

## Association for Information Systems AIS Electronic Library (AISeL)

---

AMCIS 1996 Proceedings

Americas Conference on Information Systems  
(AMCIS)

---

8-16-1996

# MERMōTT - A multimedia based tool supporting the teaching of entity - relationship modelling within a framework of Structured Systems Analysis.

Paul Marsden

*Department of Computing, Manchester Metropolitan University, p.marsden@doc.mmu.ac.uk*

Lee Staniforth

*Department of Computing, Manchester Metropolitan University*

Follow this and additional works at: <http://aisel.aisnet.org/amcis1996>

---

### Recommended Citation

Marsden, Paul and Staniforth, Lee, "MERMōTT - A multimedia based tool supporting the teaching of entity - relationship modelling within a framework of Structured Systems Analysis." (1996). *AMCIS 1996 Proceedings*. 204.  
<http://aisel.aisnet.org/amcis1996/204>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 1996 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# **MERMoTT - A multimedia based tool supporting the teaching of entity-relationship modelling within a framework of Structured Systems**

## **Analysis.**

[Paul Marsden](#) & Lee Staniforth

Department of Computing  
*the* Manchester Metropolitan University

Chester Street

Manchester M1 5GD

United Kingdom

email: P.Marsden@doc.mmu.ac.uk

## **Abstract**

MERMoTT, Multimedia Entity-relationship modelling Tutor and Tool, is a Microsoft Windows based Computer Aided Learning (CAL) package aimed at the support of first year undergraduates in their study of Structured Analysis techniques, specifically Entity-relationship modelling. The package grew from a final year undergraduate project proposed by the author as a reaction to his needs as a first year lecturer in Systems Analysis. The paper seeks to show the development of MERMoTT as a possible solution to the problems which can arise from the teaching of abstract graphical notations such as these. The paper outlines the difficulties faced by educators in the field of Systems Analysis and how the package, which is based around the CORE approach, seeks to overcome these.

## **1 Introduction**

In providing a framework for the design and implementation of Information Systems to all areas of commercial activity, the idea of a Software Lifecycle has become something of a standard. In most cases some variant on the Waterfall Lifecycle [3] is used as the basis, whatever the form Lifecycle we care to choose. With this comes a delineation of the stages of software development. In this model, System Investigation is the capturing of the users requirements by whatever means, of which interviewing is regarded as the most effective [3]. The products of the investigation are then used in the Analysis stage. Analysis is the production of a specification of requirements using abstract tools such as Process Modelling and Entity Relationship Modelling [1,3]. Design is the translation of these requirements into a systems architecture which can then be implemented.

Within Analysis, entity-relationship modelling is an attempt to abstract from the information provided by the users and other sources as to the structure of the data resident in the system.

The author teaches a course which covers the early stages of the lifecycle namely those of Investigation, Analysis and Design. MERMoTT seeks to underpin the student's understanding of the link between the investigation that takes place and one of the tools used to analyse the fruits of such an investigation namely Entity-relationship modelling, and the SSADM [1] approach in particular.

## **2. Current Approach**

At present the approach to teaching these areas is based upon lectures and tutorials. The lecture sequence follows the lifecycle; insofar as methods of investigation are studied, then particular analysis techniques are taught. The teaching of entity-relationship modelling takes the form of lectures outlining the particular notation and approach followed by simple examples. The follow up for this is a series of tutorials consisting of case-studies of fictional companies that require modelling. This is effective in the sense that the students are able to practise to a degree the notation aspects of the modelling formalism.

A major drawback is that entity-relationship modelling and the other techniques are perceived by students as separates rather than complements in the analysis of the problem domain. Students are left without a true appreciation of what occurs in the stage from investigation to the production of a requirements specification. It is a requirement of effective teaching that the students are able to appreciate the process as a whole rather than a series of unconnected parts. In the past substantial case studies have been role played over a number of weeks by the student cohort and lecturers, with interviews and meetings taking place in a fictional company. However with increasing student numbers and pressure upon lecturer time this practice no longer occurs, with staff relying upon textual case studies.

Current practice means that students face the dual problems of context and syntax; they have problems of placing the formalism in the context of their own experience, whilst grappling with the many syntactic difficulties. This poses problems for the educator too in the review of coursework; here grading can present a difficulty as there is a need to disassociate contextual misunderstandings from syntactic errors. There is therefore a perceived need for a way forward which allows students to focus upon the context of their study and the structure of the data therein, without undue concern for the correct notation.

### **3 MERMoTT Approach**

MERMoTT is an attempt to place the study of Analysis techniques with the context of a 'real' situation, as well as supporting the learner in Entity Relationship Modelling and removing, to an extent the need for complete syntactic knowledge. It consists of a Entity-relationship modelling Tutor, a Entity-relationship modelling Tool, a Scenario Viewer and a Scenario Transcript Viewer. The architecture for the system is indicated in figure 1. The arrows are the navigational pathways from one component to another. The system is based around the authoring toolkit Authorware with certain parts implemented in Visual Basic.

This approach is not seen as supplanting of traditional methods but as an alternative and support for student centred study. The students can learn/revise their knowledge of Entity-relationship modelling using the tutor based around the CORE approach. The tutor provides them with simple exercises and feedback, with which they can test out their fledgling skills. At the end of the tutorial they can attempt to model the more substantial case-study. The case study is a series of videotaped 'interviews' performed by an 'Analyst' with various stakeholders in a fictional company. The students are able to view the whole series of interviews or review any parts of particular interviews. The students can then produce a process model using the appropriate notation using the Entity-relationship modelling Tool. In producing the model the students are able to reference an interview or part of one, a transcript of a particular interview or refer back to the tutor for guidance on the modelling formalism.

#### **3.1 Entity-relationship modelling Tutor**

This is a CAL package which is constructed entirely using Authorware facilities. The tutor has been designed using the CORE approach[2]. It leads the student through the notation and approach providing self test sections and a glossary of terms, it uses 'hot text' to inform as to the definition of technical terms. The tutor has a number of simple case studies of a text based nature that can be attempted by the students using the Entity-relationship modelling Tool, which also holds solutions. The Entity-relationship modelling Tool can be invoked from within the tutor.

SRC="MARSDEN1.GIF"

Figure 1

#### **3.2 Entity-relationship modelling Tool**

This is a 'cut-down' CASE tool which allows the students to construct process models in the correct notation. The tool supports the SSADM approach to entity-relationship modelling[1]. Each relationship type has a particular cardinality; one-to-one, on-to-many, and a property; optionality, exclusivity each demanding a particular symbol. The tool bar buttons indicate these different symbols and have hot text indicating their nature, this allows students to choose the correct relationship types between entities.

The tool has been written in Visual Basic and can be invoked from a number of different places within the package.

### **3.3 Scenario Viewer**

This is a means of playing and reviewing video footage of the scenario. The viewer is constructed in such a way that the 'action' can be segmented for easier reviewing.

### **3.4 Transcript Viewer**

This is a 'notebook' which allows the student to look at a transcript of the interviews in case they have missed anything whilst watching the video. It provides a textual reference whilst students are producing the process model and provides the students with a means of producing any supporting documentation.

## **4 The CORE approach to CAL design**

CORE [2] is a design approach for the construction of learning environments. CORE is based upon principles derived from the study of language acquisition and cognitive development. The name derives from the main areas of the approach:

- **C**ontext
- **O**bjects
- **R**efinement
- **E**xpression

Thus any CORE based system is split into blocks. The first puts the skills to be learnt into a context of usage and the framework that will be followed. The skills are then presented as concrete Objects, allowing the concepts of the skills to be acquired and leading the student through the rules governing their usage. The Refinement stage involves structured self testing, each example being graded and incorrect answers being treated as learning experiences; the system provides extensive feedback. The final stage of the approach is Expression which involves the use of the new skills on a more substantial problem.

## **5 Evaluation**

The evaluation of the package was based around well known techniques[4]. The system was evaluated differently for learners and lecturers. Lecturers were asked to evaluate the system in a number of areas; flexibility of the system within the context of the courses they teach, coverage of material, approach and output of the system. The numbers of staff involved were statistically insignificant but all indicated favourably with regard to the system's pedagogic value. The student evaluation focused upon usability, feedback, supportiveness, material (context and coverage) and the use of icons. The evaluation was performed via questionnaire.

All the evaluators felt at ease using the system since they were all well versed in Windows and had used other Windows-based CAL packages. All found the tutor very useful especially the use of the modelling tool to allow them to create neat diagrams and the use of self testing. The use of icons to represent the nature of relationships in the modelling tool was particularly liked. Students especially appreciated the referential features of the system which they felt gave them the confidence to try out their newly acquired knowledge. There was positive feedback about the contextualisation of the approach and the subject matter. Many felt it brought the subject matter and that part of the syllabus alive and made the whole process of requirements specification much clearer.

## **6 Conclusion and Future Work**

The teaching of System Analysis methods is currently a mainly textual affair, with the use of lectures and case studies. The MERMoTT system provides a real life, visual context in which to teach the use of a particular Analysis method, Entity-relationship modelling. By relating its use to the phase of investigation that goes before Analysis in the Software Lifecycle, the students appreciate to a greater degree what actually goes on in the early stages of System Development. The MERMoTT system is designed to support the teaching of the area as it provides a highly structured tutorial, whilst allowing the review of the subject matter during more extensive problem solving. Student confidence is increased as the system allows them to refer to all the information that is pertinent. MERMoTT makes use of simple CASE technology, text and video and early evaluations as to its efficacy are extremely favourable. The combination of video and the tools of Entity-relationship modelling provides cognitive links between the stages of System Analysis and puts the whole process into context. Students can progress at their own pace and get feedback about their use of modelling skills.

Future work will focus upon extending the environment to support other notations and approaches found within the Analysis stage, as well as seeking to get a more complete evaluation of the current system.

### **References**

- 1 Ashworth, M. SSADM - a practical approach. McGraw - Hill, 1995
- 2 Boyle, T et al. The CORE guided discovery approach to acquiring programming skills. Computers Education, Vol 18. No 1-3. 1992 pp 127-133.1992.
- 3 Layzell, P & Loucopoulos, P. Systems Analysis and Development 3rd Edition, Chartwell-Brant, 1989.
- 4 Watson, Deryn. Developing CAL, Harper & Row, 1990.