

萬用揭示板的開發與教學應用之研究

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摘 要

「萬用揭示板」是研究者以 Flash MX 2004 為開發工具所設計的一套數學教學工具，作為國民小學一、二年級教導「數」概念的輔助教具。研究者分析現行數學教科書教具的使用情形，將許多傳統教具數位化、賦予虛擬教具(virtual manipulatives, VM)的特性，設計成虛擬的物件，分類收錄於教學工具庫中，供教師靈活運用，並提供儲存的功能，讓教師可以在課前依據教學計畫預先佈題，使課程的進行更為流暢。開發的過程中，參照多位教師的建議，並協同現職小學低年級的數學教師將萬用揭示板實際運用於教學，作為軟體修訂的參考，以提高本工具應用於教學的可行性。文中第四章列舉了萬用揭示板應用於部分主題教學的範例，作為教師教學的參考，並透過這些實例，加深使用者對萬用揭示板的了解。

從開發過程中，研究者發現萬用揭示板突破了許多傳統教具的限制，並且更能夠凝聚學生的注意力，吸引學生參與課堂的討論。然而萬用揭示板也絕非「萬能」，在某些課程中傳統教具仍然具有高度的教學效能。教師應視課程需求選擇適當的教學工具，或將傳統教具與虛擬教具並用，以收相輔相成之效。萬用揭示板僅僅在於提供教師一個新的教學工具，而非取代所有的傳統教具。

關鍵詞：萬用揭示板、虛擬教具、數概念、Flash MX 2004

The Development of Magic Board and its Applications in Mathematics Teaching

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ABSTRACT

Magic Board is a mathematics teaching tool designed by the researcher with Flash MX 2004. It is used as an aid to teach the basic number concepts in the first and second graders of elementary schools. After analyzing the current usage of teaching aids, the researcher digitalized many physical manipulatives, and designed them as virtual objects. These objects were classified and collected in an easy-to-use teaching aids bank. It also provides the save function. Teachers can design learning activities in advance to promote fluency and efficiency of teaching. During the developing process, the researcher adopted suggestions from school teachers and conducted experiments to test its' practical applications in classroom. These results were used as reference for the revision of Magic Board. Examples of applications of Magic Board were discussed in Chapter Four to provide reference for teachers. Through these examples, users can better understand how to use Magic Board in classroom teaching.

The researcher found Magic Board can overcome some limitations of physical manipulatives. It made students more concentrating and more willing to participate in classroom discussions. However, the researcher did not agree that Magic Board can do everything to substitute all traditional teaching aids. Magic Board is designed to be an alternative choice for teachers. It is hoped that teachers choose appropriate teaching aids (both physical and virtual manipulatives) in accordance with the curriculum to promote the efficiency of their mathematics teaching.

Keywords: Magic Board, virtual manipulatives, number concepts, Flash MX 2004