E1 227

A framework for developing a computer - based mathematics learning system

Computer based learning has been one of the most significant applications of computer technology. However, the use of computer based learning has different effects depending on the area to which it is applied. For example developing the system for learning mathematics is challenging. This is because computers has a means to a physical realization of the world. In contrast mathematics promotes abstract thinking.

In addressing the above, we have exploited a learning theory to mathematics learning, and deviced a computer based learning environment. This particular work exploits David Ausubel's learning theory. We used an Artificial Intelligence technique to emulate this work. In developing the system, we have postulated a three-layer architecture namely the visual level, conceptual level and abstract level. The model encourages students to use the physical realization at the entry levels of visual and conceptual levels and leads to the abstract level. Finally at the abstract level there are only numbers. The system is restricted in going backing the process, because it encourages students to learn abstract thinking and reduces the physical comprehension. As a prototype we have developed the system to teach manipulation on fractions. This has been chosen as the area of mathematics knowledge to be very poor according to a survey done on secondary education. The

development is done using Authoware and Artificial Intelligence techniques and this package has been tested and is ready to be release for use at school level. Although the system is tested only for teaching manipulation of fractions. It can be used as a general framework for mathematics teaching.