



*The National Centre of Science,
Information and Communication
Technology, and Mathematics Education
for Rural and Regional Australia
(SiMERR)*



Background

**Faculty of Education, Health and
Professional Studies**

VISION

SiMERR Australia works with rural and regional communities to achieve improved educational outcomes for all students in the areas of Science, ICT and Mathematics, so that:

- Parents can send their children to rural or regional schools knowing they will experience equal opportunities for a quality education;
- Students can attend rural or regional schools realising their academic potential in Science, ICT and Mathematics; and
- Teachers can work in rural or regional schools and be professionally connected and supported.

MISSION

We will support student achievement and enhance teacher growth in rural and regional areas through research, pre-service, in-service, community and overseas programs by working collaboratively with communities, educational authorities, professional associations and industry groups to develop solutions to problems faced by teachers, particularly those who are professionally isolated.

PURPOSE

The purpose of SiMERR Australia is to provide a national forum for addressing issues relating to the key areas of science, ICT and mathematics education, particularly as they concern rural and regional communities. Through a combination of strategic research, network building and practical support, SiMERR Australia aims to identify the needs of geographically and professionally isolated teachers, and enhance their efforts to assist students to realise their academic potential in these subject areas.

To achieve this purpose the SiMERR National Centre, located at The University of New England, comprises a team of professionals with extensive experience in science, ICT and mathematics education, expertise in many areas of student diversity, excellent administration and project management skills, and a successful track record in conducting large-scale research projects.

In order to be a truly national centre, however, SiMERR Australia has established a Hub in each state and territory. These Hubs will work together with the SiMERR National Centre in establishing links with teachers, education providers and relevant professional and community organisations within their own State or Territory, and identify research opportunities and priorities. Hub Teams will also be responsible for developing a network of researchers within their state or territory involved in science, ICT and mathematics education, and in aspects of student diversity in these subject areas.

EXECUTIVE SUMMARY

The primary aim of the SiMERR National Centre is to create a national focus to improve the quality of rural and regional students' learning by encouraging and supporting the professional development of pre-service and in-service primary and secondary teachers, in the areas of science, ICT and mathematics.

This is to be achieved through the development of a truly national centre designed particularly to address the needs of teachers in regional, rural and remote Australia who feel professionally isolated. The National Centre will draw upon and extend the demonstrated strong research and teaching record of the academic staff in these areas at the University of New England (UNE) – one of the largest academic units in education in Australia and the largest in regional and rural Australia. It will also build upon the distance education strength at UNE, and the strong national and international links already established with professional bodies within Australia and overseas.

The research agenda and operational activities envisaged for the SiMERR National Centre will promote a priority placed on the establishment of effective linkages with relevant national and international education organisations. State and Territory hubs have been established in Australian universities in all States and Territories and these are supported financially to affiliate to form SiMERR Australia by undertaking common research and professional development initiatives.

The significance of the proposed SiMERR National Centre at UNE lies in the:

- attention directed to teacher renewal in academic-discipline and subject-teaching knowledge.
- integration of expertise from staff in Science faculties with those in Education, experts from industry and professional industry organisations, and professional teaching organisations and expert classroom teachers.
- management structure of the SiMERR National Centre that is inclusive of key stakeholder groups across Australia.
- focus of the research and professional development activities that are concerned with practical classroom issues facing teachers in these subjects.
- emphasis on the integration of both preservice and inservice training and professional development.
- state-of-the-art technological approach envisaged to support other more traditional approaches of learning to teach these subjects.
- inclusive nature of the support to be available to all teachers in these subject areas, especially those in isolated, rural and regional Australia.
- option of professional certification (recognition) for professional development activities through a tertiary qualification.

The directions taken by the SiMERR National Centre will:

- be demand driven.
- foster professional development for teachers through the appropriate use of technology-based programs and other distance education techniques.

- assist teachers to integrate research-based knowledge and technology into their teaching activities.
- enable teachers to support their students in a growing environment of high-technology classrooms.
- offer specialised programs for teachers at different stages of their careers, e.g., for beginning teachers and academic department heads/coordinators in these subject areas.
- provide innovative approaches to supporting the initial preparation of teachers as well as their continued development.
- provide a cycle of professional support which allows teachers, as they become more mature and professionally expert, to look back and to help and support those teachers earlier in the cycle.
- develop strong links with industry and industry organisations in terms of personnel and financial support.

In order to ensure that the SiMERR National Centre is at a level of world's best practice, specifically targeted assistance in terms of federal funding was required. This funding complements significant resources already at hand at UNE – in terms of academic and support staff, library and curriculum resources and other forms of infrastructure. The Federal funding obtained builds upon this significant experiential and infrastructure base already in place at UNE.

Over time, further funds from government, as well as those from industry and professional bodies will supplement the grant monies obtained in this establishment period. This will enable further programs to be developed and implemented, as well as encouraging closer business interest in the education of Australian youth in these vital subject areas.

Underpinning the work of the SiMERR National Centre is the proposition that the key to addressing the professional isolation of teachers and the quality of teaching science, ICT and mathematics in rural and regional Australia is to involve preservice and inservice teachers in discovering the excitement in both subject-discipline knowledge (enhanced by current mathematical and scientific insights) and subject-pedagogic knowledge (enlivened by current international research) associated with how the subjects are taught and learnt.

This statement implies that it is essential for those involved in motivating and encouraging students to learn are themselves deeply engaged in the process of learning more about their subject, ways to improve their methods of instruction, and ways to understand how students' acquire understandings.

It has long been accepted that initial teacher education cannot provide all the necessary information, knowledge and skills teachers need for their career. Hence, there is a need for practising teachers to have access to, and be encouraged to undertake, relevant professional development experiences. The SiMERR National Centre will provide a vehicle for the continuing education of teachers – a focal point where research information, new research projects, and study opportunities are readily available across Australia.

It is intended that the publicity associated with, and the work emanating from, the SiMERR National Centre will help encourage more people to consider qualifying for teaching in these fundamental disciplines. As a consequence, the SiMERR National Centre will also promote teaching in Science, ICT and Mathematics throughout Australia as a significant and nationally important career.

Finally, the establishment of the SiMERR National Centre has received strong endorsement from the independent review of teacher education in NSW conducted by Dr Gregor Ramsey. In the report, *Quality Matters*, Dr Ramsey (2000) states that:

A model such as that proposed in the University of New England submission is strongly endorsed; it offers an innovative approach to the critical need to address issues related to the shortage of teachers in these subjects in rural and regional communities. Good science, mathematics and technology backgrounds in young people are critical to improving opportunities for them in rural and regional Australia (p.51).

Later in the Report Dr Ramsey addresses the anticipated shortage of qualified teachers in these subject areas and adds:

Clearly, on the basis of these best estimate projections, the supply of mathematics teachers overall is falling rapidly. In particular, there is an approaching crisis in supply to inland and isolated schools. These issues impact more on government schools, given that in the main the source of teachers for non-government schools are government schools.

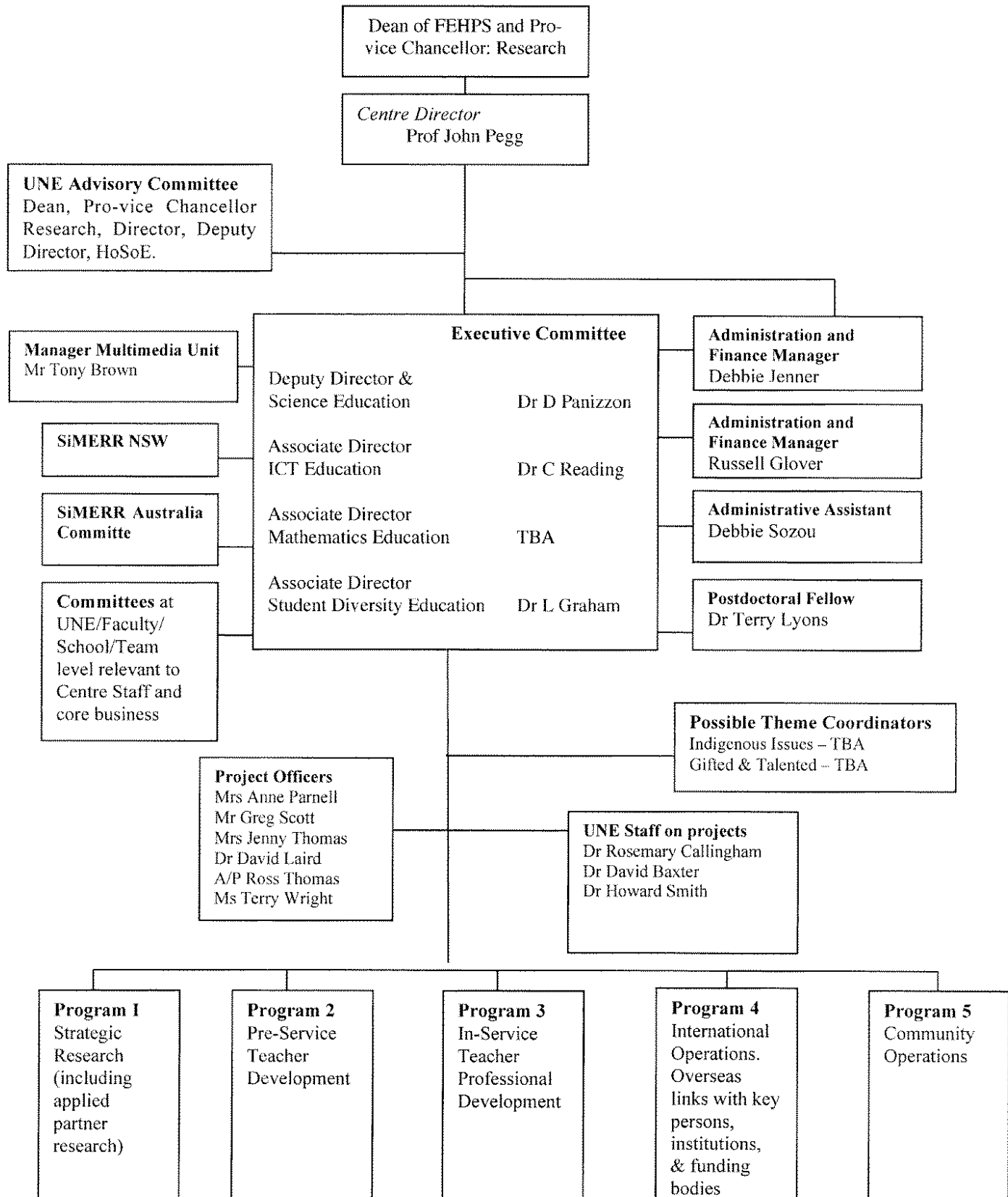
The situation makes serious consideration of the proposal from the UNE to better support the teaching of mathematics, science and technology in rural areas all the more pressing (p.196).

There is great value to Australia in increasing the profile of science, ICT and mathematics teachers, especially for those who teach in rural, outer metropolitan, and isolated areas. If Australia is to maintain its technological credentials (and extend them) it will need to have many of its people achieve a high level of technological and scientific skill. Australia cannot afford to allow the untapped potential that currently limits students in rural and outer metropolitan areas to continue. Knowledgeable, motivated, and committed teachers are an essential element in achieving this goal, and modern technology can play a pivotal role in this process.

In conclusion, this initiative of forming the SiMERR National Centre is an innovative approach concerned with addressing critical problems limiting student outcomes in rural and regional education in Australia.

SIMERR NATIONAL CENTRE STRUCTURE

The SIMERR National Centre is located at the University of New England, Armidale. The diagram below illustrates the structure of the Armidale operation.



NATIONAL FOCUS OF SiMERR

The creation of SiMERR Australia provides a national focus for encouraging and offering ongoing appropriate support to teachers at different stages in their careers. Its existence would highlight, in a tangible way, the importance to Australian society of producing teachers of quality in these areas, and of providing ongoing and sustained support at the level of world's best practice. This is to be done to meet the needs of the Nation, and provide a catalyst to market the importance and value of teaching in these particular subject areas as a viable and worthwhile career.

Successful SiMERR State/Territory Hubs

The successful applications and the nominated coordinator for SiMERR hubs are:

SiMERR Queensland is at James Cook University.

Coordinator Associate Professor Neil Anderson (ICT)

SiMERR New South Wales is at the University of New England.

Coordinator Professor John Pegg (Mathematics)

SiMERR ACT is at Australian Catholic University.

Coordinator Associate Professor Catherine McLoughlin (ICT)

SiMERR Victoria is at Deakin University.

Coordinator Professor Russell Tytler (Science)

SiMERR Tasmania is at the University of Tasmania.

Coordinator Dr Jane Watson (Mathematics)

SiMERR South Australia is at a consortium comprising Flinders University, University of South Australia and the Australian Science and Mathematics school.

Coordinator Associate Professor Jim Davies (Mathematics)

SiMERR Western Australia is at Curtin University.

Coordinator Dr Sandra Frid (Mathematics)

SiMERR Northern Territory is at Charles Darwin University.

Coordinator Associate Professor Brian Devlin

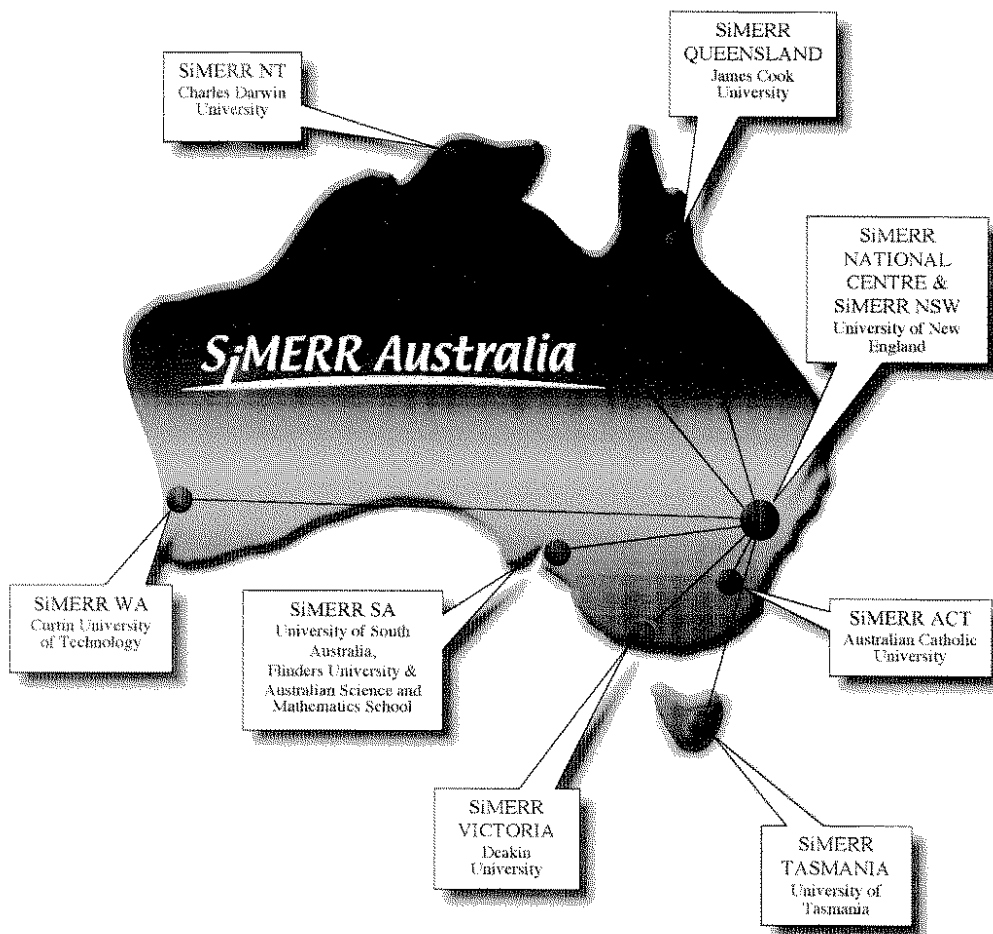
SiMERR Northern Territory is at Charles Darwin University.

Coordinator Associate Professor Brian Devlin (ICT)

SIMERR HUBS

The work of the SiMERR National Centre is supported and extended through its network of 'hubs' in each state and territory. Five hubs are now fully operational and contracts with the last three will be finalised in June 2005. Each hub has appointed a coordinator for the Mathematics, Science and ICT areas who will direct activities, liaise with professional associations in their state and collaborate with the other state hubs on national issues and basic research.

Hubs of SiMERR Australia



Planning is underway for a National Summit in November 2005 involving all SiMERR hubs, senior representatives of government organizations, professional associations and rural education experts. It will consider national and international perspectives, current responses and initiatives, future directions and opportunities for national collaboration.

GRANTS AND PROJECTS

New Grants from 1 July 2004

National Survey of Teachers in Rural and Regional Schools to Identify Issues in Teaching Science and Mathematics. Department of Education, Science and Training

The National Survey is one of the largest educational surveys ever conducted in Australia, involving 5670 schools in every State and Territory. Funded by the Australian Government, the purpose of the survey is to identify key issues affecting primary and secondary student outcomes in these subject areas in different regions of Australia. The views of teachers and parents are absolutely crucial to forming an accurate picture of these issues.

Impact of Developmentally-Based Qualitative Assessment Practices in English, Mathematics and Science on School Policies, Classroom Instruction, and Teacher Knowledge

A joint ARC research project between the University of New England and the Department of Education and Training (DET) NSW. This project aims to investigate and analyse issues concerning qualitative assessment techniques that measure students' understandings in English, Mathematics and Science, Years 7 to 10, in government schools in NSW. The significance lies in the advice that will be provided to school systems, subject departments and teachers on how assessment information can improve the learning environment for students.

Partnerships in ICT in Learning

The PICTL project aims to draw together university staff, teachers and pre-service teachers into partnerships to improve what students learn, how they learn and how ICT supports the process. Nationally, a professional community allows the sharing of knowledge and experiences about the partnerships to improve teacher education and the use of ICTs in schools. Locally, each state and territory pilots a specific partnership model.

Embedding ICT in Learning: Collaborative Partnerships for Rural Schools

The EiL project is the NSW pilot project of the National PICTL Project and aims to develop a close partnership between lecturers and pre-service teachers at UNE and teachers in Country Area Program (CAP) schools. The partnerships are Learning Teams implementing in-school projects designed to embed ICT in learning. These teams will work together in a Learning Community, supported with both face-to-face and online communication.

QuickSmart NT

The overall objective of the *QuickSmart* NT project is to research and evaluate the impact of *QuickSmart* on the literacy and numeracy development of targeted upper primary students. *QuickSmart* seeks to increase fluency of basic academic skills in literacy and numeracy for students with learning difficulties in the middle years. It is a collaborative project with Northern Territory Department of Education and Training.

Professional Learning Using the Mathematics Standards (PLUMS)

The *Professional Learning Using the Mathematics Standards* (PLUMS) Project will trial the AAMT's *Standards for Excellence in Teaching Mathematics in Australian Schools* as a framework for supporting the professional learning of *all* teachers of mathematics on a school-by-school basis. Two co-located groups (nodes) of 8 schools (primary/secondary; government and non-government), one in Armidale and one in Brisbane, will be established and supported to explore the usefulness of the AAMT *Standards*. It is a collaborative project between AAMT, NIQTSL and SiMERR.

New England Regional Schools Project

This is a collaborative venture between New England Region Schools, Department of Education (NSW) and The National Centre of Science, Information and Communication Technology, and Mathematics Education for Rural and Regional Australia. The aims of the project are to work with rural and regional communities to achieve improved education outcomes for all students in the areas of Science, ICT and Mathematics. There are 18 high schools involved in the Project.

E-Girls Connect: Encouraging Young Women to Choose Careers in the ICT Industry

This is a collaborative research partnership established between Zonta and the SiMERR National Centre to undertake an evaluation of the e-girls day, held 16th June, and long-term tracking of participants to monitor ICT-related study and career choices. The aim is to determine how the girls' future study and career choices are influenced by participation in relevant ICT experiences.

Special Projects

Annual Mathematics Day

The Year 8 Mathematics Day is held annually at UNE and is devoted to mathematical problem solving. Between 200 and 300 high achieving students attend this day and the School of Education, UNE, and the New England Mathematical Association (NEMA) jointly run it. The Mathematics Day is the largest competition of its type in Australia.

Australasian Science Education Research Association International Conference (ASERA)

Staff within SiMERR National Centre and School of Education convened the Australasian Science Education Research Association Conference (ASERA) in Armidale in July 2004. Over 100 Australian and International educators attended the conference.

Mission Possible

Approximately 200 Year 6 students from rural and regional primary schools are involved in the day each year. In recent years Mission Possible has involved schools from as far away as Gunnedah, Tenterfield, and Coffs Harbour. The day represents a collaborative effort by The Armidale School (Gordon McLennan and teachers) the SiMERR National Centre (Debra Panizzon and Terry Lyons) and our UNE preservice teachers.

PARTNERSHIPS

SiMERR is engaged in collaborative projects in all its disciplinary interests. These include partnerships with:

- Department of Education and Training (DET) NSW
- Australian Council for Computers in Education
- Australian Curriculum Studies Association
- Northern Territory Department of Education and Training
- Australian Association of Mathematics Teachers
- National Institute for Quality Teaching and School Leadership
- New England Region Schools, Department of Education (NSW)
- Zonta
- New England Mathematical Association
- School of Education, UNE
- The Armidale School

SiMERR is also currently negotiating with several national professional associations (Australian Science teachers Association, Australian Association of Mathematics Teachers, and Australian Council for Computers in Education) for the establishment of partnerships to provide professional development support for inexperienced teachers in rural and regional Australia.

SiMERR MEDIA ARTICLES

| Date | Media | Description |
|-----------|------------|--|
| | | National Survey |
| 28-Feb-05 | Newspaper | 'Tackling problems facing maths, science', <i>Armidale Express</i> |
| 4-Mar-05 | Radio | Location: Armidale, Station: NBN Tamworth Program: NBN News |
| 4-Mar-05 | Radio | Location: Tamworth, Station: 2TM Program: 12:05 News |
| 4-Mar-05 | Radio | Location: Tamworth, Station: 2TM Program: 17:30 News |
| 4-Mar-05 | Radio | Location: Tamworth, Station: ABC New England North West Program: Morning Show |
| 5-Mar-05 | Radio | Location: Sydney, Station: ABC 702 Sydney, Program: News (Weekend) |
| 7-Mar-05 | Radio | Location: Port Macquarie, Station: 2MC FM Program: Perno Show |
| 7-Mar-05 | Radio | Location: Bathurst, Station: 2BS Program: 17:00 News |
| 7-Mar-05 | Radio | Location: Sale, Station: ABC Gippsland Program: Statewide Drive |
| 7-Mar-05 | Radio | Location: Toowoomba, Station: ABC Southern Queensland Program: 12:30 News |
| 7-Mar-05 | Radio | Location: Toowoomba, Station: ABC Southern Queensland Program: Morning Extra |
| 7-Mar-05 | Radio | Location: Toowoomba, Station: ABC Southern Queensland Program: 08:30 News |
| 7-Mar-05 | Radio | Location: Bundaberg, Station: ABC Wide Bay Program: 08:30 News |
| 7-Mar-05 | Radio | Location: Sunshine Coast, Station: ABC Coast FM - Sunshine Coast Program: 08:30 News |
| 7-Mar-05 | Radio | Location: Sunshine Coast, Station: ABC Coast FM - Sunshine Coast Program: 07:30 News |
| 7-Mar-05 | Radio | Location: Brisbane, Station: ABC 612 Brisbane Program: 07:00 News |
| 7-Mar-05 | Radio | Location: Bundaberg, Station: ABC Wide Bay Program: 06:30 News |
| 7-Mar-05 | Radio | Location: Sunshine Coast, Station: ABC Coast FM - Sunshine Coast Program: 06:30 News |
| 8-Mar-05 | Radio | Location: Bathurst, Station: 2BS Program: 17:00 News |
| 8-Mar-05 | Radio | Location: Bega, Station: ABC South East NSW, Program: 12:30 News |
| 9-Mar-05 | Radio | Location: Lismore, Station: Triple Z, Program: 7:00 News |
| 9-Mar-05 | Radio | Location: Lismore, Station: 2LM Program: 06:30 News |
| 9-Mar-05 | Radio | Location: Lismore, Station: 2LM Program: 12:00 News |
| 9-Mar-05 | Radio | Location: Lismore, Station: 2LM Program: 07:30 News |
| 14-Mar-05 | Newspaper | 'Revisiting science', <i>The Australian</i> , 14/3/05 |
| 16-Mar-05 | Newsletter | 'Survey to look at science, Maths and IT in rural and remote schools', <i>Campus Review</i> |
| 23-Mar-05 | Radio | Location: Riverina, Station: ABC |
| 1-Apr-05 | Newsletter | 'Grant for teacher survey, <i>Smith's</i> |
| 6-Apr-05 | Newspaper | 'National survey to look at science, maths in regional schools', <i>Armidale Express Extra</i> |
| 26-Apr-05 | Television | Location: Gosford, Station: NBN Gosford, Program: NBN News |
| 26-Apr-05 | Television | Location: Armidale, Station: NBN Tamworth, Program: NBN News |
| 26-May-05 | Radio | Location: Tamworth, Station: ABC New England North West, Program: Afternoon Show |
| 1-Jun-05 | Television | Location: Armidale, Station: NBN Tamworth, Program: NBN News |
| 6-Jun-05 | Radio | Location: Toowoomba, Station: ABC Southern Queensland, Program: Drive |
| 7-Jun-05 | Radio | Location: Wagga Wagga, Station ABC Riverina, Program 6:30 News |

| | | |
|--|---|---|
| 7-Jun-05 7-Jun-05 8-Jun-05 10-Jun-05 11-Jun-05 | Radio Radio Newspaper Newspaper Radio | National Survey (cont.) Location: National, Station: Radio National, Program: Bush Telegraph Location: Tamworth, Station: ABC New England North West, Program: Morning Show 'Finding out why country kids aren't as sharp at math', <i>Armidale Express</i> 'Schools put to the test – focus on rural results', <i>The Daily Telegraph</i> Location: National, Station: Radio National, Program: Science Show |
| 24-Feb-05 | Radio | National Centre & Hubs Location: Tamworth, Station: ABC New England North West Program: Morning Show |
| 4-May-05 9-May-05 5-May-05 25-May-05 | Newspaper Newspaper Newspaper Newspaper | New England Schools' Project 'Schools join project', <i>Armidale Independent</i> 'Educational opportunities on the up thanks to new project', <i>Armidale Express</i> 'Schools join project to improve regional results', <i>Glen Innes Examiner</i> 'Schools and university combine to improve rural education standards', <i>Northern Daily Leader</i> |
| 10-Jun-05 10-Jun-05 | Newspaper Newspaper | Year 8 Mathematic Day 'Maths Day lets students sum up their interests', <i>Northern Daily Leader</i> 'Skills multiply at maths day', <i>Armidale Express</i> |
| 15-Jun-05 | Newspaper | e-girls connect 'Being creative with computers', <i>Armidale Express</i> |

Projects Current ... continued

Assessment Practices: Empowering mathematics and science teachers in rural areas to improve learning and curriculum implementation

This research project concerns an investigation of mathematics and science teachers in rural schools and their application of qualitative assessment practices to classroom situations.

Identifying a developmental pathway in the implementation of lesson components in the classroom of secondary science and mathematics teachers

The aim of this research is to investigate the ways in which secondary science and mathematics teachers implement lesson components in their first five years of teaching to enhance student learning in the classroom.

Developmentally-based assessment practices in analysing the strengths of technologically-based curricula

The focus of collaboration is about melding the development and application of innovative state-of-the-art technologically-based curricula with an assessment model which is able to categorise the underlying structure of students' understanding in terms of a cognitive developmental framework.

The impact of developmentally-based qualitative assessment practices

This project aims to investigate and analyse issues concerning qualitative assessment techniques that measure students' understandings in English, Mathematics and Science, Years 7 to 10, in Government Schools in NSW.

QuickSmart: A longitudinal study investigating enhancing the basic academic skills of low achieving students

QuickSmart: Improving basic academic skills for middle school students. QuickSmart is a program of ongoing intervention research that began in 2001. The program aims to improve students' automatic recall of basic literacy and numeracy skills in order to free up working memory and facilitate higher-order thinking and problem solving.

Centre Executive

Professor John Pegg
Director

Dr Debra Panizzon
Deputy Director, Science Education

Dr Chris Reading
Associate Director, ICT Education

Dr Lorraine Graham
Associate Director, Student Diversity

Mr Tony Brown
Manager, Multi Media Unit

Dr Terry Lyons
Postdoctoral Research Fellow

*For a Nation, the key to a
knowledge society rests with the
ongoing professionalism and
professional knowledge of its teachers*

For further information please contact:

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of Science, Information
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SIMERR



*All students, regardless of their geographic
location, deserve the opportunity to
realise their academic potential*



Australian Government
Department of Transport and Regional Services

UNE
THE UNIVERSITY
OF NEW ENGLAND

Background

The National Centre of Science, Information and Communication Technology, and Mathematics Education in Rural and Regional Australia (SiMERR) has been established at the University of New England. The primary aim of the Centre is to improve the quality of rural and regional student's learning in the areas of Science, ICT and Mathematics, so that they achieve at a level comparable with their capital-city peers. The National Centre, and its network of state and territory hub organizations, will conduct research and professional development activities for primary, secondary and tertiary educators. SiMERR is funded by the Department of Transport and Regional Services.

Vision

SiMERR Australia works with rural and regional communities to achieve improved educational outcomes for all students in the areas of Science, ICT and Mathematics, so that:

- Parents can send their children to rural or regional schools and know they will experience equal opportunities for a quality education;
- Students can attend rural or regional schools and realise their academic potential in Science, ICT and Mathematics; and
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Mission

We will support student achievement and enhance teacher growth through research, preservice, inservice, community and overseas programs by working collaboratively with communities, educational authorities, professional associations and industry groups to develop solutions to the problems faced by teachers, particularly those who are professionally isolated.

Aims

- To provide a national focus for issues relevant to Science, ICT, and Mathematics Education in rural and regional Australia.
- To undertake strategic research into critical areas of need related to the enhancement of student learning outcomes in rural and regional Australia that will inform curriculum development and professional teacher learning
- To bring together, as a coherent body of knowledge, new current and past research and professional development initiatives directed at improving rural and regional education in these subject areas.
- To facilitate communication and collaboration among all stakeholders.

Purpose

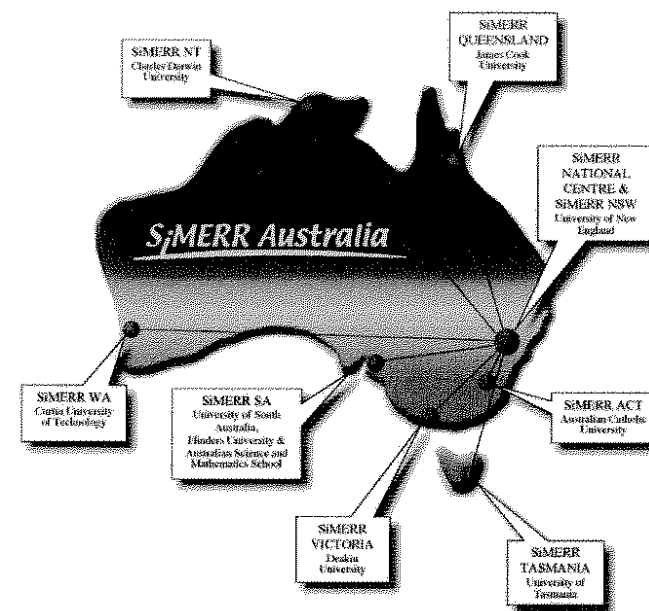
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To achieve this purpose the SiMERR National Centre, located at The University of New England, comprises a team of professionals with extensive experience in science, ICT and mathematics education, expertise in many areas of student diversity, excellent administration and project management skills, and a successful track record in conducting large-scale research projects.

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HUBS of SiMERR



Current Project within SiMERR

National Survey on Rural Needs

This proposal concerns a significant large-scale study designed to obtain high quality base-line data that will inform actions to improve educational practices and outcomes in Science, ICT, and Mathematics to rural and regional Australia. In particular, the study will identify (i) key issues facing the teachers of Science, ICT, and Mathematics in rural and regional primary and secondary schools, and (ii) the professional development needs of the teachers of these subjects that will enable them to offer an improved educational environment for their students.





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Information about the SiMERR National Centre can be obtained from <http://simerr.une.edu.au/> or contact us at simerr@une.edu.au. We look forward to hearing from you soon!

Professor John Pegg
Director
SiMERR Australia



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