

Developing a Partnership between the Riverina Environmental Education Centre and Charles Sturt University

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Abstract A collaborative partnership has evolved between the Riverina Environmental Education Centre (REEC) and Charles Sturt University in Wagga Wagga. The Riverina Environmental Education Centre (REEC) is one of 24 Department of Education and Training environmental education centres in New South Wales (see www.reec.nsw.edu.au). As part of this partnership relationship, final year BTeach(Sec)/BSc students have worked with REEC and CSU staff on developing learning materials that support and enrich the programs offered through the REEC. In particular, these students have developed materials focussing on exploring student understanding about biodiversity and salinity. Additionally, the development of web based learning activities that use regional scientists as exemplars of current scientific research and possible career options (called Real Science) has occurred. Through this partnership arrangement, it has been a 'win-win' outcome for REEC staff, CSU staff and the CSU final year secondary science students with all participants gaining valuable insights and pedagogical understandings from the partnership.

Introduction

Much has been written about the benefits that develop when creating partnerships between schools and universities. One recurring theme from this literature is the enrichment of programs offered by each institution as well as strengthening personnel links between the school and the university. The Riverina Environmental Education Centre (REEC) and the School of Education at Charles Sturt University (CSU) in Wagga Wagga have developed an educational partnership in which staff from the REEC and staff and students from CSU are active members and contributors.

During 2003 the New South Wales Department of Education and Training developed a policy framework for all its schools and teachers that was implemented in 2004 called *Professional Learning Policy for Schools* (NSW Department of Education and Training, 2004). One of the key policy requirements contained within the document was a focus on "professional learning" (McCulla & Gereige-Hinson, 2005). This policy framework

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set the contextual and theoretical parameters within which the professional learning partnership between the Riverina Environmental Education Centre and Charles Sturt University operated. Specifically, McCulla and Gereige-Hinson (2005) identified indicators of successful school professional learning practices that included:

- Strategic alignment: Where the schools have a clear statement of professional goals, outcomes and strategies;
- Collaboration, collegiality and commitment: Teachers are actively engaged in their professional learning through supportive strategies involving within school teams and external partners;
- Ongoing learning and feedback and follow-up: Professional learning is focussed on reflection on practice and its impacts on teacher and student learning. Support is both from within and external to the school; and
- Multiple sources for evaluation: Evaluation of professional learning is based on multiple sources of information including teacher and student feedback as well as collegial dialogues.

These key indicators of professional learning guided the evolution of the partnership between the REEC and CSU towards its current configuration.

From the literature on school-university partnerships, the work of Beveridge, Groundwater-Smith, Kemmis, & Wasson (2005) with staff operating in schools with students from low socio-economic status whose overall academic level of achievement were identified as low based on state wide testing programs informed the evolution of the REEC – CSU partnership. In particular Beveridge, et al. (2005) reported that an integral component of these schools action learning improvement plans involved the collegial input of an “academic partner” (p. 705-706). These external partners provided the critical friend perspective on school teaching and learning practices, assisted with curriculum construction and provided additional resources to enrich teacher professional learning.

With the formation of a professional learning partnership both McLaughlin & Black-Hawkins (2004) and Stevens (1999) suggested that one of the major benefits in a school – university partnership program concerned the development of opportunities for creating positive outcomes for all partners, the classic “win-win” situation. Both these authors cautioned that strong positive productive partnerships are hard to achieve.

Toomey, Chapman, Gaff, McGilp, Walsh, Warren & Williams (2005) suggested that “partnerships” between universities and schools are commonplace in the Australian educational context. Drawing upon a longitudinal analysis of partnership programs spanning a decade, these authors identified a significant change in the underlying assumptions and practices upon which partnership programs are built. They contended and are supported by Beveridge et al. (2005) that successful partnerships can be characterised as collaborative programs within which knowledge creation by all participants occurs as participants adopt roles involving critical friend, mentor and/or coach as all parties focus on practice issues.

Huggins (2004) concluded in his analysis of partnership programs between Victorian universities and the Melbourne Catholic Education Office that through the process of creating a partnership program, all participants but especially the teaching staff created a professional learning community. McLaughlin & Black-Hawkins (2005) and Huggins (2004) mirror the claims asserted by Toomey et al. (2005) when they state that one of the specific benefits derived from a professional learning community is the enhancement of the capacity of teachers to take an active, reflective, collaborative and learning oriented approach to their pedagogy practices.

Carpenter & Matters (2003) provided an overview of the variety of university-school partnerships that have been reported in the literature. They stated that in many educational contexts, the most appropriate term to describe the outcomes of these partnership arrangements is "learning community". These authors emphasised that successful "learning communities" frequently involved staff in active collaborations that are focussed explicitly on teaching and learning practices.

An analysis of these university-school partnership programs indicates that some of the key components to sustaining successful partnerships include the development of a learning community with a focus on contextually relevant teaching and learning practices within the learning community. Additionally, strong collaborative relationships between all participants are clearly evident that are collegial and productive. Through reviewing the literature for this paper it was identified that, unlike university-school partnerships, there has been very little written about successful university-environmental education centre partnership programs. It is the intention of this paper to contribute to the literature on university-environmental education centre partnerships through reporting upon one such partnership program and to encourage more authors to add to this important form of partnership program.

Background

The current partnership has evolved through a positive relationship between key staff within each institution extending over a long period of time. Initially, staff from the REEC came to CSU and spoke to students enrolled in primary science curriculum and social science curriculum subjects offered at CSU about the REEC. This involvement expanded to include secondary students enrolled in science curriculum subjects in the Graduate Diploma in Education (Secondary) and Bachelor of Teaching (Secondary)/Bachelor of Science courses. Later on, as the partnership further evolved, students from these subjects visited the REEC where the teaching staff conducted specialised programs focussing on:

1. the role of an Environmental Education Centre in supporting the respective secondary Stage 4/5 and Stage 6 syllabuses;
2. providing instructional sessions on astronomy, investigating invertebrate animals, and developing ecological and geographical skills associated with quadrat and transect studies on the local environment; and
3. supporting collaboratively REEC staff in conducting the annual regional level "Envirothon" competition.

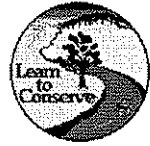
The Riverina Environmental Education Centre

The Riverina Environmental Education Centre (REEC) is one of 24 Department of Education and Training environmental education centres in New South Wales. Their principle role is to assist schools with curriculum based environmental fieldwork and to help schools become more environmentally friendly so students are immersed in a caring attitude towards the environment in their daily lives. Students from Kindergarten to Year 12 visit the REEC on a day basis. To make the fieldwork more meaningful, pre-visit topic study guides are provided on the centre's web site (see www.reec.nsw.edu.au and the front page is displayed below). In 2005, 7004 students visited the centre from 125 different schools which visited the centre 241 times.

The centre unashamedly has a large nature study component in the K-6 program. To help students find delight in the marvels of nature is a good step in promoting values for the environment. The K-6 program includes:

Riverina Environmental Education Centre

a facility of the
NSW Department of Education and Training



Students K-6	Students 7-12	Teachers K-6	Teachers 7-12	REEC Information
Study guides: plants mini-beasts soils water energy talented kids	Study Guides: science geography	Topic notes Risk assessments Worksheets	Science & Geography: worksheets risk assessments topic notes	Contact Annual report 2005

FIGURE 1: REEC Web Front Page

- Sensory Awareness Stage 1;
- Investigating Plants and Bushland Stage 1;
- Investigating Mini-beasts (invertebrates) Stage 2;
- Investigating Soils Stage 2;
- Investigating Water Stage 3;
- Investigating Energy Stage 3; and
- Talented Student Program for Stage 6.

The centre is based at an old Soil Conservation Research Centre, now the Department of Natural Resources and this site and its environment are reflected in the “investigating” emphasis of the studies.

Secondary school field study programs are developed from the relevant sections of the Science and Geography syllabuses. The secondary (Yr. 7-12) programs include:

- Ecosystem studies on woodlands;
- River red gum forests and alpine areas;
- Environmental issues and their management such as salinity, wetlands and remnant vegetation; and
- Farm planning.

Investigatory sites located both at the centre and at venues in the Riverina Region are used to support the programs offered.

Charles Sturt University's Participation

Over the past two years the partnership has evolved to a new and much more substantial relationship in which REEC staff, CSU staff and final year BTeach(Sec)/BSc students work cooperatively with the REEC staff over a 6 week period. These pre-service secondary science students spend a full day each week at the REEC where they:

1. work with each REEC staff as a colleague as they deliver the environmental program to a class of primary or secondary students who are using the REEC as a venue to complement their learning;
2. assist the REEC staff in diagnose of prior learning misunderstandings about key environmental concepts;
3. design new programs for prospective student visits; and
4. develop new learning materials for inclusion on the REEC website.

Description of Some Recent Partnership Activities

The focus of the current partnership between the REEC and CSU has evolved out of expressed and identified needs from the REEC staff that relate to improving the quality of their programs (McCulla & Gereige-Hinson, 2005). In particular, one aspect that REEC staff identified as a concern has been how can they develop ways of showing how the REEC and its programs “value add” to the quality of student learning. Through discussion with the REEC staff the focus for each year has been mutually negotiated. In 2004, it centred on ways of identifying the prior level of knowledge held by students about the concept of biodiversity which was regarded as a fundamental concept for the REEC. For 2005, the focus moved to re-examine one of the secondary programs on salinity and the extension of a web based learning resource called real science. Each of these partnership programs is discussed below.

2004 Biodiversity

The final year BTeach(Sec)/BSc students were given the task of creating a way of finding out what the prior level of student knowledge about the concept biodiversity and identifying any associated student misconceptions held about this concept.

Drawing upon their prior science curriculum studies in the CSU course, the students selected the “Interview-about-Instances” (Osborne and Gilbert, 1979) methodology as the means of identifying current levels of understanding. From this starting point, the students then read widely in the literature on biodiversity, consulted the Stage 1/2/3 Science and Technology (K-6) syllabus, the Stage 4/5 Science (yr. 7-10) syllabus, and the Stage 6 Biology, Senior Science and Earth and Environmental Science syllabuses (yr. 11-12) to establish the expected level of student knowledge and understanding about biodiversity, and examined the currently used textbooks to identify what information was being portrayed in these textbooks. From these analyses, students developed a set of 13 instances that probed their understandings about biodiversity that focussed on three broad components: a) the genetic level; b) the species level; and c) the ecosystem level. A full report of this investigation can be found in McLeod, Smith, Wilson & Boylan (2004).

2005 Salinity and Real Science

In discussions with the teachers at the REEC, they identified two developments that were linked to the REEC website (www.reec.nsw.edu.au) that were needed. The first of these areas focussed on adapting their current geography based Stage 4/5 study of salinity in the local Wagga Wagga region to align more closely with the objectives and outcomes of the Stage 4/5 Science syllabus. This activity required initially the fourth year science students to analyse the existing learning materials against the Science syllabus outcomes to identify where a match existed and then to develop additional learning activities that added a significant science based focus to the study of local salinity issues. This task has been completed and the redeveloped science based study of salinity is available to school students when they visit the REEC. A sample from the learning materials on salinity that can also be accessed through the REEC website is shown in Figure 2 below.

The second task, called Real Science, was a case study of a local scientist and the research work that this scientist is engaged in. The case study show cases possible careers in science. This task is closely related to the Stage 4/5 Science curriculum document and specifically addresses three major syllabus objectives in the Prescribed Focus Areas of: a) The nature and practice of science; b) Applications and uses of science; and c) Current issues, research and development in science. (Board of Studies, 2003)

SALINITY	GEOGRAPHY-SCIENCE HOME	SALINITY HOME
Issue: salinity		
<ul style="list-style-type: none"> • Quick Quiz • important stuff • extent of problem • what is salinity? • sources of salt • impacts • water Cycle • recharge and discharge • catchments • causes <ul style="list-style-type: none"> ◦ natural ◦ human induced • management • preparing for the field investigation <ul style="list-style-type: none"> ◦ salinity units ◦ piezometers ◦ salinity indicators ◦ investigation: how bad is salinity at this site? ◦ investigation: where does salinity occur in Wagga Wagga? 		

FIGURE 2: Salinity learning materials

This second activity involved the fourth year students in: a) interviewing a local scientist (a biologist with research interests in reptiles and riparian vegetation); b) reading a number of research publications by this scientist; and c) developing Stage 4/5 information processing and research based activities drawing upon these research articles that required the students to consider, interpret and draw conclusions from presented data. This activity is available on line at the REEC website (see: www.reec.nsw.edu.au). A sample from the fourth year students' developmental activity is shown in Figure 3.

Benefits for the Riverina Environmental Education Centre

The Riverina Environmental Education Centre has two full-time teaching staff. Both staff are highly experienced and have been teaching at the centre for 16 and 12 years respectively. They are still very enthusiastic and actively seek opportunities to engage in professional dialogue with researchers, teachers and pre-service teachers as part of their professional learning program. In particular, the staff recognise that seeking input and ideas from other outside sources (Beveridge et al., 2005) enhances the quality of their programs. Through developing partnerships the REEC staff value the opportunity to engage in dialogue with independent people, to "bounce ideas off" these outside experts, and to be able to offer constructive critical observations on the nature and focus of learning programs and activities offered by the centre (McCulla & Gereige-Hinson, 2005; Toomey et al., 2005). From the REEC staff perspective, it has



AQUATIC BIOLOGIST HOME	SCIENCE HOME	REAL SCIENCE HOME
1. Aquatic biologist: Andrea Wilson		
<p>Land along river banks (riparian) is very important in maintaining water quality, particularly for cities and towns downstream which have to treat the water before it is suitable for drinking. Good riparian zones with good vegetation cover act as a buffer stopping eroded soil and other pollutants reaching the river. Andrea is a senior lecturer with the School of Science and Technology at Charles Sturt University (CSU) based in Wagga Wagga, New south Wales. Many of Andrea's research projects have been on assessing the quality riparian zones and how they can be managed.</p>		
<p>Andrea's qualifications include:</p> <ul style="list-style-type: none"> • Bachelor of Applied Science (Honours), Charles Sturt University; • Doctor of Philosophy, Charles Sturt University 		
<p>I am broadly interested in biodiversity in agricultural landscapes, with a focus on freshwater ecology. I am currently involved in a number of ecological research projects, including an examination of stream rehabilitation in the Tarcutta catchment near Wagga Wagga and an investigation of the effects of fire on reptile populations in the western mallee regions of NSW.</p>		
<p>Previous research projects I have undertaken include studies of aquatic biodiversity in Australian rice fields and a project entitled 'Understanding landholder management of riparian zones in the Goulburn Broken catchment'. Riparian areas are beside rivers and have an important role in maintaining water quality .</p>		

FIGURE 3: Real Science sample web page

been very refreshing working with CSU staff and students, not by just looking from the outside but being involved in the day-to-day teaching.

Impact on REEC Programs

Through the consultative nature of the partnership between CSU and the REEC, outdoor field study programs have been changed in minor ways. Presentation and content within specific programs have been "fine tuned". The web based study guides have had major changes as a direct result of the input by CSU staff and students. From the REEC staff point of view, there are great benefits having "critical friends" reviewing your work. This is a very powerful tool for improving the quality of the programs (NSW Department of Education and Training, 2004). Through discussions with the REEC staff, they identified that the CSU students have up-to-date content specific knowledge based on their biological sciences studies along with deep understandings of the latest educational pedagogy (NSW Department of Education and Training, 2003). Further the REEC staff stated that they valued the contributions from the fourth year students who bring their new ideas and their different perspective to the programs offered by the REEC.

Benefits for CSU – Students/Lecturer

This rich form of partnership has had many benefits for the CSU students as well as CSU lecturing staff.

For the CSU students, they have gained:

- a deeper understanding of the role and resources available through an environmental education centre;
- a teaching experience that is in a different context to the usual practice teaching experience;
- an opportunity to engage in a collaborative liaison with the highly qualified and experienced teachers at the REEC;
- a significant learning experience in and through the research and development of the identified learning activity;
- the experience of working with both primary and secondary students in an outdoor setting; and
- an appreciation of the risk management issues with taking children on excursions into outdoor settings.

For CSU lecturing staff, this partnership has:

- enriched the quality of the on-campus teaching program;
- provided an opportunity to create closer links between the REEC and CSU;
- provided ways of relating productive teaching and learning principles to real teaching experiences; and
- created opportunities for further REEC program developments to be considered as possible future students' activities.

Collectively this partnership has established a dynamic and creative relationship in which both partners have benefited from the association (Huggins, 2004; McLaughlin & Black-Hawkins, 2004; Stevens, 1999).

Future Directions and Growth in Partnership

The present partnership works - there are benefits for both partners (Carpenter & Matters, 2003). The REEC staff have worked with a range of CSU students now and realise we will both get more from the CSU student "work experience" component if we take student individual differences into account. It means spending more time with the students when they first visit so they realise they are valued members of the staff and not just visiting students. As with any program, it continually evolves and becomes better.

The partnership between REEC and CSU has been formalised and expanded with the development of a Riverina Regional Environmental Education Plan for the 198 schools in the Riverina. CSU staff have had input in the plan and an important part involves undergraduate students in assessing and developing resources so Environmental Education is part of their "bag of tricks" when teaching.

From the CSU students' perspective, they value the opportunity to engage in a sustained way with REEC staff and visiting students while learning what the Riverina Environmental Education Centre is, how it is organised and the range of educational programs it has to offer in their secondary teaching area of specialisation. In 2006, it is planned that the fourth year BTeach(Sec)/BSc students will again be involved over a five week period at the REEC and that the focus for this year's program will include further development of the *Real Science* web materials as well as more focused involvement in the organisation and teaching aspects of both primary and secondary school visits to the REEC. For the CSU lecturers, the partnership has meant that they are able to engage in curriculum development in creative ways and to monitor the impact of their inputs. One additional benefit for the CSU lecturing staff has been their inclusion on the Riverina Environmental Education Centre's board of management.

Conclusion

From small things great things grow

The partnership between the REEC and CSU has been a productive and collaborative one (Toomey et al., 2005; Huggins, 2004). Key elements from McCulla & Gereige-Hinson (2005) concept of professional learning have become embedded in the REEC-CSU partnership. In particular, the value of collaboration, the growth in collegial relationships, a strong commitment to improving teaching and learning practices, the use of on-going learning and formative feedback, and the use of multiple sources of evaluation have enhanced the quality of the learning programs offered through the REEC. The partnership started in a small way and as mutual trust grew along side the realisation that each partner has attributes, expertise and skills from which the other partner could benefit, the relationship has evolved into a strong and dynamic university – environmental education centre partnership. The role of the university partners as described by Beveridge et al. (2005) has been one of a critical friend in which teaching and learning practices have been openly re-examined and new learning materials constructed that enrich the school students' experiences when they visit the Riverina Environmental Education Centre. This incremental model has taken time as well as commitment from all partners. It now encompasses a rich dialogue about the REEC's programs and the ultimate beneficiary are the visiting school students who engage in real-world, problem solving learning experiences that draw upon the diverse expertise of all participants.

Keywords: Environmental education; Partnership; University; Environmental Centre; Riverina region.

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