

Drivers and Outcomes of Innovations in Demand-Driven and Student-Centered Learning

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The Rangeland Management graduate coursework program at The University of Queensland is the product of a strategic response to a national need defined in a report on *Education and Training to Support Sustainable Management of Australia's Pastoral Industries*.¹ This report identified that, despite the national importance of the rangelands, there were no offerings specifically in rangeland management in Australia, and that the educational offerings available at the time were perceived by a wide range of stakeholders to be too narrow, of limited relevance, and “out of touch” with education and training needs. Typically, the focus of many such university programs in Australia has been on animal production or the environment, and on building research capacity in these fields. However, the complexity of many rangeland issues, the application of the science in management, and the growing emphasis on sustainability and interest in the “triple bottom line” of 21st century business success,² warranted a more integrated approach to the interlinked economic, environmental, and social issues in our rangelands.

The report also recommended the establishment of a Rangeland Management Centre and Network “attuned to the real needs of the stakeholders in the rangelands,” with the major stakeholders perceived to be ranchers, other land managers, livestock-based industries, state and federal government agencies with responsibility for economic development and environmental or natural resource management, and community groups with an interest in natural resource management, such as Landcare.³ The Rangelands Australia center was established with investments from The University of Queensland and an industry research and development body, Meat and Livestock Australia, and became functional in 2001.

An early audit of the supply of programs in agriculture and environmental science in Australia revealed an oversupply (150+ programs) at the undergraduate level, and a need for professional development opportunities for those living and working in our vast rangelands. The latter included graduates of animal production or environmental studies-type programs, as well as people with lower level qualifications or

no formal qualifications but many years of rangeland experience. In Australia, these are typically known as “mature age students.”

In this paper, we outline a series of highly strategic, innovative, and “best practice” approaches to curriculum and course development, adopted by Rangelands Australia in building a new articulated coursework program (i.e., Graduate Certificate, Graduate Diploma, and Master’s in Rangeland Management), as well as innovations to attract and retain both graduates and mature age students. We also report the outcomes of these initiatives.

Challenges Set

Rangelands Australia took a participatory design approach⁴ to the development of the program. Such approaches contend that the end user of the materials or product is integral to the development and should be actively involved in the development process.⁵ Consequently, the long-term goals of the Rangelands Australia initiative were set by consultation with industry, governments and the wider community, and guided the program development process. The goals were to:

- Address the need for accessible, current, and more relevant educational opportunities to build capacity to address the complex multidisciplinary issues facing the rangelands;
- Improve participation of adults living and working in the rangelands in higher education, qualify a new generation of land managers, and assist retention of skilled people in rural and remote Australia by improving access to relevant professional development opportunities;
- Enable enhanced adoption of innovations in production systems and natural resource management (NRM) by close links with research and development (R&D) agencies, corporations, and leading individuals;
- Respond to a growing interest in further education and qualifications, boosted by recognition of prior learning (RPL), national vocational training initiatives, etc., by increasing awareness of pathways for articulation from the

vocational sector to the higher education sector, and by facilitating and supporting these transitions;

- Nurture a life-long learning culture, and learning communities with a capacity for change; and
- Change perceptions of higher education in a region of historically low educational participation and attainment of higher education qualifications.

Strategic Approach

From the outset, we adopted a systematic approach to identifying and researching impediments and issues, strategy formulation, product development, and implementation as an integral aspect of the participatory design approach. This included focus groups, structured workshops, surveys, and market research. A 7-year plan was developed around participatory, demand-driven, and student-centered approaches to curriculum and course development; improving access and participation; and providing “learning for a future in the rangelands.” The first 3–4 years were spent researching key demand and supply issues and in developing and delivering the first range-specific courses. The positive response of the market to the first products led to a significant increase in industry, government, and philanthropic investment in course development, student support initiatives, and promotion and marketing. A comprehensive evaluation approach was a key aspect of these activities, both in providing feedback and in furthering participants’ involvement in the activities.⁶

In the first stage, a national workshop was held in 2001 with about 50 stakeholders, including experienced ranchers and policy makers representative of all rangeland states and territories. Workshop participants reinforced the need for a strong student focus; to “do things differently” in terms of course development, accessibility and delivery; to challenge thinking and practice, and nurture innovative solutions to management issues; to be current (in context and in use of R&D outputs); to ensure greater relevance to current and emerging issues; and to “add value” and not duplicate offerings.

Focus Group Meetings

A focus group/structured discussion approach, facilitated by the senior author, was used to identify a vision for Australia’s rangelands, to clarify knowledge and skills needs for future success in the rangelands, and to provide a framework for the curriculum.⁷ Participants were invited to identify current issues and challenges in their region, and given a short presentation on the forces driving change and major global and national trends by the facilitator. Each group then identified further trends impacting on their region, and, pulling this all together, identified the most likely scenario for their region in 10–15 years time. With this scenario in mind, the group then defined the personal qualities that would be critical for individual success and the key areas of knowledge for enterprise and community success.

Through the 24 focus groups conducted across Australia in 2002–2003, we engaged a diverse group of over 450 stakehold-

ers. Invitees were purposively selected, using a “snowball” or chain-referral sampling technique, with the key criterion being that the participants encompassed the diversity of interests in a region and the only restriction being that the individuals were recognized “forward thinkers” and not domineering personalities. Accordingly, the stakeholders so engaged included: leading ranchers; government agency representatives (e.g., primary industries, natural resources, water); research organizations (e.g., Commonwealth Scientific Industrial Research Organization [CSIRO], Cooperative Research Centres [CRCs]); policy makers at state and federal levels; Landcare, regional natural resource management, and conservation groups; indigenous groups; community leaders; service providers such as banks; and other industry representatives (e.g., mining, defense, tourism), as appropriate to the particular focus group location.

In a departure from industry tradition, and to broaden the perspectives on knowledge and skills needs, in this phase we also specifically set out to engage women and youth (i.e., 17–21-year-olds), and achieved 42% and 36% participation, respectively, across the participants of all 24 focus groups.

In a follow-up to the focus groups, we distributed the outputs of each meeting to the participants, and sought verification of, and further additions to, the expressed needs. We also conducted a survey of ranchers and extension specialists to clarify and prioritize the personal qualities identified for individual, enterprise and community success, and to identify the key gaps in knowledge among “most members” of the major segments of our target market.⁸ This process engaged a further 325 stakeholders, identified the key graduate attributes to be nurtured in learning activities, and set the priorities for course development over the next 5 years.

External outcomes of the focus group and survey processes included raised awareness and renewed interest in higher education, especially among potential students, and widespread ownership of the curriculum. This has been a valuable point of differentiation from other programs. Other important outcomes of the focus group and survey processes have been the need to focus on issues; to address the complex issues through interdisciplinary and systems approaches; and to nurture key personal qualities such as sensitivity to other values, adaptability, team work, communication, and interpersonal skills through carefully designed learning activities.

Course Scoping Workshops

Throughout 2003–2008, the expertise of over 250 experienced managers, extension specialists, researchers, and academics (14–24 per course) were engaged in the scoping, writing, and review of 12 range-specific courses, under the guidance of a full-time professional Educational Designer and utilizing a quality assurance (QA) scheme for course development. The major input was the collated and sorted outputs of all of the focus groups. The scoping processes sought to define appropriate learning objectives and a structure for each course, capture experiential knowledge and the “best” scientific knowledge for course content, and to identify relevant learning resources.

They also generated learning and assessment activities that addressed current/emerging issues and nurtured the development of graduate attributes linked with future success in the rangelands. The involvement of an Educational Designer ensured that the educational outcomes were appropriate for a graduate-level coursework program, that high impact educational practices (i.e., learning communities, collaborative projects, experiential learning, and integrated blended learning) were adopted where appropriate, and that the assessment items were authentic and challenging. An unforeseen but significant outcome of the scoping process was the learning and insights the scientists and academics gained about real-world contexts, local knowledge, and the emerging issues perceived by a wide range of stakeholders.

The course development process began in 2004 and continued until 2009. Core/compulsory courses were identified from stakeholder ratings of the critical areas of knowledge for future success in the Australian rangelands, and included: Sustainable Rangeland Production Systems and Regions; Building Effective Stakeholder Engagements; and Global and National Trends, Local Scenarios. The names of some of the ensuing elective courses are familiar (e.g., Rangeland Ecology, Grazing Management), some courses link fields or disciplines (e.g., Rangeland Monitoring and Adaptive Management; Property, Catchment, and Regional Planning; Rangeland Pest Animals, Weeds, and Biosecurity; Animal Welfare and Health; Animal Nutrition and Behavior), whereas others are fresh and topical (e.g., Managing Self, Developing and Retaining Others; Diversification and New Industries in the Rangelands). In most cases, these courses are the first national collation of rangeland information and knowledge on the subject. All courses are delivered nationally and flexibly, either in external or distance mode using on-line learning systems (e.g., Blackboard), or in face-to-face “intensive mode” at remote locations across Australia.

Research on the Market for Learning

Concurrent with the course development activity, we initiated a program of market research and strategic marketing. Commissioned research on the market for learning in rural and remote Australia⁹ identified the sectors with growth potential; clarified the barriers to learning; and identified catalysts for undertaking further education, the preferences of remote learners, and ways to engage, attract, and retain the “passionate learner,” “job-driven,” and “gonna do it someday” segments of the market.

The market research highlighted long-standing attitudinal, practical, and institutional impediments to participation and retention in higher education. For example, among the attitudinal impediments of potential students were negative opinions about the value and relevance of a contemporary university degree, and lack of self-confidence in an ability to undertake higher education. To address these, we established a national network of Rangeland Champions to provide credible local and “out-of-hours” support, developed a bridging course

(Getting into Further Study) for people without recent university experience, and engaged highly qualified lecturers with considerable “real-world” rangeland experience to facilitate co-learning and to guide progress through the learning materials.

Continuous Improvement

Consistent with both the participatory design approach, and our QA scheme for course development and continuous improvement, evaluations have been conducted at every event and in every stage of the curriculum and course development processes, as well as for initiatives such as the Rangeland Champions Network. In addition, evaluations have been conducted of every mode of every course delivered with a view to continuous improvement of the offerings. The inclusion of high-impact, educational practices has been reflected in very positive course evaluations. For example, average student evaluation scores (out of a maximum of 5) for the nine courses delivered in 2009–2010 reveal an overall satisfaction rating of 4.6; and that the courses are challenging (4.5), developing new skills and knowledge (4.7), relevant to contemporary and emerging issues (4.6), highly relevant to workplace and business (4.8), and relevant to the student’s future in the rangelands (4.6). The impact of the program and courses have also been measured by surveys of students in 2006 and 2010 (65–74% response rate), and a national survey of external stakeholders in 2009 (95% response rate). Student ratings, endorsements, and feedback have all been very positive and useful for helping to build the external credibility and reputation of the program. This feedback led to significant new investments (A\$2.1 million) in course development and promotion of the program/courses by the Australian and Queensland Governments, and recurring investment by Meat and Livestock Australia.

Outputs and Outcomes of the Combined Processes

Our participative, demand-driven, and student-centered approach has been widely acknowledged by government, industry, community groups, and academia as “best practice,” and has won several national education awards for innovation, influence on student engagement, and student learning and impact. The key outputs of these approaches have been:

- Engagement of over 1,000 stakeholders in curriculum and course development, raising awareness, and building ownership of the program;
- An innovative graduate coursework program for the professional development of ranchers, extension specialists, and Landcare or natural resource management facilitators, aligned to stakeholder-expressed needs and acknowledged to be relevant and practical;
- Twelve range-specific, interdisciplinary courses, delivered by experienced and recognized experts in their fields, utilizing flexible delivery modes and approaches that suit learner preferences;

- Marketing and promotional materials that address the information needs of the “passionate learner” and “job-driven” segments of the market for learning; and
- Innovative support mechanisms for mature age learners which address the identified barriers to learning such as bridging courses, support networks, etc., and facilitate participation, retention, and completion.

The most important outcomes of our approach have been the growth in participation and the educational outcomes recorded.

Participation

Enrollments in the program have grown from six in 2005 to over 100 in 2011. These are all domestic, part-time, and external students, whose ages range from 21–66 years. As of December 2011, there have been 56 graduates from the program, with about a third of these being mature age students.

Although the number of students is relatively small, compared to enrollments in many other fields, their potential impact on Australia’s natural resources is significant. For example, among the active students in 2010 alone, the ranchers were directly responsible for managing over 7 million hectares (2%) of Australia’s grazing lands. The regional NRM/Landcare officers indirectly influenced the management of a further 173 million hectares or almost 45% of the nation’s grazing lands. Furthermore, many of the students are emerging or current industry and community leaders, who sit on an average of three (range 1–7) natural resource management committees and/or industry boards, and in these roles are also influencing debate on the future of the rangelands and wider decisions about sustainable land use and management.

Educational Outcomes

The impact of the Rangeland Management program has been measured by surveys of graduates and advanced students in 2006 and 2010, with a longitudinal study proposed. A synthesis of the 2010 anonymous responses (i.e., from 45 students, 74% response rate) to “open ended” questions about their perception of the influence of the program on: 1) their awareness of issues and recognition of the need for change; 2) changes to enterprise management practices; 3) economic, environmental, and social outcomes; and 4) their community contributions; reveals that mature age students are realizing a wide range of personal, enterprise, and community benefits. These benefits have been expressed by the students in qualitative terms with reference to their previous (i.e., preprogram) practices, and are summarized below.

Personal benefits reported include greater capacity to represent rangeland interests and advocate for enterprise and regional outcomes; and increased options for self employment, career advancement, and career changes. Students also report greater awareness and understanding of their external environment, and especially of regional, national, and global issues/trends that could impact on their business/organization and resources; and a

willingness to consider and be more receptive to other points of view, and, as a result, a wider perspective on issues and possible outcomes. This has improved problem-solving, human resource management, and strategic planning. They also report greater insight and better understanding of their personal strengths and weaknesses, and how to be more effective in their managerial roles in farm businesses and small organizations. They have a better understanding of the needs and drivers of other stakeholder groups, are more confident in dealing with them, and are now more sympathetic to the conflicting challenges and needs of various interest groups. In the words of a student:

This program has really opened my eyes. Many of the assignment and readings have challenged my thinking and opinions. I have learnt to think critically and to read between the lines and look objectively at situations. This has helped me greatly not only on my property (ranch) but also through my representation on committees ... and Boards.

Enterprise benefits (reported or anticipated) include lower costs and improved profitability; enhanced land condition; greater confidence in trying new and different approaches to land, livestock, and people management; better management of trade-offs between production and conservation objectives; better decision making and risk management; greater capacity for innovation and managing change; and better management and retention of the next generation. Students also have an increased understanding of the way the rangelands function and “best practice” management, and the drivers of greater government and community interest in management practices and outcomes. The courses have influenced their decision making, in that they are being more proactive and rigorous, considering the longer-term and wider implications of day-to-day and medium term decisions, sourcing more information and other views in making decisions, and, as a result, they are making better-informed decisions. In the words of a student:

Thinking in terms of economic, social and environmental impact definitely alters decision outcomes. This is a different framework ... which ... better suits the business reality of these environments.

Community benefits include stronger industry and community leadership, and greater capacity for articulation and advocacy of regional issues and requirements. Students are reporting better relationships with the wider community and greater involvement in community activities (e.g., Landcare). The courses and qualification(s) have given them the confidence and credibility to actively engage and influence local decisions. Some students have engaged in large regional projects, some have stepped up to higher roles in industry/community groups and local government, and others have won national or state awards for land management or scholarships, and are clearly destined for community leadership roles. In the words of a student:

I now see myself as a contributor to a wider region with a consciousness and better understanding of the global, national, regional, local, environmental, industry, community and human factors that influence the region, its success and its future, and how I can make a difference.

Transferability of the Approach

It is hoped that the outcomes of this educational initiative will inspire others to adapt our approaches to curriculum and course revisions, be it in range science or more widely in agriculture. The approaches used here could easily be applied to any level of education—vocational, undergraduate or graduate—anywhere in the world. However, their success will depend on the quality and quantity of inputs on both the demand and supply side.

On the demand side, we have seen an extraordinary willingness on the part of external stakeholders to contribute to all of the processes, with many prepared to travel long distances and give their time freely. This is estimated to be about 1,500 days of external stakeholder time.

On the supply side, the approach requires the investment of money and time to engage stakeholders, a willingness to listen in the participatory processes, and a commitment to implement the findings even if they challenge disciplinary and institutional traditions. Over the past 10 years there has been an investment of over A\$4.3 million in Rangelands Australia—in resourcing the small team (1.6–2.5 full-time equivalents) leading, managing, and monitoring the impact of this initiative; conduct of the focus groups and scoping workshops; remuneration of course writers and reviewers; market research and development of marketing materials; participation in industry and community events likely to attract our target market; establishment and maintenance of the national network of Rangeland Champions; and delivery of the bridging course and range-specific courses in remote areas. The major impediments to adaptation of our innovations relate to institutional processes and reward systems that can constrain university staff involvement, a tension between student-centered and institutional-centric approaches to education and marketing, and the challenges of being teaching-focused and trying to maintain relevance to “management” in a research-intensive institution.

Conclusions

This graduate coursework program has been recognized in Australia, through national education awards, as an innovative and effective model for professional development in range science and management, as well as a benchmark for curriculum development in other disciplines. Through needs and gap analyses; market research; stakeholders engaged and actively guiding curriculum and course development processes; systematic and “best practice” approaches to curriculum and course development; demand-driven and student-centered approaches and associated innovations for a supportive learning environment; this program has experienced strong growth, in contrast to most programs in agriculture across Australia. The program is unique in the systems and “triple bottom line”

thinking facilitated through each course; in its influence on student learning and impact on individuals, enterprises, industry, and our rangeland regions; and in industry and community acknowledgement of its importance to the future of Australia's vast rangelands and “learning for a future in the rangelands.”

References

1. AGTRANS RESEARCH. 1998. Education and training to support sustainable management of Australia's pastoral industries. Report to the Meat Research Corporation on Project TR.004, February 1998. Brisbane, Queensland, Australia: AgTrans Research. 48 p.
2. ELKINGTON, J. 1998. Cannibals with forks: the triple bottom line of 21st century success. Gabriola Island, British Columbia, Canada: New Society Publishers. 407 p.
3. LANDCARE AUSTRALIA. N.D. What is Landcare? Available at: <http://www.landcareonline.com.au/about/what-is-landcare/>. Accessed 11 April 2012.
4. ISON, R., AND D. RUSSELL. 2000. Agricultural extension and rural development. Breaking out of traditions. New York, NY, USA: Cambridge University Press. 239 p.
5. ZAPHIRIS, P., A. LAGHOS, AND G. ZACHARIA. 2009. Distributed construction through participatory design. *In*: M. Khosrow-Pour [ED.]. Encyclopedia of information science and technology. Hershey, PA, USA: IGI Global. p. 1181–1185.
6. BLOOMBERG, A. L., AND A. HENDERSON. 1990. Reflections on participatory design. *In*: Proceedings of the CHI'90 Conference on Human Factors in Computer Systems; 1–5 April 1990; New York, NY, USA. Seattle, WA, USA: Association for Computing Machinery. p. 352–359.
7. TAYLOR, J. A. 2002. Key personal attributes and areas of knowledge for future success in the rangelands. *In*: Proceedings of the 12th Biennial Conference of the Australian Rangeland Society; 2–5 September 2002; Kalgoorlie, Western Australia, Australia. Kalgoorlie, Western Australia, Australia: Australian Rangeland Society. p. 74–78.
8. TAYLOR, J. A. 2003. Building capacity in Australia's rangelands. *In*: Proceedings of the VIIth International Rangeland Congress; 26 July–1 August 2003; Durban, South Africa. Durban, South Africa: Grassland Society of South Africa. p. 1801–1808.
9. QUAY CONNECTIONS. 2003. Market analysis and strategic directions. Unpublished report to Rangelands Australia, April 2003.

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