

INDIVIDUAL DIFFERENCES IN COGNITION AND AFFECT AND SECONDARY SCHOOL STUDENTS' MULTIPLICATIVE KNOWLEDGE IN BASIC ARITHMETICAL PROBLEMS

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The study was set in a Brisbane metropolitan secondary school that draws students from a mix of demographic and socio-economic areas. Individual differences in cognition and affect in secondary school students' multiplicative knowledge structures of basic mathematics problems were examined. Procedural and Conceptual knowledge aspects of multiplicative structures of basic mathematics problems were analysed within a proceptual framework described by Gray and Tall (1994). An expanded model of Proceptual Multiplicative Knowledge was proposed.

OVERVIEW

Four quantitative studies examined models of cognition, affect and knowledge structures of basic mathematics problems and their inter-relationships. Luria's (1973) 'whole brain' theory describes how information is processed successively (sequential and primarily temporal) and simultaneously (continuous and primarily spatial). Marsh's (1990) multi-dimensional model includes academic dimensions as measures of Self-Image. The academic dimensions of Maths and Verbal Self-Esteem can be linked directly to performance in mathematics problems. Students' responses to basic mathematics problems provided student performance data on the arithmetic operations involving integers and non-integers. A qualitative study, incorporating semi-structured interviews, focussed on individual differences in cognition and affect and multiplicative knowledge structures that students use in solving basic mathematics problems.

Ten A4 sheets of paper in varied colours will be displayed in the allocated area. Text, tables and figures will show the findings of the study and the proposed expanded model. A one-page handout of the highlights of the poster will be provided.

REFERENCES

- Gray, E. M. and Tall, D. O. (1994). Duality, Ambiguity and Flexibility: A Proceptual View of Simple Arithmetic. *The Journal for Research in Mathematics Education*, 26, 2, 115-141.
- Luria, A. R. (1973). *The Working Brain - An Introduction to Neuropsychology*. London: Penguin.
- Marsh, H. W. (1990). A multidimensional, hierarchical model of self-concept: Theoretical and empirical justification. *Educational Psychology Review*, 2.