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First-year students' use of prior knowledge in the learning of acids and bases

by

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Abstract

Title: First-year students' use of prior knowledge in the learning of acids and bases.

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Science has been perceived as difficult to learn because of its nature and the methods by which it is usually taught. Most first-year science students entering higher education in South Africa today come from disadvantaged teaching and learning backgrounds. These students bring different "knowledge, skills or abilities" into the learning process. This knowledge, referred to as prior knowledge – or what the student already knows – is the single most important factor influencing learning (Ausubel, 1968). It is on the basis of this influence of prior knowledge on learning that the focus in this study is on understanding its manifestation in learning. Prior knowledge has both facilitating and inhibiting effects in learning. However, the focus in this study was only on *inhibiting effects* of prior knowledge on learning. To better understand prior knowledge qualitative methods (interview, observation, document review and the prior knowledge state test) were used. The aim was to specifically establish how students used their understanding of selected acid-base concepts and processes to *construct understanding* and to *generate meaning* of new concepts and/or knowledge. The study managed to highlight important aspects of the quality of prior knowledge and their manifestation in learning. The findings generally indicated that:

- The quality of the knowledge that students possessed was in most instances incomplete. That is, in their description of concepts, students preferred to use *summary* and *informa*l descriptions without understanding the meaning of the concepts they were describing.
- The quality of knowledge (e.g. incomplete knowledge) affected their ability to construct understanding and/or generate meaning as this knowledge

was insufficient to access for the construction of scientifically valid meanings of concepts.

- The quality of students' knowledge impeded their ability to *reflect* and/or to be *aware* of the knowledge they possessed. This made it difficult for students to access knowledge and to restructure it in order to construct new knowledge or prevent errors in their learning.

The study culminated in the development of a framework that may in future be used to assess prior knowledge and enhance meaningful teaching and learning based on the quality of students' prior knowledge.

Key terms

Prior knowledge; inhibiting effects; knowledge construction; generate meaning; quality of knowledge; incomplete knowledge; knowledge restructuring; accessing knowledge; error prevention; and types of knowledge.

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Signature:

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