



## MONET2

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Contract: Concerted Action / Thematic Network

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## Deliverable ED3:

## Review on Integration of MBS&QR with WWW

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# 1 Introduction

## 1.1 Purpose of this Document

The Description of Work describes ED3 as a 'Review on how to integrate QR/MBS with WWW and Multimedia, focusing on technology transfer and research topics to be addressed'. However the Task Group has decided to take this one step further and actually generate an integrated Web Portal for Education and Training applications of Model-based Qualitative Reasoning. This is the accompanying document to this portal, which also fulfils the requirements of the Deliverable.

The development version of the Web Portal itself can be found at;

<http://monet.aber.ac.uk:8080/monet/qrmportal.htm>

## 1.2 Scope

One of the major problems with Educational Qualitative Reasoning (QR) Models is gaining the experience required to use them. Although the software is available (in our case freely so) if learners, teachers, or domain experts want to use QR software it is difficult, if not impossible for them to do so unaided. With tools such as Homer / Visi-Garp (Bessa Machado and Bredeweg, 2003; Bouwer and Bredeweg, 2001), VMODEL (Forbus et al., 2001), and Betty's Brain (Biswas et al., 2001), solutions for gaining insight are emerging, but they are still hard to use without any support. The idea behind the Web Portal would be to take these tools and produce an online document that people can consult to obtain information and support.

This online 'Support and Help' document would include typical examples and explanations on what and how to achieve certain results, with the intention that this is focused on University teaching and maybe even high schools. We could possibly also focus on domain experts (with the obvious initial choice being Ecology). See for a recent discussion on how to use QR technology for educational purposes also Bredeweg & Forbus (2003).

The idea to create a portal follows on from a number of teaching and training events during which the need for such an online resource emerged as a series of requests from the participants. One such event was the MONET Summer School<sup>1</sup>. During and after the lectures, students mentioned the need for further means to work on learning how to use QR after the Summer School. They also pointed out the difficulty for new users to get involved and how online support might be a way to overcome that problem. A similar situation occurred during the QRSER workshop<sup>2</sup>. One of the goals of this workshop was to teach and train ecologist in using QR technology. Furthermore, a series of invited seminars following the international QR2003 workshop<sup>3</sup> (addressing science teachers from universities and stakeholders dealing with water management) again showed the need for additional education material to support potential users in using QR technology. Finally, there are specific courses during which students are supposed to use QR tools (see e.g., Salles and Bredeweg, 2003). Again, there is a need for support, preferably an on-line facility addressing multiple users regardless of place and time.

To conclude, there is a growing group of users who want to create qualitative models, but who are not experts in Artificial Intelligence (and sometimes not even in computer science). With the recent release of the AI magazine special issue on MBS&QR, this interest is likely to increase (Bredeweg and Struss, 2003).

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<sup>1</sup> [http://monet.aber.ac.uk:8080/monet/summer\\_school\\_2003/summer\\_school.html](http://monet.aber.ac.uk:8080/monet/summer_school_2003/summer_school.html)

<sup>2</sup> <http://www.qrser.de/>

<sup>3</sup> <http://www.unb.br/ib/necbio/QR03/>

## 2 Web Portal Design

The Portal is available at <http://monet.aber.ac.uk:8080/monet/qrmportal.htm>, below is a break down of the structure of the Portal.

- Home
  - (This contains a general welcome and then specific welcomes for;
    - Ecologists
    - Model Builders
    - Students
    - Teachers)
- Background
  - What is QR
  - Why use QR
  - Domains
  - Tasks
- Software
  - GARP
  - HOMER
  - VisiGarp
  - Betty's Brain
  - Mobum
  - Qsim
  - Vmodel
- Help
  - Ontology
    - General
      - Ontology Home
    - Building Blocks
      - Agents
      - Assumptions
      - Attribute
      - Entity
      - Quantity
      - Quantity derivative
      - Quantity space
      - Quantity value
    - Behavioural Dependencies
      - Correspondence
      - Inequality
      - Influence
      - Proportionality
    - Model Fragments
      - Type and Hierarchy
      - Agent Fragments
      - Process Fragments
      - Static Fragments
      - Conditions
      - Consequences
    - Scenarios
      - Scenario details
    - Simulation
      - Simulation

- State
  - State Graph
  - Transition
- Modelling
  - General
    - Modelling home
    - File operations
  - Building Blocks
    - Agents
    - Assumptions
    - Attributes
    - Configurations
    - Entities
    - Quantities
    - Quantity Spaces
  - Model Fragments
    - Start with MF
    - Agents
    - Assumptions
    - Attributes
    - Configurations
    - Correspondences
    - Entity Instances
    - Imported MF's
    - Inequalities
    - Influences
    - Proportionalities
    - Quantities & Spaces
    - Values
  - Scenarios
    - Start with Scenarios
    - Agents
    - Assumptions
    - Attributes
    - Configurations
    - Entity Instances
    - Inequalities
    - Quantities & Spaces
    - Values
- Simulation
  - General
    - Simulation Home
    - File Operations
    - Menu Option
  - Select
    - Select Options
  - Run
    - Close State
    - Full Simulation
    - New Simulation
    - Order State
    - Terminate State
  - View

- ER-Structure
- Quantity Values
- Dependencies
- Value History
- Transition History
- Event History
- Model Fragments
- Questions
- FAQ
- Assignments
- Examples
- Community
  - Meetings
  - Current Projects
  - Involvements
  - Mailing List
- Glossary
  - Attribute
  - Causality
  - Dependency
  - Entity
  - Garp
  - HOMER
  - Model
  - Qualitative
  - Quantitative
  - Simulation
  - Visigarp
- Links

### 3 Current Status and Further Progress

When the Education and Training Task Group met in Amsterdam in April 2004 they discussed what information should be housed on the sight. The current design of the portal is a result of this discussion. It is the intention of the Task Group to continue to work on this document and populate it with all the necessary information that the different sectors of users will require to begin and continue working with QR models.

The current version of the portal has most of the 'help' pages needed to use the qualitative modelling and simulations tools HOMER and VisiGarp. Further progress is envisioned along the following lines:

- (1) Clarifying, debugging, and further detailing the current text were needed (depending on feedback by users and members of the Task Group)
- (2) Including more assignments and examples of typical models and simulations described in the literature
- (3) Extending the amount secondary information on glossary and QR history
- (4) Finally, augmenting the list of FAQ. The goal is to have the portal well established by the end of the MONET network, so that it will provide a valuable resource for users of QR technology particularly in educational contexts

## 4 References

Bessa Machado, V., and Bredeweg, B. 2003 Building Qualitative Models with HOMER: A Study in Usability and Support. *Proceedings of the 17th International workshop on Qualitative Reasoning, QR'03*, P. Salles and B. Bredeweg (Eds), pages 39-46, Brasilia, Brazil, August 20-22.

Biswas, G., Schwartz, D., Bransford, J. and The Teachable Agents Group at Vanderbilt. (2001) Technology Support for Complex Problem Solving: From SAD Environments to AI. In K. Forbus and P. Feltovich (Eds.). *Smart Machines in Education*. AAAI Press/MIT Press, Menlo Park California, USA, pages 72-97.

Bouwer A., and Bredeweg, B. 2001. VisiGarp: Graphical Representation of Qualitative Simulation Models. *Artificial Intelligence in Education: AI-ED in the Wired and Wireless Future*, J.D. Moore, G. Luckhardt Redfield, and J.L. Johnson (Eds), pages 294-305, IOS-Press/Ohmsha, Japan, Osaka.

Bredeweg, B., and Forbus, K. 2003. Qualitative Modeling in Education. *AI Magazine*, Volume 24, Number 4, pages 35-46.

Bredeweg, B., and Struss P., (Eds). 2003. Current Topics in Qualitative Reasoning. *AI Magazine* (special issue), Volume 24, Number 4 (winter), pages 13-130.

Forbus, K.D, Carney, K., Harris, R., and Sherin, B.L. (2001) *A qualitative modeling environment for middle-school students: A progress report*. In: G. Biswas (Ed.), *The 15<sup>th</sup> International Workshop on Qualitative Reasoning*, pages 65-72, St. Mary's University, San Antonio, Texas.

MONET Summer School, MONET Website at [http://monet.aber.ac.uk:8080/monet/summer\\_school\\_2003/summer\\_school.html](http://monet.aber.ac.uk:8080/monet/summer_school_2003/summer_school.html)

Salles, P., and Bredeweg, B. 2003. A case study of collaborative modelling: building qualitative models in ecology. *Artificial Intelligence in Education: Shaping the Future of Learning through Intelligent Technologies*, U. Hoppe, F. Verdejo, and J. Kay (eds), pages 245-252, IOS-Press / Ohmsha, Japan, Osaka.

QRSER - Qualitative Reasoning for Stream Ecosystem Restoration and Recovery Workshop Website at <http://www.qrser.de/>

QR2003 – 17<sup>th</sup> International Workshop on Qualitative Reasoning Website at <http://www.unb.br/ib/necbio/QR03/>

## 5 Document History

<i>Version</i>	<i>Date</i>	<i>Changes made to document</i>	<i>Changed by</i>
1.0	April 27 <sup>th</sup> 2004	Initial Document Drafted	JNT
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