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Numeracy Counts

Project Title	Numeracy Counts (C^3 approach)
Project Team	Dr I Roberts, H Spiers, S Darcy (SiMERR NT), Dr I Falk, (CDU), Professor J Pegg (SiMERR National Centre)
Period	April 06 - October 06
Funding Agency	Charles Darwin University
Organisational Base	SiMERR NT

Description

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This project trialled an approach to professional development of upper primary school teachers to increase both their confidence and competence in teaching mathematics. It emphasised the Concepts, Content and Context (C^3) of mathematics packaged in a way which deconstructed existing mathematical knowledge into a form which provided fresh insight and an approach to good classroom implementation.

A range of professional development (PD) activities were undertaken with existing primary teachers. It allowed for a trialling of the C^3 approach to mathematics education for teachers, the professional development of teachers with activities that are relevant to their classroom, the development of further insight in to the needs of primary teachers of mathematics, the evaluation of the approach by NTDEET, and the successful sourcing of funding to further develop mathematics teaching and learning in the NT.

Participants

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12 primary teachers from schools in the Darwin region.

Findings

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The extent of this trial project was quite small, but when considered in conjunction with outcomes of subsequent funded activities there are many conclusions. The following findings are clear in terms of the professional development of teachers, especially in the NT context:

- Key words which resonate with all teachers of mathematics are Confidence, Competence and Community; teachers want to be valued and treated as professionals;
- The formation of a mutually supportive community of teachers is essential for sustainability;
- Each Socio-Geographic Location (SGL) has its own special dynamics and activities need to be planned to fit the local conditions;
- The evolution of a successful group in one SGL can provide positive impetus to help a similar development in another SGL or even in another discipline area;
- Breaking the barriers of the insularity of locations is important. Teachers want and need to be interacting with teachers and relevant educators from different locations (NT, Australia, international);
- Many teachers of mathematics want regular PD, but it has to be of the appropriate type. There is strong support for it to be subject specific, and allow teachers to engage in doing mathematics as well as considering the pedagogical issues. Pre-service teaching training often lacks the time necessary for teachers to do mathematics so that they can develop confidence and competence for teaching it;
- Professional development has a significant role in supporting teachers to maintain a contemporary understanding of mathematics – to keep them current;
- Including PD activities that can be adapted and taken in to the classroom is valued, but PD can be much richer and hence valued more, especially in terms of being exposed to the 'bigger picture' of mathematics.
- Significant factors concerning teachers and the logistics of PD include:
    - teachers are willing to devote significant amounts of their personal time to take part in a mathematical community;
    - teachers would prefer to do PD after hours but it has to be done well;
    - provision of accommodation and reasonable meals is important, as is the inclusion of families in after-hour dinner/social activities;
    - these arrangements are extremely cost effective, compared to the cost of in-hours PD, saving relief teacher costs of $300 per teacher per PD day.

- The success of the projects were significantly enhanced by the fact that they was cooperation between personnel in different educational organisations who worked with a spirit of mutual support;
- Having appropriate 'critical friends' is very beneficial;
- Teachers need to be supported to realise that they can impact on their own professional environment, and seeking funding to support their professional needs is something which they can achieve;
- SiMERR has been important in that:
    - it is essential to have a focus on the needs of rural , regional and remote situations;
    - it is essential to promote interaction across the country and between discipline groups;
    - it is essential to have both genuine mathematicians and mathematics educators involved in mathematics education at all levels. SiMERR has provided some support for this process. There is a huge in-balance away from genuine mathematics in pre-service and in-service support of teachers, and teachers want to engage in 'real maths', in an appropriate way. The appropriate dialogue needs positive intervention at a National level.
- Barriers of many types have had to be addressed. These include:
    - teachers being previously directed to PDs of little value to them;
    - teachers perception of the lack of control of their own professional path;
    - teacher perceptions of the continuing undervaluing and lack of understanding of mathematics within many parts of relevant Educational Institutions;
    - a lack of recognition across many Education Faculties that the pedagogy of teaching mathematics is intimately linked to teacher knowledge of the subject (subject knowledge is important) and generic pedagogic skills are insufficient for teaching mathematics.

Outcomes

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- A viable NT-wide Professional Learning Community for teachers of mathematics has been formed in the NT and a model for professional development has been tried and tested which works in the NT context. The model has surprised many. It is much cheaper than standard models, and it involves regular Friday evening and Saturday sessions with teachers. Activities have involved more than 80 teachers from 22 schools;
- Roberts, I., (2007). C^3: Concepts, Content, Context. An approach to the professional development of teachers of mathematics A conference paper presented at Narrowing the Gap, University of New England, April.;
- An ASISTM (Australian School Innovation in Science, Technology and Mathematics Project.) Grant ($79000) was successful. It was based upon the C^3 approach;
- Other external funding has subsequently been sourced to continue the work began with this project:
    - NTDEET Continuing PD grant $135,000;
    - AGQPT grants to support mathematics professional learning communities $30,000; and
    - NTDEET for NT professional learning community and a mathematics enrichment professional learning community.

Impact

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This was a small project with significant outcomes. Its main impact was to provide necessary experience, needs assessment and evaluation (by NTDEET), to allow for the success of subsequent grant applications. These have allowed the extension of the C^3 approach across the NT, with the strong support of NTDEET. This subsequent work has led to the formation of a viable NT wide mathematics teachers' professional learning community.

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