

THE AMERICAN ASSOCIATION OF AMERICAN LAW SCHOOLS JURIMETRICS COMMITTEE REPORT ON SCIENTIFIC INVESTIGATION OF LEGAL PROBLEMS

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The 1961 report of the Jurimetrics Committee of the American Association of American Law Schools describes the interests of the committee in investigating

1. the possible usefulness of programmed self-instructional materials in legal education,
2. the use of symbolic logic as an analytic tool for detecting and controlling syntactic ambiguity in written legal documents,
3. the possible use of electronic computers and other methods of automatic data retrieval as aids in doing legal research,
4. the utility of semantics (including general semantics and recent development in linguistics) for improving communication in law,
5. the quantitative analysis of various aspects of the legal decision process, and
6. other implications of developments in science for law.

This note is intended to be a brief explanation of some of those interests.

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S1	1. If a. some of the members of the Jurimetrics Committee of the American Association of Law Schools are interested in programmed learning, then b. investigation of programmed learning will be included within the scope of the committee's activities.
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2. Some of the members of Jurimetrics Committee of the American Association of Law Schools are interested in programmed learning.

Therefore

3. Investigation of R1? learning will be included within the scope of the committee's activities.

S2 As you may have already suspected from the format of the sentences in S1, the material presented in this note will illustrate programmed R2?

S3 Professor B. F. Skinner, Harvard psychologist, has pioneered the development of programmed learning. For this reason the text materials used in this method of learning are sometimes called Skinner learning programs.

Skinner learning programs differ from ordinary textbooks and other customary methods of instruction in at least three important respects.

The first important respect in which Skinner learning programs are different is that they require active participation by the learner to a much greater degree than do ordinary textbooks and other customary methods of instruction.

Active participation by the learner is assured in a Skinner learning program by compelling the learner to respond to the material of the program as he reads through it; whereas in ordinary textbooks there is usually no guarantee of any such active R3? by the learner.

R1 programmed

R2 learning

- | | | |
|----|--|---------------------|
| S4 | For example, some part of a given statement might be omitted and the learner called upon to fill in the blank with an appropriate response in a Skinner learning <u> R4 </u> . | R3 participation |
| S5 | The second important respect in which Skinner learning programs differ from ordinary textbooks and other customary methods of instruction is that the learner's responses to the learning program are immediately evaluated. Correct responses are reinforced, but incorrect responses are not <u> R5? </u> . | R4 program |
| S6 | Reinforcement of responses is provided by furnishing the learner with a suggested response to be compared with the response that he has made.

The response that the learner makes on his answer sheet as the appropriate response for a blank in a given statement is called, as you might expect, the learner's <u> R6? </u> . | R5 reinforced |
| S7 | The suggested response, on the other hand, is the response that the programmer regards as appropriate for a blank in a given statement.

The programmer, as you would probably guess, is the person who writes the Skinner <u> R7? </u> . | R6 response |
| S8 | The learner's response is reinforced if it corresponds to the programmer's <u> R8? </u> response, because the learner is given confirmation that to some extent he "understands" the message that the programmer is trying to communicate. | R7 learning program |
| S9 | The learner's response is not reinforced if it differs from the programmer's suggested re- | R8 suggested |

spouse; insofar as the learner cannot successfully predict what the programmer will suggest as the appropriate response, the learner will realize that for some reason he has failed to understand fully the message that the R9? is trying to communicate.

- S10 Failure of the learner to predict the suggested response may result from either
- 1) the programmer's failure to communicate his message clearly and in sufficient detail, or
 - 2) the learner's failure to give sufficient attention to the information, cues, and hints that the programmer has provided to help the learner predict the suggested R10?.
- S11 Skinner learning programs also help to minimize breakdowns in communication that result from the learner's inattentiveness.
- From the immediate evaluation of his response, the learner is alerted whenever he departs from the suggested response and is warned to examine the materials of the program in the immediate vicinity of the "incorrect" response more carefully to see whether the programmer has given any cues that should have prompted the learner to give the programmer's R11? response.
- S12 Skinner learning programs also help to minimize breakdowns in communication that result from the programmer's failure to write the learning R12? effectively.
- S13 The learner's answer sheets, containing all the learners' responses, will show the R13? just exactly where his program has failed to communicate its message to the learners who have used the program.

R9 programmer

R10 response

R11 suggested

R12 program

- | | | |
|-----|--|----------------------|
| S14 | The third important respect in which Skinner learning programs differ from ordinary textbooks and other customary methods of instruction is this feedback of information to the programmer from every <u>R14?</u> who uses the program. | R13 programmer |
| S15 | The information on the answer sheets will indicate to the programmer just where the learners failed to predict the suggested <u>R15?</u> and where his presentation may be weak or obscure—and will, in many cases, thus furnish hints for revising and improving the program. | R14 learner |
| S16 | The material presented here could quite appropriately be called a Skinner <u>R16?</u> | R15 responses |
| S17 | In the learning-program format that is being used here, the suggested response to a blank in a given statement appears immediately to the right of the next statement.

Thus, the suggested response to the blank in S16 appears immediately to the right of S17, and the suggested response to the blank in S17 appears immediately to the right of <u>R17?</u> | R16 learning program |
| S18 | In summary, Skinner learning programs differ from ordinary textbooks and other customary methods of instruction in the emphasis given to
1. active participation of learners,
2. immediate reinforcement of responses, and
3. feedback to <u>R18?</u> | R17 S18 |
| S19 | 1. If
a. some of the members of the Jurimetrics Committee are interested | R18 programmers |

in symbolic logic,
 then
 b. investigation of symbolic logic
 will be included within the scope
 of the committee's activities.

2. Some of the members of the Jurimetrics Committee are interested in symbolic logic.

Therefore

3. Investigation of R19? _____
 will be included within the scope of
 the committee's activities.

S20 Members of the bar and law teachers with an interest in precise communication will find techniques of symbolic R20? useful to represent statements and this, in turn, helpful in detecting syntactic ambiguity.

R19 symbolic
 logic

S21 Which of the following alternatives should S20 be interpreted as stating?

R20 logic

Alternative A1

1. Members of the bar will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting syntactic ambiguity; and
2. law teachers with an interest in precise communication will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting syntactic ambiguity.

Alternative A2

1. Members of the bar with an interest in precise communication will find techniques of symbolic logic useful to represent statements and this, in

turn, helpful in detecting syntactic ambiguity; and

2. law teachers with an interest in precise communication will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting syntactic R21?.

S22 If

1. we use the following representations
 B Members of the bar
 & and
 C law teachers
 D with an interest in precise communication
 E will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting syntactic ambiguity

then

2. we can represent Alternative A1 by 'BE & CDE', and
3. we can represent Alternative A2 by 'R22?'.

S23 In S22 we specified capital letters to represent various sequences of words of S20 and a 'R23?' to represent the word 'and'.

S24 Using the representations specified in S22, we would represent S20 by ' $\left[\begin{array}{c} B \\ \& \\ C-D \end{array} \right] - E$ ' to

indicate that S20 was intended to be interpreted as stating Alternative 1.

On the other hand, we would represent S20 by ' $\left[\begin{array}{c} B \\ \& \\ C \end{array} \right] - D-E$ ' to indicate that S20 was in-

tended to be interpreted as stating R24?.

R21 ambiguity

R22 BDE & CDE

R23 &

Now let us consider a statement which differs from S20 only in that it contains three additional words, and let us ask whether this new statement expresses the same proposition as does S20.

S25 Persons who are members of the bar and law teachers with an interest in precise communication will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting R25? ambiguity.

R24 Alternative 2

S26 If

1. we use the following representations
 - A Persons who are
 - B members of the bar
 - & and
 - C law teachers
 - D with an interest in precise communication
 - E will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting syntactic ambiguity

R25 syntactic

then

2. which of the three alternatives represented or stated below should S25 be interpreted as stating?
 - A1 ABE & ACDE
 - A2 ABDE & ACDE
 - A3 Persons who are both members of the bar and law teachers with an interest in precise communication will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting R26?

S27 We would represent S25 by 'A [B
&
C-D] E'

R26 syntactic ambiguity

to indicate that S25 was intended to be in-

terpreted as stating A1, but we would represent S25 by 'R27?' to indicate that S25 was intended to be interpreted as stating A2.

S28 The representation ' $A-\left[\begin{array}{c} B \\ \& \\ C-D \end{array}\right]-E$ ' states the

same proposition as the representation 'ABE & ACDE'; so ' $A-\left[\begin{array}{c} B \\ \& \\ C-D \end{array}\right]-E$ ' is intended to

be interpreted as indicating that the '&' connects the 'ABE' to the 'ACDE'.

Similarly, the representation ' $A-\left[\begin{array}{c} B \\ \& \\ C \end{array}\right]-D-E$ '

states the same proposition as the representation 'ABDE & ACDE', and ' $A-\left[\begin{array}{c} B \\ \& \\ C \end{array}\right]-D-E$ '

is intended to be interpreted as indicating that the '&' connects the 'ABDE' to the 'R28?'.

S29 The need for some further refinement in our way of indicating in a representation of a statement just which words an 'and' in the statement is meant to connect, is pointed up when we try to represent Alternative A3 of S25.

We observe, first, that the 'and' that occurs between 'bar' and 'law' is being interpreted as connecting parts of sentences in Alternative A3, rather than connecting entire sentences as in Alternative A1 and Alternative A2.

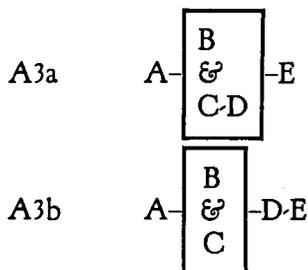
We observe also that Alternative A3 itself is ambiguous; it is not clear whether

R27 $A-\left[\begin{array}{c} B \\ \& \\ C \end{array}\right]-D-E$

R28 ACDE

- a) the '&' is intended to connect 'B' with 'CD', or
 b) the '&' is intended to connect 'B' with only 'C'.

This ambiguity turns out, however, to be harmless since the interpretations of S25 represented by A3a and A3b express the same proposition:



The reason why Alternatives A3a and A3b express the same proposition is that if a person is a member of the bar and is a law teacher with an interest in precise communication, then that person is a R29? with an interest in precise communication.

- S30 While it happens in the particular example considered here that (because of the nature of the sequence of words represented by 'D') the interpretation of S25 represented by

'

B
&
C·D

 ' expressed the same proposition as that expressed by the interpretation

represented by '

B
&
C

 ', such representations do not always represent statements that express the same proposition.

R29 member of the bar

There are pairs of statements represented by these same representations that do not express the same R30?.

S31 A close look at the representations of the various interpretations of S25 indicates how the diagrams show just which sets of words are connected to each other by the 'and'.

R30 proposition

In ' $A \begin{bmatrix} B \\ C-D \end{bmatrix} E$ ' the '&' connects 'ABE' to

'ACDE', while in ' $A \begin{bmatrix} B \\ \& \\ C-D \end{bmatrix} E$ ' the '&' connects 'B' to 'CD'.

Similarly, in ' $A \begin{bmatrix} B \\ C \end{bmatrix} D-E$ ' the '&' connects 'ABDE' to 'ACDE', while in

' $A \begin{bmatrix} B \\ \& \\ C \end{bmatrix} D-E$ ' the '&' connects 'B' to R31?.

S32 Similarly, in the representation

R31 C

' $F \begin{bmatrix} G-H \\ \& \\ I-J-K \end{bmatrix} L$ ' the '&' connects 'GH' to R32?.

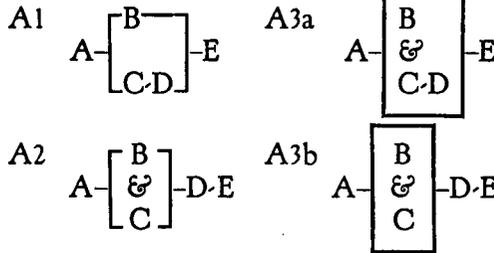
S33 And likewise, in the representation

R32 IJK

' $F \begin{bmatrix} G \\ \& \\ H-I \end{bmatrix} J-K$ ' R33?.

S34 In summary, four alternative interpretations of S25 have been described; their representations are as follows:

R33 FHIJK



The differences among the first three alternatives and the similarity of A3a and R34? are made evident by the following tabulation:

Type of Person	Does S25 assert that this type of person will find techniques of symbolic logic useful to represent statements and this, in turn, helpful in detecting syntactic ambiguity?								
AB Person who is a member of the bar	<table border="1"> <tr> <td data-bbox="555 1174 602 1203"><u>A1</u></td> <td data-bbox="615 1174 662 1203"><u>A2</u></td> <td data-bbox="676 1174 723 1203"><u>A3a</u></td> <td data-bbox="736 1174 783 1203"><u>A3b</u></td> </tr> <tr> <td data-bbox="555 1213 602 1242">Yes</td> <td data-bbox="615 1213 662 1242">No</td> <td data-bbox="676 1213 723 1242">No</td> <td data-bbox="736 1213 783 1242">No</td> </tr> </table>	<u>A1</u>	<u>A2</u>	<u>A3a</u>	<u>A3b</u>	Yes	No	No	No
<u>A1</u>	<u>A2</u>	<u>A3a</u>	<u>A3b</u>						
Yes	No	No	No						
ABD Person who is a member of the bar with an interest in precise communication ¹	<table border="1"> <tr> <td data-bbox="555 1338 602 1367">Yes</td> <td data-bbox="615 1338 662 1367">Yes</td> <td data-bbox="676 1338 723 1367">No</td> <td data-bbox="736 1338 783 1367">No</td> </tr> </table>	Yes	Yes	No	No				
Yes	Yes	No	No						

1. No offense is intended in proceeding as if AB and ABD were not synonymous expressions.

S35 Now that two of the subjects that will be investigated by the Jurimetrics Committee have been briefly illustrated, namely, programmed learning and R35?, it is appropriate to specify what else will be within the scope of the committee's activities.

R34 A3b

- S36 1. If
- a. some of the members of the Jurimetrics Committee are interested in the possible use of electronic computers and other methods of automatic data retrieval in doing legal research,
- then
- b. investigation of the possible use of electronic computers and other methods of automatic data retrieval in doing legal research will be included within the scope of the committee's activities.
2. Some of the members of the Jurimetrics Committee are interested in the possible use of electronic computers and other methods of automatic data retrieval in doing legal research.

R35 symbolic logic

Therefore

- 3. Investigation of the possible use of electronic computers and other methods of automatic data R36? in doing legal research will be included within the scope of the committee's activities.

S37 One rather obvious and elementary method for retrieving documents automatically is to "instruct" the machine to pick out those documents that contain specified words.

R36 retrieval

For example, if

1. each of the first 36 statements in this learning program (i.e., S1 through S36) is considered to be a document,
2. the information in these documents is transformed into some "machine-readable" form (punched card, magnetic tape, or other) so that the machine can have access to it, and
3. the machine is "instructed" to select those documents that contain the word 'logic',

then

4. the following eight documents would be R36?: S19, S20, S21, S22, S25, S26, S34, and S35.

S38 However, if the machine is instructed to select those documents that contain both the word 'logic' and the word 'jurimetrics', then only documents S19 and R38? would be selected. R37 selected

S39 On the other hand, if the machine is instructed to select those documents that contain both

1. the word 'logic' and
2. either the word 'jurimetrics' or the word 'alternative',

then documents S19, S21, S22, S34, and R39? would be selected. R38 S35

S40 Notice that for the instructions given in S39 there is some question about whether S26 should also be selected by the machine, because this document contains the word 'logic' and the word 'alternatives'. R39 S35

The instructions call for either 'jurimetrics' or 'alternative'; thus, the question is whether 'alternatives' is enough like R40 that S26 should also be selected.

S41 The decision as to whether 'alternatives' is enough like 'alternative' that S26 should be selected by the instructions given in S39, is one that can be made by the machine after some human being has given the machine the appropriate criteria for making such decisions. R40 alternative

Formulating the criteria for deciding that given words used in a specified subject matter are somehow sufficiently alike that they should be treated by the machine as occurrences of each other, is a task that will require the judgment of a specialist in that subject matter.

The judgment of doctors will be needed in formulating the criteria for similarity with regard to the medical literature, and the judgment of R41? will be needed in formulating the criteria for similarity with regard to the legal literature.

S42 When automatic methods for making literature searches are developed to the point where it becomes economically feasible for lawyers to search all of the past decisions of courts, the legal profession might find itself confronted with a somewhat provocative question, namely, whether such information is really the most useful of that available for guiding courts in making decisions today. S41 lawyers

Inexpensive automatic searching methods will also give lawyers greater access to the wisdom (and folly?) of other intellectual disciplines. To what extent will the profession deem it appropriate to avail itself of such greater access?

This brief discussion of data retrieval indicates the third subject that will be investi-

gated by the Jurimetrics Committee. The first two subjects were programmed learning and R42?

- S43 Notice the common thread that runs through the three subjects. Programmed learning deals with the effectiveness with which information is communicated; symbolic logic deals with the precision with which information is communicated; and data retrieval deals with the quantity of information communicated.

R42 symbolic
logic

One begins to suspect that the Jurimetrics Committee is concerned with the problem of R43? of information in law.

- S44 Some of the members of the Jurimetrics Committee are interested in semantics; some are interested in the quantitative analysis of the legal decision process; and some, in other implications of developments in science for law.

R43 communi-
cation

As you might expect, investigation of semantics, quantitative analysis of the legal decision process, and other implications of developments in R44? for law will be included within the scope of the committee's activities.

- S45 Colleagues have asked various members of the Jurimetrics Committee what 'jurimetrics' means.

R44 science

"When I use a word," Humpty Dumpty said, in a rather scornful tone, "it means just what I choose it to mean—neither more nor less."

"The question is," said Alice, "whether you can make words mean so many different things."

“The question is,” said Humpty Dumpty, “which is to be R45? — that’s all.”

S46 Since at the present time members of the Jurimetrics Committee are interested in a plan to investigate

R45 master

1. programmed learning,
2. symbolic logic,
3. information retrieval,
4. semantics,
5. quantitative methods, and
6. other implications of developments in science for law,

it is proposed that ‘jurimetrics’ (not to be confused with ‘geriatrics’ as some colleagues have wryly suggested) shall for now at least cover the bearing of these six subjects upon law.²

In short, it is intended that ‘jurimetrics’ shall cover the combination of law, science, and communication.³

If the mixture of Latin and Greek roots in the word ‘jurimetrics’ has led to some confusion,⁴ it is hoped that this Skinner learning program has helped to clarify.⁵

2. Professor Charles D. Kelso has suggested that the interests of others in the activities of the Jurimetrics Committee might be further stimulated by relating these activities to such traditional concept as ‘last clear chance’ and ‘discovered peril’:

“You might get in a corny kick or two about the Jurimetrics Committee having discovered the peril of our profession, and liability will follow unless it takes this last clear chance to avoid the proximate results of years of negligent inattention to the risks of injury which have flowed from ignoring the need to assimilate modern communication and scientific theory.”

3. Professors Harold D. Lasswell and Myres S. McDougal will undoubtedly recognize this as a branch of *Law, Science, and Policy*.

4. The term was first used by Lee Loevinger more than a decade ago in an article in which he coined ‘jurimetrics’ to refer to the scientific investigation of legal problems. See *Jurimetrics: The Next Step Forward*, 33 MINN. L. REV. 455 (1949).

5. For various helpful comments and suggestions on this note, I am indebted

to many of my colleagues at Yale Law School and on the Jurimetrics Committee
and to Professor Charles D. Kelso, i.e.,

