

3.1 Epistemology

Objektyp: **Chapter**

Zeitschrift: **L'Enseignement Mathématique**

Band (Jahr): **49 (2003)**

Heft 1-2: **L'ENSEIGNEMENT MATHÉMATIQUE**

PDF erstellt am: **26.09.2024**

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part of the issue. The second part consists of particular question(s) that serve the purpose of pinpointing some crucial aspects of the challenge that deserve to be dealt with in the Study. These are set out in boxes for the respective issues identified in §3.

From the viewpoint of this Study, an issue concerning applications and modelling in mathematics education may be viewed and approached – depending on its nature – from a variety of different *perspectives*, each indicating the category of answers sought.

- *doing*: actual teaching and learning practice (enacted or potential) as carried out in classrooms.
- *development and design*: for example curriculum design, teaching, learning, and assessment materials or activities, and so forth.
- *research*: focus is on the generation of answers to questions as yet unanswered.
- *policy*: focus is on the strategies and policies that exist or ought to be adopted in order to place matters pertaining to applications and modelling on the appropriate agenda.

A given issue may be addressed from any or all of these four perspectives, which are not intended to convey a hierarchy of importance.

3. EXAMPLES OF IMPORTANT ISSUES

In this section a number of selected *issues* – consisting of *challenges* and *questions* – are raised. Although certain inherent features have influenced their grouping, there is overlap between them and different groupings are certainly possible. They are intended as a guide to the kinds of issues that the present Study intends to address, and readers are invited to identify additional relevant issues.

3.1 EPISTEMOLOGY

Different characterisations of modelling and applications include: posing and solving open-ended questions, creating, refining and validating models, mathematising situations, designing and conducting simulations, solving word problems and engaging in applied problem solving. These present challenges if individuals are to engage successfully in applications and modelling activities.

ISSUE 1. *Which aspects of applications and modelling invite further epistemological analysis? How is the relationship between applications and modelling and mathematics best described? What is the relationship between applications and modelling and the world we live in?*

Examples of specific questions that could be addressed here are:

- What are the process components of modelling? What is meant by or involved in each?
- How does our knowledge of applications and modelling accumulate, evolve and change over time?
- What are the various meanings of ‘authenticity’ in modelling?