Progress on Room 5

A Testbed for
Public Interactive Semi-Formal Legal Argumentation

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Room 5

We are currently building a website which provides a mechanism for studying a broad community's willingness to perform structured legal argumentation.[i]

Visitors to the website are permitted to make moves in an argument game.[ii] Their moves are entered in a format that structures the disputation. The disputes are taken from recently decided U.S. Supreme Court cases.[iii] Visitors can argue either pro-petitioner or pro-respondent. They can change the current opinion in a Room 5[iv] case by giving an argument that meets the burdens of the side they are assisting. The tokens of the game are generated largely by the visitors to the site.

Room 5 supports datamining and computer-mediated communication. It is based loosely on a minimal theory of argument and defeat. The project's ambitions are however, non-technical. They are:

1. *To identify a community of web-users willing to play semi-formal legal argument games;*

2. *To gauge the willingness of such users to be subject to the constraints of various formats, gauge their general understanding of constructions permitted, and determine the practical limits of a few formats' expressiveness;*

3. *To permit a community of non-naive contributors to construct an ontology for U.S. federal law and a database of semi-structured arguments.* The ambition here is

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[ii.] Argument games are well-recognized as useful theories. Prominent examples for this community are *Wff'n'Proof* of Allen, Bench-Capon's explanation-inducing dialogue games, *An Argument Game* from one of the authors (http://cs.wustl.edu/~kang/game.html), Gordon's *Pleadings Game*, and Lodder and Herczog's *DiaLaw*. Models that are not explicitly games but essentially are games include Nitta et al's *HELIC-II*, and Aleven and Ashley's *CATO*.

[iii.] Pending Supreme Court cases are the real targets for Room 5 disputes precisely because of the interest that members of a broad community might have in arguing them. However, the existing work at this time has been only with past cases.

[iv.] "Room 5, Washington, D.C." is the mailing address of the U.S. Supreme Court.

not of course for Room 5 to yield a large, coherent, or comprehensive ontology; rather, the aim is to learn what kinds of ontological approaches are attempted in such a setting, how those choices relate to the established texts, how the different users' inputs can be kept uniform, and how those choices inform the datamining and collaborative-work support provided.

We are currently in no position to make any substantive claims or observations pursuant to these communal ambitions because Room 5 has not been officially opened to the public.[v] Still, the design of the website represents over three years of effort on issues of argument formatting and some recent insights about legal information retrieval. The technical support of Room 5, therefore, now deserves comment.

Basic Components and Tour of Site

1. Docket.

Upon entering Room 5, the visitor meets the following menu:
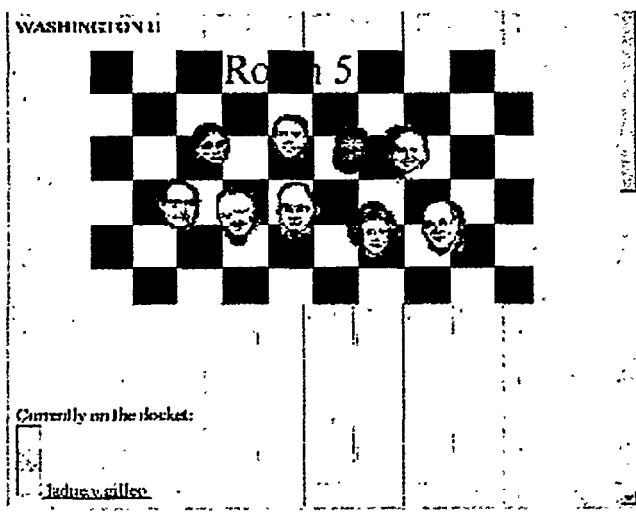
[v] Ari Luotonen's WIT (Web interactive talk) is an example of discouraging results from communal semi-formal argumentation (see Woolley). The crucial differences between Room 5 and WIT are that WIT invited any visitor to contribute (Room 5 invites only those who can cite authorities properly to contribute), and WIT invited discussion of non-specialist claims, such as whether Argentina should permit Maradona to play on their national team (Room 5 issues can be arcane). WIT was attempting to formalize usenet news discussions. Room 5 seeks to play with the formalization of appellate arguments. An example of internet-based specialist-oriented collaborative success is the Linux operating system.

which lists the cases that are "currently on the docket", the disputes of which can be joined. Our main working example has been *City of Ladue v. Gilleo,* 514 U.S., 1994, which is a recent freedom of speech case with local interest.[vi] Ideally, there will be several dozen cases listed at any one time, with supplementary access to cases that are no longer considered worth arguing. Clicking on *Ladue v. Gilleo* takes the visitor to a diagram of the dispute.[vii]

2. Encapsulated Subargument Frames

The state of the dispute is displayed in a form which evolved as a competitor to the many varieties of Toulmin Diagrams[viii] that have populated the Hypertext and CSCW literature.[ix] To understand the tabular display of arguments, consider first the simplest possible disputes.

The claims that support a claim[x] are encapsulated. Below is a single claim supporting a claim:
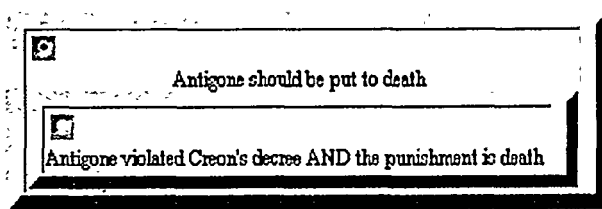

Of course, each of the supporting claims could have been given separately; supporting claims are implicitly conjoined in their support of a claim:
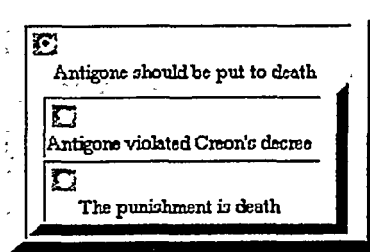

An argument and its counterargument are displayed side-by-side. Although there is often a parity between mutually attacking arguments, our format assumes *tempo* which distinguishes the side that made the first of the mutually antagonistic arguments.[xi] In color, the text is alternately green or red depending on which side makes the argument. Color is an important part of the visual intuitiveness of this layout. The reader is encouraged to visit the website or to color the text of some of these disputes manually.

[vi] The city of Ladue neighbors Washington University.
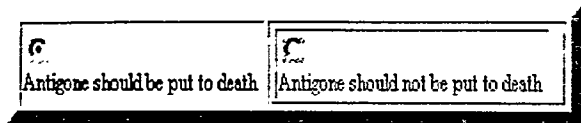
When there is a counterargument of a subargument, the counterargument shares the encapsulation of the subargument:

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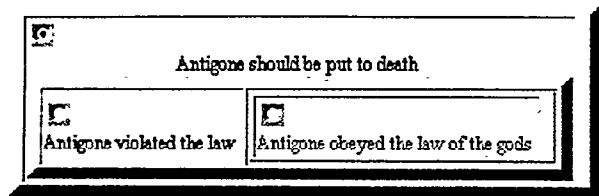
vii. An important comparison can be made to Arthur Miller's Courtroom Challenge, where a Harvard Law School professor has outlined a few important Supreme Court decisions and invites the visitor to play a game of argument-making. Miller's arguments are unstructured and are restricted to the text that he provides. The outline is static. The decisions are fixed by Professor Miller, as are the merits of the arguments, the situations in which they are helpful, and the relations among them.

PROFESSOR ARTHUR MILLER'S
COURTROOM CHALLENGE
Brought to you by the COURT TV Law Center

Welcome to the Courtroom Challenge.

I'll present you with real landmark cases decide(Court and other courts around the country. Yo facts, research the law, consider various argun either decide the case or argue one side or the how the real case came out — but not until afte up your mind about what should have happene

If you argue one side of the case, you'll get poi facts, cases and arguments that best support yi or not your client ultimately wins. Enjoy the ad hope you will learn something interesting abou way.

Professor Arthur Miller

And if the attacking argument has subarguments, those inherit the encapsulation as well. If that argument is rebutted, the rebuttal is aligned further to the right:
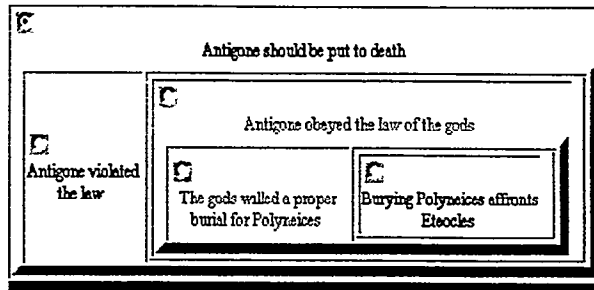

The chief distinguishing characteristic of this visual language, compared to Toulmin's, is that arrows are not used. This avoids the "pointer spaghetti" that can be the result with box-and-arrow languages. Such "spaghetti" can be especially confusing when arrows have both attack and support semantics.

Moreover, attack and support use space differently: support uses the vertical dimension and attack uses the horizontal dimension. This is a natural synthesis of the ideas that

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viii. Toulmin form combines the following building blocks: claim, datum, warrant, backing, and possible rebuttal, using boxes and arrows, e.g.
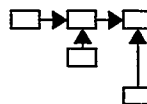
Toulmin does not prescribe a canonical use of space. For the sake of comparison, the 5-claim dispute appearing on the next page would be rendered (with backing boxes omitted, colors used, and a liberal use of rebuttal arrows):
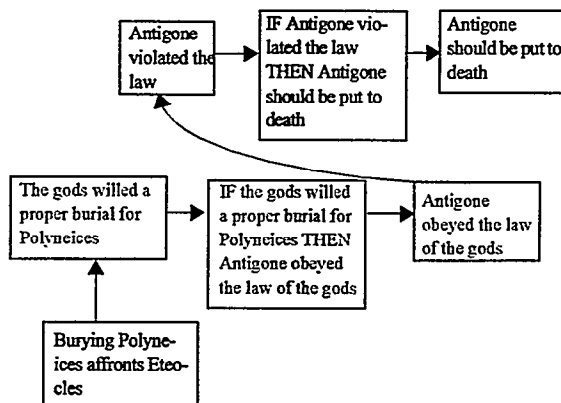
(1) *subarguments can be represented by outlines,*

and

(2) *dialectical subdialogues can be represented by progressions.*

As these two ideas are intertwined and applied recursively, the structure admittedly becomes difficult to comprehend in a single glance. But the organization remains intuitive.

Room 5 actually separates three parts of each claim:

(1) the *Authority*;

(2) the *Paraphrase* of a rule, or *Phrasing* of a claim;

and
(3) the *Formal Statement* of the logic used in making the claim.

EXAMPLE.

An example of authority, (para)phrase, and formal statement are:

Authority: Metromedia, Inc. v. San Diego, 453 U.S. 490 (1981).

Paraphrase: A city's interest in traffic safety and its aesthetic interest in preventing visual clutter could justify a prohibition of off-site commercial billboards.

Formal statement: safety interest AND aesthetic interest THUS prohibition could be justified.

Any claim that states a rule, "if *p* then *q*", implicitly claims both *p* and *q* in addition to the rule.[xii] Relative to

Toulmin form, this eliminates redundant symbolization.

The state of the dispute can be viewed in a variety of ways, depending on which parts of a claim should be visible. The interface also permits temporary hiding of arguments and their subtrees. The default view shows the paraphrase and the authority.

EXAMPLE.

For *Ladue v. Gilleo*, just a few of the argument moves are shown.

The citations can be viewed separately:

ix. Examples of Toulmin-inspired display of arguments include Marshall's AQUANET, McCall's EUCLID, Lee's SIBYL, Cavalli-Sforza's BELVEDERE, and DART, from Freeman and Farley. Our format arises from unpublished work on ARGCOL by Thieu Dang, Jeremy Frens, Jenny Smith, and Mark Foltz.

x. That is, the subarguments that support an argument. Henceforth, there will be an unavoidable ambiguity between "claim" and "argument" when referring to a frame in this visual language. This is because each frame contains its claim and the argument (and its subclaims and subarguments) supporting the claim. That is the effect of recursive encapsulation. The frame also contains the relevant rebuttals and their subarguments and so forth.

xi. Thus, the attacking argument is enclosed once more in a frame, because it might have peer arguments, which also make independent attacks on the same claim.

xii. And, moreover, that the claim has the authority that is given, that the logical form is properly symbolized, that the rule applies, and *that the move suffices in the context in which it occurs.*

1) 100%   Ward v. Rock Against Racism, 491 U.S. 781 (1989)

   • (requirement that speech regulation be narrowly tailored to survive intermediate scrutiny and pass muster under the First Amendment intermediate scrutiny does not require the government to adopt "the least restrictive or least intrusive means" of achieving its goals).

   • I would hold that the district court was correct to apply the time, place and manner test set forth by the Supreme Court in Ward v. Rock Against Racism.

   • In Ward v. Rock Against Racism, 491 U.S. 781, 799-800, 109 S.Ct. 2746, 2758, 105 L.Ed.2d 661 (1989), the Court stated that the requirement of narrow tailoring is satisfied if " "the ... regulation promotes a substantial government interest that would be achieved less effectively absent the regulation.' "

   • It is under this standard that the government may "impose reasonable restrictions on the time, place, or manner of protected speech" (so- called "time, place and manner restrictions"), provided that the restrictions are content-neutral.

   • Nevertheless, the law must not "burden substantially more speech than is necessary to further the government's legitimate interests."

   • The court initially held that the placement of tables on city sidewalks is subject to First Amendment scrutiny and is therefore subject to the time, place and manner test set out in Ward v. Rock Against Racism, 491 U.S. 781, 791, 109 S.Ct. 2746, 2753-54, 105 L.Ed.2d 661 (1989).

   • This has been interpreted as a requirement for "narrow tailoring."

   • To pass this test a law must be nar-rowly tailored to serve substantial governmental interests.

   • To the contrary, the Court has held that the First Amendment is implicated in regulations banning newsracks containing commercial publications, see City of Cincinnati v. Discovery Network, Inc., 507 U.S. 410, 113 S.Ct. 1505, 123 L.Ed.2d 99 (1993), governing the amplification of music, see Ward v. Rock Against Racism, 491 U.S. 781, 109 S.Ct. 2746, 105 L.Ed.2d 661 (1989), restricting the use of sound trucks, see Kovacs v. Cooper, 336 U.S. 77, 69 S.Ct. 448, 93 L.Ed. 513 (1949), and prohibiting the use of loudspeakers, see Saia v. New York, 334 U.S. 558, 68 S.Ct. 1148, 92 L.Ed. 1574 (1948).

Likewise, the undercutter,

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r THUS NOT(rule1)
rule1: p THUS q
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must be given as

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r THOUGH p THUS NOT(q)
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where the argument is used only to attack an argument for *q* rather than to establish *NOT(q)*. In practice, attaching a cited case to the right place in the dispute, and phrasing its holding in some terse conditional form is difficult enough without worrying about the subtle distinctions that mature formal argumentation theory permits.[xvi]

[xvi.] For example, the mathematical theories of Simari and Loui, Prakken and Sartor, Loui, or even the theory implemented in the LMNOP system of Loui, Norman, et al.

4. Online
Results of Mining Cases

At the moment, there are only minimal constraints on the text that can be contributed. The authority could be "foo" instead of the "*Metromedia, Inc. v. San Diego, 453 U.S. 490 (1981)*". Likewise, the paraphrase of the claim could be "foo" instead of "A city's interest in traffic safety and its aesthetic interest in preventing visual clutter could justify a prohibition of off-site commercial billboards." For the formal argument, instead of "safety interest AND aesthetic interest THUS could justify prohibition" we might see "foo THUS bar".

The obvious abuses will be prevented by moderating the site and by the natural critical activity of a vigilant adversary.

Instead of requiring that text conform to some standard, Room 5 takes a different approach: it tries *to maximize the opportunity for the visitor to use the actual language of federal opinions*.

Whenever input is being formulated, a search can be conducted. The search can match any regular expression

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		traffic safety AND aesthetic interest THOUGH restricts free flow of truthful information (THOUGH achieves goal) THUS valid ordinance	eliminate medium AND not strong showing AND content-neutral THOUGH traffic safety AND aesthetic interest (THOUGH restricts free flow of truthful information (THOUGH achieves goal)) THUS could be invalid ordinance
regulates physical characteristics of signs THUS valid ordinance	restricts free flow of truthful information THOUGH achieves goal THUS invalid ordinance	avoids visual clutter THOUGH restricts free flow of truthful information (THOUGH achieves goal) THUS valid ordinance	extends to private property THOUGH avoids visual clutter (THOUGH restricts free flow of truthful information (THOUGH achieves goal)) THUS could be invalid ordinance

Encapsulation is currently implemented by GAWK scripts that generate HTML tables within tables.

3. Forms Interface
instead of Automated Reasoning

When an argument is added to the existing arguments, it must either support, attack, or restate some existing argument.[xiii] These moves are controlled by a form which asks for the kind of move, then requires an authority, (para)phrase, and formal statement of the new claim.

When an argument is attacked, it is either attacked by giving an exception or by making a new point.

If a rule p THUS q is attacked by exception, only the exceptional consideration need be noted, r, and the program generates the more specific logical form automatically, r THOUGH p, THUS NOT(q). Note that r THOUGH p is essentially r AND p, where an additional conflicting relation between r and p is being stated implicitly. The use of carefully chosen bits of natural lan-

guage is intended to impose the formal model without the user's reflection.

The *giving of an exception is currently the only way to defeat an argument* (as opposed merely to interfering). Hence, the determination of the current opinion in the dispute is simple and does not require automated reasoning. If the side that is pro-petitioner can rebut all counter-arguments with exceptions, then opinion favors the petitioner.[xiv] If not, then opinion favors the respondent. There is no search. Opinion simply switches when the input meets the required condition.

Other forms of defeat, such as the preference of one rule over another[xv] must be made to conform to this limited form of defeat. A preference

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rule1 > rule2
rule1: p THUS q
rule2: r THUS NOT(q)
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must be given as the exception:

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p THOUGH r THUS q.
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[xiii.] The ability to restate the other side's argument is important as a prelude to some attacks. Currently, only refinement of an argument is implemented, where an intermediate claim, q, is inserted between claims p and r, so that p THUS r becomes p THUS q THUS r. Other forms of restatement are intended for future implementation.

[xiv.] The exact requirement is that all pro-petitioner moves be defeating. Respondent's rebuttals to petitioner's arguments for the main claim may interfere (attack without defeat, and without being defeated), and all surrebuttals and ripostes must be defeating.
[xv.] Which is the subject, for example, of the formalisms of Schild and Herzog, Prakken and Sartor, Hage and Verheij, Nitta et al., and Yoshino.

with phrases and case names datamined from federal courts' decisions.

Three years' of decisions are currently available at Villanova and Emory law schools. Although the Villanova site lists about 600 cases and the Emory site lists 4000 cases, our datamining provides summaries for over 40,000 federal decisions as explained below. For each decision, typically half a dozen significant phrases are stored, over three-quarters of which are fairly good statements of some holding of the case.

For example, to extend the Ladue dispute as above, the *Ward v. Rock Against Racism* decision was searched under the keyword "Rock", returning the data atop the previous page. The phrase "The government may impose reasonable restrictions on time, place, or manner of protected speech provided that the restrictions are content-neutral" was cut and pasted from the results-of-search window (which is spawned as a separate browser in a separate window).

Mining is effective because we do not attempt to interpret the language of the case for its findings. Instead, *a case is mined for what it has to say about other cases*. A corpus of *judicial opinion is self-summarizing*: judges quote from the cases they cite, or paraphrase the doctrines that they believe are justified by the case. It is their de facto style. In about half of the cases, the full sentence immediately preceding the citation is an appropriate statement of the doctrine (with some anaphora repair, perhaps). Half of those sentences are direct quotes from the text of the opinion being cited.

For example, the "reasonable restrictions on time, place, or manner" extraction from *Ward v. Rock Against Racism* appears in the paragraph of the judicial opinion, *Chesapeake and Potomac Tel. Co. v. United States*, F. 4th (Emory), 1995, exactly as follows (the extracted text underlined and the Emory site's HTML markers retained):

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A court, in evaluating whether a
regulation of speech runs afoul
of<p> the First Amendment, must sub-
ject the regulation to a degree of
scru- <p> tiny determined by the
particular circumstances presented.
Generally,<p> a regulation that
imposes a differential burden on
certain speech<p> because of the
"content" of that speech alleged to
infringe upon pro- <p> tected speech
is unconstitutional unless it can
survive strict scrutiny.<p>
<u>Turner Broadcasting Sys., Inc.</
u>, 114 S. Ct. at 2459. By contrast,
"regu- <p> lations that are unre-
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lated to the content of speech are
subject to an<p> intermediate level
of scrutiny." <u>Id.</u> It is under
this standard that the<p> government
may "impose reasonable restrictions
on the time, place,<p> or manner of
protected speech" (so- called "time,
place and manner<p> restrictions"),
provided that the restrictions are
content- neutral. <u>Ward</u><p>
<u>v. Rock Against Racism</u>, 491
U.S. 781, 789- 90 (1989). Last, in
rare<p> cases, the Supreme Court has
held that the First Amendment requi-
res<p> that certain regulations of
speech pass only minimal scrutiny.
<u>See Red</u><p> <u>Lion Broadcast-
ing Co. v. FCC</u>, 395 U.S. 367,
397-400 (1969).
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Not all citations need be mined. *If a precedent is important, it appears, cited in the opinions of many cases.* Thus, our extraction can be conservative with its handling of natural language. Even if 5-10% of a citations' occurrences lead to an extracted phrase, and even though the online repositories of cases are limited to a few years, a useful database of cases can be built.

Mining is currently accomplished with a few hundred lines of GAWK and PERL scripts which mainly seek citations, sentence boundaries, and prevalent wording, such as "In <CITE> we held that ... ."

Further Developments

The website is constantly under development. Some future directions have been identified:

1. *Additional disputational functionality.* Two additional functions to be provided to the visitor are (a) forms and keyword support for different kinds of attacks, such as distinguishing a case; and (b) a mechanism for seeking intervention when there is disagreement over the logical form of an argument and its legitimacy.

2. *Better datamining.* Information mining has just begun and will be improved by interactive training of extraction patterns. Keywords that contain additional information, such as "But see" have not been fully exploited. In fact, support and attack relations might even be extracted from the opinions.

3. *Access restrictions.* Once Room 5 is officially public, both the problem of attracting the right kinds of visitors and the problem of denying access to disruptive visitors arise. Room 5 will probably have two rooms, an antechamber where anyone can make temporary moves, and an inner chamber where registered participants can make permanent moves.

4. Ontology restrictions. Given the success of the data-mining: (a) an authority must be given for every move, and (b) any new propositions in the logical form must occur as substrings among the results of searching for the case that is given as the authority.

5. Report on use. Room 5 will first be used to generate skeletal arguments for several pending cases. Then the patterns of use will be carefully monitored. The designers will be particularly interested in the misuse of argument forms, and the creativity of ontology.

Simplicity and Games

This report on Room 5 highlights the argument-formatting and datamining, but it should be emphasized that the goal of Room 5 is to *provide a game*. Argument types and argument moves are kept to the bare minimum. Datamining is successful because for players of this game, any online access to legal texts is helpful.

Other CSCW systems, such as Gordon and Karacapilidis's ZENO, are based on different principles and have different aims, the new technological paradigms of websites and dialogue games, of formatted interactions between semi-cooperative parties, dominate the designs. In the end, though, the systems have more similarities than differences.[xvii]

Although the aim of Room 5 is to provide diversion for its visitors and a testbed for its designers, the datamining and argument-formatting lessons well worth the consideration of the law technology and collaboration communities.

Those lessons are: (1) that arguments can be presented graphically so that space is used to make evident the dialectical structure, and (2) that cogent case-retrieval is possible when the keyword indexing is restricted to past authoritative uses of the case, that is, when indexing excludes obiter dicta.

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[xvii.] ZENO provides support for collaborative economic (if not risk-based and utility-based) decision-making. It supports the weighing of issues, and the dialogue of negotiation. It supports argumentation, but not legal argumentation. It is not intended to be a game, but is supposed to be "smart paper." It uses the web as a medium for communcation within a group of actors defined by their political relevance rather than their legal competence. Still, ZENO's similarities are unmistakable.