BILETA

17th BILETA Annual Conference

April 5th - 6th, 2002.
Free University, Amsterdam.

The HYPATIA project. Models of Legal Knowledge and Legal Reasoning in Computer Assisted Instructional Materials for Learning the Law

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Area

Production, delivery, and implementation of technology based learning
Pedagogy of effective learning

Abstract

The HYPATIA project aims at designing computer assisted instructional materials for law students to learn the law. The focus is on *new additional* instructional materials. These materials are intended to support students where they experience difficulties in acquiring legal knowledge and legal skills, and materials are not available at all yet. The HYPATIA project is divided into specific projects. These specific projects seek to realize instructional environments for acquiring legal concepts, for learning to use statutes on the basis of insight in the system and structure of statutes, for learning to use precedents on the basis of insight in the structure and elements of precedents, and for learning to solve legal cases.

The emphasis is on a model based approach. Models of legal knowledge and legal reasoning are the basis for designing the instructional environment. To (re)construct these models a variety of theoretical sources are examined. Next to this it is necessary to gain insight in the specific difficulties students experience in acquiring legal knowledge and legal skills. Remedies are suggested on the basis of both the models of the legal knowledge and skills and the specific difficulties experienced. The research also results in an explicit instructional model. This instructional model is an important part of the instructional environment to be realized.

1. The HYPATIA project

The HYPATIA project is concerned with developing *new additional* computer assisted instructional materials for the effective and efficient learning of legal knowledge en legal skills, taking a principled and structured approach in developing these instructional materials.

2. Developing additional instructional materials

The introduction of Electronic Learning Environments (ELO's) in the Law Faculties in the Netherlands requires electronic instructional materials. To realize these electronic materials exisisting instructional materials are used, more or less, or not at all, adapted to computer assisted

instruction requirements (see, for example, Wöretshofer, Piet & Brand-Gruwel, 2001).

The HYPATIA project, however, develops *new additional* computer assisted instructional materials for legal education.

Law students experience difficulties in acquiring legal knowledge and in using legal knowledge and law teachers report these difficulties.

Where there are no instructional materials available to help student to overcome these difficulties, these type of instructional materials are developed within the HYPATIA project. The instructional materials are made available in a computer assisted instructional environment because of the advantages of individualized instruction and practice combined with immediate support and feedback. A computer program has the capacity to adapt to the individual student's performance, it may support the management of information and it may present various representations and vizualisations of legal knowledge.

3. A principled and structured design approach

Within the HYPATIA project the additional instructional materials are developed in a principled and structured way which involves two approaches: basic research and applied research (Muntjewerff, 2001).

3.1. Basic research

Explicit models of legal knowledge and legal reasoning are (re)constructed. Two components are distinguished: a theoretical and an empirical component.

The theoretical component involves the exploration, conceptualization and specification of legal knowledge and legal reasoning resulting in explicit models of legal knowledge and legal reasoning. There are two perspectives taken:

(i) legal perspective Different legal sources are examined to specify models of legal knowledge and legal reasoning:

- legal empirical research
- legal educational practice
- legal dogmatics
- legal theoretical research

(ii) knowledge engineering perspective Artificial Intelligence & Law research aims at constucting models of legal knowledge and legal reasoning. As these models have to be executed by a computer these models require a high level of explicitness (Breuker & Wielinga, 1985; Valente, 1995; Breuker, Muntjewerff & Bredeweg, 1999).

Within the empirical component empirical studies are carried out to acquire insight in the way legal practitioners and legal scientists handle legal knowledge and in the way they use legal knowledge given a specific legal task. Empirical studies are carried out to acquire insight in the way law students handle legal knowledge and in the way they use legal knowledge given a specific legal task. The results give indications about specific difficulties in acquiring and using legal knowledge.

3.2. Applied research

In the applied research stream the electronic instructional materials for efficiently and effectively learning to acquire legal knowledge and to efficiently and effectively learn to apply legal knowledge

(legal reasoning) are designed. The principled and structured design approach implies that:

(a) the basic research results are used in arranging the instructional environment

(i) the models of legal knowledge and legal reasoning are used in the instructional materials

(ii) on the basis of insight in the specific difficulties in acquiring legal knowledge and in applying legal knowledge remedies are constructed to be used in the design of the instructional materials

(b) instructional design decisions are made on the basis of a global theory on learning and instruction. In this way the design proces will result in a coherent and consistent instructional model

(c) the instructional environment is evaluated extensively (developmental and field testing) (see, for example, Muntjewerff & Breuker, 2001).

4. Specific projects within HYPATIA

The HYPATIA project captures two main subjects, legal knowledge acquisition and legal reasoning, which are realized in a series of specific projects.

A legal knowledge acquisition project Conceptual Structuring and three legal reasoning projecs being Statute System and Structure, Prededent Analysis and Legal Case Solving. We shortly describe each specific project and the design approach involved.

4.1. Project Conceptual Structuring, application ACQUIRE

Learning the law involves the acquisition of legal concepts and the relations between these concepts. Law students not only experience difficulties with extracting the major concepts from the texts that are presented to them in legal education, they also have difficulties to distinguish between concepts and to relate concepts.

In learning the law it is essential to know the legal concepts, their relations and their distinctions.

Therefore we develop a computer program that presents the law student an instructional environment in which she is able:

to list the major legal concepts from the legal subject/discipline that is presented to her

to specify the attributes and values for each concept

to construct relational structures between concepts

to link concepts to a definition

to link concepts to examples.

to link concepts to relevant statutes

to link concepts to relevant precedent cases

to link concepts to exercises

The advantages of using a computer based instructional environment are that a variety of

representations can be used, where switching between representations is easy. Constructing structures and linking can be visualized and information management can be handled easily by the environment. The environment can monitor the students' activities, diagnose errors and supply remediation. As subject matter the first year course Introduction to Law[1] is a perfect candidate because here the major concepts in law are introduced. These concepts will re-appear in any following course. Misconceptions and misunderstanding of concepts will have effect throughout the rest of curriculum. To realize an instructional environment for acquiring legal concepts the HYPATIA research approach of basic and applied research is taken.

Basic research/theoretical part

A representation to describe legal concepts is developed based on the examination of a variety of sources from a legal perspective and from a knowledge engineering perspective

An inventory is made of legal concepts in the subject matter content using the representation (including examples, definitions, links to relevant statutes and precedents)

Basic research/empirical part

Data are collected about the difficulties experienced by law students in acquiring legal concepts

Applied research

Design of the instructional model (including exercises)

Design of the instructional environment for acquiring legal concepts ACQUIRE

Implementation of the instructional environment

Evaluation of the instructional environment

4.2. Project Statute System and Structure, application STAT (STatute Analysis Tool)

Learning the law involves using statutes. Statutes are the major sources of legal knowledge. To be able to know what statute to use and how to use it, law students have to learn the system of statutes and the structure of articles that make up a statute. Law students experience difficulties with finding their way in the statutes, with reading and analyzing articles, as such and in relation with other articles. Law students need to practice with searching, reading, analyzing and applying statutes. In the current curriculum there is hardly any time available for this required practice. Therefore we suggest to develop a computer program that presents the law student an instructional environment in which she is able to practice with statutes.

To realize an instructional environment for learning to use statutes the HYPATIA research approach of basic and applied research is taken.

Basic research/theoretical part

Models of statute system and structure are (re)constructed based on the examination of a variety of sources from a legal perspective and from a knowledge engineering perspective

Basic research/empiricalpart

Data are collected about the difficulties experienced by law students using statutes

Applied research

Design of the instructional model (including exercises)

Design of the instructional environment for learning to use statutes STAT

Implementation of the instructional environment

Evaluation of the instructional environment

4.3. Project Precedent Analysis, application PAT (Precedent Analysis Tool)

Learning the law involves reading, structuring and analyzing precedents to be able to indicate the legal meaning of the precedent. Law students experience difficulties with reading and analyzing precedent cases especially with determining the specific legal meaning of a precedent. Within the current curriculum there is not enough time to read and analyze precedent cases in the presence of a teacher who may provide immediate feedback. Law students are also not presented with models that may guide them in the process of reading and analyzing precedent cases.

In learning the law it is essential to know how to structure and analyze a precedent. Therefore we suggest to develop a computer program that presents the law student an instructional environment in which she is able to analyze a precedent in such a way that the structure is made explicit and the legal meaning can be extracted.

This can be realized by presenting the student with the text of the precedent (in electronic format) and to present the student a framework for analyzing the text of the precedent. The student can copy and paste parts of the text from the precedent into the framework. This approach also enables comparison of precedents on elements in the framework.

To realize an instructional environment for learning to use precedents the HYPATIA research approach of basic and applied research is taken

Basic research/theoretical part

Design the framework for structuring and analyzing precedents based on the examination of a variety of sources from a legal perspective and from a knowledge engineering perspective

Basic research/empirical part

Collect data about the difficulties experienced by law students in reading, structuring and analyzing precedents

Applied research

Design of the instructional model

Design of the Instructional Environment for Learning to Use Precedents PAT

Implementation of the instructional environment

Evaluation of the instructional environment

4.4. Project Legal Case Solving, application PROSA (PROblem Situations in lAw)

The Legal Case Solving project within the HYPATIA project has been realized (Muntjewerff, 2001). This research addressed the problem of arranging instruction for law students to support efficient and effective learning of legal case solving.

The contributions of our research are:

- explicit models of legal case solving
- a precise description of students' difficulties with legal case solving
- a precise description of the causes for these difficulties combined with remedies
- a set of requirements for arranging an instructional environment
- PROSA, the instructional environment that is effective in improving students' legal case solving performance

Working with PROSA is more efficient than solving cases the traditional way for the following reasons. PROSA takes over the managing of information by externalizing materials, intermediate steps and intermediate results in an automatic way.

PROSA facilitates the acquisition of a conceptualization of the legal knowledge by differentiating the knowledge on the basis of its function in legal case solving. Working with PROSA is also better than solving legal cases the traditional way, because the student actively engages in legal case solving. The student actually "goes through the problem" and learns to differentiate the knowledge and to construct a complete and correct legal solution. Students who worked with PROSA showed a strong improvement in their legal case solving performance, where students who did not work with PROSA did not. The subsequent development that is planned sees to the addition of cases, the extension of the legal sources and the support and the incorporation of other domains in PROSA (see for the project proposal for a PROSA application in penal law Muntjewerff, Sutorius & Bosch, 2001).

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Applications (computer program)

An instructional Environment for Learning to Solve Legal Cases PROSA (PROblem Situations in Administrative Law/PRObleem Situaties Algemeen bestuursrecht). Application implemented in MacroMedia Authorware 4.0

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[1] In Dutch: Encyclopedie