

DOCUMENT RESUME

ED 454 039

SE 064 769

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TITLE Meaningful Mathematics in the Middle Years.
PUB DATE 1999-12-00
NOTE 7p.; Paper presented at the combined Annual Meeting of the Australian Association for Research in Education and the New Zealand Association for Research in Education (Melbourne, Australia, November 29-December 2, 1999). Contains small print.
AVAILABLE FROM For full text: <http://www.aare.edu.au/99pap/val99544.htm>.
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Action Research; Mathematics Education; *Mathematics Instruction; Middle Schools; Number Concepts; *Numeracy; *Student Participation; Teaching Methods

ABSTRACT

This paper describes an action research project that investigated issues concerning the teaching and learning of numeracy in the middle years. Building on research concerning the middle years of schooling, and their own experience of teaching mathematics in years 5-8, a group of teachers, drawn from four schools, trialed strategies intended to improve the engagement, attitudes and outcomes of their students in mathematics. The group recommended at the end of the study that mathematics needs to be meaningful for young adolescents. The concept of meaningful mathematics is explored through a description of the actions and findings of the teachers participating in this project. (Contains 18 references.) (Author/ASK)

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Meaningful mathematics in the middle years ®

Colleen Vale

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This paper describes an action research project that investigated issues concerning the teaching and learning of numeracy in the middle years. Building on research concerning the middle years of schooling, and their own experience of teaching mathematics in years 5 - 8, a group of teachers, drawn from four schools, trialed strategies intended to improve the engagement, attitudes and outcomes of their students in mathematics. The group recommended at the end of the study that mathematics needs to be meaningful for young adolescents. The concept of meaningful mathematics is explored through a description of the actions and findings of the teachers participating in this project.

Introduction and background

With the current emphasis on numeracy standards the Catholic Education Commission of Victoria implemented an action research project, "Supporting Numeracy Learning in Victorian Catholic Schools", to inform the development of strategies to support numeracy learning. The project involved six teams of teachers and facilitators and this paper is a report on the work of the only team in the project that focussed on numeracy learning and teaching in the middle years of schooling.

Innovation in the middle years of schooling, defined as year 5 in primary school to year 8 in secondary schools, was initially promoted by The Schools Council (Berkeley, 1994). The subsequent attention to the middle years is a result of the recognition of the particular needs of young adolescents (Eyres, 1992), stagnation of student achievement (Hill, 1994) and the fall in student attitudes and enjoyment of learning during these years (Snapshots of the middle years, 1997). Student alienation in the middle years is reported to derive from a curriculum that does not recognise the personal and social context of young adolescents (Cumming, 1996; Eyres, 1997). The curriculum is disconnected from students' experience (Eyres, 1997) and is geared toward basic skills in primary schools and work credentials in secondary school (Stringer, 1997). Eyres (1992) identified a range of needs for young adolescents that included growing toward independence, gaining experience in decision-making and developing self identity and self-confidence, whilst adjusting to profound changes.

Teachers who have been researching this issue in their classrooms have reported a number of strategies that have been successful in the middle years. These generally embrace principles of more flexibility and democracy in the classroom and a holistic approach to curriculum and teams of teachers (Cumming, 1996; Scott, 1997). Particular strategies have been advocated. These include the use of an integrated curriculum approach to learning (Beane, 1991; Roberts, 1997), student autonomy through participation in decision making about learning, practical activities related to real life problems and varied approaches to create interest and reduce boredom (Cumming, 1996).

Research on middle school mathematics teaching is not prevalent. Bodin and Capponi (1996) conducted a review of international practices and noted a variety of practice around the world and an absence of a common approaches within countries. They did note however, an evolution toward more student centred approaches that typically involved a problem based lessons, to address the needs of greater autonomy for young adolescents. The use of other autonomous learning approaches was not discussed in their report. It is not surprising then that, approaches for addressing the needs of young adolescents within the context of mathematics curriculum and numeracy learning are not evident in the literature that informs teachers. Therefore, this action research project set out to investigate effective teaching and learning strategies for students in the middle years that would also enhance and improve numeracy outcomes.

Structure and organisation of the action research project

The action research team consisted of seven teachers drawn from four schools and a university facilitator. Three of the schools were primary schools and one a P-10 school. As a result only one secondary mathematics teacher participated in the project. Three of the schools were located in regional Victoria, the fourth on the outskirts Melbourne.

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The project involved an initial two days of professional development and two months of action research as the teachers trialed ideas designed to effect positive change for their students. During this period the facilitator visited each of the schools to discuss the project, offered support and advice, and provided guidance on data collection and report writing. A final two days brought the teachers together to share experiences within the middle years team and to generalise and theorise their findings. Experiences were also shared with teacher researchers in the other numeracy teams and recommendations were prepared.

During the first two days the teachers shared their experiences of teaching mathematics in the middle years, identified issues of concern, engaged in some professional reading and reflection, and identified the main problem for their research and a strategy to implement. The teachers were encouraged to collect a range of data and to write cases (Wasserman, 1993) for their report. These reports formed the basis of the sharing activities on the final two days of the project. The teachers read each other's reports and wrote commentaries (Teachers Write, 1997). Findings were therefore more easily generalised through discussion.

Determining a direction for the action research.

During an initial discussion about their experiences of teaching mathematics in the middle years, consistency emerged as an issue of concern for the teachers in the action research team. They reported that the divide between primary and secondary schooling was characterised by differences in curriculum planning, teaching and learning, language as well as algorithms and methods. The primary teachers in the group were concerned that numeracy for their middle year students was usually concerned with students demonstrating basic skills in number and the regurgitation of algorithms rather than demonstration of understanding. They further believed that group work and problem solving got lost or squeezed out, especially as grade 6 teachers tried to make sure that their students had the necessary knowledge for secondary mathematics. The desire to deal with structural issues concerning transition between primary and secondary school was evident within the group.

When reflecting upon a selection of articles concerning the middle years of schooling (Cumming, 1996; Eyres, 1997; Roberts, 1997; Scott, 1997; Snapshots of the middle years, 1997) the teachers agreed that many of the findings concurred with their experiences. They were excited by some of the ideas proposed in the literature as they clearly related to positive experiences that they had enjoyed in their middle years classrooms when teaching other areas of the curriculum.

The structural issues of communication and collaboration between primary and secondary teachers were not considered for the project. This was because the selected members of the team were all primary teachers except one, and the schools had no geographical relationship with each other, except for those from the one P-10 school. The time line for the project was less than a term and hence too short to engage in cross sector collaboration. The team therefore agreed to focus on their own classrooms. Through discussion the group determined that the key question for the action research team was:

What are the "best" teaching and learning practises for students in the middle years?

The teachers were concerned not only about positive learning outcomes in mathematics but also positive outcomes in terms of confidence in mathematics learning and social skills, that would aid students' learning and their personal and social development.

The teachers argued that the teaching of numeracy in the middle years ought to: cater for individual differences and ways of knowing, promote the explaining and writing of mathematical thinking, make use of team learning and develop team skills, engage students through the use of appropriate concrete materials (manipulatives) and tools, and use assessment to identify student needs and modify their teaching program. These beliefs informed their choice of strategy for the classroom. The ideas for teaching and learning practices of particular interest to the teachers in the project were: integrated learning, problem solving, good questions, real life learning, autonomous learning, tools, concrete materials, investigations, games, open ended activities and personal experiences. Each school in the team framed a particular question and contributing questions to research and nominated a teaching and learning strategy to trial with content of their current mathematics program. "Mathematics in context" made sense as a theme for the team's proposed action research, especially since it also fitted neatly with definitions of numeracy:

To be numerate is to use mathematics effectively to meet the general demands of life at home, in paid work, and for participation in community and civic life. In school education, numeracy is a fundamental component of learning, discourse and critique across all areas of the curriculum. It involves the disposition to use, in context, a combination of:

- Underpinning mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic);
- Mathematical thinking and strategies;
- General thinking skills; and
- Grounded appreciation of context.

(Policy on Numeracy in Australian Schools, AAMT 1997).

Two schools chose to focus on games as a context for mathematics. One of these schools was particularly interested in motivating students for a range of mathematics learning areas. The other school was also keen to motivate children, and especially boys, as well as develop skills in strategic thinking and thinking mathematically. At this school the grades 5 and 6 students had been surveyed concerning their thoughts about mathematics as part of a school review. The students reported that there was not enough fun in mathematics.

The teachers from one primary school had previously used the Bloom's Taxonomy for negotiating curriculum with students in other key learning areas and they were keen to try this more autonomous learning approach in mathematics. The grade 6 teacher negotiated contracts concerning shape with students, whilst the grade 5 students worked on fractions.

At the P-10 school the students in grades 5, 6 and 7 were scheduled to begin the topic of data. The teachers were keen to trial real life investigations that concerned personal experience and involvement. The grade 5 and 6 teachers challenged their students to pose questions for data collection that were of interest to them, whilst the year 7 students embarked on a project to discover 'the average year 7 student'.

Findings from the action research

The individual reports produced by teachers documented the actual implementation of these strategies. They also reported cases and particular learning outcomes for individual or groups of students according to the Mathematics Curriculum and Standards Framework (1995). Common features of the implementation of these strategies were the involvement of students in making decisions about their learning, students working collaboratively with others and communicating mathematics with others.

The teachers believed that their experience in the project had been beneficial and that they had developed new strategies for teaching mathematics as a result. For example one teacher wrote:

"I can see the value of teaching mathematics by using this autonomous learning model, particularly to introduce mathematical concepts, to evaluate concepts at the end of a unit, to change negative attitudes towards disliked mathematical concepts or in finding the link between maths and the children's life experiences."

The teachers also reported that their students were open to their new teaching strategies in mathematics and were positive about the mathematics work that they had done during the project. Particular findings were identified for each strategy that was trialed. These findings are listed by strategy in Table 1 and include statements about learning and teaching.

Table 1: Findings about learning and teaching for each strategy trialed.

Games	Personalised investigations	Autonomous learning
<p>Learning:</p> <ul style="list-style-type: none"> ● Games enabled social interaction. ● Children communicated mathematical understanding, especially orally and by demonstration. ● Games bridged the gap between the lower and higher maths achievers in the grades. ● The games allowed for a variety of solutions and thinking, including planning, logical and strategic thinking . ● The physical engagement with materials assisted learning and enjoyment. ● Competition is shifted from mathematical achievement to the game. <p>Teaching:</p> <ul style="list-style-type: none"> ● Games need to be purposeful, that is support mathematics concepts being taught. ● Children struggled with writing about games so this needs to be taught. 	<p>Learning:</p> <ul style="list-style-type: none"> ● The <u>personalised</u> nature of the project provided motivation for students. ● Lower achieving mathematics students were able to find answers to <u>their</u> questions and achieve mathematics outcomes. ● The use of computers by some students was motivating. <p>Teaching:</p> <ul style="list-style-type: none"> ● Student self assessment and listening to students enabled the teacher to cater for their needs and interests. ● Being responsive to children's interests is challenging for the teacher. ● It is important that maths is meaningful to students. ● Need a balance of teacher directed activities to establish a skill base and student directed tasks. 	<p>Learning:</p> <ul style="list-style-type: none"> ● The contracts gave ownership to students and this was a motivating factor. ● Students took responsibility for their own learning, for example organising the materials and equipment. ● The contracts enabled students to operate at their level of thinking. ● Students negotiated contracts that built on their strengths in mathematics and other learning areas. ● Children selected real life contexts. <p>Teaching:</p> <ul style="list-style-type: none"> ● The Bloom's Taxonomy was a useful strategy for designing contracts that included higher order thinking in mathematics. ● The teacher's role changes when students are working on contracts.

One theme running across the strategies was enjoyment and motivation. The teachers reported that their classrooms had been happy and productive learning environments. For example one teacher wrote:

"...one issue became very clear: students learn best within a learning environment that is fun and accounts for their individual learning styles and abilities.."

This idea was echoed by the grade 5 teacher who personalised the data collection lessons:

"The students all agreed that it was one of the better units for the year and this would have a lot to do with the level of ownership that they felt they had. The enthusiasm generated through the use of personalised topics was infectious and was reflected in the amount of work covered."

The grade 6 students who had previous experience with negotiating contracts:

"... were keen to get started and were enthusiastic throughout the sessions. They stated that they liked doing maths this way as it was easier! The children worked with partners at times but were always keen to discuss and share what they were doing with each other."

These statements concur with those of other teachers who have varied their approach to teaching in the middle years (Cumming, 1997) and suggests that the students' usual experience of mathematics was somewhat disconnected from their interests and needs (Eyres, 1997). Middleton (1995) found that teachers were generally poor at predicting what would motivate their students in mathematics lessons and the experience of the action research team suggests that by varying approaches teachers may learn more about what motivates their students in mathematics.

An element of the happy environment reported by the teacher above was the high degree of social interaction. This was the second theme evident in the findings reported by the teachers. One teacher argued that mathematical games may play an even more crucial role in the social development of young adolescents:

"Games are an intrinsic part of a child's and adolescent's development.... Through class discussions on the games played at home (family games) it became evident that very few games were played as families; games such as Cluedo, Monopoly, Pictionary, that involve levels of discussion and personal interaction were rarely played amongst the students and families.... School classrooms may then be one of the few environments in which social interaction through game playing exists."

Mathematics lessons that personalise the content or context for learning and require interaction between students, can therefore these teachers suggest, provide a social context for the development of social skills and identity critical for young adolescents (Eyres, 1992).

The teachers were also pleased that the strategies that they had trialed enabled all the students some experience of success in mathematics. This was the third theme evident from their findings. The students recognised success through self-evaluation of their mathematics projects, as reported by the following teacher:

"By letting the children be more autonomous in their maths learning I feel I have facilitated a chance for success for all students by allowing them to work at their own level. This was evident in two of the girls' self-evaluation when they said they enjoyed this contract and it didn't feel like maths at all. These two girls are generally very negative towards maths."

The teachers also observed success since they noted the high levels of engagement of their students with the various tasks, as well as, the bridging of differences between high mathematics achieving and low mathematics achieving students. Students were successful because they were able to build on their own understandings:

"[Games] offer students ... a learning framework allowing children to clarify their own understandings at their own level."

And games also provided a means of shifting the competition evident in the classroom away from mathematics to the game itself:

"Random groupings, placed the students on an uneven playing field in terms of their ability... By identifying common strategies through interactions and communication, the students who operate on a lower level of understanding than others, were accessed to information that then enabled them to compete successfully."

The flexibility and democracy advocated by Cumming (1997) and Scott (1997) and trialed by these teachers lead to particular mathematics learning outcomes as well as increased levels of self esteem in mathematics lessons in these brief classroom trials. The relationship between confidence in mathematics and continued participation and achievement in mathematics has been well documented (see for example, Kloosterman, 1988). Positive experiences of schooling contribute to a positive sense of self worth critical to young adolescents (Eyres, 1992).

So why did these trials of teaching strategies in middle years mathematics lessons yield such positive outcomes as expressed by the teachers in their individual and collective reports? The common theme that emerged from discussion between the teachers about their experiences was the notion that mathematics needs to be meaningful for students in the middle years. When given the option, students in these classrooms selected real life contexts for learning mathematics and demonstrated numeracy skills:

"Most of the children selected real life contexts in which to present fraction information.... Allowing them to become immersed in real-life experiences of maths assisted them in a sound understanding of what a fraction is."

And:

"The contracts that the children wrote up involved realistic contexts and a lot of hands on type activities. The boys in particular wanted this whereas the girls were happy to use writing to convey their answers."

One teacher spoke about two boys in one class who were competent mathematically and knew all the mathematics before starting their contract:

"They both told me that they didn't realise what a difficult task it was to make a scale model of the school. That was probably their 'real learning' as they certainly knew what to do mathematically."

The task designed by the students themselves therefore generated mathematical meaning for these students through an experience of situated learning. Similarly the secondary teacher reported the conceptual understanding developed through the personalised data collection project:

"The project, I believe was assisting in quite strong relational understanding of data and the graphical presentation ... I now began to shudder at my former complacency, content with somewhat an instrumental understanding of mathematics."

One teacher summed up the action research team's conclusion that 'meaningfulness' was the main recommendation that they wanted make about the teaching and learning of mathematics in the middle years in her report:

"A significant issue in the mathematics classroom is catering for the wide range of abilities while maintaining enthusiasm and involvement. By involving children in the development of the unit and relating the topics to things that are meaningful to them, this goal is attainable."

The strategies employed by this group of teachers therefore provided meaning on a personal level as well as in a numeracy sense, that is an understanding of mathematics that enabled them to use their knowledge and skills in a way that was relevant to their daily lives. A relevant curriculum was a goal articulated by Cumming (1996) for the middle years of schooling.

Alongside the positive outcomes the teachers also expressed some dilemmas. For example, the teachers raised concerns about the content of the student negotiated learning:

"With the exception of Anthony, it is believed that most of the children would have achieved more CSF outcomes by learning fractions in a more structured way. However, their attitude towards fractions would not have been so positive and they probably would not have a sound concept of real-life fractions."

The teachers discussed how to encourage students to challenge themselves and move beyond what they feel comfortable with. Examples of students extending themselves during the project were identified. The teachers believed that the mathematics program needed to provide time for students to explore a topic in depth, even when the pressure may be to cover more learning outcomes. The management of assessment was also an issue within this context:

"These contracts gave the children the scope to work in ways that they were confident and good at. By the same token I wouldn't do all my maths this way as it is difficult to work out what maths has been learnt and how to manage a big grade."

These themes of concern, echoed the difficulties faced by middle school teachers as reported by Bodin and Capponi (1996).

The team seriously discussed the reflection made by one teacher during this project. This teacher had written about her changing role in the classroom:

"Although the students immersed themselves in these activities, their actions were somewhat disconcerting for me in that I was no longer the focus, but the facilitator. The 'shift' from the 'traditional' maths secondary classroom truly threatened the security of the textbook and teacher related lessons. I expected in this project to discover insights into the adolescent mind dealing with change and mathematics all at once, but instead found that the students positive reaction and evident engagement brought insights into my own beliefs of student learning, but more strikingly, my teaching practices."

They agreed that striking a balance between student directed learning and teacher directed learning was difficult to achieve, but worthwhile striving for.

Conclusion

The experiences of these teachers are not new. They concur with the previous experience of teachers who have conducted action research in the middle years (Cumming, 1997) or in negotiating mathematics curriculum (Boomer, 1982). These teachers have however, established links for themselves between these practices and the needs of young adolescents in particular. Through the project the teachers listened to young adolescents and reflected on their own practice. As a result these teachers have been inspired to repeat the strategies that were trialed, to improve on this practice, and to endeavour to use a variety of teaching and learning approaches in their teaching of mathematics in the middle years of schooling. The challenge for making mathematics meaningful in the middle years of schooling for young adolescents is ongoing and expressed by one teacher in the following commentary:

"I wonder how then we can build projects, investigations that tap into the children's own experiences and interests to strengthen their belief in themselves, break down the disenchantment and provide an open learning environment."

The teachers expressed concern about the limitations of their brief action research project. They believed that reform in the middle years of schooling also meant tackling the problem of consistency through communication between the sectors and structural change. A mathematics curriculum appropriate for the middle years would be more effectively researched through a cross sector project that brought together teachers working with students on both sides of the transition 'gulf' in local communities. The teachers also argued that further research by teachers in their classrooms, and by other researchers was required in order to confirm and understand the notion of meaningful mathematics, and to improve the practice of teaching and learning for young adolescents.

Acknowledgments

The author sincerely thanks and acknowledges the academic contribution made by the teachers working on the project: Lidia Goodwin, Robyn Henott, Mick Scully, Rebecca Rohde, Katrina O'Brien, Robyn Weinbergs and Chris Dickson, and would also like to thank the Catholic Education Office and Jill Cheeseman for the opportunity to work collaboratively with teachers on this project. Please note that the views expressed in this paper are not necessarily those of the Catholic Education Commission of Victoria.

References

- Beane, J. (1991) *The Middle School: The Natural Home of Integrated Curriculum*. Reprinted in *The Middle Years Kit*, Ryde: National Schools Network.
- Berkeley, G. (1994) Middle Years of Schooling - A Schools Council Perspective, *Unicorn*, 20(2), 5-11.
- Bodin, A. and Capponi, B. (1996) Junior Secondary School Practices. In A. J. Bishop et al (Eds) *International Handbook of Mathematics Education*, Dordrecht; Boston: Kluwer Academic Publishers, 565-614.
- Boomer, G. (Ed.) (1982) *Negotiating the Curriculum: A teacher-student partnership*. Sydney: Ashton Scholastic.
- Cumming, J. (1996) *From Alienation to Engagement: Opportunities for Reform in the Middle Years of Schooling*, Volume 3 Teacher Action, ACT: Australian Curriculum Studies Association.
- Eyres, V. (1992) *The Education of Young Adolescents in South Australian Government Schools*. Report of the Junior Secondary Review. SA Education Department.
- Eyres, V. (1997) Steering a middle course, *EQ Australia*, Issue One Autumn 1997, 8-9.
- Hill, P. (1994) Putting the national profiles to use, *Unicorn* 20(2), 36-42.
- Kloosterman, P. (1988) Self confidence and motivation in mathematics. *Journal of Educational Psychology*, 80, 345-351.
- Mathematics Curriculum and Standards Framework*. Melbourne, Victoria: Board of Studies, 1995.
- Middleton, J. A. (1995) A study of intrinsic motivation in the mathematics classroom: A personal construct approach. *Journal for Research in Mathematics Education*, 26(3) 254-279.
- Policy on Numeracy Education in Schools*, Adelaide: The Australian Association of Mathematics Teachers Inc., 1997.
- Roberts, J. (1997) To the 3Rs, add the 3Ds, *EQ Australia*, Issue One Autumn 1997, 23-25.
- Teachers Write: A handbook for teachers writing about changing classrooms for a changing world*, Ryde: National Schools Network and the Western Melbourne Roundtable, 1997.
- Scott, L. (1997) Six principles for the middle years, *EQ Australia*, Issue One Autumn 1997, 12-13.
- Snapshots of the middle years, *EQ Australia*, Issue One Autumn 1997, 10-11.
- Stringer, B. (1997) Better connections, *EQ Australia*, Issue One Autumn 1997, 21-23.
- Wasserman, S. (1993) *Getting Down to Cases*. New York: Teachers College Press.



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