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**Towards an Understanding of the Way Chemistry
Students Relate to Teaching Software, Using
Stereochemistry as the Vehicle**

A thesis

submitted in partial fulfilment of the requirements for the degree of

Doctor of Philosophy

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ABSTRACT

The aim of the project was to identify features crucial for the effective software-based learning of chemistry. The project involved four connected studies using two methods: one developed for evaluation of student-software interaction (videotaping and stimulated recall interviewing); the other, phenomenography for investigating student conceptions related to their understanding of stereochemistry, a concept addressed by the developed tutorial.

The main insights fall into two categories: the development of chemistry educational software and teaching and learning of chemistry specifically the concepts of stereochemistry.

The original stereochemistry tutorial employed multiple representations, free navigation and model progression. Students' ideas were used to modify the tutorial. This resulted in the learning tasks covering the properties of enantiomers, using the animation and guided discovery.

The use of computers in chemistry has two advantages over the traditional educational tools. Using 3D interactive ball and stick models helped students to visualise molecules and animation assisted to visualise aspects (properties), which are impossible to observe under laboratory conditions.

Learning chemistry is strongly influenced by the way chemistry is taught. Students experienced chemistry in two worlds separated from one another - the world of body of chemistry knowledge and the world of real substances (dream world-real world concept). This insight contributes to an understanding of how learning chemistry takes place.

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