
ABSTRACTS OF SHORT COMMUNICATIONS



MATHEMATICAL INVESTIGATIONS AS AN ALTERNATIVE ASSESSMENT MOTIVATOR: AN ISRAELI-BASED STUDY

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This paper describes a doctoral project, conducted nationally in Israel, which uses investigative tasks for assessment purposes. While elementary school teachers in Israel believe that understanding and thinking are their most important goals in teaching mathematics, many continue using traditional tests to assess mathematical understanding. Workshops were organised in order to encourage teachers to use investigative mathematics tasks as assessment tools. Evidence from the study indicates that teachers' participation in these workshops had an impact on their instruction and assessment.

A LONGITUDINAL STUDY OF STUDENTS' UNDERSTANDING OF TRIANGLE CLASS INCLUSION CONCEPTS

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Class inclusion, is an important characteristic of Level 3 thinking in the van Hiele theory. Researchers have highlighted the difficulties associated with understanding this idea, and have described class inclusion as a prerequisite for deductive reasoning. This study, involving in-depth interviews with 12 secondary students, considers the qualitative similarities and differences in students' attempts at linking and grouping seven different triangle types over a two-year period.

TEACHERS ASSESSING CHILDREN'S PERFORMANCES IN MATHEMATICS: HOW RELIABLE ARE THEIR JUDGEMENTS?

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The purpose of this investigation was to assess the degree of agreement between teachers when judging the arithmetical ability of young children on a performance-based assessment instrument. It was found that while there was some degree of inter-rater variability, it was not significant.

GRAPHICS CALCULATORS IN MATHEMATICS EDUCATION: A STUDY OF STUDENT LEARNING

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Although graphics calculators are being increasingly used in mathematics teaching, research has yet to identify fully those aspects of graphics calculators which best facilitate student learning. This short communication reports on some preliminary results of a research project in which clinical interviews were conducted with 25 Year 10 students as they used graphics calculators to study graphs. The interviews focused specifically on the procedural (remembering which buttons to press) and conceptual (interpreting the calculator's output) difficulties which the students experienced.

PRELIMINARY ASSESSMENT OF A TRIAL FLEXIBLE DELIVERY COURSE IN PRE-SERVICE TEACHER EDUCATION

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An initiative by Charles Sturt University (CSU) involves delivery of first semester subjects in the BEd (Primary) courses to students at both the home (Bathurst) campus and a new remote campus in Dubbo. The latter receive tuition via a recently established satellite video-conferencing facility by academic staff already involved in first semester teaching. Lecturers in the subject EMM111 (Exploring Numeracy & Technology) have supplemented flexible delivery through fortnightly visits to Dubbo and the establishment of a trial on-line version of the subject. EMM111 on-line has been enhanced by weekly postings of relevant weblinks (many interactive & dynamic) and a variety of electronic communication functions. Formative evaluation of the overall initiative was undertaken by CSU during the semester break (April, 1999), whilst specific evaluation of EMM111 will have commenced at the end of Autumn Session (June, 1999). Research dimensions of the pilot study include delivery mode impact, affective domain factors, cognitive growth and the relationship between presage, process and product variables.

CHILDREN'S VISUALISATION OF THREE-DIMENSIONAL SHAPES

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This paper describes a pilot study involving 30 students in Grades 1, 3 and 5, which investigated the students' ability to visualise three-dimensional shapes. In particular, the study examined whether, in their visualisations, students focus on critical or non-critical aspects of shapes and whether any differences exist between students' visual images, verbal descriptions and drawn representations. An interview-based assessment was devised to address the research questions. Results showed that although the quality of some students' visualisations may improve with grade level, non-mathematical or non-critical qualities feature strongly in most children's visualisations.

A STUDY OF THE IMPACT OF GRAPHICS CALCULATORS ON STUDENT ACHIEVEMENT IN TERTIARY ENTRANCE EXAMINATIONS IN MATHEMATICS

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In November 1998, students in Western Australia had access to graphics calculators when they sat for the Tertiary Entrance Examinations (TEE). This was the first time the use of graphics calculators was allowed in the TEE, and applied to all mathematics examinations and those in the physical sciences. A unique opportunity has been presented for a comparative study of student achievement using the results from the 1997 (pre graphics calculators) and 1998 (post graphics calculators) TEE that will provide data with relevance for teachers of mathematics at both the secondary and tertiary level. The central aim of the study is to establish the extent to which access to graphics calculators has impacted on student achievement in mathematics examinations in the TEE. Subsidiary to this is to identify the components of the syllabus and kinds of items for which the availability of graphics calculators seems of most benefit to students. An opportunity also avails to examine gender and student location (rural versus urban) differences in achievement pre and post introduction of the graphics calculators. Data relating to student achievement on the 1997 and 1998 TEE mathematics examinations are being obtained from the Curriculum Council of Western Australia. These are to be supplemented by those from a survey and interviews conducted with students enrolled in first year mathematics courses at Curtin University and who sat the TEE in 1998.

TEACHING NEGATIVE NUMBER USING INTEGER TILES

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The paper reports some of the findings of a study involving use of an integer tiles embodiment of the neutralisation model. Short and long-term learning outcomes of negative number teaching using integer tiles and normal number-line based teaching methods are compared. The integer tile model appears to be superior to the number line model, as currently interpreted and used in popular textbooks, for teaching of negative number operations and justifying sign rules.

MATHEMATICS EDUCATION FOR EARLY CHILDHOOD: A PARTNERSHIP OF TWO CURRICULUMS

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This paper describes the mathematics education component of one early childhood teacher education programme at the Auckland College of Education. It explores how the school curriculum can provide a meaningful framework for the mathematical learning of very young children. It identifies how the interweaving of this curriculum document with the New Zealand early childhood curriculum can support the early childhood teacher to maximise the provision of mathematically-rich environments. A variety of issues pertaining to the early emergence and development of mathematical concepts will be examined.

A CHANGE IN FOCUS: PROBLEM POSING AND PROFESSIONAL DEVELOPMENT

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This is a report of the second year of a three-year research project that aims to integrate problem posing into the elementary mathematics curriculum. Teachers attended two seminars a term: the first for debriefing and the second for reflection. In between seminars was the implementation period. During the period, teachers implemented problem posing, analysed children's work and mailed findings. Results indicated that when teachers were supported with resources and worked with colleagues, they were able to change as they act as researchers.

ADULTS' NON-OCCUPATIONAL MATHEMATICS: WANDT AND BROWN REVISITED

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A survey was administered to 187 adults of varying backgrounds. The subjects were requested to record mathematical calculations completed over a twenty four hour period. The calculations were analysed in terms of location, level of difficulty, purpose, type and frequency. Seven subjects were interviewed in relation to their survey results. The majority of non-occupational calculations made by adults were performed mentally, were completed inside the home, involved addition or subtraction and were related to time or money.

TEACHING MULTIPLICATION TO YOUNG CHILDREN USING MULTIPLICATIVE RATHER THAN ADDITIVE STRATEGIES

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The teaching of multiplication in the early childhood setting has traditionally taken the form of multiplying using repeated addition or equal groups. This reliance on addition to multiply may have implications in later years of schooling, for example in the development of understanding of decimals and the base ten system. In this session key ideas within the additive model will be compared with a model which treats multiplication primarily as change of measure. An analysis of the frequency and nature of the many types of multiplication situations found in teacher materials for the early years of school will be presented.

RESEARCH INTO VALUES IN MATHEMATICS EDUCATION: AN INTEGRATED THEORETICAL FRAMEWORK

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Several recent initiatives in education have emphasised the need to explore values and beliefs in education in general and mathematics education in particular. The beliefs and values one holds will effect the way in which one learns and teaches mathematics. This paper seeks to develop a research structure or framework that takes into consideration the most critical elements in the learning/teaching process from the perspective of values and beliefs.

DO CHILDREN REALLY HAVE A CHOICE WHEN CALCULATING?

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Year Four to Seven students from three primary schools in the South West of Western Australia were asked to give examples of questions they would complete mentally, with paper and pencil and with a calculator. The results add to the growing body of knowledge about computational choice.