
- A *lower river* site in the Riverland in South Australia, mainly dependent on irrigation water from the lower Murray (and also Darling River), mainly for horticulture.
- A *dryland* area of the northern Wimmera and Southern Mallee in Victoria, highly dependent on local rainfall, other than the limited stock and domestic channel/pipeline systems, for cropping and sheep farming.

Some characteristics of these selected sites, previously identified in Figure 1, are summarised in Table 1.

Table 1: Some characteristics of the four sites

Sites & Teams	River Catchments	States	Regions	Main Towns (ARIA+)	Climate predictions
Alpine Foley & Grace	Kiewa & Ovens	Victoria	Alpine/ North East	Mt Beauty (2.44) & Bright	Warmer Drier
Mid-river Golding & Angwin	Murrumbidgee & Lachlan	NSW	Western Riverina	Hay (5.49) & Booligal	Warmer Drier
Lower river Brown & Schulz	Murray & Darling	South Australia	Riverland	Renmark (4.18)	Warmer Drier
Dryland Smith & Campbell	Richardson	Victoria	Wimmera/ Mallee	Birchip (4.87) & Donald	Warmer Drier

ARIA+ = Accessibility Remoteness Index of Australia; higher values indicate increased remoteness and decreased accessibility to services.

Site visits and interviews

The main purpose of the first, reconnaissance visit to each site, was that the two-person teams should come away having made contact

with the key water-related stakeholders in the categories referred to in Research Question 2 (above). Also, they should have gleaned a comprehensive overview of the main sources, uses and users of water in the site; of where the water that is consumed is collected, and which government and other organisations were primarily responsible for its management, storage and distribution. The intention was to confidently return to the site several weeks later and conduct audio-taped, focus group interviews: with post-compulsory education and training organisations; water authorities and public land managers; farmers; businesses directly or indirectly dependent on water as well as community organisations.

University research ethics approval was obtained for the interviews on the return visit. These audio-taped, focus group interviews varied in length between approximately fifteen minutes and one hour each. They resulted in a total of approximately 22 hours of digital recordings across four sites from 37 fully transcribed interviews, amounting to 442 pages of transcript data from a total of approximately 150 informants. In addition, several telephone interviews were undertaken with participants who were unavailable. Some other on-site reconnaissance and interviews included note taking but no audio-recording.

The interview questions focused on: what informants already knew about water origins, use and availability; how they learned about changes in water use and availability as well as how informants and their organisations were adapting to these changes. In the case of those providing education services, a question was asked about how their course offerings had changed. The interviewees were specifically asked about:

- where their water comes from
- the demand and usage of water in the area
- the water availability in this area

- how they found out about changes over the past five years to water usage and availability
- how they were adapting to changes in water usage and availability
- to give advice as to how learning to adapt to these changes might be improved.

Literature review

A relatively small amount of research has been undertaken in this specific research field to date, as identified in the literature examined and cited in our review below. This is surprising, given that Australians are ‘Living on the driest inhabited continent on earth’ (Potter & McKenzie 2007: 1), and arguably subject to either ‘the worst drought in a thousand years’ as part of a ‘natural cycle’, ‘a sign of global warming’ (p.1), or a combination of both. It is all the more surprising, given that ‘[n]inety-five per cent of the river length of the Murray-Darling Basin is degraded’ (Gell 2007: 23), and that ‘water removal, largely for an economically significant irrigation industry, now uses up to 90 per cent of the river’s divertible flow’ (p.23).

With some exceptions, there is a lack of significant and critical, scholarly engagement with the issues that are the subject of our research questions as they relate to the way Australian communities are learning about changes in drying. McKay (2007: 96) identifies that while ‘community-driven solutions to water scarcity’ are desirable, because of entrenched ‘individual freedoms’ and a lack of a shared ethic of resource management in past water management policies, many rural communities have not been ‘accustomed to thinking in a catchment context’ (p.96). McKay (2007: 101) identifies the need for the community ‘to understand the delicate balance of the water environment’, and a particular need for ‘community education’, though without citation or evidence. Somerville’s (2007) research into ‘place literacies’ comes closest to some of the theoretical and methodological underpinnings in our own series of place-based

narratives, which we have collected very recently and *in situ*, in rapidly changing ecosocial circumstances. Somerville (2007: 153) asks what she regards as urgent questions: ‘How can places teach us about water?’ and ‘How can we incorporate the pedagogical possibilities ... to ensure the protection of people and ecosystems?’ Somerville proposes a new ‘critical place pedagogy’ framework for learning in the Murray-Darling Basin that:

... is necessarily embodied and local; our relationship to place is communicated in stories and other representations; place learning involves a contact zone of contested place stories.
.... This new theory of place literacy brings into question the epistemologies and ontologies of print literacy and proposes different pedagogies of place literacy learning.

Traditional learning about climate change

There is evidence that Indigenous people in Australia and elsewhere (eg Gyampoh, Amisah, Idinoba & Nkem 2009, from Ghana; Somerville 2007, from Australia) have learned to solve problems to do with climate change and variability in areas dependent on rain-fed rivers, through experience and knowledge passed on orally from generation to generation. While Indigenous Australians have previously adapted to and coped with climate change involving both significant wetting and drying in relatively recent geological time frames in their 60,000 plus years in Australia, what has changed is that we are now dealing with a ‘climate of our own making’ (CSIRO 2007: 1), that is being transformed in ways that are arguably more rapid and unprecedented than throughout much of human history.

We also tend to forget we are living in recently and radically changed water catchments. While non-Indigenous occupation in Australia in the Basin under study is less than 200 years, this time frame has been sufficient in these ‘climate-sensitive’ agricultural areas (Bass & Ramasamy 2008) to develop some ‘rules of thumb’ about the likely duration and intensity of floods and droughts, much of which has

been transferred to the current generations in somewhat similar ways. While the most recent decade of drying and warming, as measured by rainfall and extreme temperatures, is longer and more severe than most older residents can remember, some people we interviewed drew attention to photographs indicative of river levels lower (or higher) than those recently recorded. What these photographs show are rivers before they were dammed by reservoirs and weirs, that were deliberately put in to hold back floodwaters and to provide water for agriculture during dry times of peak water use, usually during summer.

Learning to adapt in climate-sensitive locations

Peter Holmgren's Foreword in Bass and Ramasamy's (2008: iii) findings about necessary, community-based adaptations to climate change in Bangladesh appear to be highly relevant to the southern Murray-Darling Basin. Holmgren notes the '... imperative to identify and institutionalise mechanisms that enable the most vulnerable farmers and local communities to cope with climate change impacts'. He stresses that 'Awareness raising and capacity building processes are urgently needed at all levels that will support long-term learning processes', and that 'Decentralized programs seem most appropriate to remote local adaptation within the framework of coherent national policies'. In addition, he argues that '... immediate action is needed to manage existing and future risks within the framework of broader understanding on the most likely impacts of climate change.'

Young and McColl (2008: 3) would suggest that such adaptation and actions to minimize the negative consequences in Australia is some way off, since a coherent national water and climate change policy is not yet in place. They argue that 'The causes of the Murray-Darling Basin's problems stem from a flawed [water] allocation regime', and that the way to 'fix the Basin's problems' is to 'put a new system in place that is designed to cope with whatever climatic conditions the future brings.' (p.4). This would involve replacing 'the current [water]

entitlement and allocation regime with a robust one that can be confidently explained as one that will work—no matter what climatic future arrives’, as well as implementing ‘the resultant change in a just and fair manner’ (p.4).

McKay (2007: 91) noted that:

The regulation of land and water use in each Australian state was founded on a legal implementation in the 1880s of a licence system for the allocation of water. The underlying principle of this regulation was unimpeded use for economic growth.

After a century of largely unregulated surface and groundwater water use, most areas of the Basin are ‘are approaching—or are beyond—sustainable extraction limits’ (McKay 2007: 95). Young and MColl (2008: 5) point to the urgent need for attention ‘in the southern Murray River System’. As a result of ‘the pattern of climatic events and water allocation decisions over the last two decades, they observed, at the time of writing in 2008, that ‘the southern system was virtually out of water and that a number of environmental assets may have to be abandoned, or accepted as changed forever’. They also identified a need for recognition of interconnectivity to manage the ‘entire system, surface and groundwater ... as a single interconnected system’, rather than, as at present, ‘... granting two or more people the opportunity to take the same water in the same year but at two or more different places ...’ (p.5).

Smit, Burton, Klein and Wandel (2000: 223) identify an ‘anatomy of adaptation to climate change and variability’ based upon three questions: ‘Adapt to what?’, ‘Who or what adapts?’ and ‘How does adaptation occur?’ In each of our study sites we anticipated that people we interviewed would answer each of these questions in somewhat different ways, depending very much on their answer to the first question. As Tol, Fankhauser and Smith (1998: 109) identified, in terms of adaptation to climate change,

... people will neither be dumb nor brilliant at adapting. They are likely to see the need for change, but may be constrained in their ability to adapt or in their comprehension of the permanence and direction of change.

The academic literature on adaptation to climate change and related concepts, as Berkhout, Hertinis and Gann (2006: 135) observed, is substantial, drawing on theoretical 'frames, methods and taxonomies borrowed from a range of disciplines including conservation ecology, welfare economics, and hazards and risk research'. Berkhout et al. (p.136) set out a framework for analysing adaptation, taking the perspective of the organisation based around the 'learning cycle' seen to occur within organisations based on case study interviews (in house building and water utilities companies in the United Kingdom). This 'circular' learning cycle is effectively based on learning by experience. It assumes an external signal is recognized and interpreted by an organisation, that 'experimentation and search' leads to 'knowledge articulation and codification' and to feedback and iteration. While Berkhout et al. (2006) found that '*direct* signals of climate change experienced in business activities and performance were rare and tended to be hard to interpret' (p.146), they anticipated that more direct climate feedbacks occurred in climate-sensitive sectors like agriculture.

Berkhout et al. (2006) identified four modes of likely adaptation (p.148): commercial, technological, financial as well as 'information and monitoring'. They also identified four alternative adaptation strategies (p.151): 'Wait and see', 'Risk assessment and options appraisal', 'Bearing and managing risks' and 'Sharing and shifting risks'. We anticipated all four modes of adaptation and adaptation strategies in our site-specific studies that follow, depending on whether informants perceived they were dealing with drought, the early signs of climate change, or both.

Looking ahead to the narrative themes in the papers that follow

This introductory paper deliberately sought not to draw early conclusions. Rather it sought to 'look ahead' to some of the underlying narratives we have heard, and in effect chosen to write about, from the many possible narratives. While each of the four team papers includes its own important and different site-specific conclusions from somewhat different theoretical perspectives, we have left the 'looking back' and drawing together to our joint *Wicked Learning: looking back on learning to be drier* in our final, collaborative paper (Golding, Brown, Foley, Smith et al. 2009).

The four case studies that follow rely deliberately and heavily on interviewee voice in narratives to tell their stories about drying as a learning phenomenon. The narratives seek to powerfully illustrate how adults in the basin learn to adapt and accommodate to live with less water, and how most long-term residents attempt to avoid breaking the intimate connection between the farm and rural town as their place of work, as a residence and as a family tradition. The narratives are also about the 'drought industry' and climate change advice; about whether the learning strategies and pedagogies of advisers are appropriate for farmers and local learning organisations to learn and teach from. While each study starts with a simple, physical pen pictures of the sites it leads to more complex and different narratives about the social changes associated with being dryer in each site. They provides evidence of how people, families, businesses and organisations across the Basin learn to cope with the changes, including the insidious nature of prolonged (and perhaps worsening) dryness. They incorporate narratives themes about learning to change (including learning about the likelihood and risks of climate change). Finally and importantly, they explore intricacy and interconnectedness between climate, water dependency and learning.

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Water, weeds and autumn leaves: Learning to be drier in the Alpine region

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Our paper explores how and what adults living and working in the Alpine region of Victoria understand and are learning about the changes to water availability, in a time when the response to water availability is subject to extensive debate and policy attention. Interviews for this study were conducted in the towns of Bright and Mount Beauty, with participants drawn from across the Alpine region. The interviews focused on what local stakeholders from the Alpine region understood about water availability in the region and how and what they had learned about living and working with climatic changes in their local area.

The findings of our study see that there was evidence of a strong understanding of the direct and indirect impact of climate change on participants' local community area. The study also sees evidence of learning through a community 'frames of reference' as outlined by Berkhout, Hertin and Dann et al.

Introduction

This paper seeks to gain a better understanding of how and what adults living and working in the Alpine region of Victoria understand and are learning about the changes to water availability, in a time when the response to water availability is subject to ‘extensive debate and policy attention... [yet] problems remain largely unresolved, and crucial policy measures... have yet to be implemented in practice’ (Quiggin 2008: 160).

The Alpine Shire is located about 300 kilometres north east of Melbourne, and 70 kilometres south of Albury / Wodonga. It is a regional community which comprises the three major townships of Bright, Mount Beauty and Myrtleford and is located in the Ovens and Kiewa Valleys. The region surrounds some of Victoria’s major ski resorts at Mount Hotham, and Falls Creek, with smaller snowfield attractions at Dinner Plain and Mount Buffalo. The region has a vibrant history, with agriculture, gold prospecting and the construction of the Kiewa hydro electric scheme which has played a role in creating a diverse mix of history, and culture. The shire region has a population of approximately 13,000 which swells during the tourist peak seasons. Water is an important part of a prosperous Alpine lifestyle, and is central to a flourishing tourist economy located around the ‘green’ aesthetic of the area, the ski season and the well known autumn leaves that capture the imagination of tourists each year who travel to Myrtleford and Bright simply to enjoy the colours.

According to the CSIRO, since the early 1970s, Australian droughts have become more severe as a result of warmer than average temperatures. Projections for increased temperatures and reduced annual rainfall are likely to further increase the risk of drought, predicted to increase by between 10% and 80% in the southern half of the state and by between 10% and 60% in the northern half by 2070 (State Government of Victoria 2008).

CSIRO estimates that by the year 2030, the catchments in Victoria that are located in the north–east and south–east may experience up to 30% reductions in runoff (State Government of Victoria, 2008). With the likelihood of higher temperatures there is an expectation of a shortening of the snow season in the Australian Alps with a higher proportion of precipitation falling as rain rather than snow. For the Alpine region, snow plays a critical role in storing winter precipitation and contributing to the seasonal runoff peak in late spring (Western et al. 2008). By 2020, a 10–40 per cent reduction in snow cover is predicted, resulting in decreased snow melt and runoff to downstream sites (Department of Climate Change 2008).

Along with the likelihood of a reduced snow season there is a predicted increase in the frequency of bushfires, which may result in short-term increases in stream flow, followed by longer-term reductions as forest regenerates. It is estimated that regrowth of vegetation following the 2003 Alpine fires will reduce flows to the River Murray by up to 700 gigalitres (GL) a year or 10% of mean annual flow, with the maximum reduction in flow expected to occur 20 to 25 years after the fire and ongoing impact continuing for another 80 to 100 years after that (State Government of Victoria 2008).

Design of the study

As with other papers in this special edition, a discussion of the methodology for the *Learning to be drier* project is outlined in the *Setting the Scene* paper. The present discussion will focus on some of the specific design elements of the research conducted in the Alpine site. The research was conducted in the Alpine shire region, with interviews conducted in the townships of Bright and Mount Beauty involving participants who travelled from across the shire. An initial reconnaissance visit was conducted in mid April, where we travelled to the Alpine region, allowing ourselves to be situated in

the region and experience its visual [beauty] along with introducing ourselves to local people and inviting them to participation in the project. We found on our reconnaissance visit that in most cases people were very interested in the project and extremely willing to be involved. Following the reconnaissance visit a second visit took place in late May for a period of 2 days. This allowed for a further Alpine experience in Mount Beauty, Bright and the surrounding area and a visit to Albury for an interview at the North East Water Corporation. The second visit involved conducting focus group interviews with all of the participants. The interviews were conducted with 5 separate stakeholder groups; these were adult educators, community members, which included people involved in the local fire brigade, local business owners, farmers, retired people, members of the University of the Third Age (U3A), interest groups and local authorities. The interviews focused on what local stakeholders understood about water availability in the region and how and what they had learned about living and working with climatic changes in their local area.

As with all of the papers involved in the *Learning to be drier* study, our paper is based on transcript data in the form of participant narratives taken from audio-recorded focus group interviews. The research method for our paper sees the collected interview data as personal narratives or stories, allowing the participants in the research to tell their own stories of how they learn about the changes in climatic conditions in the Alpine region in a way that is reflective of their own experiences and opinions, and representative of the diversity of people in the region. Using narrative as our method brings *life* through the spoken stories of real people living in the Alpine region, rather than our interpretation of their stories. In what follows under 'stories from the field' are narratives or pieces of exact transcribed data represented in four commonly occurring themes identified across the data. Many of the participants who informed this study spoke from multiple perspectives; for example, we interviewed

farmers who were involved in local shire and community groups along with local business owners who had a level of involvement in the tourism industry. As each interview progressed, participants moved between their various role identities with the result that, it was not possible to attach specific role identities to individual extracts from the transcripts.

Stories from the field

This research project set about to find out what people in the Alpine region are learning in response to changes in water availability. From the data in this study, we were able to identify some commonly occurring narrative themes as occurring across the participants' responses. These themes were seen as constructing common understandings of what people had learned about climatic changes in the Alpine region and what was impacting or had/is affecting them over the past several years around climate change. The narrative themes or markers were identified as occurring or fitting into four distinct themes, these themes were; Learning, Fire, Water and Tourism.

Learning

Learning about changes was the key sentiment behind our research. Adaptation to climate change is described in the literature as a process of adjusting to the impacts of climate change in such a way as to reduce the magnitude of the consequences experienced (Berkhout et al. 2006: 135; Preston and Jones 2006). Climate change adaptation is anticipated to occur at a number of levels: government policy (PMSEIC IWG 2007), business and organisational (Berkhout et al. 2006), community (DPERSP 2008), and individual (Blackadder 2005).

For adaptation to occur, certain conditions need to exist. Berkhout et al.(2006) argued that 'before change can be initiated, a signal

needs to be recognised as evidence of a novel situation, in response to which existing routines are inappropriate or ineffective' (p.138). Organisations tend to operate within established frames of reference, and resist conclusions that challenge these frames of reference 'often in the face of considerable counter-evidence' (p.138). This raises the question of whether the existing or foreseeable impacts of climate change in the Victorian Alpine region were such as to represent a 'novel situation' to which established water use routines would be seen as an inappropriate or ineffective response.

Certainly from the narratives, learning about dryness was a topic that participants were keen to discuss. When asked about where or how people learned to adapt to change conversations were broad ranging and clearly connected to the participants' backgrounds, livelihoods or where they were situated. One commonly occurring conversation particularly was around the need for community to be informed:

... I think we need to have across the community a conversation about the way in which we value water, not in dollars and cents but what all the elements of water gives us. Its only when we have an understanding at a community level of what we want water to deliver that we can get the highest value use for it.

They all use water and they all have access to water for one reason or another and to extract the wisest value use of that water the community needs to have a discussion about what we need them to achieve but also recognize that things are changing.

I think it is an education thing, I really do, I think people need to be much more aware of where the water actually comes from and what difference does it make if we do things ... like you say 'if I do this, is that going to make a difference?' ... and we don't know, so there's not enough research and there's not enough information out there, so you can't make a valued judgement.

People were also keen to discuss more formal education program availability not only in schools but more broadly in the community:

... I think to actually educate people about water usage and why and how and what happens to it, how they can have an impact on the environment one way or another if you do this or do that.

In addition to education programs developed for the community to learn about adaptation to change, some participants saw more practical hands-on water education strategies as an important way to educate people to help themselves in a practical sense. These strategies related to learning how to build water saving systems such as micro spray or micro drip systems:

... but for the people on town water supply where they are not actually taught how to put in water systems, like micro drips and micro sprays, it's usually just a blanket 'don't do this' ... in actual fact they could probably flood water a hose for an hour. If you actually had people taught how to use micro sprays they could probably use the same amount of water any time they liked... It might be just a lack of education for people on how to use the micro irrigation, it's very effective, it can even be effective on big scales. You never see anything coming out of the Water Authority at all about that.

Along with discussing water saving measures and education of the community around water saving strategies, there was a perhaps not so surprising feeling from some of the Mount Beauty participants that water was in abundance in the area because of the hydro-electric dams and their perceived relatively high rain fall compared to other parts of the region.

The local Water Authority, North East Water send out a pamphlet every now and then about saving water ... there was a bit about voluntary restrictions or whatever it was ... it doesn't work at our place, we have got a huge property and I have got a vineyard and a lot of town water goes on to that because I can. People don't seem to really seem to worry about water up here because we have got plenty. A good argument is that it goes down the stream to someone else, ultimately it all ends up at the mouth of the Murray which is silted up ... whether that should

be clear or not I don't know, there are arguments that it was originally silted up and then it was clear and now its silted up again, which is a cyclical thing. I think we should be reducing the amount of water, but it's very difficult to get people to do things voluntary.

The feeling down further in Bright was not as optimistic as up stream in Mount Beauty, where water availability is dependent on winter snow melt into the Ovens River:

... a lot of our water flows from the high country, it is collected up there and comes down to our river systems.

... our winter flows are our high flows where we are an unregulated system here in the Ovens so we rely heavily on the flow of water in the rivers and that is certainly our peak time... in terms of the water use for most of the people in our area there is no dam as such it is just relying on what's coming down the river. There is no real winter storage.

The difference in participants perception of water abundance and availability might be evidence of what Berkhout et al. (2006) suggested as community members from different locations establishing what he describes as a novel situation, that of a perceived 'abundance of water' in one community over the belief that a neighbouring community had less water.

Water

With forest catchments, national parks, and facilities such as Buffalo Dam, water harvesting is one of the main land uses in the Alpine shire. While there is abundant research suggesting that climate change will significantly reduce water availability in the Murray-Darling Basin overall, one major study (CSIRO 2008b) suggests that the direct impact of climate change on townships in the Victorian Alps is anticipated to be less severe than in other regions. Anticipated changes in snow levels, and winter precipitation and (Western et al, 2008) suggested decreased snow melt and runoff to downstream

sites by 2020 (Department of Climate Change 2008). Yet when one CSIRO study (2008b) modelled three different climate projections for the Victorian Alps in 2030, the impact range from a 'best estimate' projection of 'negligible impact' on surface water use, a 'wet extreme' projection in which water availability would be expected to increase slightly, and a 'dry extreme' projection in which water availability for the whole Ovens Region would be reduced by 45 percent. Under the 'dry extreme' model, the direct impact on water availability in Alpine townships such as Bright anticipated mild water restrictions in 62 percent of years, and severe restrictions in 21 percent of years (CSIRO 2008b, p.4). This once again raised the question of whether the existing or foreseeable impacts of climate change on Alpine communities were such as to represent a 'novel situation' to which established water use routines would be seen as an inappropriate or ineffective response (Berkhout et al.2006, p.138).

The fieldwork data suggests that this was the case. Clearly water was a significant point of discussion with the respondents. When asked about water availability and where water came from in the region all of the respondents were able to define where their water was sourced.

All our water comes from the sky, we don't have any ground water in our place, I live out in the country. If it doesn't rain, the ground water doesn't exist, the ground water dries up in late Spring, so we now have 60,000 litres of storage capacity and its not enough. It is, but if we had bushfires there wouldn't be enough water there. Without that sky water we are out of touch ... we tried to get some water but we go through so Murray Goulburn and you have to send in an application.

As far as Mt Beauty goes the water comes from up at Falls Creeks that's where it's captured, a lot of it is snow melt. What I know about it is that it is stored in those hydro dams or whatever they call them and then slowly released into the river. Our water is used for hydro and it gets used a few times on its way down the mountain which is pretty good I reckon.

Some participants had extensive understandings of where the town water was sourced:

... we have water catchment areas, there's one above Mt Beauty, one above Tawonga South I think another one in Tawonga South further down so there are three catchment areas as far as I know.

There's a specific amount of the hydro water must be kept for the town supply, North East Water has got a guaranteed supply based by Southern Hydro and that is written in stone luckily, even though we get restrictions we are actually guaranteed of that supply. Falls Creek has a guaranteed supply out the Irrigation Licence and Water Use Licence. So the snow making allocation, although that allocation is actually set up in the way of an irrigation, and because the water flows back into the dam it can then be used again, all they are doing is catching the snow so it recycles, but if they spray water below the dam so that it doesn't go back into that catchment to make snow below the race lines ... do you know how that works?

There was also awareness that the Alpine townships were better positioned in water availability than other parts of the region.

We're lucky because we have Rocky Valley Dam up top, we are a lot luckier than the Ovens Valley side because they don't have that retaining of water, so we have always had a running all year around with the river, whereas the Ovens ... we are a lot luckier than over the Ovens Valley that's for sure.

Certainly as indicated under the learning section, water seemed to hold a different value position depending on the location of the participant. For the community of Bright, the notion of Berkhout et al.(2006) frames of reference hold here. While for the Mount Beauty residents up stream have a frames of reference that sees water as abundant, Mount Beauty residents only 25 km down stream see water as this participant appropriately puts as:

... a real issue for our communities, particularly Bright because we rely so much on the flow of water coming down. Over the past few years in drought conditions the water flow has been fairly low.

Weeds: fire & environment

Hennessy et al. (2003: 17) projected climate change impacts on biodiversity within flora and fauna in the Alps. Williams et al. (2008) concluded that while Australian flora and fauna were resilient to the effects of infrequent fires, slow rates of post-fire regeneration raised concerns about the impact on biodiversity of more frequent or more severe fires resulting from climate change (p.806). In particular, Williams et al. reported that native Alpine bogs were found to experience significant invasions of exotic weeds such as willow after large fires, representing a significant threat to biodiversity that would require an effective control program (p.803).

When asked to explain about changes in the environment over the past 5 years participants under this theme discussed how fire was an ever present concern to the people of the Alpine region. Fire not only had a direct impact on the environment in terms of the loss of forests and the risk to life and property. Other concerns raised were around the impact of the 2003 fires on the region relating to weeds and the ongoing impact on the environment.

After the 2003 fires I think it was really dry and then around 2006 it was drought then as well and that's just the general knowledge. Again since then up on the high plains we haven't had too bad rainfall... after the 2003 fires there was a real concern about what was happening in the wetland in the high plains and that's generally the sphagnum wetland because we still had cattle grazing in 2003 which then stopped after the fires ... so they didn't let them up after the fires and then they stopped cattle grazing on the Alpine area.

We are still working on the bogs ... the other thing with the bogs, it's not the fires, but you have long term cattle grazing, you've got fox, horses and you've got the aqueducts and the roads and the trucks that have all impacted and taken water away out of these systems. Again no research has been done on the history of these wetland, because if you are talking about peat, has that

peat contracted over time and there is evidence that we are seeing now that there are a lot less in extent than they were and that's possibly through that climate change happening anyway ... the aqueducts and things like that and getting less into the system and more transpiration that will change the dynamics of those systems as well ... but we are not formally monitoring or researching some of those.

Some of the participants in the study particularly amongst the local authorities were involved with the implementation of environmental programs after the fires to assist with the eradication of weeds.

Green Core run 6 months program for youths aged 17–20 so we have had them doing a few projects to improve the water quality, mainly focusing on willow removal and blackberry removal and re-vegetation with needs, but they also do water quality testing as well. We do a number of projects, the major one being willow and blackberry removal along the Ovens river, so that's working with Parks Victoria and DSE and Catchment Management Authorities, so bringing all those resources together.

A fairly important issue up here [Bright] is improving and regaining our water quality and people see that as a big draw card for this area... because of the last fires the trees are under a great deal of stress because we had two fires in fairly close proximity and drought on top of that and the natives are really struggling.

The effects of fire were also impacting on the Alpine water quality, for the region according to this respondent that affected water usage and availability:

... during the fires we went to Stage 4 a couple of times but that was only because the soot and rubbish was coming down the water supply ... if you used the water you would put it through the system so they were trying to stop the people using the water so that ... they could clean it.

Other issues around fire in the region were the loss of not only indigenous trees but exotics as well:

We lost a hell of a lot, [trees] the fire came up over the dam area really fast and killed off a lot of the exotics and cypress and that sort of thing ... we had a big clear out so there are a lot less trees than there used to be. As soon as we plant them the deer wreck everything.

For the respondents in this theme, fire and its impact on the environment, personal safety, water quality and its overall impact on the aesthetic of the Alpine region was a hot topic, most particularly keeping in mind that the interviews took place in mid May and the Black Saturday bush fires were only 3 months prior on 7th February. These fires were dangerously close to Mount Beauty and Bright and threatened Mt Baw Baw, causing significant damage to the Lake Mountain and the Alpine Resort along with the Beechworth fires which burned through 31 thousand hectares.

Certainly there was a very strong connection from the participants in the study that the most significant impact on the region was through the risk of fire and its ultimate impact to the local community. This impact was not only seen through problems with post-fire regeneration on the biodiversity of the region, and the invasions of exotic weeds but also on the impact on the beauty of the region through direct fire damage. Participants in both Bright and Mount Beauty expressed concern about the risk of damage to the 'green' aesthetic of the Alpine area but also to the death of exotic mature trees in the arboretum reserves that drew visitors to the area.

Autumn leaves: tourism

Tourism is the major industry within this region, and the Alpine Region Tourism Board expressed the goal of increasing visitation to the High Country (ARTB 2008: 11). A CSIRO study to project the impact of climate change on natural snow conditions in Australia forecast reduced snow cover including a rise in the natural snowline with reduced or no snow cover on lower slopes, a reduction in the

duration of the annual ski season, and a reduction in the depth of snow (Hennessy et al. 2003). The report concluded that '[A]daptation to climate change will be necessary at all ski resorts' (p.37), with the proposed adaptive strategies including increased use of artificial snow-making. The projected changes to snow cover had clear implications for winter ski season tourism. The fieldwork revealed a high level of awareness and concern in Alpine communities of the potential impact of climate change on tourism, which could ultimately impact heavily on jobs and the economy of the region.

When asked about the affects of climate change on the Bright and Mount Beauty areas, the impact on the tourist industry was unmistakable. The changes in climate, water availability and the devastation through fire had all played its part on the way locals felt about the future of the tourist industry, and the future of the region.

...We have certainly seen some big impacts on some of our trees. We look at how we manage our key feature avenues...They [Autumn trees] are probably our biggest asset...They are what people come up here [Bright] for.

I guess the peak tourist time is spread out during the year, but winter a lot of people might stay in Bright or they pass through going up to the mountains. There's always a lot of people.

There are quite a few recreational opportunities; people use Bright as a base to go to the high country.

If you look at Bright we are a major tourist town and our major tourist time is summer which is when the river flows at its slowest so you have got like two competing demands there.

I guess the peak tourist time is spread out during the year, but winter a lot of people might stay in Bright or they pass through going up to the mountains. There's always a lot of people.

The impact on the tourist industry is as diverse and complex as the Alpine region itself. Certainly the tourist industry is the lifeblood of

the region. Tourism is not only related to snow falling to facilitate a good ski season, but it is also how much snow falls depends clearly on how much water is ultimately available not only to the immediate region but further down the Murray-Darling catchment.

Green trees, and green lawns are representative of what visitors to the region expect of Bright, Myrtleford and Mount Beauty. This is arguably why many people visit the region in summer, according to this participant strategies for keeping the ‘expectation’ of green for the tourists was high on the agenda:

...people like to see green, so we have in the past chosen a couple of key parks ... on being down at the river pool area where we get high numbers of people going down there and we maintain water onto those areas, but others we just don't water during the summer months.

Our Parks and Gardens guys also use water crystals when they are doing any planting and they are investigating using foam to put through the grass which acts as a wetting agent as well, so reducing the amount of times that we have to water. I guess being a tourist down there still has expectations that if people come up from Melbourne or other areas they like to see greenery and like to relax so there are still those expectations that we should water our key parks.

Maintaining tourist expectation is undoubtedly impacted by climate change through the maintenance of exotic trees for their autumn displays, through the maintenance of parks and forest regions for the tourists to walk and hike through. The risk of weed infestations, fire that can devastate appearance, of natural areas, that can kill exotic trees and leave ongoing weed and biodiversity issues are plainly significant climate change concerns for the region.

Discussion

Conversations with participants indicated that people in the Alpine region are aware of a range of impacts around climate change in their

community, and were identified as having a clear understanding of water availability in their local communities. There was some suggestion that levels of awareness and adaptation varied according to people's location in the region and their access to water resources. Essentially this meant that those who were situated higher up the catchment area understood water availability as being more abundant than those further down the river. A range of considerations beyond the direct impact of climate change may influence a community's ability or willingness to adapt or perhaps change their adaptations around what is seen to directly impact or affect the local community. Berkhout et al. (2006: 151) explored climate change adaptation as a learning process, identifying where the direct impacts of climate change were experienced there was a greater likelihood of adaptive responses being adopted. In contrast, where the experienced impact of climate change was indirect, there was a greater likelihood of a 'wait and see' response. In some cases, indirect impacts rendered climate change 'a hypothetical notion' rather than an 'everyday reality'; something of relevance to government policymaking rather than local business decisions (Berkhout et al. 2006: 147). Certainly the range of people's responses to learning to be drier involved issues relating to climate change that were in some cases indirect. These issues focused around fire and its impact on the local tourist industry and on the environment more broadly. The changes in climate, the reduction of water availability, the changes to snow cover and length of the snow season along with the destructive impact on the indigenous species of flora and the exotic deciduous species of the area was being felt by many of the participants in the study. The effect of this impact was related to the aesthetic [beauty] of the region and its *value* for the local tourist economy.

In the Australian literature, complexity, uncertainty, long timelines and interpretation by experts all emerged as themes. Key government reports on water availability, climate change and dryness explicitly acknowledged uncertainty around the impact of climate change in

general (CSIRO 2008a; PMSEIC IWG 2007: 17), and with specific reference to the impact on Alpine regions (CSIRO 2008b; Hennessey 2003). This complexity gave rise to a perceived need for information to be interpreted by experts as a key tool for adaptation planning (PMSEIC IWG 2007). The focus on complexity and uncertainty in some literature stood in contrast to other literature that showcased a variety of immediate and practical adaptation strategies adopted by farmers in response to the direct impact experienced from climate variability and dryness (Blackadder 2005).

Conclusion

The affects of climate change are likely to see the social fabric and social capital of rural and regional Australia threatening the viability of some regional communities (Hogan et al. 2008). Certainly for the community members involved in the study, there was evidence of a strong understanding of the direct impact and economic cost created through climate change on their local community area. What was also identified in the data was that the 'frames of reference' from where the participants were situated, that is their local communities, focused their understandings of climate change around the issues relating to the impact of climate change on their 'patch' of the Alpine region specifically. This is consistent with Hartz-Karp's (2007:5) observation that the impacts and effects of climate change tend to 'begin at the local level' where lobby groups and communities are 'doing it for themselves' before working toward a larger dialogue to determine initiatives that might best work at the state level. Hartz-Katp picks up on what Michael Booth and others (2006) have called 'practical wisdom', the experience, insight, understanding and local knowledge of 'ordinary people' learning about the challenge of climate change from their local focus. In this study the evidence points to what Berkhout et al. (2006: 151) categorises as 'handling and managing' risks. This was evidenced in the strategies identified, where local approaches were adopted around ongoing environmental projects and

through strategies to maintain tourist expectations, manage fire and weed damage while at the same time minimising water usage.

This study, and we borrow from the title of the Drought Policy Expert Review Social Panel (2008), *'It's about people'*, is most definitely about the local people that live and experience climate change from the reference point of the Alpine region, and more specifically those located up river and those located down river. Certainly the Alpine region is no doubt beautiful, diverse, vulnerable to and through fire and drought and cherished by local community members and visitors alike. What we have seen in this small glimpse is evidence of learning through a community 'frames of reference' Berkhout et al.(2006: 138) arguably situating their community learning outside of a more universal understanding of climate change to a more localised focus. What we would suggest from our small study is evidence of a community involved in the beginning stages of a constructivist learning approach to climate change, that is, using a local focus ...that 'assists [the community]...to examine the implications of climate change...in relation to a familiar, local context (Bardsley & Bardsley 2007: 332). This could be seen as the beginning of a stage of learning, understanding and managing change at the local level, in its initial stages and culminating or developing over time to a larger scale dialogue, as the process of learning broadens to determine the initiatives that might work best for the state (Hartz-Karp 2007).

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Bearing the risk: Learning to be drier mid-river

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This paper investigates learning related to the phenomena of drying over the past decade in the southern Murray-Darling Basin in Australia, as perceived in a mid-river site within the western Riverina of New South Wales, Australia. The insights from audio-recorded interviews, with a wide range of adults across the water-dependent community, mostly relate to the catchment of the Murrumbidgee River in the Shire of Hay. Our overarching theme is about how people are learning about, understanding and bearing the risks, of what is widely regarded as a prolonged drought. For some, the learning is about how to cope with less water in the Basin, and particularly from the river, as predicted in the climate change literature. Our narrative-based, empirical research registers the felt experience of those located, in situ, as a severe 'irrigation drought' extends into 2009. The paper dramatises the many obstacles to learning how to think and act differently, in difficult and rapidly changing ecosocial circumstances.

Introduction

Method

The study reported here is based on 167 pages of transcripts from fourteen audio-recorded, on-site, focus group interviews with of 32 water-related, adult stakeholders conducted in the Shire of Hay over two days in June 2009. These stakeholders included farmers, irrigators, water brokers and distributors, contractors and agricultural advisers, as well as representatives of town businesses, tourism organisations, local government, community-based organisations and education and training sectors. Most interviews were conducted in small groups, though some were conducted individually. One third of the interviewees were women. The interviews focused on what adults from diverse sections of this water-dependent community knew about the availability of water, and how and what they had learned about living and working with considerably less water in the past decade. Learning was taken in its broadest sense, from learning informally about water by doing, by trial and error and experience, through learning via the media, internet, work, family and business, to learning through formal education and training.

Most of the informants in this site were interviewed in Hay on the Murrumbidgee River, though interviews were also conducted in Deniliquin (on the Edwards River to the south), and Booligal (on the Lachlan River to the north). The interview visit was preceded by a two-day site reconnaissance visit in March 2009 and a one-day follow-up visit in September 2009. This site was selected to represent 'mid-river' New South Wales perspectives, in contrast to Alpine and dryland site perspectives in Victoria and lower river perspectives in South Australia. Further details regarding the method, its presuppositions about learning, and the associated suite of research projects are contained in the introductory paper *Learning to be drier* (Golding & Campbell 2009). In summary, four two-person project teams used similar methods to investigate aspects of learning in this and three other sites in the southern Murray Darling Basin. As in our

other sites we deliberately and consistently used the terms ‘drier’, ‘dryness’ and ‘drying’ in our communication with informants, rather than presuppose causality.

There is no debate that the southern Basin had dried out, particularly in the past decade, post 1998. There had been record low rainfall on site and record low inflows into the Murrumbidgee and Lachlan catchments, resulting in an unprecedented irrigation drought and extremely low or zero water allocations to farmers and irrigators in both catchments. There was, however, debate about causality. At one extreme the term ‘drought’, while descriptive of the situation being experienced within the site post 1998, had connotations associated with a natural aberration. At the other extreme, terms such as ‘global warming’ and ‘climate change’ presupposed change associated with human impact, a supposition that was far from accepted in this site in 2009.

Structure of the paper

We have chosen to restrict ourselves, in this mid-river site paper, to three main accounts amongst many possibilities. First, ‘About the community’ introduces a pen picture of the present-day community and the main water-dependent stakeholders. Next, ‘Learning about the risk’ takes readers deeper into the complex and rapidly changing risk of living with (and increasingly without) irrigation water. It also opens up aspects of the complex debate about learning about drying and its causes, impacts and possible solutions. Our intention is to illustrate the way in which learning about the present and the future in the site is tightly interconnected. Finally, ‘Impacts on learning communities’ looks at community impact and responses in the broad learning domain of being drier. In particular, we look how drying is already impacting on learning in the community in ways that arguably further destabilizes a community already at great risk. Our paper title, *Bearing the risk*, alludes to the combined Australian government decision, under the Australian Water Initiative, that water users

should now bear the risk of long-term reductions in water availability, including lower allocations and higher prices.

Acknowledgment of the difficulties

Lest we appear hard-hearted, we gratefully acknowledge the generosity, frankness and honesty of our informants. We are deeply concerned by the obvious extent of distress in these communities, faced by people at risk of losing their livelihood and way of life. On one level, we admired the widespread spirit of ‘defiant optimism’, identified also by DPRESP (2008: 14) in other rural communities across Australia affected by long term drying. On another level, however, this same spirit was accompanied by a sense of unreality, exacerbated by a lack of coherent information, knowledge of or denial of interconnectedness in a Basin with finite and diminishing water resources. There appeared to be very few opportunities and an understandable reluctance for adults in the community to come together and learn, even vocationally. This is one of many communities in the Basin that appear to be mentally and physically exhausted from a succession of difficult and dry seasons.

About the community

Hay, Hell and Booligal¹ and water
“Just now there is a howling drought
That pretty near has starved us out—
It never seems to rain at all.

The distinctive feature as you approach towns like Hay in the southern Riverina area is the stark contrast between the relatively fertile, naturally tree-lined watercourses trending east to west, and the almost complete lack of vegetation other than low saltbush on the extensive plains between them. This contrast is evident on the aptly

1 *Hay, Hell and Booligal* by A.B. “Banjo” Patterson, was published in *The Bulletin* in 1896, when Booligal, after years of drought, had suffered a rabbit plague followed by a grasshopper plague.

named One Tree Plain, between Hay and the tiny and isolated hamlet of Booligal on the Lachlan River towards the north of the Shire of Hay.

An even more stark contrast is the ubiquitous green lawns and nature strips with the public and private sprinklers still going strong. One of our interviewees explained that other visitors to the town were, like us, very surprised:

We do get a lot of travellers ... that pull up and they enjoy the environment we have created. But also they are quite upset that we can [water]. We are on the same river and [they think] “Why can we do this and they can’t?” To be honest, I don’t understand why. ... I think people are happy if they can turn their tap on and water comes out then that’s all they are concerned about. ... You can imagine if the powers to be said “There’s one day a week you can water” or “There’s no water”, then it would be like an alien landing for some people. It’s unrealistic for them to think that there could be a big problem.

The local defence that watering nature strips with ‘raw’ unfiltered water was ‘for sanity’ and for maintaining town pride for visitors was widespread. As one informant put it:

No matter how much the charge is for the raw water... my whole yard will have to die before I have my nature strip die. I consider it part of my yard and I couldn’t think of anything worse than to walk out the front yard and see your nice little green patch and then burrs and weed and dirt would be depressing, I think.

Hay Shire is huge: 11,348km (sq) with a population at the 2006 census of around 3,500, that is likely to have declined significantly since. With a long-term average annual rainfall of only 325 mm, without the water from the Murrumbidgee River, the area is effectively semi-arid. Being between five and seven hours respectively to Melbourne and Sydney and around six hours to Canberra and Adelaide by road, it is reasonably remote (Accessibility and Remoteness Index of Australia, ARIA+ of 5.49). Its strategic location

on several interstate highways connecting several of these state capitals means there is a lot of passing tourist traffic and trucks, and infrastructure and services to match.

Virtually the whole town of Hay is water-dependent, directly or indirectly. Apart from farmers and graziers, many of the local businesses such as earthmovers, irrigation suppliers, processors, retailers and carters of produce are highly dependent on farm businesses that take water from the Murrumbidgee River. All other retail, wholesale, service and manufacturing sectors rely heavily on the agricultural and pastoral sectors that also rely on rainfall. The Hay Private Irrigation District is the oldest in New South Wales and provides a network of largely pressurised and piped water to around 80 water users close to town. The Hay Water Users Association represents the interest of around 50 'licensed pumpers' from the Murrumbidgee River. The area has previously supported a number of large, corporate farms with broad acre irrigated summer and winter crops and intensive vegetable growers (particularly lettuces). In the 1990s, everything seemed possible: rice was big and cotton was started late in the decade. One irrigator regarded 1998 as "a monstrous year for water", though the allocations had already begun to diminish². In the decade since, everyone has had to learn to live with much less river water, and for pastoralists with land away from the river, significantly less annual rainfall.

Until recently, the term 'average annual rainfall' was understood to stand for something fixed. Older residents in Hay can recall the 1956 flood and several major prolonged periods of severe rainfall deficit, generally known as 'droughts'. While most Hay residents lived in hope for a return to the 'average', no one challenges the reality that the past decade across the site and its catchments had become drier and hotter. As a consequence, the river flows and water allocations had drastically decreased or ceased, and incomes, particularly from

2 <http://waterinfo.nsw.gov.au/ac/alloc.xls> Accessed 12 October 2009.

the irrigated land and water-related businesses and services, had plummeted.

Farmers with intensive irrigation only on the Hay floodplain who grow vegetables, particularly lettuces, were totally irrigation-dependent. Large irrigation farmers who have previously relied on broad acre grain, pulse and oilseed crops in summer or winter without dryland country as a buffer (or bore water) had been severely affected, as river water allocations as a percentage of theoretical water entitlements had steadily dropped to less than 10 per cent³. The lack of water in reserve in the Murrumbidgee during 2009 can be seen, in retrospect, as a consequence of three factors: successive record-low rainfall years in the upper catchments, a massive surge in utilisation of irrigation for new purposes in the 1990s, and optimism that there would be a return to 'normal seasons'. By mid 2009, the many water-dependent stakeholders in Hay were re-evaluating and urgently learning about all three factors.

What reports say

Given the speed with which this part of the Basin had become noticeably drier, even to a casual observer, it is unsurprising that there had been a flurry of technical, scientific and 'expert' reports to try to identify the symptoms and extent of the change, some likely causes, and importantly, some possible future adaptation plans, if the change was indeed permanent. Aside from the perceived first national priority about what plans were appropriate to ensure water security for 'Australia's major cities and urban complexes — 'home to' most Australians' (PMSEIC 2007: 3), the second, major priority was 'The Murray Darling Basin—Australia's food-bowl'. This report, based on 2006 data, acknowledged 'pressure on natural resources in terms of water resources'. The report begins with 'Our climate is changing' (p.5), and states that 'Australia has a climate-sensitive

3 As of 1 October 2009, the general allocation in the Murrumbidgee System was three per cent.

economy' (p.8). It predicts that 'temperatures across the Basin will increase' and asserts that 'urgent attention needs to be paid to how the activities associated with the basin will adapt to a new climate' (p.27).

Our field visits revealed the insidious nature of this slow and prolonged period of drying. Very few people we spoke to in the site had either read or accepted what was in these reports. The Drought Policy Review Expert Social Panel (DPRESP 2008), for example, gave first-hand accounts from 'more than 1000 people ... living with dryness over recent years' (p.3), and concluded that 'Australia will face prolonged periods of dryness in the future ... [with] an adverse impact on the social wellbeing of farm families, rural businesses and communities.' It effectively bit the federal government's hand that fed, it by urging 'a new national approach to *living with dryness* ... rather than *dealing with drought*' (p.5).

Learning about the risk

Government information programs

There is evidence of government actions and education programs in the three decades prior to 1998 that had assisted local water users to learn about and adapt to changes associated with 'natural' and recurring droughts. These changes had affected farming businesses for over a century, as one farmer elaborated:

There was an embargo on new licenses on the Murrumbidgee in 1977 initiated by water users. ... Throughout the 1980s and 1990s programs were available to help farmers to handle changes including deterioration in terms of trade, cost-price issues, succession and environmental issues. There was conversion of licences to volumetric in 1982 that forced education about the resource, management of the rivers and planning of farming decisions. There was education associated with regulation of rice growing in the 1980s as well as with the NSW government water reforms and the Murray Darling Basin Commission

cap on extractions in the 1990s. There were extensive public meetings and publicity programs at the end of the 1990s related to changes in water availability and the need for environmental flows.

There is therefore a long history of government education about the risks of and responses to living with drought. However, in the decade since 1998, there is evidence of a reluctance or inability on the part of governments to give water users appropriate and accessible information about the rapidly changing situation, particularly about climate change, on which to base their water management decisions. There is evidence that as the risk and likelihood of the Murrumbidgee and Lachlan catchments being permanently drier have increased, denial of change and its implications has increased.

Learning about the risk, and denial of risk

In 2007, the CSIRO prepared a series of papers that outlined the causes, extent and risk of climate change in the Lower Murray-Darling catchments (CSIRO 2007). It made it clear that, while the climate had changed before, 'we are now living in a climate of our own making' (p.1). Based on the research, they predicted that '... [c]hanges in rainfall and higher evaporation rates are likely to lead to less water for the rivers' (p.5) in the lower Murray-Darling communities in New South Wales. The CSIRO (2007) report advised water users that all Australian governments had agreed, under the National Water Initiative, that the water users themselves:

... should bear the risk of such reductions in water availability. As a consequence, water users in the catchment may face long-term reductions in allocations and higher process for water. (p.6)

The October 2008 glossy tourist brochure that introduces *Hay NSW: real people, real experiences* has an air of unreality one year on. The *Agriculture—primary importance* section (p.14) claims that '[r]eliable irrigation, good soils and an abundance of sunshine enables

a wide range of crops to be grown.’ At its peak, ‘before the drought’, there were 35 rice growers in the Hay district. In 2009 only two rice crops were grown. As one agricultural adviser said, as a consequence of drying, water over-allocation and water trading, a lot of:

... water has virtually gone out of this area ... and it probably means doom and gloom as far as a lot of rice growing areas [are concerned] ... The writing might be on the wall. Similarly with cotton... Cotton was 16,000 hectares five years ago. This year it was 2,900 hectares.

Similarly, the *Education and Community Services* section in the 2008 tourist brochure showcased many of the educational facilities that had closed or were under threat in 2009. Learning about why change so rapidly occurred is difficult for an outsider to comprehend. Unsurprisingly, many rural Australians in similar situations feel a sense of unreality, ‘isolated, alienated and disconnected from the rest of the country’ (DPRESP 2008: 14). We came to understand that creating the impression ‘that through government assistance the community can be returned to ‘normal’ economic and climatic stability’ (DPRESP 2008: 12) when the drought and exceptional circumstances (EC) funding finishes may in fact be delaying sustainable solutions to the myriad of problems. We came to realize that it was relatively easy to identify ‘downstream’, community and social effects of there being less rainfall, higher temperatures, and less water in the river. What was particularly hard for adults in this site was learning about what to do in response that was sustainable, other than the unthinkable of walking away from irrigation, from the land, or from the town altogether.

People in Hay learned much about ‘water debate’ and its many facets from the local and regional press. The week we interviewed, the *Riverine Grazier* (‘The heartbeat of Hay’) on 3 June 2009 ran the headline ‘Hay to suffer future job losses as Twynam signs \$303M water deal’ on page one, whilst the *Weekly Times* reported

FREE FLOW in 3 cm screaming headlines, dubbed the ‘biggest water buy-back in Australia’s history’. In the *Deniliquin Pastoral Times*, it was ‘PRESSURE REMAINS: 1.6 bil. still in buy-back account’. There was a growing realisation, as *The Age* editorialised (19 August 2009, p.16) that ‘[l]ong-term averages may no longer be a guide to sustainable [water] allocations ... if climate change has taken hold’, and that federal and state governments may:

... need to go back and review all licenses and rewrite the rules of the current highly compromised national water plan to a system capable of sustaining the environment and agricultural venture for years to come.

Learning and narratives about the allocation of water

There was evidence from the interviews that all water users had been forced, by a combination of economic necessity and government incentives, to learn to make their allocated use of water significantly more efficient, only to have their allocations further reduced:

The Government has encouraged [irrigators] to build up this infrastructure to establish all the recycling systems, the more efficient pump systems, better lined channels, [ensure] farmed country doesn’t have seepage problems ... and now to find out that water may be taken away from you.

One irrigator summed up what had been learned on the land in the previous six years. While ‘selling the water out of the district’ worked in the short term, it raised important questions about ‘why you are where you are’:

At the end of the day we have to be a viable entity or we are going to go bankrupt, so we have to be able to make the best use of that water which may have meant that we just spell it for the last few years. Because with the little water that we have had [allocated] and the crops that we grow you just can’t get a return. They have been selling the water out of the district. I guess long term there’s that challenge whether we are going to stay as we are at the moment. We may have to change things totally because you

can't just keep selling your water every year, because that's why you are where you are. ... Six years ago we were highly geared and we had a reasonable amount of employees and we grew quite a lot of crop and we were major summer croppers and more minor winter croppers. Now we have de-staffed basically.

Considerations of the long-term sustainability of either the environment or water-related agriculture were almost completely absent in the Hay transcripts. 'Allocation' was mentioned 125 times, 'upstream' only three times, and 'downstream' only twice. There was no serious concern for water users or the environment downstream, other than the euphemism 'frogs', mentioned eight times, referring disparagingly to federal Environment Minister Peter Garrett's perceived lop-sided concerns for environmental flows for the wetlands downstream. While the term 'climate change' was used spontaneously by a few informants, and believed by some as a reality, the notion of 'drought' or 'dry cycles' was preferred, as it implied that a return to wetter times was possible.

There was no recognition that the local, free access (to 2009) to unlimited, unfiltered 'raw' water was something of an aberration in the broader Basin. Most people interviewed also insisted on maintaining their inalienable riparian right to take unlimited water from the rivers, as long as it was extracted through nothing bigger than a 'two inch pipe'. For balance, there is a local argument that "the cost of metering and monitoring these pipes is far greater than the value of the water".

Most of the narratives were about entitlement, with little concern for the many users downstream. While people in the site were aware that things might have to change, the fundamental interest was in what water they were entitled to, what water should be allocated, or how much they ought to be compensated for the loss of entitlement or sale of their water rights. Most people still held out hope that a decade of

adverse and exceptional circumstances was not climate change and would eventually reverse. For example:

It's a cycle thing. Australia is a land of extremes, there's no doubt about that and it has been happening way back ... My wife is into historical things and if you look back to the 1800s there have been a lot of droughts and a lot of heat waves and a lot of rain, it's just in a cycle.

This belief was still being officially reinforced on 1 October 2009 by the optimism of New South Wales Office of Water. In a News Release from the NSW Water Commissioner headed 'September rains bring first security allocations to the Murray and Murrumbidgee and Murray Valleys', general security users in the Murray Valley were given an initial water allocation of one per cent and Murrumbidgee users three per cent, with a final sentence warning that 'water supplies for 2010/11 have not yet been secured', and asking 'all water users to be as conservative as possible with their use in what continues to be *the worst drought ever experienced*' (italics added). At worst, there was admission that some of it might be climate change superimposed on a natural drought cycle, and widespread hope that the big floods of the past would return. As a 64 year old farmer recollected, "I can't remember [19]'44, but I can remember the floods we had in [19]'74 and [19]'56 ... '56 was unbelievable".

Learning about water trading

Given the political sensitivity of the issues and speed with which the Basin has dried out, it is necessary to provide some background to the temporary and permanent 'water trading' that many farmers were actively engaged in during our field visits to this site in 2009. Only a few independent researchers such as Quiggan (2008) have critically interrogated government policy responses to the increasingly limited options for governments who made the policies. Unsurprisingly, such trading was seen to be attractive to some farmers that had land with an *entitlement* to water, but with minimal or no recent

water *allocation*. As one such farmer said, in response to a question about how water trading had changed things:

[O]ne of the big changes is that we used to value our property as a whole. Now it is not worth anything without the water, so if you haven't got the water it is worth very little. We have spent a lot of money on infrastructure. I am trying to build up the soil and really all that money we have spent isn't worth anything if you can't utilize the water, if you can't turn the pumps on. I guess that is one of the big things that has changed, the whole emphasis has gone off the actual land and onto the water.

While water trading provided immediate and sometimes desperately needed capital, it temporarily or permanently broke the link between land and the right to water it.

Quiggan (2008) noted that National Competition Policy reforms in 1994 converted 'existing water licences [previously] attached to particular parcels of land into tradable property rights', vested unwarranted 'faith in the markets'. The assumption underlying these reforms was that water trading would lead to water being allocated 'to its most valuable use, thereby ensuring a range of socially optimal outcomes' (p.5). Quiggan particularly identified a problem with the hasty conversion of 'sleeper' water licences that had never been used or 'dozer' licences that had 'some history of use, but were inactive at the time of the water reforms.' In Quiggan's words:

A limited right conditional ... on the development of irrigation infrastructure was turned into an unconditional claim on scarce water. The effect was to increase the severity of the over allocation problem that was already well known.

Impacts on learning communities

Impacts on schools

The Drought Policy Review Expert Social Panel report (DPRESP 2008: 47), *It's about people: changing perspectives on dryness*,

recently observed that '[e]ducation is essential to social and economic wellbeing, as well as to the resilience and future adaptive capacities of communities.' It noted that one of the strongest messages the panel heard was that 'the social wellbeing of children and teenagers is suffering because of dryness' (p.47). The continued period of dryness was impacting on the social wellbeing of the township of Hay with long periods of less work and reduced incomes:

From Hay's perspective the town looks like it is still thriving and I guess ... people see our green nature strips [and think] things are OK. I think the town is worse [off] than what that population might think it is.

The effects of dryness on participation in and outcomes from compulsory education and training for young people, while documented in other reports (DPRESP 2008: 43–53), are particularly evident. At schools the student numbers were dropping, resulting in a nervous wait each year to see how many teachers would be required, and who might be forced to move on to another rural town. Young teachers were reluctant to apply to a school in a town where numbers were dropping, to relocate and then have to relocate again. In the past few years the primary school had lost about 100 children, and subsequently lost the allocation of four full time teachers.

It is starting to impact. The schools are starting to lose numbers and the families have to leave the area to get jobs elsewhere and things like that.

The high school is a key feature of the town, housing the War Memorial museum and memorabilia. As the public face of Hay, the front of the school is also surrounded by green lawn. However there was concern that the school could no longer afford to pay for the water required to maintain the school 'farm' as the site for agricultural and vocational courses. The indirect impact of dryness on learning options was obvious. It was a relatively small high school, and as enrolments declined, the school was unable to offer a wide

range of curriculum options. This was most concerning in the post-compulsory years, as increasingly families were choosing to send their children out of the town for senior secondary schooling:

There seems to be an increase recently in the number of Year 10 students leaving and not going on to Year 11 and 12. I have been at my wits end trying to explain that. ... I wonder whether there is pressure from families for those kids to go out to get work because the family income has declined so much.

In the recent past, Hay had a Catholic secondary school and hostel for rural children from remoter districts to stay in town during the week. Both of these had closed. Young people from the district could no longer stay in town, unless the family could afford private boarding, or the mother could move into the town for the school week. Each Monday morning in 2009, buses left Hay to take young people to secondary schools up to two hours away in Leeton, Yanco, Finley and Deniliquin where some students boarded for the week, making the long journey home at weekends.

The high school had a number of initiatives with which they are trying to address the trends of increasing numbers moving to other towns:

We are looking at curriculum structures that ... increase curriculum choice. We are also looking at connected classrooms in combination with other schools to increase our electives that we offer so that we can maintain students here. One of the reasons they go away is they say “We can do this subject” or “We can’t do that subject” and it’s a valid argument and we are trying to overcome that. In terms of the education they get here, our results indicate that ... the average results last year were above a like school.

Post-compulsory impacts

Families with more resources were still able to provide options for their young people to complete Year 12, and many understood the importance of ‘getting kids away’ to university or TAFE [technical

and further education], typically to then stay away to work. If young people of post-compulsory age chose to remain in town and go to TAFE, they had to travel to Deniliquin, 120 km south, for most courses. The rise in petrol costs and wear-and-tear on vehicles, were all cited in interviews as barriers to such travel and to continuing or second-chance vocational training or retraining for adults.

It became apparent that the traditional school-based modes of education and training were no longer relevant to the ongoing lifelong and lifewide learning needs of this community. In a situation where almost everything was changing so rapidly, there was great concern for the impact on young people. However there was also no public place for adults to go and learn collectively and collaboratively. In this context, the learning and wellbeing that occurs through the many community-based organisations in Hay becomes critically important. In isolated communities such as Booligal this adult learning function was essentially located in the only remaining adult public place, the hotel.

TAFE offered mandatory certificates such as the safe handling of chemicals, yet most of the learning done by the farmers was from each other, from the media, through community and industry-based associations and/or the internet. Some farmers were of the view that the money 'being poured' into some government programs for learning about dryness was a total waste. Field days, the traditional way farmers got together and learned from each other, were no longer drawing the numbers of previous times, due in part to the cost of travel and the generally depressed economic climate, but also because of the use of new information and communication technologies (ICTs). We heard about the "... extremely significant role internet access now has on learning. Most farmers ... are connected now with broadband or satellite." We also heard about the critical importance of strengthening social networks. Some agencies were now providing family fun days, including food and drink as a means of getting people

together, principally to enhance community and social wellbeing. People were now more openly talking about and providing services for depression and 'looking out for each other' as a consequence of 'the drought'.

Change is needed. Whilst the differing sectors of education and training remained in their separate 'silos', they were unable to provide the type of lifelong learning that was clearly needed in order to adapt and change and survive. As one education leader said:

TAFE and schools [are now] almost the one entity. There is more flexibility in delivering adult education in a school environment. I think education institutions have probably stood still too long and are not adapting to the education needs of the community as they should be. We are stuck in this traditional mould where kids go to school and parents don't. We have these set classes in years and they follow through ... I would like to break down some of that and create ... schools ... as places not just for education for students, but an education place for the community, especially in an isolated area like this ... in a community like this or smaller, that model I don't believe fits the bill.

Community impacts and responses

The Hay township sits on a relatively narrow ribbon of riverine floodplain at the intersection of five radiating bitumen roads, sandwiched between two vast, flat saltbush plains. Hay in some senses is somewhat like an 'island', resulting sometimes in island-like perceptions in terms of work and education:

You get depressed thinking it is only in *your* town and you are personally doing something wrong. And then you go to these other centres where you have got hundreds of guys in the same employment and the same industry with the same problems.

Time and again the people interviewed in Hay commented on the long-term effects of dryness on the town itself. From the focus on 'green nature strips' as a way of keeping them sane, to the ongoing

loss of business to the town, everyone was concerned for the future of the town itself. These ranged from the closure of businesses, the loss of casual jobs in town, the loss of skilled tradespeople as work dried up, and consequently the loss of opportunities for apprenticeships in town (in this case, in nearby Deniliquin):

This is not just affecting the farming community. What it is affecting is the low skilled people who live in this town, whose jobs, the unskilled labour has gone from this district. There is no abattoir work, there is no rice workers, there's no taxi driving on a regular basis, there's none of that erratic work that they used to pick up.

As other infrastructure shut down in Hay and adjacent towns, the people in the district were being forced to travel further for services and work that used to be on their doorstep. For example, with the downgrading of the local hospital, people now had to travel over 100 km to a bigger town for treatment, and whilst there, will tended to shop, at cheaper prices, thus further reducing the income stream to businesses in Hay. Work for nurses remained in the geriatric centre, but had become erratic. Some nurses were flown in from overseas for a month at a time, resulting in a lack of continuity of care for the elderly residents and their families.

The loss of income, whether from farming, contracting or other work in town, has had a marked impact on women in the district. Most women were major partners in the economic survival of the family. Some were working in town, in business, managing a property, or, increasingly, running the farm whilst the husband worked elsewhere, either in the town or far way, in contracting work or for some in distant 'fly-in-fly-out' mines.

A concern for women working alone out on farms was fear of accidents, as in the past, there were far more workers around to complete tasks safely. Mobile phone coverage was erratic, and several women expressed anxiety when they were undertaking heavy work

alone. Whilst the men were away, the women commented on the increased workload and exhaustion. This comment was made by both women running the farm and working in town; when the children got home from school, they too had to take on more farm work caring for stock and water as well as managing the home and family:

He has to work away a lot which makes it harder on the family, because we have to feed the stock and do the water if we have got it.

Whilst several of the women commented that they had not been able to continue in formal education as long as they had wanted, all were determined that their children would have as much education as possible. There was general concern as to the federal changes in tertiary allowances, as many country young people recently chose to take a gap year to earn enough to be come eligible for youth allowance, only to have the allowance removed.

Discussion

Managing the risks

This Western Riverina case study, in a highly water- and climate-dependent site, community and economy raises two important questions. The first question, 'How do adults learn about and respond to the risks associated with drying?' was embedded in the research design. The importance of a second question, 'How do adult learn about, respond to the risks that climate change is associated with drying' only became clearer through the narratives. By 2009, most of the economically feasible responses and adaptations had already been made by the agricultural community. Many of the realistic technological and cropping adaptations in irrigation areas, including increasing water efficiencies, recycling and minimizing transmission losses, had begun at the 'start of the drought'. The most recent response was water trading and water substitution. As an agricultural

adviser said, “If growers are not trading water or using bore water, they’re using it to the highest value crop.”

The scope for further, local adaptation by farmers was therefore very limited. For some with water allocations, it was possible to ‘get by’ by trading their water or subsisting on exceptional circumstances (EC) funding. The social and psychological adaptations required for many individuals were huge. To accept that this was a drought would, for many, involve a loss of face in the community and an admission of defeat:

Some people just don’t want to accept that we are moving into a drier climate. ... [While] farmers stay on their properties they can maintain an image of semi-prosperity ... and live as cheaply as they can out on the farm, [or else] they will move away, because they won’t want to move into town and appear to have lost.

In one optimistic narrative, favoured by the New South Wales government, people in sites like Hay are ‘facing the worst drought ever experienced’, in which case they expect the rainfall and river to eventually return to its history of long-term average reliability, particularly for irrigation. In the other narrative, predicted by the scientific community and only very recently embraced by the national government, they are facing the possibility and risk that the climate has shifted and become drier, perhaps as a consequence of and caused by human activity elsewhere. Most adults we spoke to optimistically clung to the first narrative. A few entertained the possibility of both narratives superimposing and reinforcing. While some people accepted *a risk* that the current shortage of irrigation was related to climate change, to accept it as a permanent reality was too difficult, depressing, and like an admission of failure.

There was a strong sense in the site that, in the meantime, people could and should take from the rivers whatever they were legally entitled, to or be compensated for its loss. While the water for

greening the town may have used only a small fraction of the water used for irrigation, the attitude towards retaining this historic but now anomalous water use in the Basin was fiercely defended. There was very little interest or concern about the water needs of people downstream and indeed, a widespread, almost cynical disregard of environmental issues downstream. Given the still unresolved and competing uses of water by different states across the Basin, people in the site tended to retreat to the argument that water was a 'states-rights' issue and expressed concern that any national solution would treat them inequitably and leave them worse off than at present.

Very few adults articulated another likelihood: that the water resource across the Murray-Darling Basin, even before 1998, had been significantly over-allocated to irrigation use, even if the first narrative were accurate. In both cases, aside from learning to be more efficient and responsible with the continued reduction of water 'allocated' from their maximum 'entitlements', people in the site to 2009 were increasingly required by governments to bear the difficult, continuing and debilitating social and economic risks of worsening dryness.

Impacts on learning across the community

A number of other research reports have found that pressure on families, whether with men working away, women running the farm or working in town, or children responding to family stress over money, are now having an impact on both family break-up and young people's horizons for future education, training or work choices (DRESP 2008; Alston 2006). There is clear evidence that the support structures for families living in dryness in sites like this one in the Western Riverina, such as education and training and health and welfare provisions, are still working in the old model of discrete 'silos', under different government systems and processes, whilst working with a declining small population. Indeed, research is showing that institutional structures remain barriers to 'joined' up thinking in relation to change and creative approaches to new problems (Nilsson & Swartling 2009).

Conclusion

This case study highlights the limitations of learning through previous experience in the context of rapid ecosocial change. Despite widespread denial of the probability, this mid-river community is very likely faced by an arguably new and ‘tricky’ phenomenon of climate change (expanded in our ‘Wicked learning’ paper: Golding, Brown, Foley, Smith, Campbell, Angwin & Schulz 2009). The predicted, early effects of drying in this site are obvious, but the causes and solutions, if this is climate change are not yet clear.

Climate change challenges the theory of uniformitarianism. This theory, developed originally in the earth sciences, argues that processes that are observable today in the natural environment help explain the past, and will be repeated in the future. Several aspects of this theory pervade thinking about the river, agriculture, the environment and climate in this site. In the past century, changes in water availability in the Basin have been seen as normal, natural and cyclic. Local people have come to learn from experience that, while there would always be droughts and floods, with very dry and very wet years, there would be a return to the long-term average that had ensured ample water for irrigation for over a century. Departing from this expectation, including learning about, understanding and accepting either the risk or reality of climate change was a very difficult mind shift. In the case of the southern Murray-Darling Basin, predictions of permanently drier times and much less water from the rivers, required new and different understandings about inter-connectedness and a paradigm shift away from uniformitarianism.

In a rapidly changing context, at best adults in this mid-river site can learn about being drier through existing communities of practice. There is no local adult learning organization in the site with programs or forums that are at the cutting-edge of change. The learning that takes place is restricted amongst water users to what they may (or may not) learn through the various industry, government and

community-based organizations and in the popular media. With parallel, nationally politicized contestation about climate change, global emission and causality, no national Basin plan or agreement, and a state government water agency still in apparent denial about climate change in its communication with water users, there appears to be an urgent need for new information and dialogue about likely future scenarios and management options for water users across the site. There appears to be a desperate need for new *boundary* and *bridging* organizations that are able to bring together different communities of practice inclusive of water-dependent stakeholders. Such organizations would seek to create trust and collaboration opportunities and serve as arenas for scientists and decision makers to reach and communicate common understanding of the complex and rapidly changing issues (Hahn et al. 2006; Guston 2001) to people in the site.

Water-dependent communities, in this and similar sites across the Riverina are already located towards the 'pointiest' and most risky end of drying and the further risk of likely climate change. However adults are currently relatively poorly prepared by governments to learn about and bear these risks. There is a particular and urgent need for better and more accessible information and understanding about the likelihood of risks, on which future community, business, family and water management decisions might ideally be based.

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Learning to be drier: A case study of adult and community learning in the Australian Riverland

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This article explores the adult and community learning associated with 'learning to be drier' in the Riverland region of South Australia. Communities in the Riverland are currently adjusting and making changes to their understandings and practices as part of learning to live with less water. The analysis of adult and community learning derived from this research identified six different forms of learning. These are, learning to produce, learning to be efficient, learning to survive, learning to live with uncertainty, learning to be sustainable and learning to share. These forms of learning do not occur in isolation and separately from each other but to the contrary are occurring simultaneously with and alongside each other. Further, it is argued that the people and communities in the Riverland, through learning to live with the effects of climate change and less water, are at the forefront of learning to be drier.

Introduction

This project focuses on the way that adults in the communities along the southern and lower Murray-Darling Basin are learning to adjust to the drier conditions that have been evident for the past decade. The project design elaborated in Paper 1 called for four pairs of researchers, one from each university conducting research in one of four locations in these Basin communities. This article is about adult and community learning in the Riverland site centred around Paringa, Renmark, Berri, Barmera and Waikerie. The researchers were curious to find out more about the learning that is occurring in the communities in this region, in the midst of what are widely believed to be changing climate conditions and learning to live with less water. The result is the identification and explanation of six different forms of adult and community learning that are integrally bound up with a particular community of people, living in a particular place and their inter-relationships at a particular point in time.

The project

To collect data for the study, individual and small focus group interviews were conducted with participants considered to be water dependent stakeholders. The design of the study called for participants from within five categories. These are (1) farmers and growers, (2) water authorities and land managers, (3) representatives of community based organisations, (4) adult education and training providers, and (5) other water dependent businesses (as elaborated in Paper 1).

The researchers made two visits to the region to collect data and another to discuss and report back preliminary findings. The first visit was a reconnaissance to collect contextual information, to identify and confirm informants, and to set up the interviews. On the first day of the first visit the researchers were very fortunate to be able to sit in on, and speak at, a meeting of the local Murray Darling Association

which was meeting in Berri. The researchers outlined the project and were able to make useful contacts as a result of the suggestions of board members. Some suggested the names of others who they thought could make useful contributions.

On the second visit to the region the researchers conducted thirteen interviews with nineteen informants; some interviews were with individuals, some as pairs and some in groups of three. Six participants were female and thirteen male. The interviews went for between 19 and 58 minutes and generated 137 pages of transcription.

The Riverland region

The Murray River is the centre-piece of the Riverland which is widely understood to extend from the South Australian side of the state borders with Victoria and New South Wales down to Lock 1 located at Blanchetown. It is estimated that there are approximately 30,000 people currently living across this region. The 375 kms of the Murray River that runs through the Riverland is in dry times described by some of the locals as a series of ponds. This is because the Riverland section of the Murray has flowed through a series of locks and weirs which were built in the 1920s and 1930s to maintain constant water levels for boat traffic and for the storage of water (Discover Murray 2009; MDBC 2006a; MDBC 2006b; Nicholson 2002).

The water resources in the Murray-Darling River system have long been a bane of contention between four Australian states and the federal government. Since as early as the 1880s, irrigation has been an accepted farming practice along the Murray in several states. Less clearly defined and agreed to, is the issue of who owns or has rights over this water. All four states have river frontage and stake their claims. As long ago as 1911 each of the states with territory in the lower basin appointed leading engineers to collaboratively address utilisation of the Murray River (Discover Murray 2009; MDBC 2006a). One of the key recommendations was regulation of the water

through storage. A decade later this led to the building of the six locks and weirs throughout the Riverland between Blanchetown and the NSW border, with Locks 7 to 11 located within the NSW and Victorian jurisdiction of the Murray (Discover Murray 2009; MDBC 2006a & 2006b).

These early historic negotiations between the states eventually led to the River Murray Waters Agreement that was ratified through Acts of the various state and federal parliaments in 1915. This agreement established the River Murray Commission that was to later become the Murray Darling Basin Commission (MDBC) and what today is the Murray Darling Basin Authority (MDBA) (Discover Murray 2009; MDBC 2006a). Significantly, the fundamental function of the MDBA is 'to conserve water, and to share and supply three states, and with minimum wastage' (Discover Murray 2009). In the Riverland this occurs through storage and regulation of flows at the locks and weirs. While the locks are designed to allow the movement of boats to traverse the weir walls with the different water levels on each side of the weir, the main purpose of these weirs today is water storage and the regulation of flow.

The relatively constant water level can be very deceiving, what is most important are the actual flow rates. The river can look normal but live data on the flow rates at certain points are available on the MDBA websites and these tell a different story. Using figures supplied from this source on September 24th 2009 approximately 2,300 mega litres (ML) per day were flowing across the border into SA at the top end of the Riverland while at the same time approximately 1,180 mega litres (ML) was flowing through Lock 1 at the bottom end of the Riverland (MDBA 2009d). From these figures it can be seen that the volume of water that leaves the Riverland can be about half that which enters. It is estimated that water flowing across the border on Sept 24th will travel quite slowly at just over 4 kms each day and so take over two months to travel the distance from the border down to Lock 1.

Broadening from the Riverland to the Murray system it is interesting to note that at the end of July of 2009 the useable storage in the Murray system stood at 1,470 GL or 17% of capacity (MDBA 2009e). The current outlook being portrayed by the MCBA for the 2009–2010 water year remains poor and is similar to the previous two years. It is now about 8 years since the Murray River system experienced normal average rainfalls (MDBA 2009e).

The findings: A learning focus

This study involved researching how the people in the Riverland communities were learning to live with less water. Australian educational researchers such as Kilpatrick & Falk (2001) have explained how people in rural settings are involved in making decisions, instigating changes and how these actions involve learning, knowledge sharing and knowledge production. This current study is focused on the learning that is occurring in this region at this time. This research study of the Riverland identifies six different forms of learning which are discussed throughout the remainder of this article. The first of these is learning to produce.

Learning to produce

Part of understanding adult and community learning in the Riverland is in understanding its development as a region of production. The South Australian Department of Primary Industries and Resources (PIRSA) provided rough estimates on production for 2007–08. These estimates cover agricultural production that is measured in two ways. The first is at the farm gate, and the second is measured as finished food after processing. Both are measured in terms of dollars. PIRSA estimate that the gross value of production in the region to be around \$413m and with added value through processing this climbs to \$1,107m. Table 1 provides a breakdown of these totals by sector (Personal Communication, Sept 2009).

Table 1: Estimated value of production (\$million) in the South Australian Riverland

	Production	Finished Food
Field Crops	34.1	4
Livestock	14.4	2
Horticulture	134.5	231.3
Seafood	0.4	0.6
Wine	229.5	869.1
Totals	412.8	1107.0

These figures show that in terms of production and the market, the Riverland region needs to be considered as one of the food bowl and wine cellar regions of the country. Importantly, 56% of the total value of production and nearly 79% of the wholesale price of the processed food in the region is directly associated with growing grapes and turning them into wine.

One of the Growers interviewed for the study described the good times they had experienced producing grapes.

We have had a brilliant time with the grapes, I mean I wouldn't be sitting in this place if we hadn't had the early 2000s with the grapes. Some growers wouldn't accept \$1000 a ton and they were chasing the market and a lot of them were getting \$1400 a ton and now we are talking \$400. . . .

In addition to the work of the growers there is much flow on for work in other allied industries such as packaging, processing and transport. The manager of a packing shed explained the seasonal nature of the employment. In some months of the year the shed runs two shifts per day, during other months only a skeleton crew is required. He noted that not many locals work at the shed but rather there is a predominance of backpackers from overseas, earning money as they work their way around the country. These visitors also contribute to

the tourist economy in the region, although some operators told the researchers that their trade was down by as much as 40%.

Clearly the growers have learnt to use irrigation and produce crops as they have etched out their living and built up to current production levels. As the growers reach economic viability with their horticulture so too other allied and support industries are established and developed. Alongside learning to be productive is the second form of learning that was identified in the study, this is learning to be efficient.

Learning to be efficient

People in the Riverland and South Australia generally, are very conscious that they are at the end of the pipe when it comes to the Murray Darling Basin system. When it comes to water flowing down the Darling and the Murray, South Australians see themselves to some extent as being at the mercy of the other states in the basin. For this reason South Australia, more than the other states, has put in place irrigation infrastructure and farming practices that are in many ways more efficient than those of their neighbours. One of the most cited claims made by interviewees across the five stakeholder groups in this study was that the producers in the Riverland were very 'efficient' users of water and their goal was to become even more efficient. South Australia has no open irrigation channels. Instead all their irrigation is run through pipes to eliminate the waste that occurs through evaporation. The enclosure of the irrigation water in pipes was completed in the Renmark Irrigation Trust area in 1974.

A number of the growers interviewed, described how they had changed their farming practices over the years and adopted new technologies in order to gain further water efficiencies.

It used to be all furrows and probably in the 60s we went to sprinklers, in the 70s a lot of us went to under tree sprinklers which is small sprinklers for the citrus under the tree...

Just putting the water out more evenly with the overhead sprinklers you have got a lot of overlaps and things like that and its just using water better I guess. Then in the 80s we went for drippers so we have had drippers for probably nearly 30 years in which you reduce your volumes of water again and you just put it in where you need it, and you are not flooding.

Another grower elaborated further on adopting new technologies:

I invested in an irrigation system and I put in a monitoring device which actually monitors the volume of water and I'm making sure that when I am applying water to plants it's to their needs. I made that commercial investment and I'm pleased I did that because I have got a 120 meg allocation. I used to use total allocation before sprinklers and since I converted to sprinklers I am down to 60 megs so I save 50% of my water allocation,...

The allocation of water is a primary focus of the growers. In recent times they have been on the receiving ends of cuts, to the point where growers, at the time of the interviews were only getting 18% of their entitlements. Cutbacks to water allocations have meant that the grower/irrigators have had to look for even more efficiencies. They are constantly assessing their irrigation practices and seeking better options. As one grower said:

We were wasting water and I am not too proud to admit that, because we were putting water on the vines ... when it showed a miniscule amount of stress . . . but now with pipeline and everything like that it is distributed evenly throughout the vineyard...

Between them, these informants explain the increasing efficiencies gained through the ongoing development of irrigation practices over a sixty year period. As a user group located towards the end of the river system, part of the learning that is occurring in the regional centres is about learning to use water in a more efficient manner. The training arm of the SA Murray Darling Natural Resources Management Board provides an array of one day workshops such as those that

help growers get the most from their drip irrigation systems. The workshops are geared towards making crop farming more water efficient. The installation of efficient irrigation infrastructure, the adoption of changing technology and farm practices and adapting to substantial decreases in water allocations support our finding of the occurrence of learning to be efficient.

Learning to survive

A Drought Response Centre has been established to deal with a range of issues arising as a consequence of drought in the region. The researchers interviewed a staff member who explained that they saw their role as providing assistance and solutions to local people with as little red tape as possible. The centre is a direct response to the rise in the need for services to support people who are experiencing hardship and difficulties in their lives. This region has seen a sharp rise in the demand for emotional, relationship, financial and small business advice, support and services. The centre was established to provide community-based services to anyone in the region.

Direct drought assistance and advice are part of the services these community service workers provide as the drought progresses. As one counsellor at the centre explained:

At the end of last year you may be aware that the SA Government implemented 'the critical water program' which was about providing irrigators with enough water to keep their crop alive, not to produce fruit but to sustain the crop. That was managed through this building, so all the applications came through here. So [our role here] is about being a one stop shop and its about providing the service that is required at that point in time.

One of the most mentioned adjustments being made in this region is regarding irrigation practices due to decreased water availability and allocations. The total water entitlement that is meant to flow from the Murray River System into South Australia under normal conditions is

approx. 3,500 ML per day. But none of the South Australian farmers along the river has received their full entitlement now for about four years. At the time of data collection for this research project in mid June 2009, most were on 18% of their normal allocation with this due to be decreased further from July.

Another grower explained that they were now taking on extra costs associated with buying water in order to grow a crop, as the value of the grapes has slumped. The growers are currently receiving approx. \$150 a tonne for white grapes and \$250 a tonne for red grapes but the cost to the grower to produce a tonne of grapes can be somewhere around \$350 a tonne and closer to \$400 if they need to buy in extra water. This kind of balance sheet is not the basis for a viable business.

Growers are faced with hard decisions and need to weigh up their options. Do they buy in water to get a crop and then hope that they will get enough return to cover the extra expense? Falling commodity prices for their crops make this a less viable option. Some growers spoke of ploughing their crop into the ground rather than selling it and taking on the further expenses of getting the crop packed, transported or processed. Yet another option is to go out of production and mark time for a season or more. With this option comes the notion of 'critical water'. One grower took us through the concept and explained that this is the amount of water that has been estimated as necessary to keep vines, trees or plants alive (without producing a crop) until water once more becomes available. Different crops need different amounts of water; estimates of what constitutes critical water have been formulated by government for each different crop.

Growers, some tourist operators and others who work and earn their living in and alongside water-dependent industries are feeling the effects of less water. There is a rise in the community's demand for professional, emotional and financial support services. The strategy of critical water is at best a temporary survival strategy for growers. It is

in these ways that learning to survive has become an important aspect of learning in the region.

Learning to deal with uncertainty

Primary producers are used to living with levels of uncertainty. Farmers and growers are well aware that their sustainability is affected by weather cycles and that these are far from even. Accordingly they have learnt to manage the unevenness. Many budget for good and bad times using the profits from the good times to get them through the bad. However present conditions are exceptional, with the NSW Office of Water (2009) declaring their experience across the border from the Riverland as 'what continues to be the worst drought ever experienced'. Such prolonged difficulties mean that reserves built up over many years are now being used up.

Growers need water security but ongoing drought and climate change mean that this is not possible. Allocations have been cut to the minimum with further talk of no allocation being possible at all next year. This means that there is a need for strategies beyond the current notion of 'critical water'. Yet interestingly it is expected that water for irrigation will still be available on the water market to those who can afford to buy it. However when water is purchased, growers need to consider whether the commodity price of the crop they receive will support the outlay of buying in water.

Uncertainty is prevalent on many levels and exacerbated by governments sending mixed messages. In the last two years the government gave out up to \$20,000 as irrigation grants to individuals so that growers could install the latest drip technology and put drippers throughout their properties. This year they are offering exit packages that, for some blockies on around 15 hectares of land, are worth around \$150,000. However in order to get this money the exiting grower must pull up all their crops, trees and vines. A blockie can get a further \$20,000 added to the exit package if they

also remove their sprinkler systems. However, rubbing salt into the wound, in most cases, this is the same sprinkler system which was put in using previous government grants two years earlier. In some cases the sprinklers to be pulled out are brand new and yet to have water run through them.

Commodity prices are falling with some interviewees reporting a reduction in price for their crops of 40%. Some processors are not renewing contracts. In such cases growers need to wait and see how much produce the processors are willing to take and what price they will get. Current prices being offered are estimated to be as low as 25% of production costs. Some growers describe further difficulties when they tell of being dependant on large import and export markets and of getting paid their money at the end of the process, receiving what is left after the costs have all been deducted.

I have been in the dried fruit industry, the canning industry and the citrus industry, we have seen the canning and dried fruit industry virtually disappear because of the imports, the cheap imports and I think the citrus industry has had cheap imports from Brazil. I think in some ways the wine industry might be heading the same way. . . . most people at work have the guarantee that they have got so many holidays a year, they have got a guarantee of a certain minimum wage, they have got a lot of things to protect them but the grower doesn't have any of that certainty, you get what is left over.

Other businesses in the area are also affected, with some going bankrupt. Some of these were large well funded businesses that were expected to bring stability to the region. In some instances their insolvency prevented payment for produce they had already received. This left growers and their families further out of pocket.

Families and a broader range of community services are thus affected by aspects of the falling regional economy. Financial, emotional and family pressures from what might seem like numerous uncertainties

are taking their toll and some people were finding it difficult to see their future in the region. Much of what is described here requires individuals and communities to learn about these uncertainties and learn to manage them as best they can. For people to commit to a future in the Riverland they need to find a way of learning to live with these uncertainties.

Learning to be sustainable

It is interesting to note the native flora of the area and how this stands as a reminder of what this landscape would be naturally without any irrigation. The vegetation in this region is mallee. Close to the river are the large river red gums and as you move away from the river the mallee trees become thin. In the many clearings saltbush is found. Another bush found all over is the sharp prickly spinifex. In some ways this natural vegetation stands as a reminder to what grows naturally in this region. The soil is relatively good quality and with added water supports agriculture and horticulture. The river flats and plains have historically been subjected to flooding, one environmentalist interviewed explained that the historic and public records for the natural environment indicate that prior to European settlement the river broke its bank and flooded out onto the flats as much as every second year. Current records suggest that since European settlement this now occurs about one year in every eight.

One of the local environmental activists, a recently-retired outdoor educator, involved in community-based natural resource management explained to us that the river was really:

A series of lakes, that's all the river is, and it's potentially held up by the weirs and being a canoeist I was very much aware that there was very little flow in the backwaters . . . it was obvious that we weren't getting anywhere near the flows that we were previously.

The same interviewee also explained how he and his associates had been trying to get others in the community to take notice of the state of the river and in particular what they perceived as the over-allocation of water.

I know there is a great demand... on the river for a number of years over allocation of water and we have been screaming, we being local environmentalists, have been screaming for many years... it was deteriorating and it was lack of floods and the reason we were having lack of flow in the river and lack of these floods was the fact that too much water was being taken out....

He went onto explain environmental strategies and projects that were currently being developed to try and save some of the environment. He explained that the river red gums that were on the flood plains inland from the river are the ones in most danger of dying off. He spoke about rising salinity and of a project to divert water from the locks out onto the plains, through the creeks and backwaters, by flooding over the banks. He also explained about plans to try to bring back fish stocks in certain parts of the river. It is estimated that stocks are currently at about 10 per cent of pre-European settlement and the aim is to use funding from the national fish strategy to try to bring this back up to 60 per cent by 2050 (Lintermans 2009; MDBA 2003)). Some native fish such as the Murray hardy head that are currently found in the river in this region are considered endangered or rare and efforts are being made to save them (Lintermans 2009). It seems turtles and frogs also require strategies if they are to return to healthy numbers. Similarly he explained about bird life in the area. He spoke in particular of the mallee fowls and the parrots. For many years he has been involved in surveying the mounds that the mallee fowl build to breed. Bird observers use grids to divide up areas to conduct bird surveys. This informant explained that in the mid 90s where they used to find 10 or so mounds or nests across the grid, they now find none. While they still find some tracks, they see no evidence of breeding.

Yet another way of thinking about sustainability is about viability of the future in more general terms. One strategy that some people in the region are using to build their own futures is through turning to education and training. Some people are choosing to learn through attendance at one of the many day-long programs developed by the MDBA that are aimed at improving on farm efficiency. Another approach has been through utilising Recognition of Prior Learning (RPL). There is increasing interest in RPL, some of which is driven by uncertainty and insecurity as some of the irrigators in the region try to gain recognition and credentials for what they already know and can do. Most people we interviewed mentioned the need to develop sustainability in some form but especially in terms of seeking some kind of environmental balance.

Learning to share

In the Riverland region, competing demands are being placed on the water in the Murray. Growers need it for irrigation to grow their produce and to make their living; others are closely aligned to their requirements such as sellers of irrigation equipment, transporters and food processors. But environmentalists have long argued that the water is over-allocated both locally in the region but also throughout the system. Less water is travelling down the river and flowing into the region. Not only do irrigators need access to more water but the landscape, flora and fauna of the region needs floods. Fish stocks are in serious decline and floods are needed for breeding of fish and mallee fowl alike. There is a serious salinity problem and only fresh water will wash it away. For the past 50 years the salinity levels of Lake Alexandrina at Milang, downstream from the Riverland, has been measured at between 500 and 1800 EC but in April 2009 it increased to 6,000 EC and is currently at 5,500 EC. At Goolwa the salinity levels are currently at 20,000 EC, (sea water salinity is 50,000 EC), (MDBA 2009e).

Drought forces cooperation and early last century legislation was put in place for a shared governance model for the water in the Murray Darling Basin. The shared governance model has had mixed success. In times of difficulty it seems that state interests tend to prevail, however each state has its own agenda and they do not necessarily work in tri-partisan agreement. Many participants indicated a belief there was a need to get the representatives of the people looking to take a broader view of the issues and solutions.

At the federal government level the exit package requirements to pull up irrigation equipment that was previously subsidised is an example of government needing to be more efficient with monetary support. Karlene Maywald is the local state member for Chaffey, (an electorate that takes in the Riverland including the northern Mallee). Although she is leader of the National Party in South Australia she is the Minister for Water Security and Minister for the River Murray in the state Labor government. According to the SA Government website, the issues that Maywald has been driving include ‘ways of improving the management of river water in South Australia, managing salinity and, returning additional water to the river for environmental flows’, (Ministers in SA Government, 2009).

At local government level, there is little evidence of Riverland cooperation. Amalgamations have seen the Paringa and Renmark shires come together and form a single municipal council. Likewise, Berri and Barmera are one council area. As Renmark and Berri are less than 25kms apart, many in the area think that the four towns should do more to come together

The Living Murray project shows promise as a response to learning to share the water resource. The Living Murray project spans all states and authorities across the basins and is working at permanent cost-effective recovery of water for the environment especially for six iconic sites. As the MDBA fact sheet on this project explains, ‘a key part of The Living Murray is to find a balance between social, cultural

and environmental needs, as well as national interests, to ensure there is equity in the way that environmental water is delivered' (MDBA 2009b:2).

It would seem that a case could be put that more could be made of individuals and groups sharing their knowledge, understandings and learning with others across the community. One professional group who seem to collect inputs of knowledge and learning across the region from a wide group of people are the agronomists. The agronomists offer information, knowledge and advice as a professional service. However it is worth noting that the agronomists' knowledge base and understanding grows as they receive specific and detailed information, and share in depth discussions with those who are paying for their services.

Discussion

Community learning is a social form of learning and occurs as a result of groups of people who are learning through shared experience and engagement with similar situations and circumstances. Individual participants in this study were categorised as being actors within at least one of the five stakeholder groups of (1) farmers and growers, (2) water authorities and land managers, (3) representatives of community-based organisations, (4) adult education and training providers, and (5) other water dependent businesses. All are contributors in their communities, all are pursuing goal-directed activities, most are instigating changes in their lives around decreasing availability of water and therefore we would argue that all are involved in learning.

Individual participants talked about the way that they, as individuals learn. Some reflected on their own practice, others paid for advice from professionals; others attended community learning experiences such as field trips and field days, where they could look, touch and discuss with others what they saw. While there appears to be limited

cohesiveness in the way that local, state and federal governments coordinate a response to less water, there also appears to be limited cohesiveness in the way that learning among individuals is shared in the wider community. The theme of fractured relationships has carried over into the way that water is shared and the lack of it is addressed. Learning within the Riverland community could be enhanced by a greater use of networking between individuals, community resources and government initiatives.

Six different forms of adult and community learning were found in the data collected for this project. The first was learning to be productive. It is suggested that in order to understand the adult and community learning in the Riverland at the moment it is important to understand how these communities came into existence and what drives their development. Learning to produce involves the development of livelihoods, which in turn, contributes to the building of the region's economy.

The second form of learning identified in the study is learning to be efficient. The growers explained how their irrigation and on farm watering has become more efficient with changes to their irrigation practices. Some of these have occurred through the adoption of new technologies such as drip watering and the use of condition monitoring. The informants gave examples of these changes and efficiencies which spanned a sixty year period. It seems that most people throughout this region show awareness of the dryness and provide examples that demonstrate improvements to water efficiency.

The third form of learning is learning to survive. The community now needs support services to assist those who are experiencing emotional, relationship, financial and business concerns. It seems nearly all businesses across the region whether irrigator, growers, tourist operators, transport workers or processors are experiencing the effects of the drier conditions. The notion of 'critical water' has been introduced in an attempt to get through another season but even

‘critical water’ does not have any long term prospect. Accordingly, learning to survive has now become an important element of community learning in this region.

The fourth form of learning is learning to live with uncertainty. Decreasing availability and security of water has started to negatively affect the economy. Interestingly additional water is available on the water market, though as the cyclical reserves run down, so does the capacity to buy water. In order to get to the future the people of the Riverland will need to find strategies and learn to live with the many uncertainties.

The fifth form of learning is learning to be sustainable. Sustainability is a way of raising and addressing environmental concerns and river and land care. Most environmentalists and land managers in the Riverland and beyond have argued against an attitude of ‘Australia unlimited’ (Cathcart 2009) believing that there has been an over allocation of water for far too many years and therefore too much has been taken out for irrigation. Growers admitted that, compared to their more recently developed irrigation practices and usage of water, they have wasted and put too much water onto their crops. Further those with responsibilities for land and water resource management and environmentalists would argue that this has been at the expense of the life of the river and the environment generally. The eucalyptus trees that are back from the river and those on the flood plains are stressed and some are dying. Similarly the fish, turtles, frogs and birds are being effected and decreasing in numbers. Some strategies are being put in place, though some might say ‘too little and too late’ while others are left wondering where the water is going to come from to start fixing the health of the river and flood plains.

The sixth form of learning is learning to share. This form of learning appears to hold out many challenges yet there are also some impressive precedents. It is considered unique in the Westminster system of government to have a leader of a party that is in opposition

to the elected government recognised and incorporated into the government of the day as a Minister. Another example is the apparent cooperation of the states to instigate the Living Murray project ((MDBA 2009b). Similarly the instigation of a strategy to develop a new basin plan (MDBA 2009c), each, and together, these stand as examples of growing tendencies towards co-operation and an increasing acknowledgement of the need and willingness to share. Some evidence of community members learning to share is offered here, though more important is the need to have this form of learning continue, and be developed further in the future.

Decisions are being made and changes are being instigated by individuals and communities alike. National, state, and regional strategies are being developed and with these go changes. With these decisions and changes go learning, knowledge sharing and production. But these decisions and this learning are complex and important, and accordingly the people involved in making these decisions need to be informed and supported by those around them. Interestingly, the US government recognises the need for support in making decisions on climate change and has funded research into the development of a framework and a set of strategies and methods for organising and evaluating decision support activities which are related to climate change, (Panel on Strategies and Methods for Climate-Related Decision Support, 2009). Some of this work may be applicable to us in Australia and more so to those living in the community of the Riverland. Therefore this work may be worth reviewing further with applicability and relevance to the Riverland region in mind.

The concept of political economy is about making decisions regarding the allocation of resources when there are competing demands. Competing demands are being placed on the water and it is very difficult to negotiate and prioritise the allocation of quantities of a diminished resource to the satisfaction of all. Accordingly there is a

theme within this study that is in part about the lived experience of the political economy of water in this region. Clearly there is much learning that has occurred, is occurring, and needs to continue to occur around living with less water, increasing dryness and climate change in this region and more broadly.

Conclusions

This research has identified and described six overlapping and inter-related forms of learning. Learning to produce and learning to be efficient are aligned with the future because they are about modifying and improving existing practice. Learning to survive and learning to live with uncertainty are happening now and are about the seriousness of the present. Learning to be sustainable and learning to share are about changing past and present practices so that future approaches are able to cope with a changing water climate.

This study shows that the people and communities in the Riverland are at the forefront of serious engagement with learning to be drier. They are considering evidence, ideas, and options. They are making decisions and they are developing and implementing strategies. People will continue to need information in order to make decisions that suit their circumstances and enable them to adapt to changing water supplies. Clearly though, they are all in the process of learning to live with less water and climate change. In short, they are learning to be drier.

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Learning to be drier in dryland country

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This research project, part of a much larger study, considered how people in regional communities learnt to deal with the impact of reduced water availability as a result of drought or climate change. The communities in the Mallee-Wimmera region of Victoria, Australia, were the focus of this study and a range of local people from different sectors of the communities were involved in interviews, which became our main data source. We recognise the limitation that not all viewpoints could possibly be accessed in the participant selection process. The resultant data indicated that significant changes were being made to local practices as a result of the learning taking place and that there were a range of processes which enabled adult learning across the communities.

Introduction

This paper looks at learning about living with drier conditions in an area which has always been comparatively dry. The Wimmera-Mallee region, in north-west Victoria, while in the past a productive wheat and sheep agricultural area, has survived over the years without major sources of water apart from rainfall. No large rivers run through the area, although the Murray runs along the northern Mallee northern border. The rivers that exist are intermittent and the 'terminal' lakes are not dependable and increasingly saline. Farmers are therefore dependent largely on seasonal rainfall although there is a stock and domestic system in place that delivers water by channels from the Grampians-Wimmera-Mallee (GMW) water authority, which is now in the process of changing to a piped system as will be explained in the paper. The northern part of the region has significantly lower rainfall than the south, and the drier conditions experienced in the past decade have therefore been a greater change for people in the south of the region.

The research was carried out in the southern part of the Mallee region and northern Wimmera. Here there are four larger towns, each in the order of a thousand people and each separated by about half an hour's driving distance. Each town has a range of basic services: shops, agricultural suppliers, hotels, and secondary school and so on; but with some discernible differences in prosperity and population age structure among the towns, with one (Town B in Table 1) having a larger number of younger families, as reported by respondents. No significant rain had fallen in several years before the research took place (remembrances of the number of years since significant rain varied among respondents); but, both ironically and excitingly, heavy rain fell on the second day of our first visit in April 2009 and reasonable rain continued between then and the second visit in July, at which time the landscape had taken on a completely different aspect, with good rains continuing into Spring 2009.

Background and literature review

The background against which this case study should be viewed can be briefly summarised as follows. Australian farming has undergone a radical transformation in recent decades. A combination of an increasingly global agricultural marketplace and cycles of drought have led to an uncertain outlook for farmers. Family farms are increasingly becoming consolidated in larger holdings, some of which are owned by large companies rather than by individuals. These changes have major impacts for farmers and their families and an increasing trend towards off-farm working for family members (eg Alston, 1995). There has been longstanding concern about the depopulation of many rural communities in Australia as in other countries, due to younger people leaving for further education and jobs and not returning (Gabriel, 2002). Farm mechanisation has led to a decrease in demand for labour on the land itself (John, Pannell & Kingwell 2005; Schulz 2001: 80).

Clearly drought is not the only factor affecting farming regions, but it is extremely important. The Introduction to this special edition covers drought literature in detail so this section is confined to literature specifically about the Wimmera-Mallee area. The Birchip Cropping Group (2008a), a notable Wimmera-Mallee organisation concerned with improving farming practices, undertook an extensive research project about the effects of drought in the region, involving 60 farming families. The major findings were concerned with the uncertainty faced by farming families, the way in which prolonged drought had depleted families' resources, the tendency to adopt conservative farming practices, the worries that communities are irrevocably declining, and the high and continuing levels of anxiety experienced by some farmers. On the more positive side, they also reported farmers' commitment to their occupations and among most farming families a continuing tendency towards optimism (Birchip Cropping Group 2008a). A report by the Youth Affairs Council of

Victoria (YACVic 2008) in partnership with a Wimmera-Mallee organisation, the North Central Local Learning & Employment Network, showed that drought had a particular effect on young people as they had grown up in dry conditions, with the associated stress. Some young people worried about whether they would be able to afford tertiary education and about the effects of the drought on employment prospects; others mentioned the stress their parents were under and the effects of dry conditions on the availability of sporting facilities (YACVic 2008).

Given that drought has such major impacts, it is important to know how bad it is and how likely it is to continue. The average annual rainfall for the Mallee region between 1961–1990 was 331 millimetres that was traditionally spring and winter based (Victorian Government Department of Sustainability and Environment, 2008). Between 1998 and 2007, average rainfall was 13 percent below this, and also temperatures became hotter with average maximum temperatures increasing by 0.7 percent and the number of days over 30 degrees increasing by eight (Victorian Government Department of Sustainability and Environment, 2008). For the Wimmera, annual rainfall long-term is 403mm (Commonwealth Scientific and Industrial Research Organisation [CSIRO] 2007). As with the Mallee, rainfall was 13% below average in the ten years 1997–2006 (CSIRO 2007). Predictions are that rainfall for the Wimmera-Mallee will remain at a lower level, although not at the low of the past ten years (Birchip Cropping Group, 2008b) which might lead to a wheat yield decrease of up to 18% compared with the twenty years between 1980–1999 (Birchip Cropping Group, 2008b). Farming adaptations such as introducing or increasing use of fallow, and retaining stubble were reported by the Australian Department of Agriculture, Fisheries and Forestry as increasing wheat yield in the Wimmera-Mallee, while changing varieties and adapting different planting regimes were found to have few benefits (Birchip Cropping Group 2008b).

The Buloke Shire, covering much of the Wimmera-Mallee region, scores well on some measures of community well-being and less well on others. The 2007 Community Indicators Victoria survey (Community Indicators Victoria [CIV], 2008) shows the shire above average for Victoria on indicators of personal health and well-being, safety and absence of crime, housing affordability and community engagement; but below average on school-leaver outcomes, employment rates, educational qualifications and internet access. It is well below average in terms of average income, with a median equivalised gross weekly household income of \$396 compared with the Victorian average of \$600.

In the Wimmera-Mallee region there are several secondary schools, and while there is no TAFE college within the region there are several community centres which include adult learning activities among their range of offerings. It is generally accepted, although not uncontested, that learning can be described on points along a 'formal' to 'informal' (eg Marsick & Watkins 1990) spectrum. It might be expected that community members attending a formal course may expect to learn, whereas their learning from other activities in their community may be less conscious. Smith (2003) has extended the concept of formal vs informal learning for on-the-job learning at work to new categories of taught, sought and wrought learning. The latter applies to learning that is fashioned from experience rather than being intentional, and requires the ability to reflect on experience.

Research method

Two visits were undertaken to the site. At the first visit, April 2009, five interviews were undertaken, with six at the second visit in July 2009. Some of these interviews had multiple participants. Four interviews were undertaken by telephone, with participants who were unavailable on the days of our visits. Six of the interviews were taped with permission—those on the second visit—while notes were taken

from the interviews on the first visit and the telephone interviews. Most interviews lasted around 30–40 minutes, with the longest being 75 minutes. The interviews were semi-structured and were based around the questions described in the introduction to this special edition. In addition we were provided with literature produced by some organisations and referred to relevant web sites; we also read local newspapers.

Details of the interviewees are given in Table 1, with an indication of the town at which or nearest which they were normally based; to preserve confidentiality the towns are not actually named. Some participants had a region-wide responsibility. The interviewees have been divided into three major categories, under which the findings will be reported. It should be noted that there is considerable overlap among the categories, with all respondents proffering information and views about issues pertaining to other categories. Many had more than one role with relation to water use; for example some people farmed as well as having community jobs.

Table 1: Details of interviewees (n=28)

Role	Organisation	Town
<i>Water supply/economic/domestic/social</i>		
Research manager	Water authority	Outside the region
Communication manager	Water authority	Outside the region
3 staff with responsibilities for economic & community development	Council	A
6 members	Gardening group	C
<i>Farmers/ farmer groups and support services</i>		
Farmer	Farming property	C
Executive officer	Farmers' development organisation	B

6 committee members/ farmers	Farmers' development organisation	B
Agronomist	Agricultural supplier	A
Agronomist	Agricultural supplier	C
<i>Community/education & training organisations</i>		
Co-ordinator	Community/learning centre	A
Co-ordinator	Community/learning centre	B
Co-ordinator	Community/learning centre	C
Executive officer	Regional education and training organisation	D
Principal	School	B
Principal	School	C
Project officer	Regional community development organisation for women	C

The aim of the participant selection was to speak to those involved with all aspects of the water supply and use, and to those specifically involved with education and training services. Within the framework set for the research project as a whole, in which categories of stakeholders were identified, participants were selected by the 'snowball' method, which relies on pre-existing networks (Browne 2005); names of contacts who had participated in previous research projects were provided to the researchers, and these people suggested other people or groups to interview. It should be noted that a limitation of this method is that others outside these networks are not accessed. It should be noted that it proved quite difficult during the interviews and focus groups to encourage participants to confine their answers to issues to do with learning. Most were eager to tell the story of the effects of drier conditions on themselves and their communities, and how they had adapted to them. Due to the desire of participants to tell the broader story, the amount of data about methods of learning formed a relatively small part of the total data

collected. Data were analysed by visual inspection of the transcripts and notes for common themes which included both 'etic' issues (relating to the questions posed by the researchers) and 'emic' (arising from the participants' interests and responses (Stake 1995 20). It is recognised that the sampling methods may affect the validity of the conclusions drawn (Sadler, 2002, 132); however, the use of multiple perspectives in a range of different locations, as well as personal observations while in the locality for a total of three days on two different occasions, provided some confidence that the data were valid.

Findings

Learning about water supply

The water authority accessed water from reservoirs and bores and a small amount from the Murray. As a result of prediction work undertaken twenty years previously the authority was changing its delivery method to the Wimmera-Mallee from channels to pipelines. Pipelines would save 80 per cent of the water which was currently lost through evaporation and would also provide better quality water. Participants had varying impressions of the changes this would bring, depending presumably on where they had learned about the pipeline. A small number of participants believed the pipeline would solve all their water problems, while some were more circumspect, believing it would assist but that prices would increase. Spokespeople from the water authority mentioned several education strategies they utilised about water use: they provided leaflets with bills, produced booklets which were available in community centres and the like, displayed web pages about saving water and sponsored a weekly radio program about gardening. In addition they attended agricultural shows and field days, sent speakers to service and gardening clubs, and had constructed a promotional trailer. They also held community water-saving information sessions which were well-attended: 'usually more than expected' with between 50–150 attendees.

The water authority itself learned about climate conditions and water use by regular monitoring of inflows to and outflows from the system. From the former they had deduced that the water situation was worse than could be modelled under climate change and therefore that there was a drought (perhaps superimposed on climate change) which might improve in the future. They learned from outflow data that once the pipeline was introduced (which had already happened in the northern part of the region) people's improved water-use practices would not revert to pre-crisis conditions but were likely to retain their more conservative use of water. The authority had acted on feedback about community impact of water restrictions, and had reintroduced limited hosepipe use due to injuries to elderly people carrying buckets, and relaxed restrictions for sporting clubs. As the research manager said "It's a question of social responsibility".

Learning to be drier for economic, social and community purposes
(excluding farming)

The representatives from the Council outlined the difficult economic situation in the area. They stated that 50 per cent of Victoria's grain had traditionally been produced from within 100km of where they were located and that drier conditions had badly affected this situation. They reported high levels of depression among farmers and one case of suicide in a business person. The Council was active in promulgating new ideas for farming crops, which used less water—for example the oil mallee tree. Council officers in turn learned about such possibilities from the Department of Primary Industries. They provided 'farm gate' visits so that individual farmers were aware both of available financial assistance and of different farming options; and spoke or brokered other agencies' speakers at local meetings, for example at fire sheds. It was felt that farm gate visits were useful in encouraging people to attend community meetings, and provided additional information for council officers to use in their planning. Several local jobs designed to address drought-created problems had been instituted, but were of a short-term nature due to limited

periods of funding from government (State and national) which made long-term planning difficult. Council officers indicated that there was awareness in the community with the range of initiatives and programs:

People are almost at the point of tiredness with the amount of activity that's going on. They are surveyed out. The challenge is to get practical activity happening.

Other participants also mentioned problems of decline in some of the towns. For example, an agronomist mentioned the difficulty of getting together a boys' football team:

Up at XXX (town) now in the football they've only got 12 kids in the under 16s and they get a car load of YYY (town outside the region) boys every week to help them play... Yes and they sort of ask the opposition side each week if they can have a couple of kids to help them. So it's getting pretty hard in terms of sporting and everything.

Several people mentioned the decline in volunteering. It was difficult to separate in people's minds the issue of dryness from rural decline; while there is clearly a relationship, some of the towns were growing, indicating other issues were also at play.

The gardeners' group included women who were active in many areas in the community. One participant mentioned the effects that the drought had on the golf and bowls club. Two participants were both former owners of the local nursery business. In relation to gardens all mentioned the imperative to adapt their gardens for drier conditions; heat was also an issue with one participant saying 'when we had those days that were 50 (in early 2009) a lot of the succulents just boiled within themselves'. One participant, however, had been able to maintain an 'English-style' garden despite restrictions until recently on anything other than hand-watering. In gardening, strategies such as better positioning or shielding from the wind were utilised as well as purchasing drought-hardy plants. Participants mentioned making

choices, for example shrubs or a vegetable patch, and focusing on keeping one area of the garden alive. During a visit to the farm of another participant, a visual confirmation of the effects on farm gardens was given with the participant indicating areas of cultivation that had been abandoned.

Water was carefully conserved, as the following interchange among members of the gardening group during the focus group illustrates:

- Interviewer: So have you all put on extra tanks and things in the last few years?
- Participant A: We put a really big one.
- Participant B: Yeah we did.
- Participant C: Everything that's got a shed.
- Participant D: Yeah everything that's got a shed's got tanks.
- Participant C: Everything that's got a roof's got a tank on.
- Participant B: A roof, yeah.
- Participant E: I've even got 44 gallon drums around the yard that catch a little bit of water off here and there.
- Participant C: Anywhere there's a drip there's a bucket under there.

However participants in this group were tolerant towards those who cheated a little. One participant told a story about her elderly mother which related to the rule that waste water from the shower could be used for the garden.

My daughter called there one day and said, damn, Nanna's in the shower. She yelled out and Nanna wasn't in the shower at all but the shower was running... ..she's 90. Can't she put a bit of water on her garden?

The members of the gardening group reported that some strategies had adverse consequences; for example recycling water waste for garden use could render septic systems too dry, and if certain types

of detergents were used, could kill plants. These issues tended to be learned by trial and error and by adopting ideas learned from neighbours. More formal learning took place at the local nursery or from speakers at the gardening club. Speakers attended the club monthly and drought-friendly gardening was a frequent topic. The members also learned from gardening programs on television. Landcare also provided occasional seminars and ran courses for example on seed propagation. The garden club was well attended, often with 40 or 50 people. Participants mentioned that younger people were also well aware of the need to conserve water, which was passed on through the family.

Learning to be drier in farming

In the region, two farmers' development groups operated: the Birchip Cropping Group and Farm Management 500. Both had membership fees which provided access to courses, information and cheaper entry to events. The Birchip Cropping Group provided some services to non-members including the results of its research into crop varieties and other farming matters.

As one participant who was an agronomist put it, the basic challenge facing farmers was that:

As a primary producer, you're trying to grow as many kilos of crop X for available millimetres of stored soil moisture.

After many years of drought, the moisture levels in the soil were extremely low. A wide range of improvements in farming practices were reported by participants including moving from keeping sheep to growing crops and within crops, to those that required less water; fallowing paddocks; sloping and sealing paddocks to catch storm water run-off; using GPS to sow seed and fertiliser in exactly the right location to utilise micro-soil conditions; dry-sowing to anticipate coming rain; retaining stubble; minimal or no tilling; and the use of press wheel technology to compact soil around seed to conserve

water. Some of these practices (eg those requiring better tractors) were very expensive (half a million dollars was quoted, for example) and it was stated that farmers often shared expensive equipment amongst themselves. The operation of electronic equipment and use of the internet were routine among farmers. Changing conditions meant that farms had grown through consolidation; around 3000–5000 acres was the norm now, whereas 200 acres used to be sustainable.

A group of committee members of one of the farmers' development groups, all of whom were also farmers, provided the following information about the education strategies that they used with farmers about better farming practices, including working with drier conditions. There was recognition that people learned in different ways and therefore there was a need to offer a variety of strategies. It was felt that most people would not attend an event badged as a 'learning event' and therefore education activities needed to be blended with other activities—'good coffee and good speakers and a lot of fun and meeting your mates'. It needed to be something that 'gets people off the tractor'. Talks were often branded as 'relevant information to your decisions' rather than 'education'. One stated reason for these strategies was that some people had had previous negative experiences with learning. Attention also needed to be paid to rural etiquette. For example question and answer sessions might not always be felt appropriate as some farmers perceived questioning as being unduly aggressive—'rude and critical', and also may be afraid of being humiliated by asking an inappropriate question.

However some farmers were different and did enjoy learning as a specific activity; they might read or use the internet—'ferreting out' information. It was mentioned that increasing proportions of farmers were university-educated and therefore activities needed to suit all points on the educational spectrum. For example, a member of the farmers' development group said:

At the last expo, XXX who is a climatologist, oceanographer, sort of person gave a talk on climate models and the tent was packed with people. They were standing up the back and everything... and it was really quite a demanding lecture.

This group of people also discussed the range of attitudes towards changing farming practices: 'We have some farmers that have not moved and we have others who have moved tremendously'. It was felt that some farmers 'don't even see what goes on through the fence' and some were 'satellite learners who don't go out but they do see what goes on through the fence'. These were also described as 'tailenders'. It was also mentioned that some farmers adopted practices that others used but without understanding why; it was suggested that they were 'not doing the mental work'.

Another group of people who help farmers learn about farming practices are agronomists. These might be independent consultants who might be employed by an agricultural supplies group. The farmers' group mentioned above were fairly dismissive of agronomists, suggesting that they were generally trying to sell products and their advice might not be unbiased.

However the two agronomists that were interviewed appeared to have a genuine commitment to their clients and worried about the success of their clients' farms. They explained that their income could be derived from fee for service or from commission, or from a mixture. The work that agronomists did was summed up by one participant, a farmer, as:

...in the business of helping you look at your whole farm and decide what crops you're going to sow in each paddock and how much fertiliser you'll put on each crop and then which herbicide you're going to spray. They'll walk in the paddocks and find out what the weeds are and tell you what to spray them with and all that sort of thing.

The agronomists reported that farmers often had to make very difficult decisions, about whether they could afford fertiliser in a particular year, for example,

Not being able to farm, because of economics, the way they want to farm, in the way they should be farming. In relation to that, are things like not sowing a newer-type variety that they should be sowing (because) they probably can't afford to buy variety X for a large amount of money ... They haven't been able to apply the nutrition to the crop or pasture or whatever they're trying to produce to the value that they want to because economics haven't allowed it.

It seemed that many farmers used an agronomist and also received information from other sources such as farmers' development groups and the internet. Some participants in the farmers' development group had said that if members of the group approached farmers individually offering to help, it might cause discomfort. So perhaps the degree of control and privacy afforded by the act of hiring an agronomist, rather than receiving individual assistance from a representative of a community group was one thing that made learning from an agronomist more attractive to some farmers. Agronomists also reported that their work contained a great deal of counselling, although one noted that the degree of counselling was a matter of personal 'style' and that not all agronomists took this approach. It was clear that agronomists were extremely closely connected to their clients and to the farming situation in general; they were aware of the devastating effects that dry conditions were having. Although, as mentioned earlier there had been no farm suicides in the region, one agronomist reported instances in a town not far from the region:

I know up at XXX (town outside the region) there were five people who committed suicide within a space of only about two or three months... They'd taken their sheep to the YYY (stock agent), and they either didn't sell or they didn't sell for the price

they wanted, and they just, they just went home and ... ended their life. But that's just what drought can do to people.

As well as one-to-one work, agronomists provided presentations to local farmers and sometimes their branches mounted 'family fun days' and other events. One mentioned that he had taken farmers away to a two-day residential course to remove them from the pressure of facing their dry farms for that period of time. The agronomists reported that they did their own learning from a variety of sources: their initial agricultural degrees, their companies' training programs, mentors within the company, suppliers, learning from their customers, and visiting field days. One said that the field developed so quickly that more than a few months away from the work would send him a long way behind.

It was agreed however by a few participants that too much information was sometimes problematic; one council officer in particular said that people under stress did not want too many choices. It was also mentioned that people needed to be able to evaluate what they learned and assess the validity of the information in terms of the source. A member of the farmers' development group pointed out the need:

...to know the value of published peer review stuff compared to something that's put out by a snake oil person.

Changes to formal learning systems as a result of drier conditions

Community Centres noted that course offerings had changed as a result of the drier conditions. Hobby courses were less common because all members of a family needed to work and did not have the same amount of free time as previously. Vocational courses which prepared people for work or for second jobs were more common: for example, heavy goods vehicle courses or fork-lift licences. A State government program called Rural Skills Connections worked with training providers to find work for members of farming families with

skills that could provide an income. In relation to farming matters specifically, the Federal government funded ‘Partners in grain’ workshops in several of the towns. These were heavily subsidised and included, for example, farm office management courses and spraying workshops lasting for a full day.

The water authority undertook a great deal of educational activity through schools. These included a quarterly newsletter with educational information for students—using the character ‘Phil the Bucket’ for primary aged children, an annual water poster competition for students, and an annual conference for students in Years 9 and 10 (approximately aged 15–16) on the theme ‘Is our water use sustainable for today and tomorrow?’ The latter conference involved a Skype link with New Zealand students in 2008. In another international link, the regional educational and training organisation had received funding for a program in which they sent 20 young people to California to visit farming communities, as a part of which they undertook pre-visits to Victorian farms. This exercise provided the young people with a good overview of farming practices and also showed them that Australian dryland farming practices were quite advanced although confidence was higher in the US despite practices not being as good.

Schools adopted water wise practices in their school grounds and taught them in the curriculum. A few participants mentioned that as this generation of children grew up, they would adopt different behaviour from the current generation of adults; it was mentioned twice, for example, that young children did not know what sprinklers were. School newsletters often contained information about water-saving, and these were distributed to the general community through local newsagents as well as to parents. It was hoped that community practices might be influenced through this means. As one principal said, the school was pivotal in the community in many different ways.

Discussion

As the Wimmera-Mallee is a traditionally dry area, participants did not find it alien to be concerned about water and were open to learning better ways to work with drier conditions. Those who had lived in the region for longest, and particularly those who lived or had lived on farms, seemed to be particularly adept at utilising little water for domestic purposes.

Learning to be drier took place through a number of strategies that ranged in formality, including, arranged in increasing levels of formality—or from ‘wrought’, through ‘sought’ to ‘taught’ (Smith 2003):

- Feedback on actions eg planting a new variety of crop or garden plant.
- Individual learning through the receipt of provided information (eg from the water authority, from one’s children’s school, the local newspaper or magazines produced by agricultural suppliers) or from seeking information via the internet.
- Talking informally ‘over the fence’ (back gardens) or ‘through the fence’ (farms) to neighbours.
- Attending a community activity specifically on water issues or via another group eg gardening group or Country Fire Association meeting.
- If a farmer, joining a farmers’ development group and/or employing an agronomist, both of which sources were able to collect and filter information and pass it on.
- Enrolling in a course (from a short skill-focused program through to a qualification).

In addition it was clear that people learned from others’ experiences, particularly in those areas which had visible results such as crop planting or garden maintenance. This could be regarded as a form of social learning (Bandura 1977). This form of learning was evident

within formal as well as informal activities, for example in the trials of crops that were run by bodies such as farmers' development group, and hence does not fit neatly on the above spectrum.

The nature and range of people's engagement with the above activities varied according to individual circumstances and learning style preferences. Agencies seemed to be well aware of this and utilised a range of strategies to get their messages across. It was also clear, from comments from a number of participants, that some adults did not choose to engage in learning activities. This reluctance seemed to relate to a number of factors including previous negative experiences in formal education or the challenges posed to existing long-standing practices, which could be confronting (James 1999).

The interviews and focus groups revealed some interesting differences among participants and their views, which indicated some underlying tensions in the communities. These might be (albeit crudely) characterised as dichotomies as follows:

Beliefs

- Climate change believers vs drought believers
- Optimists vs pessimists

Perceptions about others in the community

- Farmers are slow learners *or* farmers are nimble adaptors
- People who did not change their practices were problems for the community *or* were making legitimate choices for their own land and lifestyle
- Businesses which sold agricultural products were exploiters *or* were partners with farmers
- People concerned with environmental issues were 'half-baked greenies' (in the words of one participant) *or* were responsible users and preservers of land

Perceptions of the locus of responsibility

- Believers in self-funded community initiatives vs believers in government-funded institutionalised programs

It was apparent that these tensions could affect learning processes—who got to learn, who engaged in learning and who didn't, who would feel comfortable with attending which events, and who was likely to act on what they learned. However as community relationships and perceptions were not the focus of the research, it was not possible to draw firm conclusions.

The actual process of the research also raised some not unrelated issues. It was clear that the major participants in issues of drier conditions and community adaptation to such conditions were well known to each other, albeit the degree of mutual respect varied. However as researchers we were conscious that there were many people within the communities that we did not access due to the sampling method (Browne 2005) and that the picture we have provided may be incomplete. These 'omitted' people may also be omitted in other research and perhaps in community initiatives as well. These people might be the 'hard to reach' group mentioned by the farmers' development group participants, or might be otherwise. It was also salutary, and perhaps indicative of the difficult times being experienced, to note that while most participants were extremely helpful, a few, while readily agreeing to participate, expressed some resistance to the research. These people's views may be summed up as feeling that the community was over-researched, that they wanted to see some practical strategies suggested as a result of the research, and that they were not confident that this outcome would emerge.

It should be pointed out that the foregoing statements are not intended to negate the strong evidence we gathered of community strength and cohesiveness. One agronomist, for example, said

The towns are small and struggling so there's no real competition as to trying to grow a better crop than your neighbour ... There might be a couple of blokes like that but not really ... There's been cases where some farmers have been injured through work and have been in hospital or stuck home in bed for a few weeks and at a busy time of the year when it's cropping, you know, the local community get three or four guys together and they'll go out and sow their farm for them and help with stuff like that.

As mentioned at the beginning of this paper, 2009 was proving a good rainfall year in the Wimmera-Mallee region, the best for six or eight years according to two participants, and participants mentioned the increased depths to which soil moisture was reaching. Both school principals reported having to educate the children about bringing mud into the school and one said the school had needed to undertake a program of re-roofing. One principal said

I had to ring up a grandparent last week and ask if they could come up and pick their grandson up, take him home and shower him and put these new clothes on him. So that's the most interesting thing that we've had to do this year. We've got so many kids getting wet and dirty and muddy.

However there seemed to be a refusal to be too optimistic. One participant said:

The worrying thing is, if we have a really good year, that some people might just clear their debt, pack up and leave as well.

Another participant said that there was no certainty until the crops were harvested; in the previous year, rainfall had been good at the beginning of the season and then tailed off. Our research suggested that, however the 2009 season concluded, the individual and community learning undertaken during the period of drier conditions would persist into the future.

Conclusion

At the commencement of this research, we had hoped to clarify some of the modes of learning and particular strategies which people in the dryland area used to gain information about living with less water. The nature of the learning varied according to peoples' circumstances and personal preferences. From the data, its analysis and the discussion above, the following strategies were identified: feedback on actions (seeing the results of personal activities); individual learning through the receipt of provided information or from seeking information via the internet; talking informally with others; attending a community activity focussed on the provision of information about water issues; using a professional group or service and through formal learning (enrolling in a course)

We identified some underlying tensions relating to personal beliefs, perceptions about others in the community and about the locus of responsibility. While these tensions would probably affect learning, it was outside the scope of this research to delve any further into these variations.

Most participants were very obliging in providing us with information; however, we were also aware that some felt that their contributions would not necessarily lead to any change in their circumstances. We are also very conscious of the fact that there would be individuals or groups who were under-represented in our data, so we acknowledge that bias.

In consideration of the information gained, we raise the following questions: What is the best way forward? Are there new strategies that can be developed? It is possible that future research could focus on those groups of people who appear to be disengaged from the community activities which are currently used as vehicles for delivery of information. Only after research into this issue could ways be developed either of motivating such people to engage in existing activities or of considering activities that might be more suited to this target group.

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Wicked learning: Reflecting on *Learning to be drier*

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In this final, collaborative paper in the Learning to be drier edition, we reflect on and draw together some of the key threads from the diverse narratives in our four site papers from across the southern Murray-Darling Basin. Our paper title, Wicked learning, draws on a recent body literature (Rittel & Webber 1973) about messy or 'wicked problems' as characterised by Dietz and Stern (1998). It picks up on our identification of the difficulty and enormity of the learning challenges being faced by communities, associated, at best, with a decade of record dry years (drought) and severely over-committed rivers. At worst, drought is occurring in combination with and as a precursor to recent, progressive drying of the Basin associated with climate change. Our research is suggestive of a need for much more learning across all segments of the adult community about '... the big picture, including the interrelationships among the full range of causal factors ...' (Australian Public Service Commission,

APSC 2007: 1) underlying the presenting problem of drying. We conclude that solutions to the messy or wicked problem of drying in an interconnected Basin will lie in the social domain. This will include building a wider knowledge and acceptance of the problems and likely future risks across the Basin including all parts of communities. The problem of drying as well as its causes and solutions are multidimensional, and will involve comprehensive learning about all five key characteristics of other 'wicked' policy problems identified in previous research in the environmental arena. The narratives that we have heard identify the extreme difficulty in all four sites of rational and learned responses to being drier as the problem has unfolded. All narratives about being drier that we have heard involve a recognition of a combination of the five characteristics common to wicked problems: multidimensionality, scientific uncertainty, value conflict and uncertainty, mistrust as well as urgency. All narratives identify the importance of social learning: to be productive, to be efficient, to survive, to live with uncertainty, to be sustainable and to share. Combating the extent and effects of drying, causality aside, will require new forms of learning through new community, social and learning spaces, apart from and in addition to new technological and scientific learning.

Introduction

Our first paper (Golding & Campbell 2009) set out the parameters and presuppositions of our research including our research questions, method and literature that help inform our method. Our first research question was about how and what adults learn in response to changes in water availability in the southern Murray-Darling Basin. Our second question was about how the learning is experienced by the different stakeholders. Our third question was about how stakeholders are learning to respond. The team papers (Foley & Grace 2009; Golding & Angwin 2009; Brown & Schulz 2009; Smith & Campbell 2009) answer the questions using interview data collected from each of four sites (alpine, mid-river, lower river and dryland

respectively). In this collaborative paper we look back on and draw together some of the key threads from the diverse narratives in the four site papers.

While there has been much recent research into the significantly changed water regime and climate-related parameters associated with change in the Basin, there has been very little previous research of people's learned responses to these changes. We were uncertain at the outset as to which theoretical construct(s) would be most useful in organising and interpreting the data. We decided, after evaluating alternative theoretical perspectives, to structure our final paper and its title around the perceived 'wickedness' of the problems involved in drying, 'not in the sense of evil, but rather as an issue highly resistant to resolution' (APSC 2007: 1). We note very recent research (Lazarus 2009) that identifies global climate change as a 'super-wicked' problem, because time may be running out, there is no central authority and some of those seeking to solve the problem are also causing it. Drying of the southern Murray-Darling Basin, even if it was not related to global climate change, arguably shares some of the same defining characteristics.

The literature on wickedness has its origins in social policy planning, and bears no relation to the way many young people now use the term to mean 'really good'. Wicked problems are seen, by contrast, to be messy, difficult or impossible to solve. They typically involve incomplete, contradictory and changing requirements, that are often hard to recognize. We recognize that the resolution of a drying issue (or climate change) in an interconnected Basin, as Rittel and Webber (1973) would likely argue, cannot be treated with traditional linear, analytical approaches. In a similar way, we identify the necessary adult learning as wicked, in the sense of being highly resistant to resolution, using the limited and fragmented, existing learning opportunities, organisations and systems.

Reflecting on some limitations (and strengths) of the method

Our ability to draw a coherent picture of learning about drying in four sites in the southern Murray-Darling Basin to mid 2009 is limited by a number of factors. These include the small number of sites selected, the limited time each team had on each site and the limited range of interviewee types and individuals selected or available for interview. As with all research, the project and each of our site papers have been shaped by people with different experiences and interests in learning. These include what is valuable to study, how to collect and report data, which literature to consult, which theoretical perspectives best inform and answer the selected research questions and how best to communicate our findings in this academic paper format. In that sense, we do not claim to present an objective or unbiased view. We acknowledge the difficulty, particularly in dryland areas, of separating out the evidence of general rural decline, from the effects of a prolonged drought, and particularly, from the effects of hypothesised climate change.

We have studied learning as a community-based, social constructivist phenomenon, in which learning is situated (Lave & Wenger 1991), and which takes place socio-culturally in context as explored by Vygotsky (see Kozulin 2003). While we regard this approach as appropriate in rural locations and communities where universities and comprehensive technical and further education (TAFE) provision are effectively missing, we have not heard about 'higher' forms of institutional and accredited education and training. The advantage, however, of choosing to hear what a diverse range of people are saying *on site* about drying, is that we have heard a wide range of perspectives and narratives, that tend not to come through some scientific and technical papers.

Reflecting on the evidence across the sites

The location of our four sites in the southern Murray-Darling Basin, including three different states in south-eastern Australia are identified in Figure 1.



The sites ranged from an *alpine* water harvesting area in the headwaters of the Murray River around Mount Beauty in Victoria, to a *dryland* area with little surface water around Birchip in the Victorian Mallee. The *mid-river* site was on the Murrumbidgee River around Hay in the New South Wales Riverina region. A fourth site was on the lower Murray River around Renmark in the South Australian Riverland region. The Riverland and Riverina sites provided perspectives from areas largely dependent on irrigation drawn from major rivers in the Basin.

All areas have been, as the Productivity Commission (2008: xx) *Inquiry into government drought support* put it,

... experiencing hardship from the latest severe and prolonged drought. ... While this is not new to dryland farming, 'irrigation drought' is uncharted territory.

Even in the largely forested, alpine site, a series of unprecedented dry years had increased fire frequency and intensity and led to significant changes to the alpine environment. These changes had placed this site and its tourism-dependent communities in uncharted territory in term of their economies, as well as in terms of public safety and environmental risks.

While the causes of being drier (drought, climate change or both) remain contested and highly politicised, the risks of becoming even drier threaten the viability and sustainability of most water-dependent businesses as well as the environment in all four sites. No time has been more urgent, as a submission (28, p.1) to the Productivity Commission (2008: 187) put it, for:

... [i]mproved education, research, information provision, and most importantly, public and private extension services ... to underpin Australian drought ... responses. The human capital on farms and in the advisory sector needs urgent investment as it copes with a torrent of new information and complex issues.

Our research shows that being drier has significant and often debilitating flow-on effects to all families, businesses, arms of government, industry sectors and community organisations in all four sites. This extension should arguably be much broader in its scope than agriculture. If, as Young and McColl (2008: 32) conclude, 'Now is the time to confidently inform those who depend on, and love the Murray Darling Basin what type of future they and the system can expect', all sectors of the community need to be so informed, and urgently. As long as there is widespread distress in drought-affected rural communities (Hennessy, Fawcett, Kirono et al. 2008), there

is a need not only to manage the water, but also to account for the wellbeing and families and communities.

Learning issues by site

The alpine site

The alpine case study (Foley & Grace 2009) found copious evidence of community learning taking place in the region. This was seen through strategies to maintain the tourist economy, strategies and programs to assist with environmental issues related to fire damage to the environment, and community members being aware of and modifying their usage of water. It drew its conclusions using the notion of 'frames of reference' from Berkhout, Hertin and Gann (2006). That is, participants focused their understandings about widespread drying through community beliefs and paradigms within their 'patch' of the Alpine region specifically. There is evidence here of what Berkhout et al. (2006: 151) categorise as 'handling and managing' risks.

The aesthetic beauty of the Alpine region and its related value to tourism was understood by many in the study as the frame of reference from which decisions were being made about drying. More than in other sites, this understanding included more acceptance of climate change. The case study conclusion saw that the frames of reference of the participants were towards the beginning of a stage of learning, understanding and managing change through a local focus, which was seen by Foley and Grace (2009) as a necessary precursor to understanding climate change.

The mid-river site

The mid-river and lower river case studies (Golding & Angwin 2009; Brown & Schulz 2009) identified both regions to be significantly affected by 'irrigation drought', and therefore in difficult and uncharted territory in terms of previously learned or experienced responses. Both regions had previously relied on water security

through 'water banking upstream' and had typically adapted to previous fluctuations in water availability. Never before had irrigators been forced to learn how to cope, as in 2009, with close to zero water allocations, or to allocations of 'critical' water simply to keep vines and trees alive. Water-dependent communities in the mid-river and lower river sites were already seen to be located towards the 'pointiest' and most risky end of what is likely to be the risk of climate change. However adults across the community in both sites were relatively poorly prepared, by their respective local and state governments or their national government, to understand, learn about and bear the risks. Both Golding and Angwin (2009) and Brown and Schulz (2009) identified an urgent need for better and more accessible information and understanding about the likelihood of risks, on which future community, business, family and water management decisions might ideally be based.

Golding and Angwin (2009) found a rapidly changing context in the mid-river, Riverina site. Most adults were struggling to learn about being drier through existing communities of practice. There was no local adult or community learning organization in this region. The learning that took place was restricted amongst water users to what a small number of farmers had learned through the various industry and government organizations. Otherwise, what most people knew had come from personal networks, community-based organizations and the popular media. Confusion about an appropriate, learned response was complicated by parallel, nationally politicized contestation about climate change, global emission and causality, no national Basin plan or agreement, and a state government water agency still in denial about climate change in its communication with water users. In this context, Golding and Angwin (2009) identify an urgent need for new information and dialogue about likely future scenarios and management options for water users across the site. They particularly suggested the need for new *boundary* and *bridging* organizations that are able to bring together different communities

of practice, inclusive of water-dependent stakeholders, to help communicate common understandings of the complex and rapidly changing issues (Hahn et al. 2006; Guston 2001) to people across the site.

The lower river site

Brown and Schulz (2009) identified clustering around six different forms of adult and community learning types in the data from the lower river site. Three of these learning types were oriented towards developing and maintaining sustainable businesses and communities, using and extrapolating from learning principles and experiences from previous fluctuations in irrigation water availability. They included *learning to be productive*, *to be efficient* and *to be sustainable*. Three of the other forms of learning were newer and more acute. One was *learning to survive* on their allocation of 'critical water', the amount of water simply to keep permanent vine and tree plantings alive where no productive capacity was anticipated. Brown and Schulz also identified the community need to *learn about support services* to assist those who are experiencing emotional, relationship, financial and business difficulties.

The lower river site is situated in a difficult point in the catchment. It is located towards the bottom end of a giant Basin, in which almost all of the water used is harvested from and already shared between three other, upstream states. The water needs of its state capital city, Adelaide, had yet to be taken out downstream. The other, new learning needs identified by Brown and Schulz (2009) in the lower river site, further discussed in the current paper in relation to 'wicked' learning, were *learning to live with uncertainty* and *learning to share*.

The dryland site

Smith and Campbell (2009) divided the learning from the transcript data in the dryland site into four categories. *Learning about the*

water supply was important but less directly linked to farming futures than in the two irrigation sites, as the region was progressively moving from open channels with high transmission losses to a piped stock and domestic supply. Dryland farmers without access to irrigation water from rivers and with minimal groundwater resources had always relied on and learned to adapt to a naturally variable and highly seasonal rainfall, and were found to be in a qualitatively different learning space. *Learning to be drier in farming* was found by Smith and Campbell (2009) to be already highly developed in their site, over several lifetimes of dryland cropping and grazing. This recent decade of ‘drought years’, while unprecedented in scale, was familiar in terms of its effects and involved a learned, coping response by farmers. It had brought further, incremental changes in cropping systems, water retention efficiencies and technologies. It had also hastened further ‘farm consolidation’, which means an exit from farming for those farming families whose land has been consolidated, although depopulation was not a major issue in the local towns. The drought years and water restrictions in the towns had impacted on gardens in a way not seen before, but as with farming, people seemed to be coping.

As in the two irrigation sites, the most difficult and important learning aside from farming and living in a drier environment was the *learning needed to cope with the economic, social and community changes*. Unlike in the irrigation sites, the dryland site had a range of community-based and local government learning organisations in each small town, already well adapted to lead and facilitate the learning. However, sometimes it seemed that the initiatives may have carried with them some pre-existing attitudes and perceptions that were not always or entirely functional. There was also evidence in this site of *changes to formal learning systems* both in community centres and schools, including changes to course offerings to reflect shifts in the local economy.

Reflecting on the learning choices available across sites

The diversity of local and public adult learning choices available to adults in the four sites diminished, as one might expect, with the decreasing size of the community, but also differed by state. Community-based learning opportunities and organisations were observed in all rural towns large enough to support secondary schools in these and other dryland and alpine towns in Victoria. State government-supported, community-based adult learning organisations provided important, local, ‘first steps’ to help adults learn to cope with a wide variety of changes. Their approach tended to be more inclusive of community development approaches than to narrow vocational preparation and retraining. In mid-river New South Wales there were no such organisations in larger rural towns. In the lower river site there were some government-sponsored learning organisations available and mentioned by participants. However there did not appear to be a great emphasis on accessing or supporting them.

In all sites and communities, there was a top-down conservatism and inertia associated with formal and sectorally separate approaches to education and training in schools and post-compulsory vocational education and training. In several important senses and with some exceptions, formal adult education institutions and their staff were to some degree insulated from and buffered against the direct effects of change. Most of these institutions benefited from people and businesses needing to change and retrain and some of this was teaching people to be drier. By contrast businesses (including farming businesses) were at the cutting edge of change in that they *had* to learn to be drier or fail as businesses. This included learning new ways to be more water efficient and grow different crops with very little or no water allocations. In addition to this, the most recent learning in both irrigation sites had been about how to trade water.

While we received considerable local support for our research, there was an underlying and learned distrust amongst some people ‘on the land’ of authorities and experts. Local people had been metaphorically burnt, several times before, by research findings, recommendations and predictions, most recently about fire (in the alpine site) water availability (in the mid-river and lower river sites), salinity (in the dryland site) and environmental flows (in all sites). With an arguable lack of understanding about the complexity and likely wickedness of the causes of change, it had been difficult in all sites to learn to manage the risks. It had been relatively easy to blame others: experts, environmentalists and politicians, and water users upstream or downstream. The hardest learning had been about learning to accept that the changes in water availability may be due to climate change. In some cases, businesses and families had internalised the most difficult learning: that sometimes there was no viable options but to walk away from the land, the community and/or their businesses.

Discussion: reflections on learning

Reflecting on the learning responses observed

There was extensive evidence in all sites that water-related stakeholders with an incentive (financial, environmental or idealistic) to save water, had learnt much about *water savings systems and technologies* in the context of drying. This particularly included water conservation, distribution, metering and recycling technologies in irrigation areas as well as cropping systems in all sites. Most of this learning had been achieved through a combination of learning by trial and error as well as via government and industry advice.

Similarly, there was evidence that significant learning had taken place in learning about new *ways of doing business* in dryer conditions. Learning in farming businesses had typically occurred by individuals actively seeking answers to problems, by trial and error, from the neighbour, by reading the paper or by going on the internet.

Some advice was available from pastoral, agricultural, horticultural and forestry industry extension services in both the private sector and government. Importantly, much of what these government 'experts' knew came in turn from the experience of people 'on the land'. As the period of drying had lengthened, learning about water trading (buying and selling) and substituting water from other sources, particularly from groundwater, has also grown.

The learning options for water-dependent, non-agricultural local businesses (such as irrigation suppliers, laser graders, farm produce processors and cartage contractors) have become very limited in irrigation sites. As the 'long dry' had continued, many such businesses had tried to diversify and extend the location in which they operated to include other areas of the state, and in some cases, to other states. Many other service and retail businesses had been very badly affected in all sites where agriculture was a major industry. This had resulted in businesses either reducing staff, or in some cases, closing up and moving elsewhere.

There was much difficulty learning about *new family and social models* that fit with the changed circumstances. While off-farm income had been an important supplement to farm incomes in Australia for several decades, more recently off-farm income had been the only thing to keep many farm families viable. The hardest learning, again, had been learning about ways of understanding water-related causality and solutions. In many instances, this had also required learning to learn in different and new ways.

Learning to extend knowledge of the risks and possible responses
Agricultural 'extension', as the Productivity Commission (2008: 188) observed, was historically delivered through state government departments but had more recently been 'wound back'. Many extension arrangements were now conducted in partnership with, and partly funded by, the private sector. The Productivity Commission's

separate treatment of agricultural ‘extension’ from ‘education and training programs’ in their report is indicative of the implied difference, which we regard as unhelpful and artificial, between ‘farmers learning new things’ (p.187) and a largely formal ‘education and training system that services agriculture’ (p.196).

The term ‘remote’ is often applied from afar to sites and communities (like those studied) that are distant from cities and their comprehensive services. Looking outwards from each of these sites, formal education and training systems were generally missing, and where present were sometimes regarded as remote from or inappropriate to the lifelong and lifewide learning needs of place-bound residents in all four, small rural communities.

Climate change, as Rittel and Webber (1973) noted in IDCC (2009: 72), is part of a family of environmentally related ‘wicked problems’ with no definite formulation and no clear point at which the problem is solved. As such they pose significant and arguably wicked learning challenges for all four communities.

Learning about the wickedness of the learning problems

Dietz and Stern (1998) identified five key characteristics of ‘wicked problems’, all of which have come through strongly in the interview data about learning to be drier, whether climate change is causally implicated or not. The first characteristic, *multidimensionality* is demonstrated both within and across all four sites. If ‘being drier’ is taken as the changed environmental process, it can be seen, as Dietz and Stern (1998: 441) describe it, to have ‘many different types of effects, distributed unevenly so that those affected face unequal share of the costs, risks and benefits’, within each site and across the Basin.

The second characteristic, *scientific uncertainty* is also present in many ‘Learning to be drier’ narratives. Decision makers, including government water managers and water-dependent businesses in all sites, want and desperately *need* to understand and know the future

risks in order to make decisions about future fire, environment, river flow, irrigation, business and cropping risks. However the science of climate change and prediction is too uncertain to provide anything other than alternative probable scenarios.

We also identify recurring themes in the narratives associated with the third characteristic of ‘wicked problems’, *value conflict and uncertainty*. As Dietz and Stern (1998: 444) put it,

People differ in the importance they attach to the different effects of any action, and these judgements change as people experience how their own and others’ actions affect the things they value.

Value conflict and uncertainty of this nature was present in the narratives in all four sites, going well beyond the contested nature of causality. People’s different value positions about the relationship between fire, control burning, the environment and woody weeds are good examples from the alpine site. There were conflicting value positions between residents in the Riverina site to maintain ‘green lawns and nature strips’ and riparian water rights and those outside of the site (including the researchers). Value positions associated with whether to trade water temporarily or permanently away from a site (and particularly interstate) were particularly conflictual in both irrigation sites. There also seemed to be values conflict in the dryland site between those who attended assiduously to the need to adopt practices consistent with reduced water availability, and those who paid less attention to it. While some respondents were tolerant towards people’s varying adoptions of ‘better’ practices, others appeared quite judgemental towards those who were seen to be lagging. Also, conflicting views were expressed about the motives of some of those who provided information. For example, the role of agronomists working in agricultural extension for private companies was strongly endorsed by some respondents, but critiqued by others.

Several forms of *mistrust*, the fourth wicked characteristic, are apparent in narratives developed from all sites. There is a mistrust of the various levels of government to respond in a coordinated, systematic and logical manner to less water. In the mid-river and dryland sites, there is evidence of a mistrust of education opportunities. We were told that the best way to get participants to attend training opportunities was to 'lure them' and 'don't call it training'. In several of the sites there was also a mistrust and wariness of us as researchers, catalysed by their previous experience of those who had taken knowledge away only to see it misused or misinterpreted.

The final characteristic, *urgency*, was evident in participants' voices as they spoke about their experiences with less water. There was pain, emotion and frustration. In the mid-river site, there were those who overcame their *mistrust* of 'not another bloody study' to speak to us, because "We have to do something, anything, about the water and if there is a chance that this will help, let's do it."

Discussion

It is important, before concluding, to acknowledge that consistent with the nature of wicked problems as defined by Conklin (2005), the problems of drying in the southern Murray-Darling Basin, and particularly the problem of climate change, will require large groups of individuals inside *and* outside of the Basin to learn enough about the problem, to change their mindsets and behaviours. Given that people's responses across the Basin will depend to a large extent on their beliefs about causality (over-commitment of water, drought, climate change or a combination of these and other factors), the learning required will be similarly wicked.

While Australian rainfall was recognized more than a decade ago as being 'more variable than could be expected from similar climates elsewhere in the world', Nicholls, Drosdowsky and Lavery

(1997: 66) identified evidence that some of the previous relationships between governing factors had already shifted climate systems in the Australian region. In the decade since, all four sites in our *Learning to be drier* study in the southern Murray-Darling Basin had experienced an unprecedented series of unusually dry years leading to significantly less runoff, consistent with predictions in most climate change models and scenarios.

It is important to observe that as we completed this final, sixth paper in October 2009 some of the southernmost parts of the Basin had experienced encouraging rains. While insufficient in most areas to break the irrigation drought they were enough to give farmers in the dryland area we studied the prospect of one good year in a decade. Whether the lower Murray-Darling Basin will indeed get what CSIRO (2007) predicts by 2030: lower annual average rainfall, runoff and streamflow, more severe droughts and more hot days over 35 degrees C, will only be known 20 years hence.

Conclusion

Conclusions by site

In this, conclusion to this final paper, we return to the initial research questions which formed the focus of our research project and our case studies: 'How and what do adults learn in response to changes in water availability in the southern Murray-Darling Basin?' and 'How is the learning experienced by the different stakeholders and how do the stakeholders learn to respond to the changed circumstances?' In this section we summarise conclusions by site.

All participants had an understanding of where their water came from and that there was less of it. Interestingly Foley and Grace (2009) make the point that the notion of belonging to one of the stakeholder groups becomes problematic as the people of these communities undertake multiple roles displaying multiple identities. Therefore the people living in the alpine site might more usefully

be divided by location, because they appeared to have different perceptions and experiences of dryness depending on which part of the site they lived. Those at the higher altitude location believed that water was more plentiful because of nearby storage facilities for the hydro system. Those at the lower altitude location had a lived reality that water was more scarce, as their river only had winter runoff and became dryer in the other seasons. People in both locations were concerned about changes to the region which would affect the local economy that centred around tourism. Both communities saw the potential changes as being of great concern. Importantly, less water meant higher risk of wildfire. Weeds that had grown as a result of the last bushfire are also seen as a threat to the existing aesthetics and livelihoods being made in the region.

In the mid-river site people around Hay people are asking some very fundamental questions about why they live in the region. With water scarce, some faced the hardship of decisions about staying or moving. What they had done in the past for some was no longer viable or possible. Golding and Angwin captured the way that young people are affected by schools closing and people choosing to leave the district. In government terms, the people in this site must now bear the risk of water availability and water prices. Increasingly the internet is being used as a research tool, as people seek immediate information to make adjustments to their lives. Yet a disjunction remains between the message from the experts and their science, and those who believe they have lived through the same cycles of drying previously.

Brown and Schulz, in the lower river, Riverland site, noted that due to the use of weirs and locks, the superficially 'full' look of the River is deceiving. Whereas water levels look unchanged, flow rates have markedly diminished. Yet just five minutes inland, away from the river, there is little doubt of the impact of the dryness, with trees across the floodplain in dire need of water. Most people in the Riverland are proud of their efficiencies with water, though this is

relative to other users upstream in the basin. Many think there is over-allocation of water, but this is seen as being more about being an upstream problem a problem for the Riverland. Environmentalists and conservative land and water resource managers are seen as being at loggerheads with the growers. The health of the river is desired by all, but prioritised for only by some, as individual interests are maintained.

In the dryland site of the Wimmera-Mallee region of Victoria, the research again found that farmers and community members were trying to work and live using water more efficiently. In some cases new farm practices were being developed. New crops were tried, feedback was sought and informal evaluations were conducted. Information was being obtained through local newspapers and information published by the water authorities. Some information came home via the children's schools, and increasingly via the internet. Informal talks occurred through and over the farm fence between neighbours and acquaintances, where significant observations, information and ideas were conveyed and exchanged. Explicit attempts were made to engage farmers through a farmers' development group. These often employed professionals such as agronomists to provide advice. Some others in the dryland site opted to enrol in short skill-based courses provided through an education or training facility.

Broader conclusions about learning across sites

The relatively recent, extreme drying of the southern Murray-Darling Basin, while more familiar to dryland farmers, has created major water resource availability and allocation problems across the southern Basin, and placed irrigators, water managers and fire authorities in uncharted territory. If we accept that this difficult issue of drying might be a wicked manifestation of climate change, our task, as Conklin (2005: 18) would suggest, '... is not whose fault the mess is—the issue is our collective failure to recognize the recurring

and inevitable dynamics of the mess.’ Conklin’s analysis of wicked problems would suggest that there are likely to be no easy, technical solutions or value in apportioning blame. Rather, the solutions will lie ‘... in the social domain, in building capacity to collaborate effectively’ (pp.18–19). Conklin (2008: 10) suggests that ‘... [t]he first step in coping with a wicked problem is to recognize its nature. ... There is a psychological dimension here—a shift from denial to acceptance.’ If climate change (and perhaps global warming associated with human action) are implicated and are to be more widely accepted, the complex learning associated with their acceptance, and the actions to address them, are ones that we all share and need to learn in an interconnected atmosphere.

Even if this is a ‘natural’ but extreme aberration from the existing climatic variability, the policy solutions involved with changes in water allocation in an interconnected Basin, particularly in catchments where water entitlements already exceed supply, will still be very difficult. In all cases, including where businesses and environmental values are already lost, damaged, severely compromised or unsustainable, this necessarily involves social and political decisions and values, including consulting and learning with affected communities about what is desirable and appropriate.

The observed differences in learned adaptations to drying between sites are likely to be related to the heterogeneous nature of the sites and the communities, as anticipated by Adger (2003: 400). Adger postulated the formation of a [climate change] social capital where communities ‘find strategies to manage risks through strategic and local networks and interactions ... manifesting different forms of social capital in different circumstances’. Adger (2003: 401) suggested that ...

Although insights from social capital and collective action can inform the processes of adaptation, societies that are dependent on climate sensitive resources are themselves heterogeneous

... so when they are faced with significant changes in climate regimes and extremes of weather in the future, different societies will clearly adopt radically different strategies ... determined in part by their networks and social capital. Different types of networks will settle on different types of strategies for adaptation.

As well as planned learning, there is evidence of a great deal of unplanned learning (Committee on the Human Dimensions of Global Change—CHDGC 2009) occurring in all four sites. Much of the learning occurring is undertaken by individuals. However as both Senge (1990) and Fiol and Lyles (1985) indicate, organisational (or in this case community) learning is not just an accumulation of individual learning. It is about ensuring that a learning culture is present to nurture all learning, so that the knowledge becomes beneficial in a wider sense. The challenge in all communities across the Basin might be how to create both a community of practice (Wenger 1998), where knowledge and learning is shared amongst all stakeholders. There is also a need to support double loop learning (Argyris & Schön 1974), so that a *coordinated response* to less water might occur at *every level*.

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Investigating students' beliefs about Arabic language programs at Kuwait University

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The current study attempted to identify students' of Arabic programs beliefs about their chosen programs. To achieve this purpose, a survey was developed to collect the data from randomly selected students in liberal-arts and education-based programs at Kuwait University. The results showed that students were statistically differentiated as a function of different beliefs insofar as the Arabic language programs are concerned. Yet beliefs were not just confined to materialistic benefits; students tended to value other types of benefits as well. Implications for educational policies and recommendations for future research were also included. The most important implication is that students along with their beliefs should be included in evaluating or revising the educational programs.

Introduction

The returns on different kinds of schooling are conceived as key factors in the demands for schooling. Demand for education is a kind of human capital investment because it confers benefits on individuals, enterprises and societies as a whole. These benefits can take two forms: market benefits like earnings and non-market benefits such as life goals (Blaug 1985; McMahon 2006).

Based on various benefits of education, Kuwait's public education enrolment at all levels has increased considerably over time (Ministry of Education 2008), and public expenditures on education have also accordingly increased. So, the crucial questions facing educators in Kuwait now involve the content of schooling at all levels: what does the educational process produce now and what should the education process produce in order to achieve the optimal goals of education?

Language-related programs are among those that have undergone close examination of content and delivery methods. In Kuwait, there are two types of programs which dominate the scene related to teaching and learning of Arabic—the liberal arts-oriented program and the education-oriented program (Kuwait University 2006). Equally important is the decision taken by individuals to pursue education in terms of the cost to individuals and the need to meet academic requirements and deferred entry into the labor market. Thus, individuals are viewed as important stakeholders to be considered in any educational policy studies.

Statement of the problem

The research problem is guided by the following research questions:

1. Do students of the Arabic Teaching program at the College of Education differ in their motivations for joining such program, their career intentions and their choice of program from students of Arabic Language and Literature at the Faculty of Arts?

2. Do students of the Arabic Teaching program at the College of Education differ in their perceptions of future employers' expectations from students of Arabic Language and Literature at the Faculty of Arts?
3. Do students of the Arabic Teaching program at the College of Education differ in their aspirations for career development and long-term life goals from students of Arabic Language and Literature at the Faculty of Arts?

Purpose of the study

The purpose of this study is to test the theory of human capital investment in education that links what students expect from a given academic program and their decision to join it. The focus of this study is to examine the beliefs of students of the Arabic Teaching program at the College of Education and Arabic Language and literature at the Faculty of Arts about their respective programs.

Importance of the study

The justification for the present study is reflected in both future practice and research. With respect to future research, it is anticipated that the findings of this study will contribute to the body of knowledge related to students' beliefs about continued education. Such beliefs appeared to be closely linked to certain outcome variables like job specification and degree of efficiency (Yuan 2008). This study is the first to examine the variables which constitute Kuwaiti students' beliefs in terms of the different Arabic language programs. Moreover, this study will assist current and future administrators in making decisions regarding admission policies and in evaluating programs in an attempt to overcome imbalances among the students, labour market and academies. The information in this study can also provide educationists with data which they will communicate with prospective students and to give a better understanding of the students expectations prior to college enrollment.

Assumptions of the study

The study is based on four assumptions. First, students are believed to be rational when they decide to follow a specific program of study because of their predetermined beliefs about their chosen programs (Yuan 2008). Second, individuals think in terms of the relations between the cost and benefit in terms of gains they will obtain from joining a specific program. Third, based on equal opportunity in education, Kuwait University will continue to provide free education and to allow individuals to choose their own preferred programs of study. Fourth, all students who constitute the population of the study are assumed to meet the academic requirements for enrolment in their programs, particularly insofar as language proficiency is concerned.

Definitions of the study

Beliefs

These refer to the assumptions we make about ourselves, about others in the world and about how we expect things to be. Beliefs are about how we think things really are. Beliefs tend to be deep set and our values stem from our beliefs (Pietrandrea 2009).

Program of study

'A planned series of experiences in a particular range of subjects or skills, offered by institutions and undertaken by one or more learners' (Aggarwal & Thakur 20). In the present context, it is the type of the course that students choose to complete their degrees in Arabic language. They are the language-based and liberal arts-based programs.

Students of Arabic at the College of Education

Students who are preparing to be teachers of Arabic as a mother tongue language (language-based program).

Students of Arabic at the Faculty of Arts

Students who study Arabic for its own sake (liberal arts-based program).

Hedonistic motivation

Refers to intrinsic interest or enjoyment in the participant.

Pragmatic motivation

Refers to choosing a specific program of study for vocational and longer-term reasons.

Fatalistic motivation

Refers to students who embark on their program of study by default, because they could not get into the program they preferred.

Review of the literature

This section of the paper is divided into two major parts: contextual background and theoretical background. The first part gives an overview of the State of Kuwait and its people, status of Arabic education in Kuwait, and higher education in Kuwait, namely the College of Education and the Faculty of Arts at Kuwait University. The second part presents the theoretical concepts around which the study revolves.

Contextual background

Kuwait is a constitutional state in south western Asia, located at the upper angle of the Arabian Gulf, and is a small country: 45% are native Kuwaitis and 55% are foreign residents. Petroleum is the sole economic product, and it has made Kuwait a classic welfare state and a tax-free country where education, health, housing and other public services such as building roads are free (Ministry of Information 2002).

Kuwait looks very different now from what it did in the aftermath of World War II. Like other developing countries, Kuwait's major motive

for this development in education was developing its own human resources in order to be fully independent from the colonial powers of that time (Al-Shaye 2002). The government of Kuwait bears all public expenditure at all levels of education to include both capital expenditure and current expenditure. Public expenditure in the field of education covers such outlay/costs as staff salaries and benefits, contracted or purchased services, books and teaching materials, welfare services, furniture and equipment, minor repairs, fuel insurance rents, telecommunications and travel (The Arab League Educational, Cultural and Scientific Organization 2008).

There are two higher education institutions in Kuwait: Kuwait University and the Public Authority for Applied Education and Training. These two institutions contribute to achieving the ultimate goal of the Kuwaiti educational system—building well-balanced citizens who can advance the welfare of the country and humanity. Among the 12 colleges of Kuwait University, there are two colleges offering Arabic language programs: the College of Education and the Faculty of Arts (Kuwait University 2006).

The main goals for the College of Education are (College of Education 2008–2009):

- Preparing highly qualified manpower in the field of teaching profession.
- Increasing awareness of the importance of practical educational research.
- Meeting the needs of society in the field of educational services.

The different disciplines which are represented in the Faculty of Arts aim to produce well-rounded graduates (Faculty of Arts 2008–2009):

- Developing critical thinking skills in a cross-cultural manner.
- Enhancing awareness of the wider perspectives and relationships between contiguous areas of knowledge.

- Improving the ability to implement the practical applications and orientations of their knowledge within societal and national contexts, while appreciating different points of view.

The Arabic language is highly visible in the Kuwaiti landscape. For first-time visitors, advertisements in streets and shops are often in Arabic, and graffiti is mainly also found in Arabic. Arabic continues to be widely used in the Kuwaiti media. Arabic can also be found in foreign publications, and on radio and TV local or satellites (The Academy of Arabic Language 2006). The emphasis of this study is not on what education in Kuwait is about, what the policies are or how policies are made; but on what Kuwaiti students perceive that they will gain from different programs of study. This perspective focuses on the user side rather than on how policy-makers work and on what the education providers intend to achieve (EL Touny 2002).

Arabic language teaching is designed to fulfil the following cluster of objectives as stated by the Ministry of Education (2008):

- Developing the learners' proficiency in understanding and using the language in spoken and written form.
- Improving the learners' competence so that they can communicate in these situations where they have to use Arabic.
- Enabling the learners to become well-informed about the life and culture of the countries that use Arabic as a means of expression.

Theoretical background

It is necessary at the outset to examine how established the topic of students' beliefs is as a research subject. The concept of human capital, which conceptualises a relationship between human capital investments (that is, education, time and effort) and diverse benefits, assumes that the expected benefits of education are key factors in the demand for 'investment in education' (Becker 1964). For the purposes of this study, themes relevant to the concept of human capital, and students' beliefs are discussed.

Human capital theorists stress that relating education to purely materialistic gains has distorted the multi-faceted value of education (e.g. Psacharopoulos 2000, Woodhall 1998). In narrow versions of human capital theory, skills and knowledge are instrumentally perceived, insofar as they raise individuals' productivity and hence, other things being equal, their lifetime earnings. In contrast, the human capital model may be interpreted more broadly so that we can see the overall picture. Learning should not be limited to higher market earnings (McMahon 2006), but should also include a knowledge of and capacity to appreciate world cultures. For example, learning may provide a future benefit not reflected in market earnings. The notable contribution of the human capital model emphasises the importance of non-economic considerations in addition to economic ones. Thus, monetary and non-monetary returns on education are complementary, not exclusive. Schultz (1963) observed that the classical viewpoint of education had put us on the wrong road of economic thought; he claimed that the individual human was a form of capital that could be developed. Therefore, Schultz's important contribution was the assertion that *skills* and *knowledge* are a form of capital.

Black (2008) explained that an individual's beliefs are information that is gathered from past experiences, knowledge about predecessors' experiences, peer group, or even public opinion, pressure, and social norms that are associated with certain programs of education. Since these sources of expectations are vulnerable to variation as a result of various factors, it is likely that they will be imprecise calculations of the expected returns in the chosen program (Lopez 2008). Beliefs themselves are not fixed; rather they depend on how favourable individuals perceive their circumstances to be in the changing situation (Chen 2008).

In the most basic terms, students expect continued participation in education to give them good earning ability, a high living standard,

a respected social status in the future, and positive personal development (Purcell & Pitcher 1996). In her study, Al-Kandary (2004) found that Kuwait University students' decisions to pursue higher education are affected by their beliefs about how those decisions will alter their future lifetime earning. Similarly, Menon (1997) revealed that students of Cyprus display similar traits with respect to their decisions to pursue higher education. Interestingly, Menon found significant differences between the anticipated beliefs of students intending to pursue higher education and those who are not. In fact, not only deciding to continue participation in education is critical, but also what area of study is chosen.

Across different regions of the world, Arabic language programs study still attract a fairly large number of students. However, as with other language programs, students' beliefs about Arabic programs are based upon program-related differences. Boys et al. (1988) examined British students' entry behaviour in different disciplines, including English, at nine different institutions, each of which had its own philosophy and mission, particularly teaching-based institutions and research-based institutions. They found that the choice of a specific program of study has adjusted overtime to reflect students' beliefs. For example, students choosing a liberal arts-based English degree program had different beliefs with respect to lifelong values from those selecting a teaching-based English program. The latter expected that their programs would provide them with different benefits. Besides appreciating the humane side of language study, there were a number of references to communication skills, which were held to improve the ability to assimilate and present information, so that when students select their majors, they would be well-equipped. Based on the researchers' findings, an important point was made—the relationship between academic study and students' beliefs is extremely complex due to the complex relationship that reflects the changing nature of students' beliefs.

In their study, Martin and Gawthrop (2004) revealed that students of English show a mix of attitudes towards English and expected benefits. Although students of English at liberal arts school scored low on direct career relevance, their decisions to continue studying the subject for pure enjoyment are often hedged with taking up another, more applied subject in a combined program. Brennan and Williams (2003) observed the following with respect to students of English at a liberal arts school in the UK:

If we compare the skills English graduates feel they lack to those the English benchmark statement reports they should possess, there is a mismatch in terms of developing team-work, time management/organisation and IT skills. Moreover, these same skills were all mentioned to a greater or lesser extent in the search of websites. And indeed ... employers felt that English degrees were worst at developing time management and building relationships ... although the evidence ... is limited, it suggests that English departments may not be developing the full range of attributes and capacities outlined in the benchmark statement (p. 27).

This may point to several issues in the area of the interaction of language education and the real world. Most obviously it points to a widespread disappointment among graduates of language, with the quality of working life after a mismatch between beliefs and experience. Those entering liberal arts or education-based language programs may indeed have an idealised image of career development, or an assumption that the degree is a ticket to a lifetime of demanding and rewarding work. However, it must also be considered that many beliefs are not unreasonable (Martin & Gawthrop 2004). The question of content and delivery method of language education has arisen out of this new circumstance.

The emergence of language programs that focus more on applied sides of language has become a phenomenon. Skills such as written communication skills, oral communication skills, documenting,

searching and the like have dominated the prospectus of language-related programs, whether liberal-arts or education-based (Grin 2002).

Method

This section is divided into the following parts: (a) research hypotheses; (b) a description of the study populations and the methods used to obtain the samples; (c) instrumentation for the study, including a description of the dependent and independent variables; (d) data collection; and (e) data analysis.

Research hypotheses

Based on the findings of the previous literature that there is a relationship between students' beliefs and the program of study they choose (Dominitz & Manski 1996; Williams 2001), the following are the research hypotheses:

- H1-a Students of Arabic at the College of Education are different in their hedonistic motivations for investing in higher education, their career intentions, and their choice of program from students of Arabic at the Faculty of Arts.

- H1-b Students of Arabic at the College of Education are different in their pragmatic motivations for investing in higher education, their career intentions, and their choice of program from students of Arabic at the Faculty of Arts.

- H1-c Students of Arabic at the College of Education are different in their fatalistic motivations of investing in higher education, their career intentions and their choice of program from students of Arabic at the Faculty of Arts.

- H2 Students of Arabic at the College of Education are different in their perceptions of future employers' beliefs from students of Arabic at the Faculty of Arts.
- H3-a Students of Arabic at the College of Education are different in their aspirations for career development from students of Arabic at the Faculty of Arts.
- H3-b Students of Arabic at the College of Education are different in their long-term life goals from students of Arabic at the Faculty of Arts.

The null hypotheses regarding the above research hypotheses to be tested are that two study samples came from the same population.

Participants

The population of this study comprised students of Arabic at the College of Education (210 students) and the Faculty of Arts (390 students) (College of Education 2008/2009, Faculty of Arts 2008/2009). The samples of the study were divided into two groups: students of Arabic at the College of Education (n=171), and students of Arabic at the Faculty of Arts (n=180). The sample size is as important as the sampling procedure, so a process of random selection within each group was utilised.

Instrumentation for the study

Data were collected through the use of a survey administered to the participants. The survey questionnaire that was used in this study is based on the published literature. The survey consisted of the following parts:

- Independent variable:
- There is one main independent variable: Program of Study (students of Arabic at the College of Education and students of Arabic at the Faculty of Arts).

- Dependent variables: there are three dependent variables:
 - Students' motivations: Purcell and Pitcher (1996) categorised three kinds of motivation with respect to the chosen program: (a) hedonistic refers to intrinsic interest or enjoyment in the participant; (b) pragmatic refers to choosing a specific program study for vocational and longer-term reasons; and (c) fatalistic refers to students who embark on their program of study by default, because they could not get into the program they preferred.
 - Students' perceptions of future employers' expectations; and
 - Students' aspirations for career development and long-term life goals.

All these variables were assessed on a five-point Likert scale. For positively and negatively worded statements, high scores reflect positive attitudes, whereas low scores reflect negative attitudes. Although the scale was a five-point Likert scale, the scale format was of different presentations such as 'agree,' 'possible', and/or 'important'. However, these different presentations were based on their relationship to each concept respectively.

Data collection

Since this study is related to students' beliefs about their chosen programs of different Arabic language programs (Arts and Education), the necessary paperwork was submitted to obtain permission for conduct of the study. Since the average class size is 25 students, a number of classes were randomly selected from each program to obtain the desired number of participants mentioned previously. Subsequently, course instructors were contacted for permission to administer the questionnaire to their students during a class period. The instructors were assured that the complete administration of the survey would not take more than 30 minutes from their class time.

Data analysis

In order to create a data file for analysis, a coding system was designed based on the questionnaire items and response categories. Each question and measured item formed a variable, and each response category within the variable was defined and assigned a numeric value. For the purpose of this study, each variable was coded according to its appearance in the instrument. Following data collection, an identification number was assigned to each questionnaire in order to keep track of each case and to check the accuracy of the data. Based on the coding system, responses were analysed using the Statistical Package for Social Sciences version 11.0, Microsoft Windows.

Based on the research questions and hypotheses, the levels of measurement (nominal and interval) and the types of variables (continuous and discrete), two data analysis procedures were conducted: descriptive statistics, and inferential statistics, namely, two independent sample t-test. The two independent-sample t-test was used to determine if there were any statistically significant differences between the two groups of students of Arabic at the College of Education and the Faculty of Arts.

The pilot study

The pilot study showed that the Cronback's alpha reliability coefficient of the whole measure was fairly high ($\alpha = 0.89$). It seems clear, therefore, that the measure assessed the variables of interest with high levels of internal consistency (Pedhazur & Schmelkin 1991). The pilot study was also used to check whether the time needed for completing the survey form was sufficient and to test whether participants had any difficulties in understanding the questions. The outcome was satisfactory.

Findings

This study was conducted to investigate how students in different academic programs of Arabic at Kuwait University differ in their beliefs about these given programs.

Research Question 1

Research question 1 was whether students of the Arabic Teaching program at the College of Education differ in their motivations for joining such a program, their career intentions and their choice of program from students of Arabic Language and Literature at the Faculty of Arts. The hypotheses predicted that students of the Arabic teaching program at the College of Education are different in their hedonistic, pragmatic and fatalistic motivations for investing in higher education, their career intentions and their choice of program from students of Arabic at the Faculty of Arts. The results are shown in Table 1.

Table 1: T-test results for items showing statistically significant differences in students' opinions regarding motivations for choosing a specific program

Type of motivation	Program of study		t-value	Sig.
	M (SD)	M (SD)		
	Education	Arts		
Hedonistic motivation	16.8 (4.8)	15.7 (5.4)	-2.10 (347.28)	.04
Pragmatic motivation	14.6 (5.63)	12.5 (4.6)	-3.80 (330.7)	.0005
• Training opportunity	2.10 (1.2)	1.7 (1.03)	-2.30 (332.25)	.02
• Specialised skills and knowledge	1.57 (1.12)	1.33 (.80)	-2.34 (306.97)	.02
• Job motivations	2.20 (1.29)	1.78 (1.15)	-3.23 (339.26)	.001
• Getting chosen career	2.46 (1.36)	2.06 (1.29)	-2.83 (349)	.005
• Pursuing education	2.16 (1.24)	1.92 (1.12)	-2.53 (343.58)	.01

Fatalistic motivation	16.47 (4.29)	18.05 (4.49)	3.35 (349)	.001
• Finding employment	2.88 (1.53)	3.51 (1.44)	3.99 (349)	.0001
• Suitable job	3.44 (1.41)	3.89 (1.38)	2.98 (349)	.003

Sig. value is 0.05

Hedonistic motivation

The data suggest that there was a statistically significant difference only in the total scores of hedonistic motivation for students of Arabic in the Faculty of Arts and College of Education, and thus the H1a is not rejected. Specifically, the students of Arabic in the College of Education were more intrinsically-motivated and had more enjoyment from their experiences than their counterparts from the Faculty of Arts.

Pragmatic motivation

The data suggest that the two groups of students demonstrated a statistically significant difference in the total scores of pragmatic motivation, and thus the H1b is not rejected. This pragmatic motivation specifically manifested in five components.

Students of Arabic in the College of Education and their counterparts in the Faculty of Arts demonstrated a significant difference in their opinions regarding the job training opportunity which their chosen programs would provide. Participants from the College of Education consistently thought that enrolling in the College of Education would give them the training that they were seeking. Accordingly, participants from the College of Education had a mean difference in their beliefs with respect to the specialised skills and/or knowledge that their program would help them to develop higher than that of participants from the Faculty of Arts.

Students of Arabic in the College of Education scored more highly than their counterparts in the Faculty of Arts with respect to job-related motivations. Participants from the College of Education

expected better job prospects than participants from the Faculty of Arts. Similarly, students of Arabic from the College of Education expected a better chance to enter their chosen career than did students of Arabic in the Faculty of Arts. Not only were students of Arabic from the College of Education motivated by job-related concerns, they also expected more positively that their chosen program would enable them to pursue their postgraduate studies than did students of Arabic from the Faculty of Arts.

Fatalistic motivation

With respect to fatalists, students who embark on their program of study by default when they could not get into a preferred program, the findings were surprising. In contrast to the hedonistic and pragmatic motivations, the data indicate that students of Arabic from the Faculty of Arts were less fatalistic than their counterparts from the College of Education, and thus the H1c is not rejected. Specifically, finding employment rather than being a university student was not as applicable to the participants from the Faculty of Arts as to participants from the College of Education. Moreover, students of Arabic from the Faculty of Arts did not cite negative reasons that 'not finding a suitable job was their motivation to be in this program' as did their counterparts from the College of Education.

Research Question 2

Research question 2 asked, 'Do students of the Arabic Teaching program at the College of Education differ in their perceptions of future employers' expectations from students of Arabic Language and Literature at the Faculty of Arts?' The hypothesis was that students of Arabic at the College of Education are different in their perceptions of future employers' expectations from students of Arabic at the Faculty of Arts.

Data suggested that there were no statistically significant differences in the total score with respect to the perceptions of future employers'

expectations for students of Arabic at the College of Education ($M = 42.10$, $SD = 13.60$), and students of Arabic at the Faculty of Arts ($M = 19.70$, $SD = 2.02$), $t_{0.025}(348) = -1.64$, $p = .10$. Thus, the H2 is rejected. However, there was a statistically significant difference in the item concerning the perception of the importance of 'time management' between participants from the College of Education ($M = 2.97$, $SD = 1.44$) and participants from the Faculty of Arts ($M = 2.58$, $SD = 1.48$), $t_{0.025}(349) = -2.51$, $p = .01$. This last difference between the two groups is inconsistent with what Brennan and Williams (2003) observed about the lack of time management among students of Arabic at liberal arts schools.

Research Question 3

Research question 3 centred on whether students of the Arabic Teaching program at the College of Education differ in their aspirations for career development and long-term life goals from students of Arabic Language and Literature at the Faculty of Arts. The hypotheses were that students of Arabic at the College of Education are different in their aspirations for career development and long-term life goals from students of Arabic at the Faculty of Arts. Table 2 shows the results.

Table 2: T-test results for items showing statistically significant differences in students' beliefs about aspirations for career and long-term life goals

Item	Program of study		t-value	Sig.
	M (SD)	M (SD)		
	Education	Arts		
Future career aspiration:				
• Changing employer	2.8 (1.4)	2.4 (1.4)	-2.2(349)	.02
• Achieving higher position	3.9 (1.3)	3.6 (1.5)	-2.5 (345)	.01
• More secure employment	3.8 (1.3)	3.4 (1.5)	-2.8 (342)	.005

• Changing their field of responsibilities	3.2 (1.35)	2.8 (1.22)	3.31 (349)	.001
Lifelong goals	41.2 (5.0)	40.7 (5.5)	-7.5 (349)	.45
Sig. value is 0.05				

Future career aspiration

The data suggested that there was no statistically significant difference in the total score of the future career aspirations for participants from the College of Education and participants from the Faculty of Arts, and thus H3a is rejected. However, there were some items under this dimension where the two groups showed statistically significant differences (see Table 2).

There was a statically significant difference in the score of the possibility of changing employers for participants from the College of Education and the score for participants from the Faculty of Arts. Additionally, the participants from the College of Education and the participants from the Faculty of Arts showed a statistically significant difference in the possibility of achieving a higher position. Also, participants from the College of Education and participants from the Faculty of Arts showed a statistically significant difference in their belief in the possibility of achieving more secure employment. However, in contrast to this line of difference in the respective future career aspirations for both groups, where participants from the College of Education showed higher scores than their counterparts from the Faculty of Arts, the latter group believed they were much less likely to change their field of responsibilities than the former group.

Lifelong goals

The data suggested that there was no statistically significant difference in the total score on the lifelong goals scale for participants from the College of Education and participants from the Faculty of Arts, and thus H3b is rejected.

Discussion of the findings

It is relevant at this point to raise two issues. First, it is important to know that both groups showed some rationale in choosing their field of study (Becker 1964)—that is, participants perceived benefits from their investment in education. The statistically significant differences between the two groups were in the degree, not in kind (Abu-Allam 1994). Second, the bipolar dichotomy of concepts is better seen as a continuum; that is, if some people are pragmatically motivated, it does not necessarily mean they are not hedonistically motivated as well (Al-Thabeity 1998). In fact, this continuum nature of combining different or even conflicting factors explains why some people showed varying levels of conviction with respect to different factors.

As students decide to continue participating in education, it is clear that they are aware of making an investment in their human capital (Blaug 1985; Schultz 1963). The mosaic of beliefs shows that relating any program of study to merely materialistic benefits is not realistic; non-materialistic returns to individual investment in education such as knowledge and skills are apparent in students' perceptions (Psacharopoulos 2006; Quiggin 1999; Woodhall 1998).

Although students of Arabic have what might be called 'generic' beliefs with respect to investing in continued higher education in Kuwait, students who clustered within certain categories held different beliefs as a function of course content (Boys et al. 1988). Hence, students of the two programs showed no statistically significant differences in terms of lifelong beliefs about their programs and their general philosophy of higher education. Moreover, since the future employer is very probably the government (El Touny 2002), different programs of Arabic language appear to be a less prominent indicator of future employers' expectations than if the employment were part of the private sector.

Implications for educational pedagogy

The findings of many studies, including the current study, have demonstrated that students' beliefs about investing in higher education have become, or are becoming, an important tool and an essential part of educational policies. The findings from this study suggest a number of implications to be taken into consideration by educational planners in Kuwait. First, they need to be aware of the role of students' beliefs in investing in further education and to encourage students and their families to communicate those beliefs about the potential benefits of their chosen program with those who are in a better position for advising them. The channels of communication are various. Second, students' beliefs are of no less importance as an input than other indicators to policies concerning education and employment. Third, it is plausible to let each program present itself as it is, whether liberal arts-based or professional-based language programs (Grin 2002). The case should be, however, that the whole community believes in the unique contribution of each program, respectively (Martin and Gawthropem 2004). The ultimate goal is to enhance students' achievement and understanding of the content of their chosen program.

Recommendations for future research

This exploratory research has revealed fascinating patterns within the beliefs of the students of Arabic enrolling in career-based and liberal arts-based programs. First, the extent to which students' beliefs of enrolment in different programs are being and are likely to be true, and the extent to which their beliefs about the transition from education to real world are realistic, can only be assessed properly over a longer period of time (recommendations for future research below). Second, if I was to approach the research again, I would rather conduct a two-stage study, comprised of a quantitative followed by a qualitative study. Alternatively, it is suggested that a qualitative study be built on the findings of this and other similar

studies. The main strength of the qualitative approach would lie in providing a deeper understanding of a given phenomenon through answering ‘how’ and ‘why’ questions, and placing emphasis on tracking situations over a period of time rather than tracking frequencies of occurrences. Basically, the qualitative approach could provide us with two crucial outcomes (see Creswell 2003):

- understanding participants’ ways of making their experiences and events meaningful, and how their beliefs and behaviour are reflected in the real world mutually influencing each other, and
- understanding the particular context within which participants act, and how this context affects their actions.

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Participation of elderly women in community welfare activities in Akinyele local government, Oyo State, Nigeria

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This paper assessed the participation of elderly women in community welfare activities in Oyo State, Nigeria. Simple random sampling technique was used to select 120 elderly women from six out of the twelve political wards in the study area. Both qualitative and quantitative methods of data collection were used to elicit information from the respondents. A focus group discussion was conducted with the elderly women groups, in each of the six wards.

Frequency counts and percentages were used to summarise the data, while chi-square and the multinomial logit regression model were also used to analyse the data. There were significant relationships between the level of participation of rural elderly women in community welfare activities and age ($X^2 = 81.50$, $P = 0.05$), marital status ($X^2 = 3.84$, $P = 0.05$), educational status ($X^2 = 196.07$, $P = 0.05$), religion ($X^2 = 8.53$, $P = 0.05$) and place of origin ($X^2 = 51.53$, $P = 0.05$).

The study concludes that rural elderly women participate in various community welfare activities such as care of children, giving of advice on child care, maternal care, family planning, family health, mediation and resolution of conflicts, assistance with domestic chores, family nutrition, children education on basic skills and good morals. It is therefore recommended that rural elderly women should be involved in rural development issues since they have a wealth of knowledge on various community welfare issues.

Introduction

The United Nations Decade for Women (1976–1985) legitimised women's status and contributed immensely to the awareness of their major contributions in communities (Odebode & Oladeji 2001). Many studies have also significantly shown that women have been the unrecognised cornerstones of many rural economies, especially those of the developing countries (Yahaya 2002). Besides their work on farms, women are involved in various biological, social, cultural and economic activities that contribute significantly to the well-being of their households and communities, including the aged.

Women constitute more than 60% of the adult population resident in the rural areas of Nigeria (Adeyeye 1986). This population of women is too large to be ignored, because all through their lives they are involved in many activities that provide medical, social, food, economic and cultural needs of their households. Elderly women contribute significantly to nation-building and economic growth through their roles in agricultural production, housekeeping, child welfare services and community welfare activities. These roles need to be documented so that development planners can use elderly women as change agents in efforts to improve the living conditions in rural communities, hence, achieving sustainable welfare in rural communities. It is on this basis that this study investigated the rural

participation of elderly women in community welfare activities with a view to providing answers to the following questions:

- What are the selected socio-economic characteristics of elderly women in Akinyele Local Government Area of Oyo State?
- What is the level of participation of elderly women in community welfare activities in Akinyele Local Government Area of Oyo State?
- What are the income-generating activities of elderly women in Akinyele Local Government Area of Oyo State?

Objectives of the study

The main objective of this study was to determine the level of participation of elderly women in community welfare activities in the Akinyele Local Government Area of Oyo State. The specific objectives were to:

- examine the selected socio-economic characteristics of elderly women in Akinyele Local Government Area of Oyo State
- determine the level of participation of elderly women in community welfare activities in Akinyele Local Government Area of Oyo State
- examine the income-generating activities of elderly women in Akinyele Local Government Area of Oyo State.

Hypotheses of the study

The main hypotheses of this study are listed below:

- There is no significant relationship between the selected socio-economic characteristics of elderly women and their level of participation in community welfare activities in the Akinyele Local Government Area of Oyo State.
- There is no significant relationship between the income-generating activities of elderly women and their level of participation in community welfare activities in Akinyele Local Government Area of Oyo State.

Related literature

Activities of elderly women in rural households in Nigeria

In developing countries within Africa, Asia and Latin America, family members generally expect elderly women to play multi-faceted roles based on their experiences. They have a sense of moral obligation to assume such roles. Rural elderly women play an important role in family decision-making. This is as a result of age and experience in various aspects of family life. Aubel et al. (2004) revealed the multi-faceted functions of elderly women at the household level. These include assistance with domestic or household chores, education and socialisation of women of reproductive age and children, advising younger generations, mediation and conflict-resolution. They also supervise and care for children, animals and household items and manage all family health problems. However, with increasing age, rural women often have increased market activities and increased agricultural labour (including control over land inherited from their husbands) (www.ncsu.extension.org 2006). These activities contribute significantly to the well-being of families and communities.

Participation of elderly women in community welfare activities in Nigeria

In Nigeria, elderly women and other family members in the community constantly interact with children from their first days of life. This interaction has been reported as being a reason for African infants being more precocious than European children (Apanpa 2000). This author further described them as generous, patient, tolerant and committed to the well-being of family members, especially young children, and the environment. In most African societies, elderly women have authority over the practices of the younger ones. According to Castle (1994), there is a hierarchical transmission of knowledge from mothers-in-law to daughters-in-law, in the household care of sick children in Fulani and Humbebe households in Mali. They are the guardians of traditions of the society, custodians of the society treasures, upholders of cultural

values and the institution of wisdom (Ajala 2006). Due to the respect accorded them by other household members, they influence family decision-making. They contribute to communal development efforts by airing their views at community meetings, contributing financially to projects and being responsible for the well-being of younger women and children.

Elderly women build and strengthen communities, stabilise the future of the younger generation and are excellent sources of providing cultural identity, often assuming responsibility for the children within their communities. They pass on historical values and understand the community and relevant components of child and family welfare. If community welfare is to be promoted, roles of elderly women should not be disregarded.

Methodology

Area of study

The study was carried out in Oyo State (population of 3.45 million in 1991, National Population Census 1991), specifically in the Akinyele local government area which covers a total land area of 575 square kilometers with twelve political wards. Of the population in Akinyele, 90% is involved in agriculture as a primary source of income. Some of the cultivated crops are oil palm, timber, maize, cassava and plantain.

Six out of the twelve political wards were randomly selected with the use of the ballot method. Wards 1, 3, 5, 7, 9 and 11 were selected. From each ward, two communities were randomly selected. From each community selected, households were systematically selected. Sampling by replacement method was therefore used for households without an elderly woman. In all, a total of 120 elderly women were sampled.

Table 1: Distribution of the respondents according to communities from Akinyele Local Government Area

Ward	Ward names	Selected wards	Selected communities	Number of selected respondents
1.	Ikereku	Ikereku	Ikereku, Alakeji	20
2.	Labode/ Olanla/ Obada			
3.	Arulogun	Arulogun	Arulogun, Aroro	20
4.	Onidundu/ Amosun			
5.	Moniya	Moniya	Akingbile, Aponmode	20
6.	Akinyele			
7.	Iwokoto/ Amosun	Iwokoto/ Amosun	ApapaOdan, Iwonla	20
8.	Ojoo/ Ajibode/ Orogun/Sasa/ Owe/ Kankun			
9.	Ijaye	Ijaye	Ijaye Orile, Iware	20
10.	Alabata			
11.	Okegbemi/ Mele	Okegbemi/ Mele	Okegbemi, Molarere	20
12.	Iroko			
Total	12	6	12	120

Primary information was collected through the use of structured questionnaire, interview schedule and focus group discussion because most of the elderly women are illiterates. Face validity of items on the questionnaire was done and a reliability coefficient of $r = 0.89$ was achieved.

Data analysis

Descriptive statistics, such as frequency counts, was used to summarize the selected socio economic characteristics of the elderly women. Other statistical tools used in analyzing the data include Chi square, Pearson Product Moment Correlation and Logit Regression Model. A multinomial Logit model, based on the random utility model, was used to analyze the effects of selected socio- economic characteristics on level of involvement in welfare activities.

Results and discussion

Age of respondents

Age could be regarded as an indicator that could affect the level of involvement of the respondents in community welfare activities and determine their income-generating activities. The results, as represented in Figure 1, show that a high percentage (53%) of the elderly women are within the age range of 61–70 years, while three percent are more than 80 years of age and the mean age is 69 years. This implies that most of the respondents are aged and have experience in various activities that ensure the welfare of their family members.

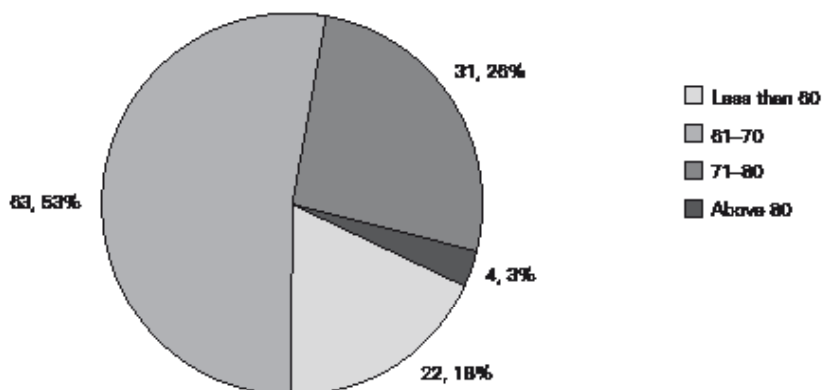


Figure 1: Distribution of respondents according to age

Number of wives of respondents' husbands

Of the sampled women, 63% are widowed and 37% have husbands who are still alive. The widows head their households, trying to meet as many as possible of their family's needs. Most (62%) of the respondents indicated occupying the fourth position in their households (Figure 2).

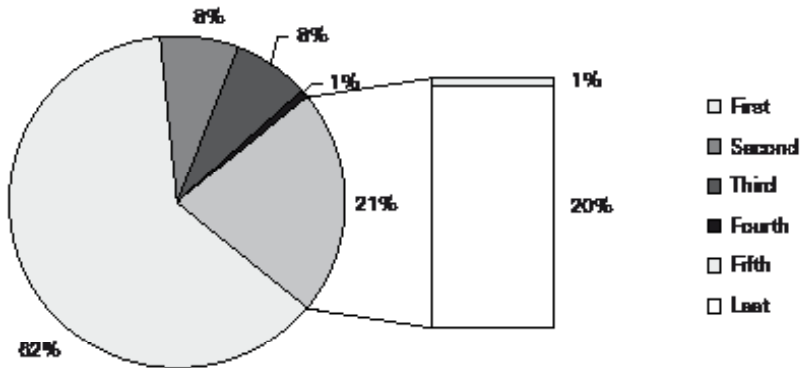


Figure 2: Number of respondents according to marital position

Educational status of respondents

Table 3 shows that a large majority (80%) of the respondents has no formal education and only (14%) have had access to functional literacy programs, such as cassava utilisation. Most of them were exposed to these programs informally, through their mothers. This lack of formal education is due to gender disparity in educating male and female children in Nigeria, especially in the rural areas. These women need to be educated and given access to functional literacy programs, such as child-care, home management/improvement courses and so on. This will teach them how to improve the welfare of their households (Adeyeye 1988).

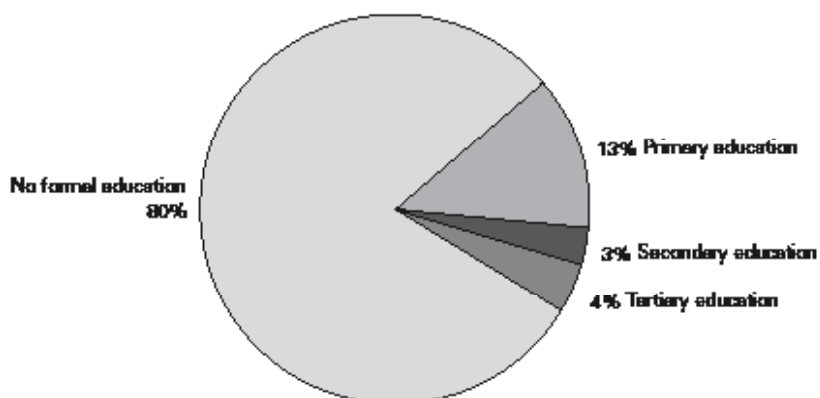


Figure 3: Distribution of respondents according to educational status

Number of wives is closely related to religion and the women believe their husbands have a right to marry as many wives as they wish.

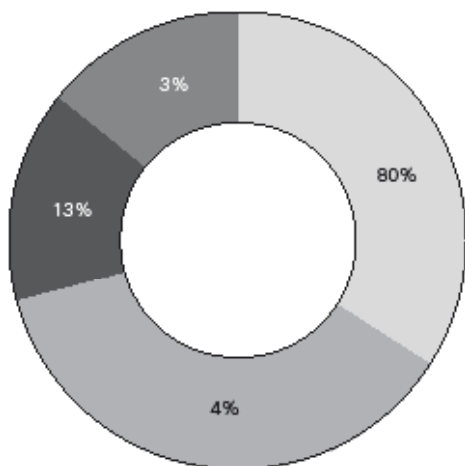


Figure 4: Distribution of respondents according to number of wives

Distribution of respondents according to religion

Religion is an important aspect of welfare. This is because every religion stresses the importance of living at peace with others. Sixty three percent of the respondents are Christians, while 37% are Muslims (Table 2).

Table 2: Distribution of respondents according to religion

Religion	Frequency	Percentage
Christianity	76	63
Islam	44	37
Total	120	100

Level of involvement in community welfare activities

The level of involvement of the rural elderly women in community welfare activities was measured by their level of involvement in home and productive activities. Elderly women are involved in various activities in different households. These activities contribute to the well-being of their family members. Table 3 shows that 88% of the women always care for children, 82% always give advice on childcare and 78% always manage household affairs. Also, 95% educate children on morals, 97% are involved in religious activities and 87% influence their family’s decision-making.

Table 3: Distribution of respondents based on level of involvement in community welfare activities

Home and productive activities	Always		Sometimes		Never		Totals
	N	%	N	%	N	%	
Care of children	106	88	7	6	7	6	120 (100)
Give advice on childcare	98	82	17	14	5	4	120 (100)
Give advice on maternal care	83	69	25	21	12	10	120 (100)
Give advice on family planning	70	58	20	17	30	25	120 (100)
Give advice on family health	76	63	30	25	14	12	120 (100)
Mediate & resolve conflicts	69	58	42	35	9	7	120 (100)
Manage household affairs	93	78	21	18	6	4	120 (100)
Assist with domestic chores	73	61	32	27	15	12	120 (100)
Give advice on family nutrition	60	50	41	34	19	16	120 (100)
Educate children on culture	67	56	51	43	2	1	120 (100)
Teach children skills	59	49	45	38	16	13	120 (100)
Influence family's decision-making	83	69	22	18	15	13	120 (100)
Religious activities	98	82	18	15	4	3	120 (100)
Educate children on morals	101	84	13	11	6	5	120 (100)
Educate children on effect of vices	93	78	17	14	10	8	120 (100)
Give advice on child nutrition	87	73	22	18	11	9	120 (100)

Source: Field Survey, December 2006

Income-generating activities

All the elderly women in the sample indicated that they engage in various income-generating activities, especially production, processing and marketing of agricultural produce. Udegbe (1991) reported that all the women in her sample were engaged in various income-generating activities while their children were young; this study confirms this finding and that these women continue with their work, even at old age. The results from the focus groups, represented in Table 4, also show that elderly women in the selected communities engage in several income-generating activities as a livelihood strategy.

Table 4: Distribution of sampled rural elderly women by income-generating activities and community

Type of activity	Ikereku	Arulogun	Akingbile	Apapa odan	Ijaye	Okegbemi	Total
Crop farming	7	2	8	8	1	5	29
Livestock rearing	5	5	7	7	-	4	31
Petty trading / trading	1	13	8	5	4	2	33
Processing	5	3	3	2	2	2	17
Selling food / foodstuffs	-	4	3	1	6	1	15
Tailoring	-	-	-	-	1	-	2
Operation of grinding machine	-	-	1	-	1	-	2
Others	1	3	4	4	-	2	14

Source: Focus group discussions with groups of the elderly women

In four of the communities, crop farming is the dominant activity among the discussants. Trading/ petty trading is the most dominant livelihood activity. This is explained by the fact that, with increasing age, the elderly women find it more difficult to engage in strenuous physical activities.

Results of the focus group discussion with the elderly women

Discussants in the focus groups (see Plate 1) stated that there have been efforts in the past to improve the welfare of their communities but that lack of infrastructural facilities and corruption are major constraints to achieving this aim. They suggested that both the local government and the people must work together in order to improve the welfare of the communities. They stated that elderly women can help by voting for 'good' citizens and supporting all efforts directed at improving the welfare of their communities, in any way they can.



Plate 1: Focus group discussion with the women

The discussants rated the level of infrastructural development in their communities as very low. They stated that there are few infrastructural facilities in their communities and many of them are not functional. This is represented in Table 5.

Table 5: Distribution of infrastructural facilities present in the communities

Community	Facilities present
Ikereku	Road, bore-hole water and mechanical oil palm processor, few schools, primary health care centre
Arulogun	Road
Akingbile	Electricity, untarred access road
Apapa odan	Poor rural road
Ijaye	Rural road, non-functional maternity centre, few schools
Okegbemi	Poor rural road

Source: Focus group discussions with groups of the elderly women

Multinomial logit analysis of the effects of selected socio-economic characteristics on level of involvement in community welfare activities

Educational background and extension contact were significant at 5% and 1% level respectively and both variables have negative coefficients (Table 6). This implies that a unit change in educational level will decrease the likelihood of participation of the elderly women in community welfare activities by 0.463. Nonetheless, elderly women require more informal education to be more involved in community welfare activities. Also, a unit change in frequency of extension contact will decrease the likelihood of participation of the elderly women in community welfare activities by 0.271. Even so, the elderly women should be exposed to more contact with extension officials, to be more involved in community welfare activities. The *a priori* expectation that there will be increased participation with increased extension contact and educational level is not satisfied. This could be due to negative experiences the elderly women may have had with previous community welfare programs.

At high level of involvement, frequency of extension contact is also significant at 1%. Income, frequency of extension contact, religion,

marital status and educational background have positive coefficients of 0.105, 0.292, 0.063, 0.042 and 0.232 respectively. These results show that a unit change in these variables will increase the likelihood of participation of the elderly women in community welfare activities by these values. These imply that with higher income, more frequent extension contact, more informal education and being married, there is likelihood that the elderly women will be more involved in community welfare activities. The *a priori* expectation that there will be increased participation with increased income, extension contact, educational level and marital status is satisfied. Age, with a negative coefficient of 0.014, implies that a unit change in age decreases the likelihood of involvement in community welfare activities. This may be due to poor health status that will prevent active involvement in community welfare activities. Overall, all the variables are significant at 1% level.

Table 6: Multinomial logit analysis of the effects of selected socio-economic characteristics on level of involvement in community welfare activities

Variables	Low		Middle		High	
	Coeff	t-value	Coeff	t-value	Coeff	t-value
Constant	-0.343	-0.519	0.514	0.647	-0.171	-0.200
Marital status	0.036	0.296	-0.078	-0.616	0.042	0.329
Age	0.012	1.636	0.003	0.289	-0.014	-1.510
Educational background	-0.463*	-2.576	0.230	1.570	0.232	1.590
Religion	0.029	0.322	-0.092	-0.092	0.063	0.614
Place of origin	0.113	1.269	-0.077	-0.746	-0.036	-0.342
Income	-0.044	-0.732	-0.061	-0.866	0.105	1.105
Extension contact	-0.271**	-3.055	-0.022	-0.214	0.292**	2.895

Log likelihood function: -110.64

Restricted log likelihood function: -131.66, Chi square: 42.04, Degrees of freedom: 14

Significance level: 0.00012**

* and ** refer to significance at 5% and 1% respectively

Hypotheses testing

Hypothesis 1

In Table 7, it can be observed that the p values of the selected socio-economic characteristics are less than 0.05. This implies that the selected socio-economic characteristics of the elderly women were all significant and therefore have influence on their level of involvement in community welfare. This suggests that selected characteristics, such as age, determine the level of involvement of elderly women in community welfare activities. For instance, women who are above 80 years may be unable to participate actively in community welfare activities.

Table 7: Chi-square analysis of the relationship between the selected socio-economic characteristics of the elderly women and their level of involvement in community welfare activities

Variables	df	X ² (cal)	X ² (tab)	P value	Decision
Age	25	81.500	37.625	0.000	Significant
Marital status	1	8.533	3.841	0.003	Significant
Education	3	196.067	7.815	0.000	Significant
Religion	1	8.533	3.841	0.003	Significant
Place of origin	3	51.533	7.815	0.000	Significant

If $p < 0.05$, null hypothesis is rejected

df = degrees of freedom

P value = significant value

Hypothesis 2

The correlation coefficient value of 0.21 shows a weak relationship between the income generating activities of the elderly women and their level of participation in community welfare activities ($r = 0.21$, $t_{cal} = 2.33$, $t_{0.05} = 1.64$). However, the relationship was statistically significant at 0.05 level of probability; therefore, the null hypothesis is rejected. This implies that the income generating activities of the

elderly women, such as crop production, buying and selling of cash crops, processing of agricultural produce and operation of grinding machine have no influence on how involved the elderly women are in community welfare activities.

Hypothesis 3

The correlation coefficient value of 0.04 shows a weak relationship between the constraints being faced by the elderly women and their level of participation in community welfare activities ($r = 0.04$, $t_{cal} = 0.43$, $t_{0.05} = 1.64$). However, the relationship was statistically insignificant at 0.05 level of probability; therefore, the null hypothesis is accepted. This is because, of all the constraints, lack of income was the only one identified as a very severe constraint by a large percentage of the respondents. This implies that the elderly women may not be able to contribute a lot of money.

Conclusions

This study has established that the majority of elderly women actively participate in community welfare activities. Due to age and experience in family life, they manage household affairs, assist with domestic chores, and educate women of reproductive age and children. They also advise younger generations, mediate and resolve conflicts, supervise or care for children, animals and household items and manage all family health problems. They are also involved in various income-generating activities that contribute to the well-being of their families.

Based on the findings of this study, the following recommendations are made:

- Programs that are directed towards empowering elderly women economically should be developed so that they can participate more actively in community welfare activities in their communities.

- Elderly women are a wealth of knowledge on diverse issues; therefore, they should be actively involved as resource persons in all rural development issues.
- The capacity of elderly women as partners in improving welfare in their communities should be strengthened. This should be approached in such a way that there is respect for their practices and beliefs, so that they see interventions as an improvement on their practices and not a criticism of it.

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BOOK REVIEW

Emerging perspectives of workplace learning

Stephen Billett, Christian Harteis and Anneli Eteläpelto (eds.)
Rotterdam: Sense Publishers, October 2008
pp. 257, ISBN: 978-90-8790-643-6

This new edited collection is one of the latest offerings from Sense Publishers and forms part of an excellent series on workplace and learning development. The book is an international undertaking to promote research developed around the world on workplace learning, with contributions from Australia, Finland, Germany and New Zealand.

The editorial team is led by an acknowledged Australian academic in the field of workplace learning, Stephen Billett, Professor of Adult and Vocational Education at Griffith University, Brisbane. In the preface, Billett and his co-editors describe how they have set out to document a range of emerging findings about learning through and about work. The common theme across the 15 chapters is to understand how individuals engage in and learn through their work. Following the introductory chapter about a range of emerging perspectives

on workplace learning, six chapters in Section A deal with learning about the self and agency, and eight chapters in Section B address specifically learning about work tasks. In section A, the authors cover a range of issues including: areas of vocational and professional identity, teacher educators' workplace learning, and how women discover self and learn to become and belong through work. Section B includes a diverse range of papers including how people learn through errors, developing conceptual knowledge through guided learning, and how workplace conditions may promote transfer of training. Of particular interest, Chapter 10 provides an interesting discussion on how workplace leadership development curriculum offers better prospects for effective learning when it is centred on the needs of the organisation.

As a distinguished scholar in the area of workplace learning, Billett's influence is ever-present throughout the book, directly in Chapters 1 and 3 and indirectly through several citations in twelve of the remaining 14 chapters. On first glance, the title of this book is likely to entice a more enquiring adult educator or human resources practitioner who is keen to undertake a new read on a recurring topic—and one immersed in perpetual change. Moreover, the book will attract a great deal of interest from readers who know and follow other literary works from the lead editor. However, as one progresses through the first few chapters, a realisation soon emerges that the book will appeal more to academic readers or serious educators who have a keen interest in comparing global perspectives on learning and professional development in the workplace. Arguably, the book could be considered as an academic text for researchers in the field of adult and workplace learning, as the intent of this publication is to bring together a collection of research findings from doctoral candidates who have recently completed or are nearing completion of their theses. As one would expect from postgraduate candidates under supervision, each of the chapters is well written and based on a range of emerging issues, with an international flavour. In the preface, the editors claim that each chapter covers something fresh and this

is where the book has both strength and value. Taken together, these chapters provide an impressive body of scholarly work. The high profile of Billett, as a recognised guru in the area of workplace learning, undoubtedly serves as a major asset to this combined text, but equally, this strong presence could be perceived as an indulgent or limiting characteristic.

As the title suggests, the strength of this book lies in bringing together an informative collection of original research covering a diverse range of emerging perspectives in the area of workplace learning. The book is constructed as a compilation of papers making it possible to dip into each chapter, if a shortage of time or intellectual appetite does not allow for a full read. Perhaps, the academic format and use of scholarly language will make the book more appealing and accessible to post-graduate students, thoughtful adult education professionals and be of particular value to those who teach in this area.

In summary, this is a thought-provoking book that introduces the reader to a breadth of ideas and many theories for putting workplace learning into context. The book brings into wider circulation a collection of important research on learning that otherwise might have been restricted to academic journals. Each chapter draws from a wide range of literature, but in some parts the readers may feel they have been over the same ground in other texts—though this feature could be perceived as an important conduit. If there is a limitation in this book, it is the potential inaccessibility to those readers less conversant with academic language and research terminology. The diverse perspectives taken from each of the main chapters are not easy to digest or weave together. However, the final chapter attempts to consolidate the main points and set them in the context of learning as a socio-constructive process. With the benefit of hindsight, readers are recommended to read the final chapter directly after the introduction chapter before diving into the two main sections.

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BOOK REVIEW

Adult education and training

James Athanasou (ed.)
Terrigal, NSW: David Barlow Publishing, 2008
316 pages; ISBN: 9781-921-333033 (pbk)
Retail price: A\$55

The editor of this soft-cover, adult education textbook is James Athanasou, a member of the Faculty of Education at the University of Technology, Sydney, Australia. He specialises in vocational guidance and assessment and has written over 150 publications in his field. This compilation of works includes 17 chapters from 16 academics based in the eastern states universities in Australia, four from the USA and one from Canada. These authors come from schools including Education, Adult Education and Psychology.

In his preface, Athanasou states that adult learning is 'heterogeneous in its nature and scope. It operates in a bewildering variety of contexts. It is certainly a moving target.' (p. 1). This is reflected by the eclectic range of topics covered in this book. Athanasou rationalises

his decision to follow his introductory chapter with the international authors' contributions by stating that these are more general in their scope and content. He then gathers the Australian chapters together in the latter section on the basis that they relate to more specific aspects of adult education.

In the first chapter, Anthanasou provides a short insight into the field of adult education by diving directly into information provided by adult education interview participants. He follows this with a brief description of what constitutes adult education and some historical data about various approaches to it.

The next three chapters focus on topics including the importance of personal (cognitive) development as expressed through neuroscience and its relevance to a tripartite trajectory which also includes interpersonal (emotional?) and transpersonal development. This approach is described as both transcending former notions of identity development, and embracing aspects of the concepts of deep inner transformation of consciousness from which the development of our social altruism can emerge.

These concepts are complemented by Patricia Cranton and Elizabeth Tisdell's engaging chapter about transformative learning in which they in part examine cognitive and emancipatory perspectives and the role of the multiple dimensions of knowing.

Brookfield's chapter challenges us with the question: 'Can critical thinking be taught?' (p. 51). He explains both why teaching critical thinking is an essential skill for survival in a post modern world, fraught as it is with tensions and dualities, and how it can be done. I found his candour about his need to undertake some serious personal critical thinking following his experience of having been 'plagued with clinical depression' (p. 66) refreshingly candid. Brookfield explains that he had to identify and unravel his own beliefs—couched as they were in his patriarchal and erroneous sense of what it is to be a man

—so that he could examine and discard them in order to maintain his sanity and to survive. This compelling anecdote reinforced the importance and relevance of developing our skills in critical thinking.

The following chapters vary widely. One is a useful contribution to the importance of being aware of gender differences in teaching and learning. Another gives a historical overview of adult education in Australia; this is followed by contextually based, practical information about teaching indigenous students. Language, literacy and numeracy are introduced in a chapter in which stories about adult language and literacy and so on are highlighted and framed within the relevant curricula, policies and programs in adult education.

Stephen Billett's contribution changes direction; this section is centred in part on the social learning which occurs in workplaces. Billett extends this to the way in which school students learn through reflecting about their work experiences and he draws useful conclusions about the desirability of integrating educational learning with that which occurs in workplaces.

Additional chapters include an introduction to the information processing theory of human cognitive architecture. This is then linked to the use of learning strategies through the application of aspects of the theoretical model. Similarly, another chapter introduces basic concepts of human communication and how these can be utilised in education and training. These are followed by contributions which focus on competency and curricula assessment methods. One chapter which sat uneasily amid these was an overly brief introduction to research methods which oddly—in an educational textbook—gave an introduction to referencing using the American Psychological Association (APA) method. The final chapter is a sound bite about e-learning.

Each chapter concludes with a useful set of review questions.

I was initially concerned about this text as its wide sweep suggested to me that the content may be less rigorous than I would have expected in a textbook. I am still unsure about the value of including one short chapter on teaching indigenous students, and one on gender as the potentially tacit message here is of concern. This is, however, a moot point; while these topics are essentially marginalised by their limited presence, these two chapters nevertheless may draw attention to the topics to readers who had not previously considered them. This could also apply to the brief introductions to research methods and e-learning.

As is inevitable in a multi-authored volume, the quality of writing is idiosyncratically variable; however, the editing process does appear to have been rigorous. I would have enjoyed the addition of a final or overarching concluding chapter, in which underlying pedagogical theories are outlined, contrasted or drawn together for students who are new to learning theory.

Overall, and despite some misgivings, this reasonably priced text would be a useful resource for a new student of adult education. It introduces a broad range of relevant topics, some of which are explored at a much greater depth than others.

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REVIEW ARTICLE

Reviews of five DVDs on adult learning, distributed by Video Education Australasia,

111A Mitchell Street, Bendigo, Victoria 3550, and
PO Box 4390, Shortland Street, Auckland:

Adult learning principles (2007—18 minutes)

What will I say at the interview (2009—30 minutes)

10 Employability attributes and skills (2007—14 minutes)

The future starts here (2001—23 minutes)

Workplace rights and responsibilities (2008—28 minutes)

The good, the bad and the ugly of DVDs in the training environment— tips for using DVDs and traps for the lazy and unwary

DVDs are one tool an educator may use to create a stimulating learning session but it requires careful planning to make the best use of this tool. A DVD must be vital to the session, as any unplanned or casual use of DVDs implies non-professionalism or laziness, which could affect the learning in the session and loss of credibility.

This article outlines seven steps to consider in preparation for using a DVD, previews five DVDs and provides an 11-point checklist to determine the appropriateness of any DVD, as not all DVDs are useful training aids.

Seven steps of preparation for using DVDs

To prepare for using a DVD, an educator should:

1. Read any supplied documentation (e.g. the facilitator's guide) as it may give useful information; provide ready-made activities; outline points for discussion; and explain if the DVD is designed to be viewed in parts or as a whole.
2. Preview the DVD at least once to identify the central learning points and decide whether there are times to pause for discussion or elaboration; or irrelevant information which can be ignored.
3. Consider how the DVD will be used, for example, as an introduction, in parts throughout a course, for post discussion or as a review of the session.
4. Create post discussion, handouts or activities to reinforce the learning and key points tailored to the learners.
5. Judge the best way to introduce the DVD at the session, and outline the reason for using it, what the learners should be looking for, and what follow-up activities will occur. This is to ensure the learners understand the DVD is important to the session and not a 'time out' or 'a break'.
6. Ensure the environment is conducive where everyone can see and hear, and there are no outside distractions.
7. Reflect on the best way of obtaining feedback on the effectiveness of the DVD itself and as part of the course to enable improvements.

Previewing five DVDs

After reviewing five DVDs, distributed by Video Education Australasia (www.vea.com.au, 111A Mitchell Street, Bendigo, Victoria 3550, tel: 03 5448 2400, vea@vea.com.au, and PO Box 4390, Shortland Street, Auckland, New Zealand, tel: 0800 486 688), the following issues were observed.

(a) *Adult learning principles* (2007—18 minutes; Subject: Communication) Since 1979, Eve Ash has produced over 500 Australian training films, videos and television episodes, many distributed in 40 countries. In 1986 she teamed up with fellow psychologist, Peter Quarry, to create Ash Quarry Productions and together they have created helpful and practical materials for thousands of people around the world.

In this DVD, Eve interviews Peter on five key adult learning principles, based on the work of Malcolm Knowles. Peter outlines the need for trainers to move away from a lecturing style, based on what was seen or experienced at school. He advocates that why groups become difficult is they are treated like children rather than adults. Instead, effective educators use adult learning principles to underpin their sessions.

He explains, with examples, the need for educators to:

- Allow participants to have some control over the learning. This includes dialoguing with the participants to ask about learning needs for the session, or when they want breaks. He states the importance of planning for training sessions, but to be more flexible and incorporate participants' ideas into the training session.
- Recognise, respect and use the experience of the participants.
- Create active not passive learning by using more group-based activities which can incorporate participants' experiences. A danger for educators is the over-use of Powerpoint that has too much script or is read to participants, neither of which help retention of learning.

- Make material problem-oriented, not subject-oriented. Focus on problems the participants face and explore solutions.
- Create immediate application to ensure the design of the training can be transferred the next day.

The DVD concludes with two key points. First, people need to consider the design and delivery of materials in a participant-focused way, based on these five adult learning principles. Second, a good educator uses more of a facilitation model where he/she manages the learning process, rather than a subject-matter expert who expects to lecture. For some educators this will involve a change of mindset.

The strength of the DVD is that, throughout each of the five principles, Peter and Eve give practical examples of what they have personally experienced to demonstrate each concept. The five principles are sequential and the key phrases highlighted. The interview is brief and to the point. The only weakness is that it is an interview and may not appeal to younger educators. It may be useful to stress more strongly that adult learning principles underpin an educator's philosophy and there is still the need to learn a range of practical design and delivery skills.

This is a useful DVD providing basic information to people new to the training role, on the importance of applying andragogy and not pedagogy principles. Ash and Quarry have captured the key points of Knowles; which will save time reading training books.

(b) *What will I say at the interview* (2009—30 minutes; Subject: Careers) is an 'artificial' documentary which follows a young job-seeker with 'attitude' preparing for her next interview with a career advisor. The first part gives practical information on the usual topics of having an up-to-date CV and interview etiquette. It outlines different types of interviews (one-on-one, panel or videoconference); the difference between factual and behavioural questioning; anticipating questions and designing effective responses using the STAR method (situation, task, action and result) and understanding the job requirements and culture fit. Some of this is done over coffee

in a kitchen. Most of this information can be found in career books or internet.

The strength of the DVD lay in the second part when watching two interviews with practical critique and comments for improvement. Actually watching someone giving a good handshake, explaining technical information then to see the mobile phone ring, criticising a former employer, and not bringing a spare copy of the resume or work samples is invaluable. While the information could be conveyed in a lecture / powerpoint, there is something in the voyeurism of watching failure and success that has more impact.

The occasional wobbly camera work; and '*after the break*' comments were the main weaknesses.

(c) 10 *Employability attributes and skills* (2007—14 minutes; Subject: Careers) by Quarry Ash is an interview style presentation. It first outlines five important attributes such as confidence, adaptability and confidence, then five core skills including communication, planning, IT competence and ability to learn.

There is nothing unique in the presentation that basic research then a lecture with powerpoint could not convey. However, it can be useful to hear other professionals discussing their experience.

(d) *The future starts here: The future of work and you* (2001—23 minutes; Subject: Business, Careers) is aimed at medium to tertiary age level for business or careers. It begins with the presenter dressed in a Star trek-type costume, stating he is from the future. Next is a mixture of information from the presenter interspersed with interviews from experts, and summaries. It attempts an historical perspective with facts, including the loss of blue collar jobs in the late 1990s, the rise in call centre staff, more businesses outsourcing, that a 15 year old may have seven to nine careers, and the Mayer key competencies. The emphasis seems to be

that employers want well educated staff with analytical skills, who can think on their feet, are flexible and can resolve conflict—a competent allrounder. It outlines the need for a career portfolio to develop a personal career path.

The main weakness was the out-of-date information. The presenter stated the up and coming careers were in health, education, IT and business for 2006. There was an attempt to be contemporary with the use of Australian clichés such as *raw deal*, *what's upstairs*, *side of the coin* and comments from author Peter Lewis (*Tales from the New Shop Floor*). But watching a costumed Star Trekker climb through a jungle gym seems inappropriate. The overall effect was corniness.

(e) *Workplace rights and responsibilities* (2008—28 minutes; Subject: Careers) is aimed at mature workers returning to the workplace. The practical information includes a worker's rights such as to be given time to read through a contract before signing, minimum conditions, wages and payslip, no harassment or bullying, and safety. The DVD defines collective agreement and the difference with a workplace agreement which is negotiated with individuals in either verbal or written form. It further addresses work / life balance. Again, most of the information can be found in books and internet.

The strength lies in the mini-vignettes, as an older worker encounters discrimination, bullying and inappropriate use of the mobile phone.

An 11-point checklist for selecting DVDs

DVDs can be useful, but the educator needs to be careful of relying on the DVD as the only way to get the key message across or for entertainment. A quality DVD should hold the learners' attention and provide real life scenarios or information that is not easy to create in some other manner.

The following list is an aid to help effective educators select a helpful DVD. While watching each DVD, consider if it is:

1. Relevant to the audience, in terms of learning points, content and presentation.
2. Appropriate for the learner age, literacy level, communication and learning style.
3. Current (already, ***The future starts here*** is out-of-date).
4. Country specific—for example, showing an American or British DVD on law would probably not be relevant.
5. Short and pithy, as it is difficult to watch more than 40 minutes and most people prefer about 15–25 minutes.
6. More than just interviews or ‘talking heads’ (the downside of ***10 Employability attributes and skills***).
7. Good quality, not shaky camera work.
8. Culturally or emotionally sensitive. I was surprised that two VEA videos showed people sitting on desks, as in New Zealand this is taboo in Maori culture.
9. Demonstrating cultural diversity in the issues or choice of actors (without stereotyping).
10. Cost effective, as it can save time for the educator researching information, but dates quickly.
11. Showing ‘real’ situations that the learners could encounter.

After the DVD

The main problem with DVDs is the passive and non-active learning which is counter to effective adult learning principles. Also, learners may consider the trainer to be lazy if using a DVD that is non-stimulating or contains nothing different to a lecture. Older readers may remember Friday afternoon films at primary school, especially wet Friday afternoons, and consider it just entertainment or a time-filler.

One key to using DVDs is the creation of a supplementary or follow-up activity to embed and apply the information. A DVD needs to provide something different that cannot be provided by a lecture with powerpoints. Following are examples of follow-up activities for three of the videos.

DVD	Potential follow-up activity
<i>What do I say at interview</i>	<ul style="list-style-type: none"> • List the job seeker's errors for a post-discussion • Write a list of factual and behaviour questions • Practise STAR responses
<i>10 Employability attributes and skills</i>	<ul style="list-style-type: none"> • Create an acronym for the 10 attributes and skills • Place the attributes and skills in a pyramid hierarchy or continuum to stimulate post-discussion
<i>Workplace rights and responsibilities</i>	<ul style="list-style-type: none"> • Discuss personal experiences or concerns in returning to the workplace • List the rights and design a poster • Write an advice letter to a friend returning to work

Most DVDs are for a one-off use for a set topic. It is a bonus if a DVD can be used in a range of situations. Commercial movies can offer this option better than most industry DVDs. For example, a fashion teacher could use the movie 'Titanic' (abiding by copyright, of course) for students to draw the different fashions, while a communication teacher could use the opening scene to discuss body language in card playing, and an IT learner could discuss the graphic style and faults when the ship sinks.

Conclusion

If an educator wishes to use relevant DVDs in a learning session, then by pre-watching and using the 11-point criteria, they can identify the appropriateness of the material. Then, by designing relevant activities, the learning can become more active, stimulating and relevant.

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NOTES FOR INTENDING CONTRIBUTORS

- 1 Papers are to be sent to the Editor, Professor Roger Harris, Adult and Vocational Education, School of Education, University of South Australia, Mawson Lakes Boulevard, Mawson Lakes, South Australia 5095. Phone: 08 8302 6246. Fax: 08 8302 6239. Email: roger.harris@unisa.edu.au
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for chapters: Newman, M. (2009). 'Educating for a sustainable democracy', in Willis, P, McKenzie, S & Harris, R (eds.) (2009), *Rethinking work and learning: Adult and vocational education for social sustainability*, Dordrecht, Netherlands: Springer: 83-91.
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