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SKILLS

Critical Thinking and the Law

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Introduction

Recently, the authors invited thirty incoming first-year students to participate in a four-week, pre-matriculation program of study entitled *Critical Thinking and the Law*. This program, which was conducted at Texas Southern University's Thurgood Marshall School of Law, sought to accomplish two sequential goals. The first goal was to demystify the concept of 'thinking like a lawyer' by developing a more precise definition than is found in the legal literature.¹ The authors believed that this goal would be best accomplished by replacing the ambiguous concept of 'thinking like a lawyer' with the promising developments in the teaching of thinking movement, focusing particularly on the developments in the definition and measurement of the concept of 'critical thinking' in educational psychology and related disciplines. The Critical Thinking and the Law Program was founded upon the assumption that the developments in other disciplines had proceeded to where the key lessons of the teaching of thinking/critical thinking movement could be adapted to legal education.

As its second goal, the program sought to demonstrate the utility of learning critical thinking skills and related strategies directly, even at a point in the students' education which would likely mark the last stage of formal study. This second goal assumed that the performance of students from all backgrounds, including those whose statistical likelihood of success in law school and on the bar examination fell below others, would be enhanced by early recognition and adoption of critical thinking tasks, skills and related strategies.²

This article traces the origins, and discusses key features of the Critical Thinking and the Law Program. In addition, this article evaluates and projects the implications of the Critical Thinking and the Law Program for legal education. The first section of the article reviews the rich literature on the teaching of thinking movement, and focuses upon those elements of the movement which have had the greatest influence on the design and execution of the Critical Thinking and the Law Program. This section also reports the findings of a survey formulated to determine the current involvement of North American law schools with the teaching of

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thinking/critical thinking movement. The second section of the article describes the crucial elements of the program and the specific influences of the critical thinking movement on those elements. Section two concludes by discussing the program's evaluation plan, including the results of two types of empirical evaluations of the program.

Section I. Origins of the Critical Thinking and the Law Program and the Law School Critical Thinking Survey

(a) Review of the teaching of thinking literature

Prior to designing and executing the Critical Thinking and the Law Program, the authors reviewed the vast literature of the teaching of thinking/critical thinking movement, and subsequently surveyed North American law schools to determine their involvement with the movement. The purpose of this section of the article is to describe the manner in which the results of the literature review prompted the law school survey and influenced the design and execution of the Critical Thinking and the Law Program.

During the decade of the 1980s, scholars assumed the task of defining and evaluating the educational significance of critical thinking. Each year, scores of journal articles and several books were published on the subject.³ It is noteworthy that nearly two-thirds of the books and monographs on critical thinking have been published since 1980.⁴

The first phase of our review of the teaching of thinking literature focused upon development of the definition(s) of critical thinking. The second phase of the review focused on the literature's descriptions of programs designed to improve thinking skills.

Experts in the forefront of the teaching of thinking movement recognise that most people have difficulty in defining precisely the concept of 'thinking', but that success in the teaching of thinking requires a precise and detailed definition of 'thinking'.⁵ These experts identify hierarchies of thinking skills, and suggest that each skill in the hierarchy consists of at least three components: (1) The use of existing and varying types of knowledge, including heuristics⁶ and domain specific⁷ knowledge; (2) Cognitive operations; and (3) Certain attitudes or dispositions.⁸ Critical thinking skills are ranked relatively high in such hierarchies. The elements of critical thinking skills, for example, outrank or encompass the analysis and synthesis thinking skills that are most closely associated with teaching first year law students to 'think like a lawyer'.⁹

Thinking skills identified by experts as critical thinking skills include: seeking out evidence and giving evidence when questioned; suspending judgement when there is insufficient evidence; logical reasoning abilities; recognising ambiguity in reasoning; distinguishing reason and fact from opinion; distinguishing what is relevant from what is irrelevant; identifying contradictions in arguments; evaluating the empirical soundness of conclusions; testing and refining generalisations; identifying and evaluating assumptions underlying beliefs, ideas, and values, including one's

own; transferring ideas and concepts to new contexts and situations; and making interdisciplinary connections and using insights from one subject to illuminate other subjects.¹⁰ In addition, the literature suggests that critical thinking requires an attitude of reflective scepticism; an attitude that avoids oversimplification and is comfortable with complexity; an attitude that firmly adheres to rational principles despite the opposition of others; and an attitude of awareness and appreciation of the diversity of values, behaviour, social structures, and artistic forms in the world.¹¹ In designing the curriculum of the Critical Thinking and the Law Program, emphasis was placed on developing a detailed definition of the critical thinking skill(s) under study.¹²

Our review of the teaching of thinking literature next focused on programs that were designed to enhance thinking skills. This review led us to focus on programs which employed the formal/stage development approach to the teaching of thinking skills.¹³ These programs are based on the premise that higher order thinking is achieved through the express identification and development of thinking skills at progressively increasing levels of abstraction in a series of steps or stages.¹⁴ One expert outlined a five-step sequential process for teaching each thinking skill.¹⁵ The first step introduces the skill by describing an example of the skill in action and by having each student actually perform the skill.¹⁶ The second step refers to the introductory experience for examples, whereby the teacher explains the specific steps and rules for executing the skill. The expert refers to this step as identifying strategies which are used to perform or to enhance the skill.¹⁷ The third step demonstrates the skill in the context of the substantive material under study.¹⁸ The fourth step has students working in pairs or triads under the guidance of an instructor. Here, the students apply the skill procedures and rules/strategies to data which is similar to, but not the same as, that used in the demonstration.¹⁹ Finally, the fifth step requires the students to restate and explain the basic components of the skills in the manner in which they have been used.²⁰ This detailed procedure for teaching a thinking skill provided the core concept in developing the curriculum of the Critical Thinking and the Law Program.²¹

An additional feature promoted by most of the formal step programs, and which seemed potentially beneficial to the development of a law school program, was the premise that the teaching of thinking skills ought to be pursued within the context of a subject matter course, rather than as a distinct subject in and of itself.²² The focus on a given subject matter, and particularly a new area of study, enhances the student's acceptance of learning a sequence of thinking skills, since students are likely to act on the belief that command of such skills will facilitate comprehension of the new substantive material.²³ Success with the material, in turn, enhances student appreciation of the general utility of mastering 'thinking skills', including the possible transference of these skills to future intellectual tasks.²⁴ New law students seemed to provide an ideal group upon whom to test this theory.²⁵

A second program identified during the review of the teaching of thinking literature, and used as a model for the Critical Thinking and the Law Program, sought to improve the "metacomponents" of intelligence.²⁶ Experts define "metacognition" as the set of executive thinking skills, and include among its

components an ordered sequence of 'intellectual monitoring activities'. These activities include: conceptualising a problem or task; finding alternative ways of representing it; planning an approach; planning one's next move in executing a strategy; monitoring the effectiveness of individual steps in choosing and executing a strategy; revising strategy as the need arises; and reflecting on and evaluating one's strategy to determine its effectiveness after solving the problem or completing the task.²⁷

Improvements on a variety of intellectual tasks were attributed in several studies to increased awareness and use of 'metacognition'.²⁸ Some of these studies provided encouraging results at the planning stage of the Critical Thinking and the Law Program, since the studies reported that identifying and practising metacognitive skills led directly to the improvement of academic performance among college students who faced socio-economic barriers to likely succeed on standardised tests.²⁹ For example, Arthur Whimbey, one of the leading proponents of training in executive cognitive skills, found that students who have trouble with analogy problems also tend to experience difficulty in understanding and answering multiple choice questions about selections taken from textbooks.³⁰ Whimbey concluded that their thinking is 'one-shot' and 'imprecise' with respect to both analogy and multiple choice tasks.³¹ Analytically weak students miss analogy questions because they are not sufficiently aware of the need to explicate the relationships between the pairs of words with enough detail and precision.³² To remedy this deficiency in thinking, Whimbey developed a procedure called 'talking aloud pairs' (TAPS) in which one student, working with another student, talks through her solution to a problem in detail, while the other student monitors the steps of the solution.³³

Other critical thinking researchers have suggested that the more information an individual has about his or her own cognitive functions and the manners in which they can be used, the more powerful that individual's approach to new thinking tasks is likely to be.³⁴ A key feature of the Critical Thinking and the Law Program is the emphasis placed on metacognitive thinking skills.³⁵

(b) The law schools and the teaching thinking-critical thinking movement: a survey

During the summer and fall of 1989, the authors mailed a survey form to the deans of 184 American ABA accredited law schools and Canadian law schools. The survey sought information by which the authors could evaluate the influence of the critical thinking movement on legal education as we entered the 1990s. The survey instrument asked the respondents whether their law school had sought to formally measure the critical thinking skills of students. For those schools responding affirmatively, additional questions sought to obtain the instrument or method used, the person who administered the instrument, and the results obtained.

A total of 103 responses were received from the 184 schools solicited, which amounts to a return rate of nearly 56%. Generally, the responses confirmed the hypothesis of the authors that the teaching of thinking/critical thinking movement has not had much influence on North American law schools. Only five (5) of the respondents formally measured critical thinking skills of their students; and even those schools gave responses that indicated little or no influence by the teaching of

thinking movement. Hence the survey results provided a strong basis for concluding that the Critical Thinking and the Law Program was among the first programmatic attempts to transfer the lessons of the teaching of thinking movement to legal education. The next section of the article describes the substance of the program, and the manner in which its key features were influenced by the lessons drawn from the teaching of thinking/critical thinking movement. The section concludes by reporting preliminary evaluations of the program.

Section II. The Critical Thinking and the Law Program

(a) The program and the influences of the critical thinking movement on the program

Following the review of the critical thinking literature, the authors submitted written proposals and received grants to conduct a four week summer 'head start' program for up to 30 in-coming first year law students.³⁶ The critical thinking literature influenced every key feature of the Critical Thinking and the Law Program, beginning with the drafting of a twenty page program syllabus.³⁷ The program syllabus provided guidance in the development of daily and weekly lesson plans.³⁸

The review of the critical thinking literature influenced the selection of the program's participants and the teaching settings and sequences employed in the program. This section of the article presents a brief description of each feature of the program, and indicates how each feature was influenced by the teaching of thinking literature.

The teaching of thinking literature criticised the failure of many 'thinking improvement' programs to include an adequate evaluation plan.³⁹ The grant proposal for the Critical Thinking and the Law Program detailed an evaluation plan, which included a commitment to hire an expert as program evaluator.⁴⁰ The evaluator examined the program from its outset in order to monitor the program's identification of pedagogic goals, the effectiveness of daily and weekly plans to implement those goals, the student selection and counselling process, and the pre-program and post-program test performance of students on an identical set of standardised instruments.⁴¹

Several advocates of the teaching of thinking program note the value of accommodating differences in student readiness to accept and gain from the direct teaching of thinking.⁴² The program syllabus committed the Program to a student selection process that increased the probability of producing a student group (thirty students) which would reflect the composition of our first year class. This composition was measured by a predicted first year law school grade point average (pGPA), and was determined by an index score calculated through a weighted combination of undergraduate grade point average and Law School Admission Test score.⁴³ Of the thirty students who initially accepted invitations to attend the Critical Thinking and the Law Program, one-half had a pGPA in the lower third of the in-coming class.⁴⁴ A substantial majority of the remaining half had a pGPA in the middle third of the in-coming class.⁴⁵

The grant proposals committed the Program to a low student teacher ratio, as

well as direct, hands-on exposure to pedagogy based on the teaching of thinking movement. In order to accomplish these goals, the plan called for hiring two teaching assistants with no law school experience. Both assistants, however, were expected to possess either specific teaching of thinking/critical thinking pedagogical experience or exposure to formal training in pedagogy. Two PhD candidates, attending and working as teaching assistants, at Rice University were selected. One of the teaching assistants had previously taught classes on elements of critical thinking. Both had extensive teaching experience, which included teaching writing as a skill.⁴⁶

The teaching of thinking literature included recommendations that students be afforded repeat opportunities to practice thinking skills and related strategies.⁴⁷ The Critical Thinking and the Law Program used four teaching settings: Assembly, Class, Group, and Pair. The differences in the settings were based upon differences with respect to student/teacher configurations. These settings provided opportunities to practice the same skill and related strategies several times in the same day, and provided a basis for comparing and contrasting 'work products' several times each day. Each setting was employed, at least once per day, for about fifty to sixty minutes. An 'Assembly' involved the students and all four faculty members. Most days began and ended with Assembly. A 'Class' consisted of a law school professor and a teaching assistant and one-half of the students. A 'Group' was a faculty member (either a law professor or a teaching assistant) and one-fourth of the students. 'Pairs' consisted of two students from a group working together, with a faculty member rotating among the pairs to monitor their work and thought processes as evidenced by the 'think-aloud' protocols.⁴⁸

The teaching of thinking movement's search for and identification of an array of thinking skills characterised as critical, and the ranking of such skills, influenced several key features of the Critical Thinking and the Law Program.⁴⁹ As the core of the curriculum, the Program sought to establish the definition, illustration, and practice of a selected sequence of thinking skills.⁵⁰

The Program emphasised one set of thinking skills per week in the following sequence: (1) Metacognition; (2) Induction/rule making; (3) Evidence identification, evaluation, and use; and (4) Conceptualising/problem solving.⁵¹ The skill sequence was based on the premise that the skill(s) focused upon in the prior week(s) would facilitate comprehension and acquisition of the thinking skill(s) yet to be studied, and that the skills became progressively more complex.⁵²

The program also focused on identifying strategies most closely linked to facilitating the acquisition and use of each skill.⁵³ In addition, the program focused on identifying legal and non-legal tasks that could be accomplished with each skill. Opportunities were provided to complete these tasks using the identified skills and related strategies.⁵⁴

The teaching of thinking movement's development of sequential step programs to improve thinking skills influenced several key features of the Critical Thinking and the Law Program.⁵⁵ Most significant is the step programs' emphasis on how teaching of thinking within the context of a new subject area, and the resultant tendency to enhance and facilitate student learning of both critical thinking skills

and subject matter.⁵⁶ The Critical Thinking and the Law Program relied on this integrative theme to guide the selection and organisation of the daily reading and writing assignments.

During the preparation of the course, the faculty assembled and edited a 'Critical Thinking and the Law' reader. The reader consisted of twelve excerpts on the teaching of thinking/critical thinking movement and ten on 'thinking like a lawyer'.⁵⁷ The reader was organised to alternate excerpts from each field. The teaching of thinking excerpts began with readings focusing on metacognition and then emphasised in sequence the key thinking skills and strategies on which the program focused.⁵⁸ Each night of the program, the homework assignment included a written summary of at least one of these excerpts. Specific instructions were provided concerning the reasons for the summaries and the pattern to be followed in producing the summary.⁵⁹

The casebook selected was 'On Law in Courts'.⁶⁰ Each student was asked to complete two types of written exercises each night based on the casebook reading assignment of that day. The first assignment required the students to identify on each page of the casebook the lawyer thinking tasks, skills, and strategies suggested by its content.⁶¹ The students were given a model of how this task was to be completed, which amounted to a copy of the first fifteen pages of the casebook on which the faculty had identified the lawyer thinking tasks, skills, and strategies suggested by the content of each page.⁶² Subsequently, students were asked to restate the main idea from a case, a set of main ideas from a sequence of related cases, or the main idea of a series of related secondary source readings.⁶³

The focus of the teaching of thinking movement on metacognitive skills and the reliance of thinking improvement programs on instruction in metacognition influenced several key features of the Critical Thinking and the Law Program.⁶⁴ This influence is demonstrated most acutely by the decision to require that each student keep an 'academic journal' during the four week program. The purpose of the journal was to encourage reflection and introspection by each student on the key lessons of the program, and the manner in which these lessons might be transferred to facilitate the student's first year of legal studies.⁶⁵

(b) The program's evaluation plan and two preliminary empirical evaluations

In compliance with the terms of the grants that funded the program, the evaluator completed a final report on the Critical Thinking and the Law Program.⁶⁶ The report included a comparative evaluation of student pre-program and post-program performance on a battery of standardised instruments. The following paragraphs report on this evaluation.⁶⁷

The instruments included a 'Mini' Law School Admission Test (LSAT),⁶⁸ the Watson-Glaser Critical Thinking Appraisal,⁶⁹ the Test Anxiety Inventory,⁷⁰ the State Trait Anxiety Inventory,⁷¹ the Kolb Learning Style Inventory⁷² and the Survey of Study Habits and Attitudes.⁷³

A comparison of pre-test and post-test results showed a statistically significant improvement in critical thinking skills as measured by the Watson-Glaser Critical

Table 1. Mean and standard deviation of pre- and post-program measures of critical thinking ($n = 22$)

Measure	Time of administration		<i>t</i>	
	Pre-program	Post-program		
LSAT				
Reading comprehension	X	1.8	1.5	- 0.86
	SD	1.1	1.1	
Reading & reading analysis	X	1.5	1.7	1.18
	SD	1.0	1.0	
Issues & answers	X	5.7	4.2	- 2.62*
	SD	2.1	1.8	
Reading & reasoning by logical analysis	X	3.5	3.8	0.75
	SD	3.1	2.5	
Total score	X	12.6	11.4	- 2.13*
	SD	3.1	2.5	
Watson-Glaser critical thinking appraisal	X	48.5	54.4	2.67*
	SD	9.9	6.8	

* $p < 0.05$

Thinking Appraisal.⁷⁴ On three of the four types of items on the 'Mini'-LSAT test, students showed some, but not statistically significant improvement. (See Table 1.) On the fourth item ('Dispute Characterisation'), however, program students had a statistically significant decline in performance.⁷⁵

We followed the program participants through their first year of law school. In order to compare the first-year performance of the program group with their peers who had not participated in the four week pre-matriculation program, we examined the performance of the program students who completed the summer program and immediately enrolled in the first year of law school ($n = 19$) with the performance of a 'control group' ($n = 43$).⁷⁶ The control group consisted of forty-three first year students who enrolled that same fall and who had the same predicted first year law school grade point average (pGPA) in the same section as at least one program student.⁷⁷ The first year law school grade point average (GPA) of the program students was compared with the GPA of the control group students. In the following discussion, we refer to the program students and control group students together as the total array (TA).

Two program students had the highest GPAs among the total array. Three program students were among the five students with the highest GPAs in the total array, and seven of the twelve students with the highest GPAs in the total array were program students.⁷⁸ Sixty-eight percent (68%) of the program students achieved a GPA in excess of their pGPA, while only fifty-one percent (51%) of the control group students exceeded their pGPA. (See Table 2). Yet when a statistical analysis was run on the total array, the difference in performance between the program students and the control group was not found to be statistically significant (see Table 3).⁷⁹ We attribute this finding primarily to the significance of the distribution of the program students in the sections of the law school first year program, and secondarily to the size of the total array.⁸⁰

Table 2. *Comparison of predicted first-year grade point average with actual first-year grade point average. Program students only (n = 21)*

Student	Predicted gpa	Actual gpa	Increase/decrease
1	2.2	2.37	+ 0.17
2	2.2	2.27	+ 0.07
3	2.2	2.90	+ 0.70
4	2.7	2.67	- 0.03
5	2.3	2.27	- 0.03
6	2.3	1.47	+ 0.17
7	2.3	2.90	+ 0.60
8	2.4	2.17	- 0.23
9	2.3	2.43	+ 0.13
10	3.1	2.80	- 0.30
11	2.6	2.81	+ 0.21
12	2.5	2.80	+ 0.30
13	2.3	2.37	+ 0.07
14	2.3	3.23	+ 0.93
15	2.3	1.97	- 0.33
16	2.1	2.03	- 0.07
17	2.3	3.00	+ 0.70
18	2.3	3.07	+ 0.77
19	2.3	2.87	+ 0.57
20	2.4	3.43	+ 1.03
21	2.2	1.37	- 0.83

Table 3. *Analysis of variance table for the effect of treatment between the program students and the control group students*

Source	df	Sums of squares	F
Section	2	2.62	6.21*
Group	1	0.08	0.37
Section $\times$ Group	2	0.23	0.55
Error	56	11.80	

* $p < 0.005$

After reading an earlier draft of this article, one commentator suggested that any improvement by program students might be attributable to a 'Hawthorne Effect'. The authors found little evidence, however, in the educational research literature to warrant attributing the improved performance of any of the program students to a 'Hawthorne Effect'.⁸¹

Section III. Conclusion & Implications

The Critical Thinking and the Law Project was designed to demonstrate the feasibility of planning an intensive pre-law school matriculation program based upon several key lessons learned from study of the current teaching of thinking movement.

Section one of this article identified the key elements and programs of the teaching of thinking movement from which these lessons were drawn.⁸²

Section two of the article identified the key lessons learned from the teaching of thinking movement and how they were transferred to a pre-enrolment law school program. This included the manner in which they were used to create a curriculum, lesson plans, a reader, a student journal format, a sequence of daily teaching configurations, and the identification of specific thinking skills and related strategies to emphasise the selection of students and teacher aides, and choosing a course book.⁸³ Section two also described how the plan for the program included the hiring of an independent evaluator to aid in an attempt to create a systematic scheme to evaluate the success of the program, including the use of a battery of pre- and post-study tests.⁸⁴ Finally, section two described how the evaluation plan included a subsequent comparison of the first year law school performance of program students with that of students with the same predicted first year grade point average in the same section.⁸⁵

Because the program described in this article was designed and executed as a pilot project, any conclusions and implications from the subjective and objective evaluations of the program must be expressed in tentative terms. Certainly we recognise that the number of participants in this study is too small to make strong claims of success for the specific design of the program or the adaptability of the teaching of thinking movement to legal education. But the reactions of the participating students, and the data does suggest a positive effect and, we hope, is sufficiently interesting to encourage others to design and implement similar 'critical thinking' programs from which additional confirmatory data might be obtained.

This seems especially important for those legal educators and institutions committed not only to opening the doors of legal education to groups traditionally underrepresented, but to the design, development, implementation, and evaluation of academic programs that seek to meaningfully improve the ability of such students to succeed in the study of law. If more 'critical thinking' programs are undertaken, we urge control groups be created and that the evaluation instruments used in this pilot study be considered for adoption so that additional norming data might be collected and shared among legal educators. Although each of the instruments used has substantial norming data and have been subjected to significant reliability and validity testing, only the LSAT instrument has been used extensively on the participant population that is the subject of this study.⁸⁶

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Notes

- [1] Others in legal education have also noted flaws in the definition and utility of the concept of 'thinking like a lawyer'. Several legal commentators have noted the vagaries of the concept. See JOHN O. MUDD (1983) Thinking critically about 'thinking like a lawyer', *Journal of Legal Education*, 33, p. 704; ANDREW J. PIRIE (1987) Objectives in legal education: the case for systematic instructional design, *Journal of Legal Education*, 37, pp. 576, 587 (citing this criticism in the work of other authors). See also PAUL F. TEICH (1986) Research on American law teaching: is there a case against the case system?, *Journal of Legal Education*, 36, p. 167, n.2 (citing MICHAEL JOSEPHSON, *Learning and Evaluation in Law School*, pp. 50-98 (Association of American Law Schools, Teaching Methods Section ed. Jan. 1984)) describing in detail the sequence of cognitive skills to be taught in law school.

Other legal critics of the concept have noted that the phrase 'thinking like a lawyer' implies that there is something unique about the thought processes of lawyers. This, however, is an assumption bereft of experiential or empirical support. See EMILY M. CALHOUN (1984) Thinking like a lawyer, *Journal of Legal Education*, 34, p. 507; JOHN DEWEY (1924) Logical method and the law, *Cornell Law Quarterly*, 10, pp. 17-18; MUDD, J. (1983) Thinking critically, *Journal of Legal Education*, 33, p. 705. Some legal educators concede that we may not do a good job of precisely defining the phrase 'thinking like a lawyer', and they recognise that the term does not represent a unique set of skills, but they nevertheless assert that law schools effectively teach analytic skills. See, e.g., DAVID P. BRYDEN (1984) What do law students learn? A pilot study, *Journal of Legal Education*, 34, p. 479.

- [2] See BEAU FLY JONES (1986) Quality and equality through cognitive instruction, *Educational Leadership*, 42, pp. 1, 5-6.
- [3] See, e.g., BARRY K. BEYER (1979) *Teaching Thinking in Social Studies: Using Inquiry in the Classroom*, rev. ed., 1979 (Columbus, OH, Merrill Publishing Company); BARRY K. BEYER (1983) Common sense about teaching thinking skills, *Educational Leadership*, 41, p. 44; BARRY K. BEYER (1984) Improving thinking skills—practical approaches, *Phi Delta Kappan*, 65, p. 556; PAUL CHANCE (1986) *Thinking in the Classroom—A Survey of Programs* (New York, Teachers College Press); EDWARD DEBONO (1983) The Cognitive Research Trust (CoRT) Thinking Program, in: WILLIAM MAXWELL (ed.) *Thinking: The Expanding Frontier*, p. 115 (Philadelphia, PA, Franklin Institute Press); REUVEN FEUERSTEIN et al. (1980) *Instrumental Enrichment: An Intervention Program for Cognitive Modifiability* (Baltimore, MD, University Park Press); DIANE F. HALPERN (1984) *Thought and Knowledge: An Introduction to Critical Thinking* (Hillsdale, NJ, Lawrence Erlbaum Associates); MARCIA HEIMAN & JOSHUA SLOMIANKO (1985) *Critical Thinking Skills* (Washington, DC, National Education Association); JOHN E. MCPECK (1981) *Critical Thinking and Education* (New York, St Martin's Press); CHET MEYERS (1986) *Teaching Students to Think Critically* (San Francisco, Jossey-Bass); W. EDGAR MOORE et al. (1967) *Creative and Critical Thinking* (Boston, MA, Houghton Mifflin); RAYMOND S. NICKERSON et al. (1985) *The Teaching of Thinking* (Hillsdale, NJ, Lawrence Erlbaum Associates); RAYMOND S. NICKERSON (1984) Kinds of thinking taught in current programs, *Educational Leadership*, 42, p. 26; BARBARA Z. PRESSEISEN (1986) Thinking skills: research and practice, in: *National Education Association Series "What Research Says to the Teacher"* (Washington, DC, National Education Association); BARBARA Z. PRESSEISEN (1986) *Critical Thinking and Thinking Skills: State of the Art Definitions and Practice in Public Schools* (Philadelphia, PA, Research for Better Schools); WILLIAM A. SADLER, JR. & ARTHUR WHIMBEY (1980) Teaching cognitive skills: an objective for higher education, *National Forum* 60, p. 43; 1 & 2 JUDITH W. SEGAL et al. (1985) *Thinking and Learning Skills* (Hillsdale, NJ, Lawrence Erlbaum

Associates); ROBERT J. STERNBERG (1986) *Intelligence Applied: Understanding and Increasing Your Intellectual Skills* (San Diego, CA, Harcourt Brace Jovanovich); ROBERT J. STERNBERG (1983) Criteria for intellectual skills training, *Educational Research*, 12 pp. 1, 6; MARILYN WATSON (1988) Critical thinking: repackaging or revolution?, *Language Arts*, 65, p. 543; ARTHUR WHIMBEY & JACK LOCHHEAD (1984) *Beyond Problem Solving and Comprehension: An Exploration of Quantitative Reasoning* (Philadelphia, PA, Franklin Institute Press); ARTHUR WHIMBEY (1985) Reading, writing, reasoning linked in testing and training, *Journal of Reading*, 29, p. 118; ROBERT E. YOUNG (ed.) (1980) *Fostering Critical Thinking* (San Francisco, CA, Jossey-Bass). The proliferation of books and monographs on critical thinking continues into the 1990s. A recent 'OCLC' search found over one hundred books and monographs on 'critical thinking/teaching' which have been published since 1990.

- [4] See, e.g., ROBERT A. PAUKER (1987) Teaching thinking and reasoning skills: problems, and solutions, in: BEN BRODINSKY (ed.) *AASA Critical Issues Report* (Arlington, VA, American Association of School Administrations). A review of the ERIC database discloses 4435 entries under the heading 'critical thinking' as of April 1993, of which 2,883 have been published since 1979. *Educational Leadership*, the journal of the Association for Supervision and Curriculum Development, published theme issues on critical thinking in October 1981, September 1984, November 1984, May 1985, May 1986, and April 1988. Other journals which gave significant space to articles on thinking skills include: *Phi Delta Kappan*, *Social Education*, and *The American Teacher*. Reports on educational 'reform' and 'excellence' helped to accelerate the critical thinking movement during the 1980s. The National Education Association (NEA) first focused on critical thinking in 1979 with a booklet entitled, *Teaching Styles as Related to Student Achievement*. DAVID L. SILVERNAIL, National Education Association, Teaching styles as related to student achievement, in: *What Research Says to the Teacher* (Special Report 1979). In 1982, the NEA extended its series on critical thinking with three publications: *Cooperative Learning*, *Questioning Skills for Teachers*, and *Language Skills in the Classroom*. In September 1986, the NEA completed its project on critical thinking by releasing a multimedia training program featuring audio/videotapes, filmstrips, workshops designed to train teachers and materials designed for parents. In April 1983, the National Assessment of Educational Progress published *A Nation at Risk: The Imperative for Educational Reform*. Early in 1985, twenty-four national associations representing major sectors of education formed the Collaborative on Teaching Thinking; see PAUKER, *supra*, pp. 14–16. The stated purpose of the Collaborative was to encourage the development of a critical thinking perspective among the affiliated groups. The last decade has also seen the creation of 'centres' for the study of teaching of thinking/critical thinking. One such centre is located at Sonoma College in California, and each August it sponsors an international conference on critical thinking.
- [5] BARRY K. BEYER (1987) *Practical Strategies for the Teaching of Thinking*, p. 13 (Boston, MA, Allyn & Bacon).
- [6] A 'heuristic' is a method of solving a problem that does not guarantee a result, but that raises the possibility of reaching a solution or tends to decrease the time needed to reach a solution. A heuristic might be compared to an algorithm, which is a finite sequence of operations that are certain to yield the solution to a problem when executed correctly. See, STUART SUTHERLAND (1989) *The International Dictionary of Psychology*, p. 16 (New York, Continuum).
- [7] 'Domain specific' knowledge is knowledge gained and used within the context of a specific professional field such as law or medicine. Thus, in this sense, the term 'domain' is used more narrowly than the manner in which it is used by Bloom. See BENJAMIN BLOOM *et al.* (1956) *Taxonomy of Educational Objectives: The Classification of Educational Goals* (New York, Longmans-green). Bloom describes broad areas of competency according to their well-known taxonomies of objectives—cognitive, psychomotor & affective domains—and applies the term 'domain' more generally than its use in educational psychology by referring to 'domain-referenced tests'. In this latter usage, 'domain' refers to the specifically circumscribed universe from which performance is sampled and to which performance is expected to generalise. See TORSTEN HUSEN & T. NEVILLE POSTLETHWAITE (eds.) (1985) *The International Encyclopedia of Education*, p. 1447 (Oxford, Pergamon Press).

- [8] See BEYER, *supra* note 5, pp. 16–17, 19–20; *supra* note 3, pp. 17–18 (citing Segal, *supra* note 3. Throughout this article, the term ‘thinking skills’ refers to attributes of ‘thinking’ which consist of these components.
- [9] See BEYER, *supra* note 5, pp. 17, 26–27; PRESSEISEN, *supra* note 3, pp. 21–22 (citing ROBERT ENNIS (1985) A logical basis for measuring critical thinking, *Educational Leadership*, 43, pp. 44, 48 n.2). See also STERNBERG, *supra* note 3, pp. 11–12 (outlining Piaget’s theory that cognitive structures evolve and become progressively more sophisticated over different stages of human development). See generally BLOOM, *supra* note 7, for an educational expert’s ‘taxonomy’ of intellectual skills. Given the embryonic state of our attempts to integrate the critical thinking movement with legal education, it is fair to say that critical thinking not only encompasses, but goes beyond the traditional analysis and synthesis skills emphasised in law school. For example, the literature explicitly mandates that critical thinking skills go beyond constructing generalisations from a related set of sources. The literature expressly identifies the skills of ‘evaluation’, ‘testing’, ‘reformulation’, and ‘transference’ of developed generalisations.
- [10] See BEYER, *supra* note 5, p. 17; PRESSEISEN, *supra* note 3, pp. 10–11. See also *Defining the Critical Student & Person, Seventh and Fifth International Conference on Critical Thinking and Education Reform* (1989). These experts note that, as a concept, critical thinking has been interpreted in a variety of ways by scholars seeking to define and align critical thinking skills with other thinking skills. The description of critical thinking applied by the authors of this article is pluralistic in that it reflects the varying definitions of critical thinking suggested by the identified experts.
- [11] *Ibid.*
- [12] See *infra* notes 51–54 and accompanying text. In addition, this article emphasises metacognitive skills—executive thinking skills. See *infra* note 28 and accompanying text.
- [13] Programs which employ this approach include: (1) RICHARD KARPUS (1974) *Science Curriculum Improvement Study* (Teacher’s Handbook); (2) T. C. CAMPBELL *et al.* (1980) A teachers guide to learning cycle: a Piagetian based approach to college instruction, in: ROBERT G. FULLER *et al.* (eds) *Piagetian Programs in Higher Education*; (3) MARTIN BROOKS *et al.*, (1983) Cognitive levels matching, *Educational Leadership*, 40, pp. 1, 4, 8.
- [14] Hence these programs require the development of a series of definitions which recognise different types of thinking skills, and the creation of a hierarchial ranking of such skills. See *supra* note 9 for sources detailing the efforts of scholars to develop such thinking skill definition sets and hierarchies. The literature of the critical thinking/teaching of thinking movement urges that these skills be taught from kindergarten to the workplace. See, e.g., RICHARD W. PAUL & A. J. BINKER (1990) *Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World* (Rohnert Park, CA, Center for Critical Thinking and Moral Critique, Sonoma State University); CATHLEEN STASZ (1990) *Teaching and Learning Generic Skills for the Workplace* (Berkeley, CA, National Center for Research in Vocational Education, University of California). See generally *Think, A Magazine for Critical Thinking* (1990–91) (edited for grades K–8) (San Antonio, TX, ECS Learning Systems).
- [15] BEYER, *Common Sense*, *supra* note 3, at 46. See also PAULA LUSTBADER (1992) The stages of learning to ‘think like a lawyer’, in: *AALS Legal Writing Conference Materials* (applying the concept of cognitive development which occurs in stages to the teaching of legal writing to first year law students) (on file with authors).
- [16] BEYER *Common Sense*, *supra* note 3, p. 46.
- [17] *Ibid.*
- [18] *Ibid.*
- [19] *Ibid.*
- [20] *Ibid.*
- [21] Beyer has asserted that ‘the key to effective, direct teaching of thinking skills is to give students repeated opportunities to apply the skill—preceding each application with explicit instruction on the use of the skill and following each application with discussion among students on how best to use the skill. The focus throughout must remain on the skill being taught or applied’. BEYER, *Improving Thinking Skills*, *supra* note 3, p. 59.
- [22] Scholars advocating the teaching of thinking skills within the context of a subject matter course include MEYERS, *supra* note 3, pp. 5–7; CHANCE, *supra* note 3, pp. 117–32 (characterising

- programs designed to teach thinking within the context of a given subject matter as 'Thoughtful Teaching'); Nickerson, *Kinds of Thinking*, *supra* note 3, pp. 26, 29–32.
- [23] MEYERS, *supra* note 3, pp. 6–7.
- [24] CHANCE, *supra* note 3, pp. 129–32. Chance includes a report on improvements in standard tests math performance arising from one school district's attempt to teach math by identifying and applying the thinking skills needed to solve the problem types encountered at various grade levels. Furthermore, Chance identifies some of the key difficulties which follow the decision to teach thinking skills within a subject matter context, including the probability that teachers will need to possess superior knowledge of the substantive course, and the resistance of students, and particularly older students, to learning new thinking skills. *Ibid.* pp. 129–32.
- [25] See *infra* notes 55–56 and accompanying text.
- [26] Some of these programs are discussed in STERNBERG, *Intelligence Applied*, *supra* note 3, pp. 40–46. STERNBERG identified three such training programs: (1) FEUERSTEIN (1980) *Instrumental Enrichment*; (2) LIPMAN (1980) *Philosophy for Children*; and (3) *The Chicago Mastery Learning Reading Program* (1982).
- [27] J. H. LARKIN *et al.* (1980) Expert and novice performance in solving physics problems, *Science*, 208, pp. 1335, 1342; ALAN H. SCHOENFELD (1980) Teaching problem-solving skills, *American Mathematical Monthly* 87, pp. 794, 794–805; STERNBERG, *Intelligence Applied*, *supra* note 3, p. 61; BEYER, *supra* note 5, p. 17.
- [28] ANN L. BROWN (1978) Knowing when, where and how to remember: a problem of metacognition, in: ROBERT GLASER (ed.) *Advances in Instructional Psychology* (Hillsdale, NJ, Lawrence Erlbaum Associates); ANN L. BROWN & J. C. CAMPIONE (1978) Permissible inferences from cognitive training studies in developmental research, in: W. S. HAIL & M. COLE (eds.) *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 2, 46, pp. 46–53; J. C. CAMPIONE & A. L. BROWN (1978) Toward a theory of intelligence: contributions from research with retarded children, *Intelligence*, 2, p. 279 (dividing the process of cognition into two categories: (1) Metacognitive processing, or executive skills used to control one's information processing; and (2) Cognitive processes, or non-executive skills used to implement task strategies). See also ROBERT J. STERNBERG, (1985) Cognitive approaches to intelligence, in: BENJAMIN B. WOLMAN (ed.) *Handbook of Intelligence—Theories, Measurements, and Applications*, p. 61 (New York, Wiley). Other investigators have proposed essentially identical distinctions between the two categories of cognitive processes. See, e.g. EARL C. BUTTERFIELD & J. M. BELMONT (1977) Assessing and improving the executive cognitive functions of mentally retarded people, in: IRV BIALER & M. STERNLICHT (eds.) *Psychological Issues in Mental Retardation* (New York, Psychological Dimension); J. H. FLAVELL (1981) Cognitive monitoring, in: W. P. DICKSON (ed.) *Children's Oral Communication Skills* (New York, Academic Press); E. M. MARKMAN (1981) Comprehension monitoring, in: W. P. DICKSON (ed.) *Children's Oral Communication Skills* (New York, Academic Press); WALTER R. REITMAN, (1965) *Cognition and Thought: An Information-Processing Approach* (New York, John Wiley & Sons Ltd).
- [29] See, e.g., the sources cited in JONES, *supra* note 2, p. 10.
- [30] ARTHUR WHIMBEY (1985) Reading, writing, reasoning linked in testing and training, *Journal of Reading*, 29, pp. 118, 119–20. Other investigators of child populations also suggest that defective metaprocesses or deficits in executive cognitive skills contribute to poor academic performance on reading comprehension. See e.g., MEYER MEYERS II & SCOTT G. PARIS (1978) Children's metacognitive knowledge about reading, *Journal of Educational Psychology*, 70, p. 680; E. RYAN (1981) Identifying and remediating factors in reading comprehension: toward an instructional approach for poor comprehenders, in: E. MACKINNON & T. WALLER (eds.) *Advances in Reading Research*, reported in DONALD MEICHENBAUM, Teaching thinking: a cognitive-behavioral perspective, in: SEGAL, *supra* note 3, p. 408.
- [31] WHIMBEY, *supra* note 30, p. 119.
- [32] *Ibid.* Without knowing what steps to take, students often guess at answers rather than carefully analyse problems. Thus they fail to direct their thinking towards comprehension based on the material before them. See Sadler, *supra* note 3, p. 44.
- [33] JOHN D. BRANSFORD *et al.*, *Improving Thinking and Learning Skills: An Analysis of Three Approaches*, in: SEGAL, *supra* note 3, p. 148. In other contexts, peer feed-back has been shown to benefit both

- the giver and the receiver. See e.g., ELIZABETH F. HAYNES (1978) Using research in preparing to teach writing, *English Journal*, 67, p. 82, discussed in BEYER, *Common Sense*, *supra* note 3. Another researcher of critical thinking argues that a cognitive skills approach to learning intellectual skills requires the verbalisation of thinking by experts and all learners so that the learners have a sense of which steps they are following, which processes work, which processes do not, and why. BEYER, *Common Sense*, *supra* note 3, p. 44.
- [34] JOHN M. BELMONT *et al.* (1982) To secure transfer of training, instruct self-management skills, in: ROBERT J. STERNBERG & DOUGLAS K. DETTERMAN (eds.) *How and How Much Can Intelligence Be Increased?* (Norwood, NJ, Ablex Publishing Corporation); RICHARD E. SNOW, The training of intellectual aptitude, in: STERNBERG & DETTERMAN, *Ibid.* p. 19.
- [35] See *infra* notes 64–66 and accompanying text.
- [36] The Meadows Foundation and the Texas Bar Foundation provided approximately \$50,000 for the program. After receiving the grants, the authors spent eight months developing the overall syllabus for the program by studying the teaching of thinking/critical thinking movement, and by reviewing 'thinking like a lawyer' literature.
- [37] The syllabus identified weekly and daily program goals, and tied them to specific teaching settings, tests, problems, and reading and writing assignments. See *supra* note 14 (noting the emphasis in the teaching of thinking movement on systematic curriculum planning). See also Pitre, *supra* note 1, pp. 590–94 (advocating adoption by legal education of 'Systematic Instruction Design').
- [38] The four faculty members who participated in the program met daily to review, revise, and finalise each daily lesson plan. End of the week meetings were used to review, revise, and finalise the up-coming weekly lesson plan.
- [39] For a critical review of the execution and evaluation plan of most college critical thinking programs, see MCMILLAN (1987) Enhancing college students critical thinking: a review of studies, *Research in Higher Education*, 26, p. 3. See also Chance, *supra* note 3, pp. 8, 23–25, 38–40, 54–56, 69–70, 82–85, 96–98 (reviewing the evaluation evidence of many of the most popular critical thinking programs targeting primary and secondary school age children). See also *supra* note 29 for programs which report some success in improving the critical thinking skills of college age minority students and students in lower socio-economic classes.
- For articles on the evaluation of legal education programs, see STEVEN HARTWELL & SHERRY L. HARTWELL (1990) Teaching law: some things Socrates did not try, *Journal of Legal Education*, 40, pp. 509, 510 n.6 (reporting on an empirical test of three different teaching methods, and their impact on first year law school performance; concluding that no significance could be given to different teaching methods on law school performance, similar to all other reported law school empirical tests of teaching methods). But see CHARLES L. FINKE, Affirmative action in law school academic support programs, *Journal of Legal Education*, 39, pp. 55, 65–67 (1989) (reporting on a multi-faceted academic support program at Oregon School of Law that did improve the law school performance of its participants with higher LSAT scores). The CLEO (Council for Legal Education Opportunity) Regional Summer Institutes, operated by various schools since 1968, have not been evaluated on a national basis in any manner since 1981, although a new study of effectiveness is apparently being planned, according to the authors' private communications with Executive Director Denise Purdie. The last published study with respect to the program focused on performance data. See WADE J. HENDERSON (1980–81) Implications for affirmative admission after Bakke: analysis of academic and bar performance of council on legal education opportunity program fellows 1968–78, 7 BLACK L. J. 108–121. In addition to the CLEO summer institutes, a number of law schools have designed and offered a variety of special programs for minority students. Very brief descriptions of these programs, but no evaluative data, are published by the Law School Admission Services in *Summary Report on the LSAC Questionnaire on Special Law School Programs for Minority Students* (March 1988).
- [40] The evaluation plan included: (1) Administration of a battery of pre- and post-tests; (2) Daily monitoring of student individual and group performance with respect to a sequence of identical or related thinking tasks and tests; and (3) Weekly, formal, individualised evaluations of student work product. The proposal defined 'expert' to mean an academician with a terminal degree in education or educational psychology, and experience in evaluating educational programs.

- [41] For the evaluator's report with respect to the pre- and post-test performance of the students, see *infra* notes 66–75 and accompanying text.
- [42] See, e.g., CHANCE, *supra* note 3, pp. 22, 52–53; HEIMAN & SLOMIANKO, *supra* note 3, pp. 17–18.
- [43] The first step in the selection process was to obtain from the admissions office a list of all students who had been accepted, and a list of those students who had indicated that they would attend. The admissions office also provided the index score of each person. The program directors then divided the students into three groups based on their index scores. An equal number of invitations was extended to each group. The ideal goal was to have ten students from each group attend the program. Students with index scores in the top third, however, declined the invitation at a greater rate than students in the other two-thirds. For an explanation as to the manner in which the index is derived, see *infra* note 44.

Of the thirty students who initially indicated they would attend, only twenty-five began the program. Five students claimed that monetary and other unanticipated concerns prevented them from attending. Of the twenty-five students who began the program, two quit before completing one-half of the four week curriculum. Again, both students claimed monetary concerns as the primary reason for quitting the program. Finally, two students who completed the program decided not to enrol in the first year. Overseas family emergencies were involved in both cases. Hence only twenty-one students completed the program and enrolled immediately in the first semester at the law school.

The group who completed the program was diverse with respect to both gender (eleven women and ten men), and ethnicity. The group consisted of eight African-American women and two African-American men, three African/foreign male students, two Anglo-American women and one Anglo-American male, one Asian-American male, one Hispanic-American woman and three Hispanic-American men. Two African students who completed the program were unable to enrol in the fall semester. During the Critical Thinking and the Law Program the evaluator monitored the teaching and administration of exercises to determine whether they were designed to accommodate differences in learning styles. See *infra* note 73.

- [44] For a discussion of the reasons why a disproportionate number of students who agreed to attend were students with lower pGPA, see *supra* note 43. A pGPA of 2.75 or higher placed a student in the top third; 2.7–2.4 fell within the middle third; and below 2.4 placed in the lower third. The pGPA is a weighted calculation of the student's undergraduate grade point average (uGPA) and the student's Law School Admission Test (LSAT) score. The weighing is based upon the historical pattern of each law school and is intended to predict success in the first year of law school at a specific school. For instance, a student with an admission index of 2.4 at Thurgood Marshall School of Law is predicted, based upon historical evidence of other students with similar uGPAs and LSATs, to complete the first year of study at this law school with a 2.4 GPA. The same student might have a significantly different index at another law school with different historical data. For a list of studies validating the LSAT see *infra* note 68. For a comparison of the actual first year grade point average earned by program students, and how their actual performance compared to a control group, see *infra* notes 75–79.
- [45] See *supra* note 44.
- [46] The hiring of these assistants made it possible for the program to employ a four home room student/teacher configuration, and to reduce the basic student/teacher ratio to 8 to 1 at the outset of the program and 6 to 1 by the end of the program. The two teaching assistants also conducted weekly individual student evaluations. The presence of the teaching assistants, neither of whom had any prior exposure to legal education, at the daily and weekly revision of lesson plan meetings proved very helpful.
- [47] See *supra* note 21 and accompanying text.
- [48] Each week, students rotated among groups. The result of this rotation was that each student had all four faculty members as their group leader for one week. The rotation insured that the pre- and post-test performance was not skewed by differences with respect to the opportunity to interact with a given faculty member. The rotation also insured that each student would receive one weekly evaluation from each faculty member.

- [49] See *supra* notes 5–11 and accompanying text. For example, the first day of the first week's afternoon session focused on the specific thinking skill known as 'recall'. The skill was defined and several strategies to enhance recall were identified. The second day of the first week introduced a visual presentation of the thinking skills and related strategies upon which the program was to focus. For a discussion of the impact of a specific sequence of thinking skills on the reading and writing assignments for the course, and on the first three kinds of entries in the assigned student journals, see *infra* notes 57–63, 65 and accompanying text.
- [50] See *supra* note 11 and accompanying text. For a discussion of the sequencing of thinking skills, see *supra* notes 14–21 and accompanying text. Sequencing is a key feature of the 'step' programs for the teaching of thinking.
- [51] The first task each week was to define the skill(s) to be focused upon that week. For the definition of 'metacognition', see *supra* note 27 and accompanying text. 'Induction' was defined as the ability to create a rule which captures the essence or key points of commonality or difference of an examined set of facts, sources, symbols, or ideals. 'Evidence comprehension' was defined to focus upon the creation and use of pre-existing expert models (categorisations and sequencing) to facilitate understanding of an examined fact, source, symbol, or ideal. 'Evidence evaluation' was defined by equating it to the concept of 'assessment models'. 'Assessment Models' were defined as guidelines that facilitate the identification of the strengths and weaknesses of points made in oral and written presentations under study. During this week students learned and practised concepts that aided in the assessment of the strengths and weaknesses of sources under study, such as policy and interests analysis. Students were also exposed to traditional concepts of logic that identify the weaknesses of sources under study, including assumptions, bias, and logical fallacy detection. 'Evidence use' was defined as the ability to make inferences. 'Conceptualising/problem solving' was defined as the creative process of mentally combining and ordering the elements or components of a task to facilitate completion of that task. In week four of the program, students learned that it was valid to assume that a combination of metacognition, induction, and evidence comprehension, evaluation, and use were components of the solutions to most non-legal and legal problems.
- [52] See *supra* notes 28–32 for a discussion of the teaching of thinking movement's support for the premise that executive thinking skills should be introduced before cognitive and knowledge based skills, because acquisition or improvement of executive thinking skills facilitates acquisition of cognitive and knowledge based skills. See *supra* note 9 and accompanying text for a discussion of critical thinking experts' ordering by relative degree of complexity an array of thinking skills, including the three cognitive skill(s) focused on in the Critical Thinking and the Law Program. See also *supra* note 14 and accompanying text for a discussion of the critical thinking/teaching of thinking movement's support for programs that employ a progressively more difficult skill step approach.
- [53] For a discussion of strategies linked most closely by the program to metacognition, see *infra* note 64 and accompanying text. The program identified 'rule generation and application' as the strategy that best facilitated acquisition of the skill 'induction'. See *supra* note 32 and accompanying text for a defence of rule generation as the strategy to improve analogy evaluation. In applying this strategy to a law-related task, for example, the program created six categories into which the significant content of any case could be categorised. Students were then instructed to use the last three of those categories—the significant facts as found by the appellate court, the legal doctrine relied upon by the appellate court, and the interest identification-evaluation prioritisation decisions of the appellate court—to generate the main idea of that case. Group sessions generated fifteen questions on how to forge the three critical elements of a case brief into the main idea of a case, and the merits of attempting the generation of such a main idea.
- Assembly, group, class, and pair discussions focused the same day on extending the use of this strategy. It was demonstrated that the main idea of any given case could be compared and contrasted with the main idea of other cases, and that they could be collectively examined to identify the best precedent for a new case. Similarly, to solve a non-legal problem requiring induction, students were told to create as specific a rule as possible to represent the relationship of the given sources of information, and then to use that specific rule to examine and choose carefully the relationships between other sources that most closely represented this rule.

With respect to evidence evaluation, students were expressly instructed in the strategy of argument characterisation and evaluation. 'Modelling' and 'mimicry' of existing models were the strategies the program used most frequently with respect to acquisition and enhancement of conceptualising/problem solving. 'Modelling' is often characterised in the literature as the building of paradigms to solve specific problems. See CALHOUN, *supra* note 1, at 510–11. The program defined 'modelling' as the process of choosing the thinking skill(s) and related strategies and their correct sequence to complete an encountered task. For examples of the key models created during week four and earlier stages of the program are provided, see *infra* note 55.

- [54] For a discussion of the utility of expressly identifying tasks in developing a program of systematic instructional design, see PITRE, *supra* note 1, pp. 590–91. With respect to metacognition, the program was based on the premise that greater reliance on these executive skills could facilitate accomplishment of any task requiring the array of skills subsequently emphasised in the program. With respect to induction, non-legal tasks that were identified included word analogy problems on standardised tests, spatial and numerical repeat sequencing problems on standardised tests, and problems requiring the identification of the main idea of a reading passage on standardised tests. Legal tasks that were identified included generating the main idea of a specific case, generating the main idea of a series of related cases, labelling the end product of that process 'restatement', and identifying the best precedent for resolving a new case from among the main ideas of a series of related cases. Students were directed to identify and use the following concept: non-legal and legal tasks with different names are often identical. For example, the task of completing non-legal repeat sequences and legal identification of the best precedent were viewed as similar tasks. The program identified research as among the tasks whose accomplishment is facilitated by the ability to identify, evaluate, and use evidence. The program identified negotiation and counselling as among the lawyer tasks whose accomplishment is facilitated by the ability to conceptualise/problem solve.
- [55] See text accompanying *infra* note 56. One of the most influential aspects of the step program was its focus on a sequence of selected thinking skills. See *supra* note 50 and accompanying text. Other key elements of the program which were heavily influenced by the sequential step programs included the focus on displaying to the students and enticing the students to participate in creating 'expert' models to show how pertinent thinking operations might be performed. See *supra* note 53 for the definition of 'modelling' as a thinking strategy. See also BEYER (1987) *Practical Strategies for the Teaching of Thinking*. One expert model which was shown to students included a sequence of videotapes depicting experienced attorneys and law professors engaged in conversation about the thinking skills they would employ to advise a client about a problem which the authors posed to the respondents. Some of the skills and values identified by the experienced practising attorneys on the videotapes included the ability to evaluate a case from the perspective of both parties, intense loyalty to the interests of a client, the ability to justify the arguments that one makes on behalf of clients by resort to broad based legal principles and policies, the ability to negotiate on behalf of and to counsel clients, and the related skill of communicating precisely certain perceptions about client options and preferences. Students were also introduced to, and practised with, thinking skill and related strategy models created to perform such tasks as case briefing, synthesis creation (we employed the term 'restatement' when the sources under study were legal sources), and performance on the LSAT.
- [56] See *supra* notes 22–24 and accompanying text.
- [57] This insured that at least one assignment per day could be made from the reader.
- [58] After the very first readings on teaching of thinking described the critical thinking/teaching of thinking movement, defined critical thinking, and earlier critical thinking programs, the focus in the reader narrowed to metacognition. The 'thinking like a lawyer' articles or excerpts began with materials that focused specifically on the lack of a consistent definition for this phrase. Other articles described the few experiments law schools had undertaken to evaluate the influence of programs, courses, or specific teaching strategies designed to enhance the ability of law students to think like a lawyer.
- [59] The first paragraph of each summary was to restate the main idea of the excerpt. The second paragraph of each summary was to state the student's views of the critical thinking skills and strategies identified or enhanced by reading the excerpt, and how the student was going to use the

excerpt in planning for law school study. The summaries were collected each morning and evaluated by the teaching assistant with a background in writing critique and by the faculty member assigned as the student group leader for that week. These evaluations were shared with the student during the individual evaluations conducted at the end of each week. The summaries were returned to the students at that time and placed by the students in the section of their journals established for these summaries.

- [60] MISKIN, P. & MORRIS, C. (1965) *On Law In Courts* (Brooklyn, NY, Foundation Press). This casebook was selected due to one of the author's prior use of the book in introduction to law programs and courses. The book's content, including secondary material, lent itself to conversion as the primary source for demonstrating the utility of learning thinking skills to facilitate a student's introduction to law and the thinking tasks of lawyering.
- [61] For a discussion of the general pedagogic value of expressly identifying the thinking tasks encountered in a given field of study, see Pirie, *supra* note 1, at 571. Once each student completed an individual search for lawyer's thinking tasks in the casebook, group, class, and assembly discussions compared and contrasted what was discovered. Finally, revisions of the identified lawyer's thinking tasks and skills were made by the pairs, group, class, and assembly sessions.
- [62] Lawyer thinking tasks and skills identified from the first fifteen pages included the knowledge and skill needed to avoid litigation, researching a legal problem, understanding the process and procedures of litigation, predicting the outcome of new client cases based upon current precedent, developing a plan of action/theory of the case that accommodates client goals, adequately counselling a client, and mastering legal jargon/terms of art. An assembly session completed discussions which had moved from pairs to groups to classes on the identification of lawyer skills in the next twenty pages of the casebook. The list produced by the end of the assembly session included another twenty lawyer thinking skills which were paired with the strategies used to identify these skills in the casebook. Some of the lawyer thinking tasks and skills identified by students in those twenty pages included a working knowledge of the court systems of a state and the federal government, and the creation of new law by applying broad based legal principles and policies to new situations. One of the non-legal trained teaching assistants expressed her surprise during one of these sessions in discovering the significant role 'creativity' played in lawyering.
- [63] Again students were presented with a model from the first cases in the casebook on how to categorise information in the case, and employ the categorised information to state the main idea of the case. The task of writing the main idea of a case paralleled the task of writing the main idea in summarising excerpts from the reader. For a more detailed account of the process of identifying the main idea in a casebook case, see *supra* note 53.
- [64] The students in the program practised daily the thinking-aloud-in-pairs metacognitive strategy advocated by Whimbey. See *supra* note 33 and accompanying text. The students were introduced to metacognition when they were sent a set of pre-attendance assignments, including a request to identify all formal and informal prior experiences with the direct teaching of thinking and critical thinking. These experiences were collected and shared. The program also relied heavily on the metacognition-related strategy of visualisation of the topics under discussion. Over two hundred visual representations of the thinking skills, tasks, and strategies, along with their interrelationships, were created by the groups, class, and assembly sessions during the twenty days of the program. Metacognition was the basis of the self-monitoring strategy that was a key element in the construction of a standardised general model to enhance performance on multi-choice tests of all types. This model included enhancing self-awareness of timing, the use of 'surveying' a series of related test items, the pre-creation of a test plan, and the pre-identification of a sequence of steps in executing that test plan.
- [65] For a discussion of the identification of 'transference' as a critical thinking skill, see *supra* note 24 and accompanying text. The blank journals were purchased for each student by the program staff. The journals were program personalised by the creation and use of a critical thinking logo as a cover sheet. Replications of Rodin's 'The Thinker' served both as the cover sheet for the journal and the critical thinking reader. See *supra* notes 57-58 and accompanying text. Prior to distribution to the students, ten organisation tabs with accompanying blank sheets of paper were inserted into the journals, and on each tab a section heading title was written. The tab headings first focused on

recording of 'thinking/lawyer thinking tasks', 'related skills and strategies', and their 'applications'. The remaining categories were organised to facilitate transference of lessons from these first four categories to preparation for law school. These categories included 'course organisation', 'time management', 'note-taking', 'exam preparation', 'Me and the Law', and a glossary of legal terms. Each student was given approximately thirty minutes each day to record in their journals the lessons of the last twenty-four hours. Students were also urged to record in their journals during the evenings following each daily session and over the week-ends. The journals were collected and reviewed by the instructional team and the evaluator at the end of each week.

- [66] The report included sections on: 'Program Implementation', 'Instructional Activities', 'Student Assessment Instruments', and 'Evaluation of Outcomes'. For an explanation of the selection of the evaluator, her expertise, and a statement of the scope of her assistance to the program, see *supra* notes 40–41 and accompanying text.
- [67] The purpose of reporting the results of the pre- and post-tests is to share with others in legal education how such comparative performance on standardised tests might be employed as an element of an overall evaluation scheme.
- [68] The 'Mini-Law School Admission Test (LSAT)' was constructed from selected actual items from prior tests, and after consulting with persons at LSAC/LSAS who had an oversight role in the construction of the LSAT. The consultations focused upon how many and what type of questions should be selected to maximise the possibility that the test would mirror the test content of the actual test given the administration time of forty-five minutes.

The LSAT, which is administered to every applicant for admission to an ABA-accredited American law school, has been evaluated for validity in a number of studies conducted on behalf of the Law School Admission Council. See e.g., ALFRED B. CARLSON (1970) Factor analysis and validity study of the law school admission test battery 261 in: *Reports of LSAC Sponsored Research*, Vol. I; BARBARA PITCHER (1973) An exploratory study of the possibility of curvilinearity in law school validity study data 387 in: *Reports of LSAC Sponsored Research*, Vol. II; BARBARA PITCHER (1974) *LSAT part-score validity study* 535 in: *Reports of LSAC Sponsored Research*, Vol. II; W. B. SCHRADER & BARBARA PITCHER (1974) Extension of the study of the possibility of curvilinearity in law school validity study data 691 in: *Reports of LSAC Sponsored Research*, Vol. II; FRANKLIN R. EVANS (1982) Recent trends in law school validity studies 347 in: *Reports of LSAC Sponsored Research*, Vol. IV; ROBERT L. LINN & C. NICHOLAS HASTINGS (1983) A meta analysis of the validity of predictors of performance in law school, in: *Reports of LSAC Sponsored Research*, Vol. IV.

An internal consistency measure of reliability is reported by LSAC Law Services for every test form. Reliability coefficients for LSAT forms have ranged from 0.90 to 0.95. Law School Admission Council, LSAT 1992–93 Information Book (1992).

- [69] *The Psychological Corporation, Watson-Glaser Critical Thinking Appraisal* (1980). Norming data, reliability and validity information for the Watson-Glaser Critical Thinking Appraisal may be found in the Manual for the instrument. GOODWIN WATSON & EDWARD M. GLASER (1980) *Watson-Glaser Critical Thinking Appraisal Manual* (San Antonio, TX, The Psychological Corporation). For a collection of a wide range of reviews of the test, some critical of the instrument and some laudatory, see McMILLAN, *supra* note 35 p. 10.

The Watson-Glaser Critical Thinking Appraisal has been widely used to measure improvement in critical thinking and problem solving ability as a result of educational intervention. See, e.g., CLARENCE YOESTING & JOHN W. RENNER (1969) Is critical thinking an outcome of a college general physical science course, *School Science & Maths*, 69, p. 199 (concluding that the course in general physical science did contribute to the improvement of the students' ability to think critically); GEORGE CHAREN (1970) Do laboratory methods simulate critical thinking?, *Science Education*, 54, p. 267 (noting that the investigator's tests of critical thinking found no significant difference in favour of either laboratory approach, whereas analysis of the Watson-Glaser pre-test/post-tests demonstrated a significant difference in favour of the control); RUSSELL M. AGNE & DAVID J. BLICK (1972) A comparison of earth science classes taught by using original data in a research-approach technique versus classes taught by conventional approaches not using such data, *Journal of Research in Science and Teaching*, 9, p. 83 (finding that the data-centred experimental unit

- showed significantly greater gains in total score on the Watson-Glaser post-test over the Watson-Glaser pre-test); ROBERT J. STARR (1972) Structured oral inquiry improves thinking, *American Biology Teaching*, 34, p. 408 (reporting that the use of [structured inquiry materials] with high-ability students resulted in significant gains in critical thinking when compared with similar students who did not use the materials); LINDA F. ANNIS & DAVID B. ANNIS (1979) The impact of philosophy on students' critical thinking ability, *Contemporary Educational Psychology*, 4, p. 219; JUDITH UTZ ARAND & CAROL GIBB HARDING (1987) An investigation into problem solving in education: a problem-solving curricular framework, *Journal of Allied Health*, 16, p. 7 (finding that a particular course within the overall curriculum that was specifically oriented toward problem solving had a significant impact on improving critical thinking skills); KENT R. COLBERT (1987) The effects of CEDA and NDT debate training on critical thinking ability, *Journal of the American Forensic Association*, 23, p. 194 (finding that the critical thinking test scores are consistently higher for debaters than for nondebaters and that the type of debate training was not significant in terms of critical thinking scores).
- [70] CHARLES D. SPIELBERGER *et al.* (1989) *Test Anxiety Inventory* (Palo Alto, CA, Consulting Psychologists Press).
- [71] CHARLES D. SPIELBERGER (1983) *State-Trait Anxiety Inventory—Form Y* (Palo Alto, CA, Consulting Psychologists Press).
- [72] DAVID KOLB (1985) *Learning Style Inventory* (Boston, MA, McBer and Company). Reliability and validity information for the Learning Style Inventory (LSI) are included in the technical Manual for the instrument produced by McBer and Company. The Manual reports excellent internal reliability for the two combination scores. The theory underlying the LSI is that people develop different learning styles to acquire/employ cognitive skills, and that these differences can be categorised along two primary dimensions. The first dimension is a continuum, beginning with people who employ concrete experiences (CE) and ending with people who rely primarily upon abstract conceptualism (AC). The second dimension is also a continuum, beginning with people who employ active experimentation (AE) and ending with those who rely primarily upon reflective observation (RO). These two dimensions are employed as an X (CE—AC), and Y (AE—RO) axis, and a twelve question inventory is administered to subjects. Each question has four options, representing a choice between the four end points of the two dimensions, and the subject is asked to rank the four options in the order of his or her preference. The responses are then graphed on the X,Y axis. Kolb describes a person who prefers to learn more by concrete experience and active experimentation as an 'Accommodator' and describes such persons as relying on action rather than theory formation. Learning for such persons results most readily from 'hands-on' experience. Kolb describes a person who prefers to learn more by concrete experience and reflective observation as a 'Diverger', and describes such persons as relying on imagination and multiple-perspectives. Kolb describes a person who prefers to learn more by abstract conceptualism and active experimentation as a 'Converger', and describes such persons as relying on technical skills and practical solutions. Finally, Kolb describes a person who prefers to learn more by abstract conceptualism and reflective observation as an 'Assimilator', and describes such persons as relying on inductive reasoning and logic for purposes of theory building.
- Studies using the Learning Style Inventory have examined whether students or professionals from particular disciplines have common learning styles. Accounting students and professionals, have been found to be predominantly 'convergers'. See B. JENKINS & J. HOLLEY (1991) Learning style preferences and the prospective accountant: are there gender differences?, *The Woman CPA*, pp. 46, 49. Studies of law students and law professors demonstrate preference for the Converger or Assimilator styles. Indeed, Professor Cynthia Kelly has argued that "the traditional law school is generally oriented toward only one type of learner: the assimilator, who is most comfortable with abstract theoretical models and a reflective approach to learning". See CYNTHIA ANN KELLY (1983) Education for lawyer competency: a proposal for curricular reform, *New England Law Review*, 18, pp. 607, 621. A survey of the learning styles of faculty at The University of Tulsa College of Law in 1985 found that the faculty overwhelmingly preferred the Converger Style. See correspondence from Prof TAUNYA L. BANKS on file with the authors. A survey of the participants in the Leadership

Institute in Judicial Education, which was offered by the State Justice Institute in 1990, found that appellate judges were generally Assimilators, while the administrators in attendance were typically accommodators. See PAUL NEJELSKI (1990) Symposium seeks new approaches to judicial education, *Judicature*, 74, p. 104.

A search of the ERIC database and publications making reference to the LSI uncovered no reported studies which employed the LSI to track the influence of a course of study, program or experience on the learning style of college age students. The study described in this article did use the LSI in such a pre- and post-course fashion. See *supra* note 51 and accompanying text for a discussion of the selection of conceptualising/problem solving as one of four kinds of thinking skills focused on by the program. The specific focus on concept/model creation and on metacognition are possible reasons why the program students perceived their learning styles shifting significantly from concrete to abstract.

- [73] *The Psychological Corporation, Survey of Study Habits and Attitudes* (1965) (New York, The Psychological Corporation).
- [74] $p < 0.05$; $t = 2.67$.
- [75] $p < 0.05$; $t = -2.62$. The authors evaluated, but were unable to account for the significant drop-off on the Dispute Characterisation questions. Studies conducted by the Law School Admissions Council provided some evidence that most repeat takers improve their overall LSAT score. LINDA WIGHTMAN (1990) *The Validity of L.S.A.T. Scores for Repeaters: A Replication* (Newtown, PA, Law School Admission Council/Law School Admission Services). This question type was dropped from the LSAT in June 1989 because it added no independent predictive value. See *The LSAT: Sources, Contents, Uses* 4 (Sept. 1991).
- [76] A total of twenty-one program students completed the summer program and enrolled in the fall semester. Two of these students were dropped from the follow-up study, because neither of them could be matched with a control group student. One program student had a predicted grade point average of 3.1, and no student with that index enrolled in her section of first year classes. Another program student was enrolled in courses in all three sections of the first year. Hence it was not possible to identify a control group student(s) for reasons explained *infra* note 77.
- [77] See *supra* note 44 for a discussion on the bases for deriving a predicted first year grade point average. The control group consisted of twenty-six men and seventeen women. It included twelve African-American women and nine men, one Caucasian-American woman and eight men; three Hispanic-American woman and nine men; and one Asian woman. The control group was thus more diverse than the program students. See *supra* note 43. The authors recognise the desirability of a control group with the experience of a four week 'headstart' program that did not focus on materials from the teaching of thinking/critical thinking movement. The nature of grant funding, however, made such a control group creation impossible since it would have required an additional \$30,000. See also *infra* note 83 for a discussion of evidence that neither enrolment in a summer program nor exposure to traditional content in such programs is likely to produce the results described in this study. At Thurgood Marshall School of Law, four of the five courses required during the first year are year-long courses. These are Civil Procedure (6 hours), Contracts (5 hours), Property (5 hours), and Torts (5 hours) The only grade of record is a final grade which is awarded at the end of the entire academic year. Case Analysis is taught in the fall semester (3 hours), and a grade is awarded. The Case Analysis course continues during the second semester with a focus on appellate advocacy (3 hours), and a separate grade is awarded. Finally, Substantive Criminal Law is a second semester (3 hours) course. At Thurgood Marshall School of Law, first year students at the time of the follow-up study were placed into one of three sections, with approximately 60 students in each section. Each section of each course is normally taught by a different professor, and only rarely does any single professor teach more than one first year course, with the exception that one professor has normally taught a section of Torts and a Substantive Criminal Law section. One of us taught Civil Procedure in the follow-up study year, and the other Substantive Criminal Law. Until 1990-91, the law school did not employ a grading curve. Hence, differences in the collective grading patterns of the professors assigned to the courses in one section might produce a different range of grade point averages for the students in the three different

- sections. For this reason, it was deemed important to compare only students with the same index in the same section.
- [78] A program student with a pGPA of 2.4 had a GPA of 3.43, the best of all 62 students. Another program student with a pGPA of 2.3 had a GPA of 3.23, second best of the total array. A third program student with a pGPA of 2.3 achieved a GPA of 3.07, which was tied for third highest average among the total array.
- [79] An analysis of variance was performed to predict the difference between predicted and actual GPA from the factors of group (program vs. control) and section. Although there was a significant main effect of section ($F(2, 56) = 6.21, p < 0.005$), there was no effect of group or the interaction of group by section. While the statistical analysis of predicted vs. actual performance does not permit us to conclude that the program had a positive effect on the program students, when compared to their non-program (control group) peers, the fact that 68% of these students performed better than they were predicted to perform in the first year of law school is encouraging. The results seem positive enough to warrant further investigations using our approach, or a similar approach, with a population that could yield a larger sample size for statistical purposes.
- [80] During the 1988–89 academic year, overall the students assigned to section 3 ended the year with an average GPA higher than that of the other two sections. Ten of the nineteen program students (53%) were randomly enrolled in section 3, whereas only eleven of the forty-three control group students (26%) were randomly enrolled in section 3. Within section 3, nine of the ten program students earned a GPA greater than their pGPA, as did nine of the eleven control group students. Thus it is possible to attribute the improvement of GPA over pGPA to the relatively more favourable grading patterns of the instructors assigned to teach in section 3. We recognise that had our statistical analysis been more supportive of the educational intervention, the small sample size alone would probably not have supported strong statements of success.
- [81] The Hawthorne Effect takes its name from a series of studies that investigated the influence of a variety of job conditions, including illumination, on the productivity of assembly line workers. The studies included those conducted at Western Electric's Hawthorne Works, located in Cicero, Illinois. The most significant finding of the studies was that the changes in job conditions had no significant effect on productivity, but that productivity increased with every 'experimental' period. BAUERNFEIND & OLSON (1973) Is the Hawthorne Effect in educational experiments a chimera?, *Phi Delta Kappan*, 55, p. 271. The Hawthorne Effect is defined in educational research as changes in behaviour as a function of awareness of participation in an experiment. ADAIR, SHARPE & HUYNH (1990) The placebo control group: an analysis of its effectiveness in educational research, *Journal of Experimental Education*, 59, pp. 67, 68. Hawthorne effects have also been broadly defined by educational researchers as the distorting influence of attention paid to an experimental group, awareness of the experimental group that they are participating in an experiment, the experimental activity undergone by the group, as well as the related distortions of higher motivation, novelty, and interactions with the designers/conductors of the experiment. ADAIR, SHARPE & HUYNH (1989) Placebo, Hawthorne, and other artifact controls: researcher's opinions and practices, *Journal of Experimental Education*, 57, pp. 341, 344.
- The most frequently employed technique to control for the Hawthorne Effect(s) is the creation of a specially treated control group, defined as any control group which receives something (usually a simulation of the awareness, attention, or activity of the experimental group or a combination thereof) beyond which a no treatment or wait list control group receives. ADAIR, SHARPE & HUYNH (1989) Placebo, Hawthorne, and other artifact controls, *Journal of Experimental Education*, 57, p. 344. A placebo group, for example, is an attempt to emulate in education (or other social science) research the use of an inert substance with no known pharmacological effect in medical science. ADAIR, SHARPE & HUYNH (1990) The placebo control group, *Journal of Experimental Education*, 59, p. 67.
- In the five decades since the results of the Hawthorne Works study were reported, commentators have sharply criticised the validity and initial interpretations of those experiments. DIAPER, G. (1990) The Hawthorne Effect: a fresh examination, *Educational Studies*, 16, pp. 261, 263. Commentators note that educational researchers accepted without a single substantiating study

that awareness of participation in educational experiments may taint educational research results. BAUERNEFEIND & OLSON (1973) Is the Hawthorne Effect in educational experiments a chimera?, *Phi Delta Kappan*, 55, p. 271. Commentators note that confusion surrounds the use of specially treated control groups (STCGs), such as Hawthorne, Placebo, or attention-Placebo control groups in educational research. Although widely used to control for artifact arising from the experimental setting, there is little agreement on either the contaminating variables or the appropriate STCG activity. ADAIR, SHARPE & HUYNH (1989) *Placebo, Hawthorne, and other artifact controls*, *Journal of Experimental Education*, 57, p. 344; Accord GEPHART & ANTONOFLOG (1969) The effects of expectancy and other research-biasing factors, *Phi Delta Kappan*, 50, pp. 579, 580. Indeed, the fundamental question of whether and how the placebo concept, for example, applies to behavioural research has never been adequately addressed. ADAIR, SHARPE & HUYNH (1990) *The Placebo Control Group*, *Journal of Experimental Education*, 59, p. 67. Recent surveys of educational researchers employing such STCG(s) found that approximately the same number of researchers believe such groups would perform at the same level as no-treatment control groups (NTCG), as those who believe they will perform better. ADAIR, SHARPE & HUYNH (1989) *Placebo, Hawthorne, and other artifact controls*, *Journal of Experimental Education*, 57, p. 345. Most modern educational researchers employing STGC or NTCG believe that awareness by subjects that they are participating in an experiment and expectations arising from such known participation are artifacts of little concern to modern researchers. ADAIR, SHARPE & HUYNH (1989) *Placebo, Hawthorne, and other artifact controls*, *Journal of Experimental Education*, 57, p. 352. For example, just over a quarter of researchers seeking to match activities of the experimental group with the special treatment control group expected that the STCG would perform better than a NTCG. ADAIR, SHARPE & HUYNH (1989) *Placebo, Hawthorne, and other artifact controls*, *Journal of Experimental Education*, 57, p. 347.

More significantly, almost all studies designed to prove the existence of Hawthorne/Placebo effect(s) have failed to produce empirical evidence to support the existence of the former, and little evidence exists to support the existence of the latter. ADAIR, SHARPE & HUYNH (1990) *The placebo control group*, *Journal of Experimental Education*, 59, p. 69. Accord ADAIR, SHARPE & HUYNH (1989) Hawthorne control procedures in educational experiments: a reconsideration of their use and effectiveness, *Review of Educational Research*, 59, pp. 218, 224; BAUERNEFEIND & OLSON (1973) Is the Hawthorne Effect in educational experiments a chimera?, *Phi Delta Kappan*, 55, p. 273. DIAPER, G. (1990) The Hawthorne Effect: a fresh examination, *Educational Studies*, 16, p. 264 (arguing that even when educational studies found a "Hawthorne Effect", reviewers have attributed it to such specific cues as the STCG being told that a particular program had proven very effective in helping other students); HADDAD, NATION & WILLIAMS (1973) Programmed student achievement: a Hawthorne Effect?, *Research In Higher Education*, 3, pp. 315, 321; RUBECK & PATRICIA (1975) Hawthorne concept—does it affect reading progress?, *The Reading Teacher*, 28, pp. 375, 378–79. Similarly, 'meta-analysis' of educational studies purporting to employ awareness, attention, or activity controls found no support for the effectiveness of any of the three artifact control procedures. Ibid. STCG which combined simulation of activities of the experimental group and attention were more likely than other controls to produce a control group performance between that of the experimental group and a NTGC, but such studies were more frequently studies of interpersonal rather than academic topics and were more comparable to psychotherapy than to educational studies. ADAIR, SHARPE & HUYNH (1990) *The Placebo control group*, *Journal of Experimental Education*, 59, p. 79. Activity simulation STCG in educational studies were found less successful than even attention and awareness in producing evidence that mere emulation of treatment can account for improvement in educational performance. ADAIR, SHARPE & HUYNH (1989) Hawthorne control procedures in educational experiments, *Review of Educational Research*, 59, p. 225. Moreover, meta-analysis of a comprehensive survey of educational studies purporting to employ Placebo controls concluded that other control methods can reduce distortion to where use of a STCG has no additional significant impact. Ibid, p. 225.

The Critical Thinking and the Law study used a no treatment control group. Many educational research studies have employed no treatment control groups. ADAIR, SHARPE & HUYNH

(1989) Placebo, Hawthorne, and other artifact controls, *Journal of Experimental Education*, 57, pp. 343–44. Researchers employing NTCGs have justified their decision on lack of practical ability to use a STCG given the nature of their study, and the adequacy of other controls such as randomisation. ADAIR, SHARPE & HUYNH op. cit. pp. 350–51, 352. Both reasons account for why no STCG was used in our study. See *supra* note 77. Grants for this project totalled \$50,000; to include a STCG would have increased the costs of the study by another \$20,000–\$30,000. Such additional funding was unavailable the summer the program was conducted.

Moreover, in the overwhelming number of educational studies which compared the performance of a STCG on a standardised test to that of the experimental group and a NTCG, no significant difference was found in the performance of the STCG and the NTCG. BAERNFEIND & OLSON (1973) Is the Hawthorne Effect in educational experiments a chimera?, *Phi Delta Kappan*, 55, p. 271. Educational theorists have even postulated that if there is a Hawthorne Effect it decays with the passage of time, *Ibid*.

Finally, it should be noted that most law school experimental programs have found that manipulating teaching methods does not influence comparative law school performance. See *supra* notes 1, 9. Two years after the Critical Thinking and the Law Program, Thurgood Marshall School of Law instituted a six week summer preparation program called 'LEAP' (Legal Education Advancement Program). The program was designed to improve the first year academic performance of the law school's discretionary admit category. Twenty LEAP students completed that program and enrolled at the law school in the fall. A majority of these students had pGPAs for that year which were higher than those of a majority of the Critical Thinking and the Law Program students. Eleven of the 'LEAP' students failed to achieve the minimum grade point average of 2.0, and only two of these students finished in the top twenty percent of the class. The attrition rate was as high or higher than that expected for these discretionary students based on the experience of recent years at the law school. This indicates that it is not necessarily true that all summer programs will enhance performance of the treated group of students.

[82] See *supra* notes 3–35 and accompanying text.

[83] See *supra* notes 36–38, 42–65 and accompanying text. A reviewer of an earlier draft of this article seemed to object to our great reliance on the teaching of thinking movement and the choice of cognitive skills and related strategies and tasks that we emphasised as a result of that reliance. This reviewer believed that we should have paid more attention to the literature on thinking by lawyers such as that found in the books and articles by LEVI, CROMBAG & SCHLAG. See, e.g., CROMBAG *et al.* (1975) On solving legal problems. *Journal of Legal Education*, 27, p. 168; LEVI (1949) *An Introduction to Legal Reasoning* (Chicago, The University of Chicago Press); SCHLAG & SKOVER (1986) *Tactics of Legal Reasoning* (Durham, NC, Carolina Academic Press). While we had previously studied this literature and used it in transferring lessons to the law school setting, see *supra* note 1, we view the teaching of thinking literature as a sounder fundamental basis for building such special assistance programs. This is not to say that the skills we chose to emphasise are the only skills and attributes that might be chosen, but rather that it is important and useful to have a coherent theory of learning in mind when designing a program of educational intervention.

[84] See *supra* notes 39–41, 66–75 and accompanying text.

[85] See *supra* notes 79–81 and accompanying text.

[86] See *supra* notes 68–72 and accompanying text.