Readability of Glass-Box Models as Part of Learning Environments in Vocational and Economics Education*

Klaus Breuer
Stefanie Hillen
Kai Berendes

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Background of the experimental activities:

Research Program on Teaching and Learning within the German *Dual Vocational Training System* for Qualified Office Clerks

Project* on modeling and simulation of complex business processes within vocational / economics curricula, especially the one for qualified industrial office clerks (1997 - 1999)

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\[ \text{domain specific approach & results} \]
What’s experimental? Aspect 1

Concept of *complexity*

as feature of objectives within teaching and learning:
Concept of Complexity within Training Curricula

An example from the training curriculum for qualified industrial office clerks:

Students shall ...

- ...  
- develop the ability of thinking within complex economic environments;
- become able to understand complex business tasks and problems, and learn to develop appropriate solutions;
- ...
Concept of Complexity ...

Basic dimensions of complex domains

**Dynamics**
- exponential growth
- delays, time lags
- feedback loops

**Multiplicity**

Number of Variables

Training curricula
What’s experimental? **Aspect 2**

Application of SD-based simulation and modeling activities within vocational/economics classes targeting at teaching and learning of complex business issues.

Domain specific use of the cognitive tool *modeling software* sensu Salomon and Jonnason.
Overall approach to teaching:

#1: exploration
#2: learning episodes
#3: managing

August 1998

June 1999

August 2000
What’s experimental? Aspect 3

A glass-box model of a generic holistic, complex enterprise structure SYDUS
Concern of this study: Readability of the glass-box?

Microworld SYDUS:
- based within the approach of enterprise activities sensu PORTER
- represents generic business policies
- simultaneous representation of structure and dynamics based within a functional notation

Assignments for students on:
- conceptualisation of the enterprise activities
- exploration of the activities
- description of the structural logic of the activities (core elements and relations)
Assignments for students

glass-box model

 Worksheets
Methodology

1. Assignments on
   1. Conceptualisation of the structure
   2. Description of the structural logic

2. Media & object of content analysis

3. Content analysis on
   a) concepts and structural relations between concepts depicted based in
   b) everydays versus elaborated business education terminology
Readability of the glass-box model?

Results

Legend:
- Assignm. # 1
- Assignm. # 2

- Elaborated versus everyday knowledge

- Concepts
  - Assignm. # 1
  - Assignm. # 2

- Relations
  - Assignm. # 1
  - Assignm. # 2

- Dynamics
  - Assignm. # 1
  - Assignm. # 2

Based on the exploration of the enterprise model, students apply more business adequate descriptions.

Everyday's knowledge becomes substituted by more elaborate systemic knowledge.
Conclusions and Perspectives

- Students can read the glass-box representation of the generic complex enterprise model SYDUS.

- Extension of the analyses to the processes of actively modeling and of decision-making within running the model enterprise.

- Development of different modes/levels of instruction within a more adaptive approach.
Klaus Breuer
FB03 - WiPäd
Johannes Gutenberg-Universitaet Mainz
D-55099 Mainz
+49-6131-39-22004
breuer@pop.uni-mainz.de