The principle of economy in the teaching and learning of mathematics
Title: The principle of economy in the teaching and learning of mathematics

Authors: Hewitt, David P.L.

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Abstract: This thesis looks at the learning and teaching of mathematics through the issue of economy. Here, economy is concerned with the personal time and effort given by a learner to achieve some desired learning. The study sets out to establish that the principle of economy informs the learning and teaching of mathematics, and to establish a list of principles which can assist an economic approach to the teaching of mathematics. The study is carried out within the Discipline of Noticing and is based on the development of theory from significant events building on the work carried out by Caleb Gattegno on the subordination of teaching to learning. An account of these events are given, followed by accounting for them, and linking the generality contained within these isolated events with everyday learning experiences. At times, the reader is asked to carry out simple tasks which assist in drawing their attention, through a personal experience, to the points being developed. The learning process which turns something newly met into something which can be done with little conscious attention, is analysed and called functionalisation. The analysis of this process produces the idea of practice through progress, where the learner's attention is placed in a task which requires the desired learning to be subordinated to it. Particular attention is given to the learning of young children before entering school, since this is impressive in terms of economy. This study identifies powers children use in their early learning, and how these link in with root notions in mathematics called mathematical essences. A list of principles of economy are developed which provide guidelines for approaches to teaching to make use of children's powers and utilise mathematical essences. A computer program, GRID Algebra, is developed to demonstrate how the principles of economy can be incorporated into a resource.

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abstract idea, provide them with more tangible visualizations. Researchers have found that when technology makes abstract ideas tangible, teachers can more easily (Bransford, Brown, & Cocking, 1999; Roschelle et al., 2001; diSessa, 2001). Since the 1980’s, the importance of computer support in the teaching and learning of mathematics has been emphasized more and more. Information and Communication Technology (ICT) is basically an umbrella term that encompasses all communication technologies such as internet, wireless networks, cell phones, satellite communications, digital television computer and network hardware and.