Computer-Mediated Collaborative Learning of Legal Argumentation

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Abstract

In this paper we review the role that collaborative learning can play in law. In particular we see it as a constructive way of acquiring information not only about the domain, but also the processes that operate in the domain, and how to play the roles that arise in the domain. We have previously described a stand-alone dialogue tool to support such learning. In this paper we describe how the tool can be embedded in a more general environment which will support a variety of aspects of collaborative learning.

1 Introduction

In all fields of learning, the advantages of collaborative group working are widely recognised. The educational benefits of collaborative learning are of two kinds. Firstly, group working provides a framework within which students can learn from and help each other, and can share knowledge and resources to this end. This model is closely linked with the notion of *constructivism*: the idea of the student as an active learner who constructs a personal base of knowledge and understanding, in this case in collaboration with others. Secondly, working in a team gives students practical experience in the mode of working which, in many cases, will be the norm in their future careers.

The latter is especially the case for students of law. Almost all work in the legal domain essentially involves multiple interpersonal interactions between legal practitioners, clients, judiciary and lay parties to prepare cases, resolve disputes and determine outcomes. Some of these interactions are collaborative, others adversarial, and many role-driven. Much of this revolves around the preparation and conduct of arguments to support particular positions. These include not only rigorous legal arguments, as are required in a courtroom context, but also the less formal, persuasive arguments used in the development of briefs and in advocacy to clients.

It is clear that argument is central to the practice of law, and training in the skills of argument and advocacy were amongst the recommendations of the Lord Chancellor's Advisory Committee on Legal Education and Training (ACLEC 1996). It is unsurprising, therefore, that there have been a number of attempts to create computer-based systems to

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assist students in the construction of legal arguments: examples include STATUTOR (Routen 1991), the Delict Game (Blackie & Maharg 1998) and CATO (Aleven 1997). This work – together with work on argumentation in general such as Prakken & Sartor (1998) – has been immensely important in advancing our understanding of the structure and representation of argument, especially of the kind of precise argument that is the legal ideal. In practice, however, argument in the legal domain, almost as much as in other contexts, involves less well-defined concepts of persuasion and cooperation as well as precise logical skills. Collaborative learning (Johnson & Johnson 1991) involves the development of collaborative skills that include communication, building and maintaining trust, leadership, and managing conflict. Law students, perhaps more than most, need these skills to deploy alongside their expertise in formal argumentation.

In earlier work (Bench-Capon et al. 1998) we have explored the use of dialogue games to provide a basis for the computer-assisted teaching of legal argumentation. In this paper we broaden this to develop a framework to support the development of these skills in a learning environment which is collaborative, in that it facilitates cooperation within groups of students, and which also allows students to adopt quasi-legal roles in an adversarial context. The approach seeks to integrate three ideas: of cooperative working within a 'learning community'; of constructivist education; and of the use of dialogue, and dialogue games in particular, to provide a structure both for the development of skills of argumentation and for the construction of knowledge by the student.

In section 2 we discuss the educational background for these ideas, and in section 3 review the use of dialogue games in this context. In section 4 we describe a preliminary implementation of a system to support collaborative development of arguments via the World Wide Web. In section 5 we use this to develop a model architecture for the environment we envisage, and in section 6 review our conclusions.

2 Computer-mediated collaborative learning

Collaborative enquiry offers a different model of teaching from that provided by traditional lecture and classroom-based methods: for a discussion of this in a general educational context see Lucas (1988). The potential role of computers in supporting collaborative learning has long been recognised, and has been given fresh impetus by the emergence of the Internet and the World Wide Web, encouraging the concept of computer-mediated learning communities which support cooperative learning and encourage learning and social skills (Hiltz & Wellman 1997). Gordin et al (1996) identify a number of aspects of interaction within a learning community: these include access to literature and source data, dialogue between participants, collaborative project work, and making the results of students' work available for use by others.

There have been many instances of Computer Supported Collaborative Learning (CSCL) systems which provide support for groups of students working on joint projects, communicating interactively, and sharing information through a common database: see, for example, CSILE (Scardamalia et al. 1989), CoVis (O'Neill & Gomez 1994), ICSL (McManus & Aiken 1996) and CLS (Koua & De Diana 1998). While the architectures of these systems vary, most incorporate the notion of a common database to

which students add contributions to the task under consideration and comment on the contributions of others. The underlying educational concept is that of constructivism (Wilson, 1996). In this view of learning, learners construct their own unique understanding of a subject, through a process which includes social interaction so that the learner can explain understandings, receive feedback, clarify meanings and reach a group consensus (Stacey, 1998).

In the simplest case, these interactions are unmoderated, with the system providing support for communication within the group, access to common information sources, and storage of results. Many researchers, however, have reported problems with undirected discussions, including unwillingness of some students to participate actively (Jackson 1994); (Klemm & Snell 1996) and failure of discussions to develop productively (Lai 1997). This leads to arguments for a more structured facilitation of the discussion, requiring participants to place their contributions within a clear context. In the Dyn3W system, for example (Hietala 1998), students are required to categorise their contributions by type: e.g. giving new information, asking a question, supporting or disagreeing with a previous comment, etc., and also to indicate the source of the comment: e.g. personal opinion, view drawn from discussion, or derived from written authority. The Belvedere system (Suthers & Jones 1997) is of particular interest in that its domain, the teaching of scientific enquiry, has similarities to that of legal argumentation. Belvedere uses the idea of an 'enquiry diagram' to provide a graphical structure which links a problem statement to other evidential statements of various kinds, and a collaborative enquiry database to record the progress of the enquiry. Provision is also made for tutor input to stimulate lines of enquiry, etc.

In applying these ideas to the teaching of Law, an additional dimension is added. This is because the practice of law is itself largely centred on the use of discussion and argument, often with the participants taking well-defined roles, so the process of debate and the playing of roles involved in constructivist learning is itself part of the learning process in addition to the specific goals of the discussion. A number of computer systems have been developed specifically to assist in the teaching of legal argumentation, typically by requiring the student to adopt a role in a legal dialogue 'game'. We discuss previous work in this respect in the following section.

3 Computer-based teaching of legal argumentation

Two issues are central to a discussion of systems for teaching legal argumentation. The first is the argument structure implied by the system: for example, CATO (Aleven 1997), probably the best-developed system of this kind so far, assumes a quite strict 'three-ply' argument model of citation, response and rebuttal. The second, related, issue is the process by which the argument is advanced. Many systems have cast this in the form of a dialogue 'game'. The two aspects are well illustrated by two systems described by Lodder & Verheij (1999). The 'Argue!' system- and its successor 'Argumed' systems (Verheij 1999) – uses a procedural model of argumentation, represented graphically as a sequence of linked arguments and counterarguments. Here the emphasis of the system is on the structure of the argument and, especially, its representation and visualisation. Conversely, in the other system described, DiaLaw, the

emphasis is on the development of the argument as a two-person dialogue game, in which four 'moves' are possible: to make a claim, question a proposition, accept a proposition, or withdraw a claim.

In previous work (Bench-Capon et al. 1998), (Bench-Capon 1998) we have discussed the use of a dialogue game, TDG, within a generic framework for the conduct of a two-person argument. TDG uses a more complex argument structure than those of the examples above, derived from the schema described by Toulmin (1958). This structure decomposes an argument into a set of constituent parts: claims; data to support a claim; warrants, to provide rules of inference for the use of the data; backing, to provide authority for a warrant; presuppositions, to define the scope of application of a warrant; and rebuttals, which may negate a warrant in defined circumstances. This structure is illustrated in figure 1.

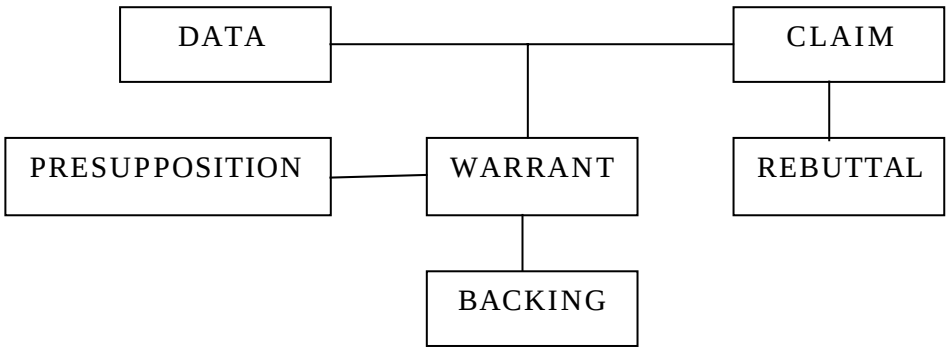

Figure 1: Toulmin's Argument Schema

In TDG, an argument between two participants in the game proceeds as a series of moves in which participants propose, question, challenge or support elements of this structure in respect of an initial claim. The structure is extensible into a linked chain of arguments; for example, if the data advanced to support a claim is challenged, it becomes the claim of a subsidiary argument which must be resolved before the initial debate can be concluded.

TDG, and other dialogue games advanced for use in legal argumentation, provide a framework in which a carefully-argued and rigorous argument can be developed and validated. Games of this kind are useful to support the teaching of skills of argumentation in that they require participants to be precise in the assertions they make, to examine their assumptions, to provide evidence and to be ready to respond to challenges and rebuttals. In this respect, the rules of the game are the key features in imposing a rigorous form for the development of the argument. The structure imposed also allows for role-based participation in the dialogue; so that one participant may present a claim and support it, another challenge assertions and propose rebuttals, a third provide authoritative backing, and another take the role of a judge in assessing the conclusion. For another example of a role-based learning game within a less rigid argument framework, see the 'Delict game' of Blackie & Maharg (1998).

The aims of a system for teaching legal argumentation, however, go beyond training in practical skills of argument; we also wish to provide a framework that will support collaborative learning, give access to information sources, and enable the construction of a personal knowledge

base by learners. The formal dialogue structure imposed by a dialogue game, we believe, is useful not only as a model for training in argument skills but also as an organisation for the knowledge required in the argument and hence as a basis for constructivist learning. In this respect, we contend that the relatively rich structure provided by the Toulmin-derived schema is pedagogically helpful in that it supports not only a precise argument form but also enables information relating to the argument to be more precisely categorised. We may see a TDG-mediated dialogue as a process which results in the transfer of knowledge from a variety of sources into a structure which reflects the role which that knowledge has in the students' understanding of the argument and the legal issues involved: statutes will appear as warrants, relevant case law appended as backing, counter-instances as rebuttals, etc.

Our goal, therefore, is a teaching system that will support three aspects of legal education:

1. The teaching of skills of argument within the structure defined by the TDG schema.
2. Support for collaboration, through role-play and otherwise, between groups of students in the construction of arguments, including access to information sources and facilitation of group discussion.
3. Constructivist learning, in which the TDG schema is used to provide a structure for each student's knowledge base on an aspect of law.

4 Preliminary implementation

Experience has shown that tools become more effective if they are provided as part of an integrated suite of programs that support several aspects of the work that needs to be done. Thus CATO is effective because it is not only designed to teach argument, but also to provide an analytical index to leading cases. Similarly the experience of Softlaw in Australia has shown that knowledge based systems become much more effective when they are incorporated as part of a general case management system.

To provide a more integrated environment we saw the need to investigate tools that would provide the surrounding support to the dialogue tool. In particular we wished that the environment would support the storage and retrieval of arguments, so that they could be stored, browsed and edited independently of the particular role playing dialogue system TDG.

A preliminary implementation of an argument management system has been carried out as a student project at Liverpool University under the supervision of the authors (Lever 1998). The aim of this system was to enable two or more participants to view and contribute to arguments within the Toulmin-derived framework, via a computer program accessed through the Internet. In contrast with our earlier work on TDG, the emphasis in this implementation was on the structure of the argument and the medium for interaction, rather than on the formal rules of the dialogue which produces the arguments, so that we would have the necessary infrastructure for a more complete environment.

Figure 2 illustrates the top-level organisation of the system and the information flow between elements. The 'Welcome' page controls access to the system via user name and password. From this entry point, access is enabled via a menu to three options: to create a new argument, search for an existing argument, or view (and perhaps contribute to) an argument.

Creating a new argument involves, essentially, only the assertion of a claim. Like all contributions in this system, a claim is simply a textual submission, which is tagged with the user name of the contributor and the date and time of the contribution. Additionally, in the case of a new claim, the contributor is invited to enter a keyword which will be used to help identify the argument for future reference. The unique argument identifier, however, is created by the system which establishes a new database record for the argument. The form of this record follows precisely the Toulmin-based structure illustrated in figure 1, in which each component corresponds to an entity with attributes representing the textual contribution, name of contributor, and date and time of the contribution.

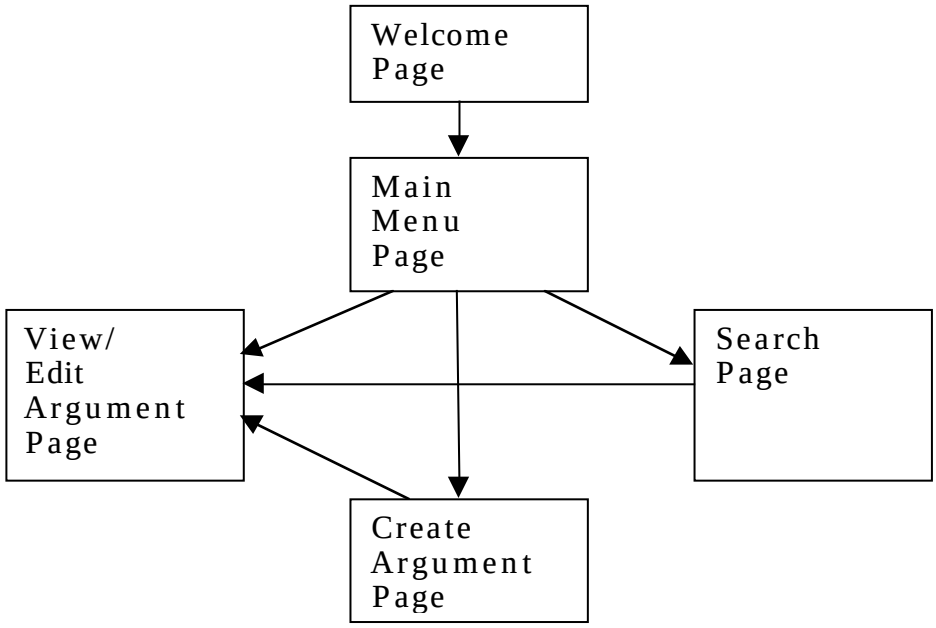

Figure 2: WWW implementation of storage, browse, view and edit.

Arguments so created are stored in date order within the database, and the 'View argument' page allows these to be browsed in sequence. Alternatively, it is possible to use the argument keyword to proceed directly to the argument or arguments relating to the subject of the keyword. The view presented of a argument displays the elements of the argument structure corresponding to the TDG schema. A menu on the View argument page now allows the user to add to the argument currently displayed, by making a contribution under any of the Toulmin categories.

In this implementation, there are four possible actions by a participant:

1. Make a claim, i.e. create a new argument.
2. Add a contribution to an existing argument, within the TDG framework.
3. Extend an existing argument by challenging its data.
4. Link two arguments by using the claim of one to provide data for the other.

The two latter options both involve the linking of arguments, and are also provided via the 'View argument' page. In the first case, the participant selects the data component of an existing argument to become the claim of a new argument (which will be linked in this way to the original). In

effect, this move may be interpreted as a challenge to the data supplied for the first argument, since this now becomes an (initially unsupported) claim to be debated. The second case is the converse of this, in which a (possibly substantiated) claim of an existing argument is used as data to support a second argument. In both cases the View argument page allows navigation along the links provided, which may of course be extended indefinitely.

This initial implementation has been useful in clarifying the requirements of an argument management system to be used in a teaching context. In future development, we propose to extend the system to enable multiple contributions to be made within each argument category; to link assertions explicitly to source information; to allow chained elaboration of backing and rebuttal elements, as well as data; and also perhaps to allow assertions to be withdrawn if they have been rebutted. Details of this kind, however, most of which are open to debate, are less important than the overall framework of the system. In this respect, the dialogue management system is only one element of the teaching environment we propose.

5 Organisation of a collaborative teaching framework

In developing an integrated teaching environment, we wish to use the structure imposed by the TDG model within a broader framework which will also provide support for collaborative working and for access to information sources relevant to the learning process. An outline of the organisation we propose is illustrated as figure 3.

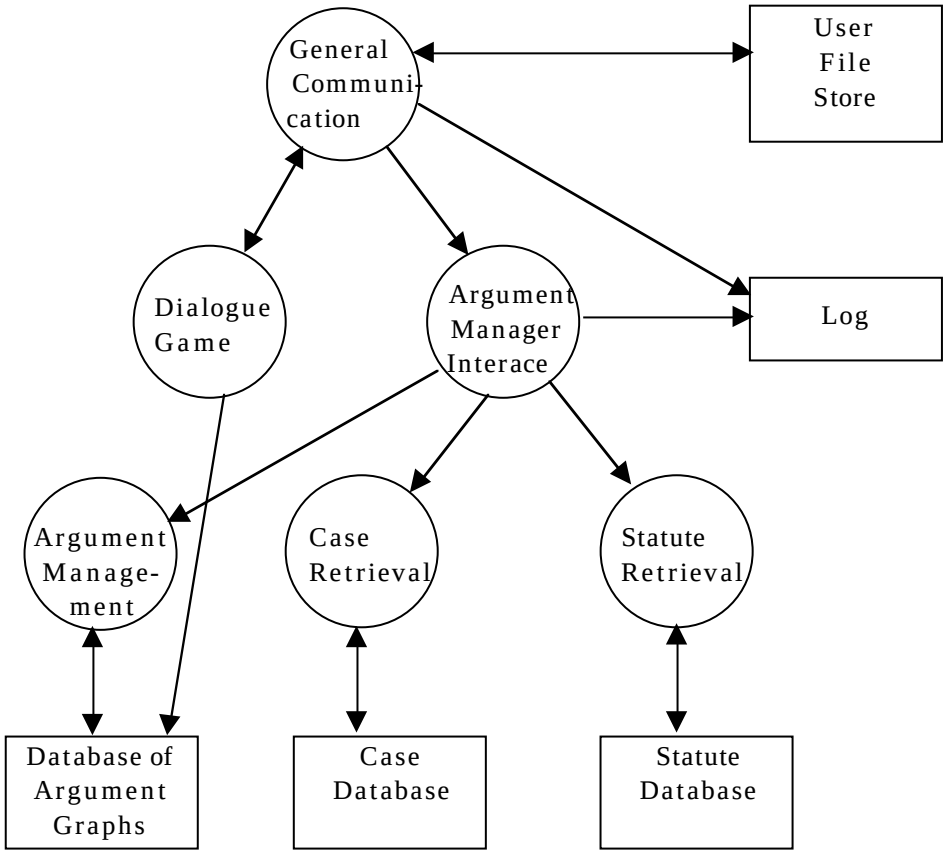

Figure 3: Integrated System Architecture

At the heart of this is the argument management system, essentially based on the prototype presented in the preceding section. This system will create and maintain a database of argument graphs, each of which comprises a linked set of TDG argument structures. Each such graph represents not only the summary of a process of argument, but also a record of the information used in constructing the argument.

As we have earlier discussed, this structured information record is a central feature of the constructivist approach we are proposing. In order to direct this further, however, so as to maximise the benefits that flow from supporting more aspects of the task, and to avoid some of the problems that have been reported by others experimenting with computer-mediated discussion systems, we anticipate a need also for other, less structured, interactions within the learning group which are moderated and facilitated by teaching supervision. For this purpose, a group communication module is included to enable broadcast communications within the group. This will be used principally for two purposes:

1. To allow a group tutor to initiate a group task, i.e. proposing the subject of a dialogue, and possibly assigning roles for participants in the argument. These could be either quasi-legal roles, e.g. prosecution and defence, or could be explicitly related to the TDG structure: e.g., responsibility for finding data to support a claim, researching possible rebuttal cases, etc.
2. To enable informal communications within the group, e.g. suggesting possible lines of argument, pointing to information sources.

All these communications will be logged for reference purposes. As the explicit contributions to the dialogue are also logged and tagged with the contributors' names, all the details of participation in the development of the argument are recorded, and can be used, if required, as a basis for assessment.

The final elements of the system provide for access to sources of information. We propose two that seem to be especially relevant:

1. Access to a library of cases relevant to the subjects under consideration. Ideally, the cases in this library will be stored as TDG argument-graphs which can be retrieved and appended to an argument under construction, as either 'backing' or 'rebuttal' elements. For a representation in a similar style see Dick (1992).
2. Access to a library of statutes. Usually, data from this source will be imported to provide warrants for assertions made in the arguments.

Other types of information source are also possible. The key aim of the system is to facilitate the extraction of relevant date from credible sources, and the organisation of this data into a structured argument which will also become a final information resource for the participants.

6 Conclusions

In this paper we have described an environment which will support the collaborative learning of law. In addition to the dialogue tool which we have described before, and which is intended to support learning of the process of argument and role playing, we have added facilities which

allow also for the storage, retrieval and editing of arguments independently of the dialogues which produced them. This in turn can be incorporated in a general environment to support task setting feedback, and other communication which will arise in a collaborative learning situation. It is our belief that this integrated environment is highly desirable if the tools are to become widely used as part of general teaching practice.

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