WHY CAN'T STUDENTS THINK MORE LIKE HISTORIANS?

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After years of trial and error, toil and tears, history teachers and specialists in various fields of education and psychology are still seeking the fundamentals of a more systematic approach to the teaching of historical thinking. At the heart of the matter are several questions: 1) What cognitive tasks, processes, and skills are essential to historical problem solving? 2) What heuristics or rules-of-thumb aid the historian? 3) To what extent are college students proficient in these areas? Earlier research by Edwin A. Peel, Martin E. Sleeper, and Roy N. Hallam has approached historical thinking in terms of the classical tasks devised by Jean Piaget, and their studies have centered upon adolescent problem solving.[1] While of great importance, their results are difficult to translate into teaching objectives for college students.

For the purpose of answering the above questions in a manner easily applicable to the college classroom, an information-processing approach was taken. Information-processing theory views man as a system which receives information from its environment and processes it through the application of intellectual processes and skills. In order to identify the expert's problem-solving skills, processes, and heuristics, four professional historians were tested and a model of Historical Problem Solving was constructed (Table I). The entry level behavior of college students was determined by administering a second test problem to five history majors. After analyzing and comparing the behavior of experts and novices, a descriptive list of errors associated with each process and skill was written. Heuristic deficiencies were also noted as a prerequisite to the selection and teaching of historical problem solving.

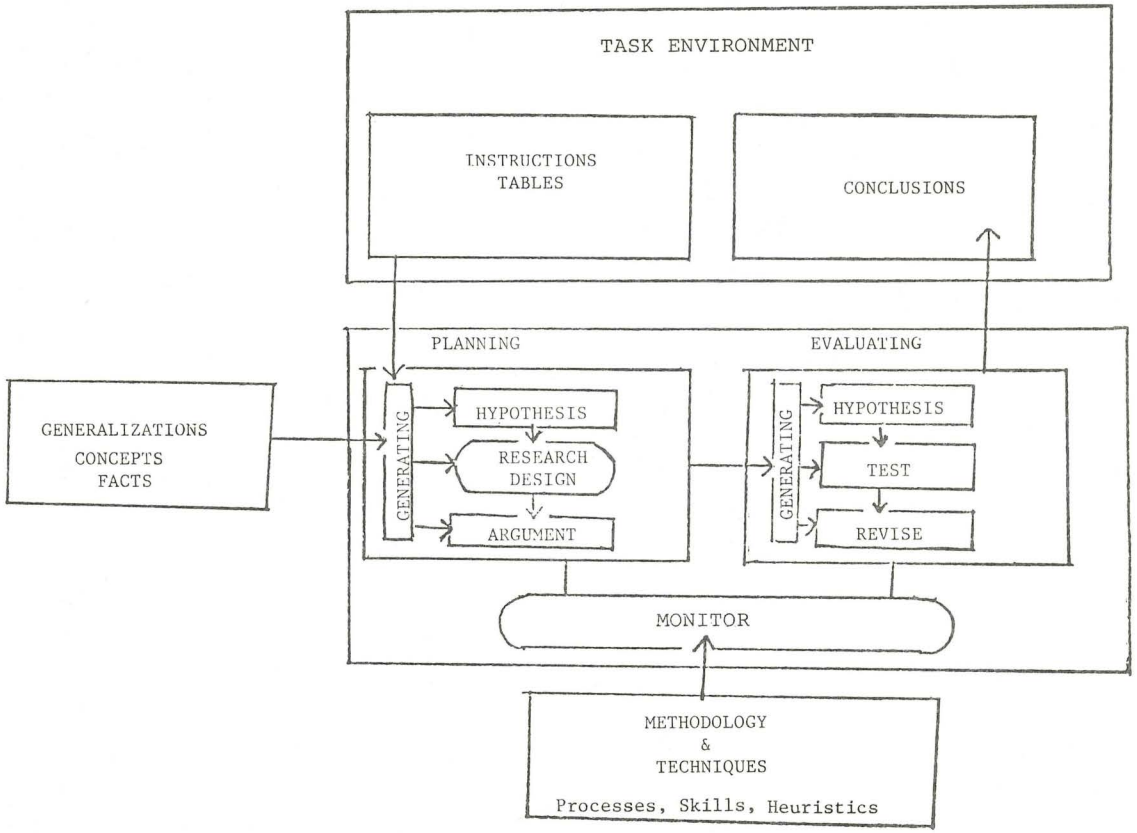
METHOD

Four professional historians were selected for testing. Although each worked in the general area of United States Social History, some began work in other fields. The first historian majored in European and Nineteenth-Century English History but switched to Public Health and Medical History later. The second historian is a specialist in Cultural History, particularly that of the early nineteenth century. The third historian worked primarily in the history of the South before moving into Black History in recent years. Historian four specializes in Frontier and Trans-Mississippi West History. Despite these differences, all share a common training experience, processes, skills, and heuristics. These will be clarified later.

Test materials consisted of a set of instructions, a problem in social history, and two sheets of additional tables. Each subject was tested individually and asked to do all reading and thinking aloud so that responses could be taped. The instructions required each historian to read through a table of statistical data entitled "Couples Having First Child Within Eight Months After Marriage."[2] The percentages of couples having premarital relations were taken from two Virginia tidewater counties and arranged by decades covering the period from 1700 to 1769. Each county was presented separately. After reading through the problem, the historian was asked to describe the situation as he inferred it from the table and to hypothesize possible causes of the fluctuations in premarital behavior. The subject was then requested to outline his "research design in terms of the materials you would sample and the proof(s) you expect to find for your hypothesis(es)?" Following the generation of a list of sources and their potential bearing upon the hypothesis(es), the specialist was instructed: "Assuming that you find the desired evidence, how will you argue that it supports your hypothesis(es)?" Finally, the historian was allowed to open and read the data contained in the Evidence

TABLE I

HISTORICAL PROBLEM SOLVING



envelope. It contained three more tables. The first showed "Trends in Premarital Relations by Class" for both counties. Socio-economic status was determined on the basis of landholdings, wills, and inventories prior to dividing the couples into upper and lower classes. A second table gave the "Average Tobacco Price in Pence Per Pound" for the same decades. Through matching this table with the previous one, the historians found a correlation of price with upper-class premarital behavior. A final table, "Permissiveness Index and Population Change," provided parallel columns tracing the correspondence of growing population density to the percentage of cases of nonmarital behavior which were presented to and dismissed by the county courts. The historians found these figures correlated with lower-class behavior. They were again requested to infer possible causes of premarital behavior and to demonstrate whether or not the new evidence supported any of their hypotheses. Finally, these experts were asked how they might modify their hypotheses and why they felt that their final conclusions were acceptable.

Table I describes the historical problem-solving process evoked by the instructions and tables. The Task Environment contains the factors external to the problem solver. As materials are read or examiner prompts given, the individual scans the information, focuses upon essential attributes of the problem, and generates hypotheses. Questions stimulated by the data evoke chains of associated information from Memory. These, in turn, may act as further probes into memory for still other associations. Information is stored and cross-referenced in memory much as in a library file system or computer memory bank, and each probe, in effect, scans the index for related knowledge. This retrieved information helps to fill in gaps and to reconstruct the problem setting. Each reconstruction may suggest one or more hypotheses. Some immediate evaluation of the "fit" of the hypothesis to the problem attributes may then take place; for example, does the hypothesis accord well with the time, place, and other relevant knowledge? During this phase, hypotheses are tested, revised, or deleted. If the hypothesis appears "fruitful," it is fed into research design and argument construction. A new hypothesis may be suggested at any point, and this will then be recycled back through design and argument construction. After the last argument is stated, new evidence is read, and the process is repeated with the exceptions of research design and argument construction. Old and new hypotheses are evaluated, employing a knowledge of such criteria as the "fit" of the evidence, its weight, variety, and quality. If an hypothesis is confirmed, a conclusion is stated. All of this activity is monitored and regulated by the historian's knowledge of methodology and investigative techniques. Through analysis of the taped readings and responses, much was learned of this monitor and its role in historical thinking.

Following these taped sessions, transcripts were typed and each line numbered for reference. Lines were broken down into thought segments or goal-oriented inference chains which were initiated by new information both internal and external. A segment terminates when no further inferences can be drawn.[3] For the purpose of making possible discoveries readily applicable to classroom situations, the results of earlier analysis were translated into a simpler format (see Table II).[4] In column one are listed the "Data" being read and the cognitive tasks employed: 1) Search and Focus require the individual to read through the material and focus upon relevant information: e.g., names, dates, places, headings, sub-headings, trends, peaks, correlations, curious phenomena, etc. 2) Reconstruction of a problem setting requires the subject to integrate new information with prior knowledge in order to draw inferences and arrive at hypotheses. The cognitive processes most frequently found to be associated with Search and Focus are Scanning/Holding and Generating/Listing. The first pair "involves sampling information, holding some of it in mind, and recoding it at the same time so that a portion will be available for later reference . . . ." The second pair is concerned with generating lists of questions, sources needed

TABLE II

Historian 1

TASK	PROCESS	SKILL	DESCRIPTION	LINE
Data: PMR Tables				
Search/Focus	Scan/Hold	Comprehension	Notes and wonders why "this high fluctuation?" Notes upward tendency in both A&B to 1739 but A drops later while B's % stays high.	B33-40
	Gen./List (KN)	Knowledge	Are figures accurate?	B44-47
			Steady pop. increase?	B54-55
Reconstruction	Order/ Relate/ Recall	Interpretation Knowledge	Notes 1740s data corresponds to time of Great Awakening and infers it could have decreased PMR.	B56-60
S/F	G/L(KN)	Knowledge	Were there urban-rural differences?	B61-63
	S/H	Comp.	Notes PMR increases in Co. B 1730-59 but not in Co. A.	B64-66
	G/L(KN)	Knowl.	Any religious differences between counties?	B67-71
	G/L(KN)	Knowl.	Frontier or settled?	B72-76
	G/L	Knowl.	Returns to question of PMR increase 1700-39, slight drop, and peak in 1750s.	B89-97
S/F	S/H	Comp.	Notes 1739 beginning of a war	B99
Recon.	O/R/R	Knowl. Interp.	War of Spanish Succession, King George's War--possible effect?	B100-101
		Analysis Evaluation	Tests War of Spanish Succession, 1701-1715, against PMR and concludes war had no effect.	B107-108

to answer those questions, test implications of the expected proofs, and arguments stating the relationships between the evidence and hypotheses.[5] Although the Generate/List process may appear in conjunction with Reconstruction, it is most frequently associated with research design. The processes of Order, Relate, Recall govern the organization, storage, and recall of information. Concepts are created, labeled according to criterial cues (field, topic, name, event, date, etc.), and stored for later use in memory. Information may be ordered hierarchically, sequentially, geographically, or causally in the form of generalizations.[6]

The cognitive skills found to be associated with these processes are listed in column three and are based upon those found in Benjamin Bloom's Taxonomy.[7] Fundamental to all the skills is Knowledge of facts, concepts, generalizations, sources, and methodology. Comprehension requires a grasp of the meaning of a communication and the ability to paraphrase it accurately. Interpretation involves the ability to discover relationships and to infer logical implications. For the purpose of this study, Analysis is defined as the ability to construct and/or evaluate arguments according to historical methodology and rules of logic; also, the ability to distinguish necessary from sufficient causes.[8] Synthesis "involves the process of working with pieces, parts, elements, etc., and arranging and combining them in such a way as to constitute a pattern or structure not clearly there before."[9] Finally, Evaluation is defined by Bloom as "Quantitative and qualitative judgments about the extent to which material and methods satisfy criteria.[10] Such criteria include the "fit" of the evidence to the hypothesis as well as the weight, variety, and quality of the evidence.

In the "Description" column are recorded summaries of the subject's observations, comments, inferences, questions, errors, etc. The transcript line number is given in the last column.

HISTORIANS' HEURISTICS

In solving the test problem, these historians made full use of the processes, skills, and tasks already identified. They read and re-read the materials in great detail, compared and contrasted the tables, drew upon their vast stores of knowledge, and made use of powerful heuristics. Among the latter were means-ends analysis and factoring. First, they kept the problem solution in mind and checked their progress toward it at various points. Ideas, hypotheses, or steps toward the solution were tested against the evidence or memory, and if they helped move the subject toward the solution, then the means were adopted and put into action. Otherwise, they were discarded and new means were sought. Secondly, the historians tended to factor the problem into sub-problems using the evidence to suggest some of the divisions. This was most evident during the phases of table comparison and contrast. Correlations were discovered which suggested new interpretations. Confirmation of small details could lead to acceptance or rejection of more comprehensive hypotheses.

Extensive search of the documents also characterized the behavior of the historians. Materials were scanned in detail repeatedly both before and during Reconstruction. The experts sought out or focused on those details which enabled them to reconstruct the event and hypothesize causes. In proposing hypotheses, the historians withheld final judgment (premature closure), noting that even their final conclusions must be held somewhat "gingerly," pending discovery of more qualitative evidence. Their hypotheses suggested multiple causes as checks upon each other. They also noted the need to look for evidence which might disconfirm the hypothesis.

Central to the problem-solving process was questioning: Knowing when and what to ask enabled those specialists to establish sub-goals and to measure movement toward a solution. They began with general "why" questions

in response to observed peaks or trends requiring explanation (Why was percentage so high in 1750s? Why does trend run counter to my expectations? Why do the figures for these counties differ?). Initial questions revolved around problem identification. They then moved directly to their hypotheses which sometimes took the form of a question (Could it be the Great Awakening? Colonial Wars? etc.). During Reconstruction, hypotheses might take the related form: "If we may assume this to be true, then a possible hypothesis is demographic change." These questions guided research design, raised new questions ("To support this, I would like to know more about the economy, religious institutions, landholding patterns, etc."), suggested answer-containing sources and test implications: If the evidence shows this to be true, then we may confirm this hypothesis. In the final evaluation phase, the historians carefully examined the expected and unexpected answers to their questions and tried to arrive at reasonable conclusions about the causes of premarital behavior in colonial Virginia.

COLLEGE STUDENT BEHAVIOR

The college student sample consisted of one freshman, one junior, and three seniors who were majoring in history. Each was given a set of instructions similar to those used earlier and asked to read and think aloud. Their question was: "Why Did the People of Frederick County Adopt The Frederick County Resolves?" They were given a copy of the Resolves which were passed by those freeholders of Virginia on June 8, 1774. After reconstructing and hypothesizing, they were asked to create a research design and state their arguments. Next, they opened the Evidence envelope and removed the following:

1. A contemporary poem glorifying the Boston Tea Party. No title was provided in order to see if the subject would infer the subject matter.
2. The Boston Port Act of March 31, 1774.
3. Paul Revere's engraving "The Able Doctor," with the notation that a similar one appeared in the London Magazine of April, 1774.
4. A copy of the December 27, 1773, notice summoning Bostonians to a meeting of the State House.

Following the taped sessions, transcripts were typed and analyzed according to the tasks, processes, skills, and heuristics described earlier. Error types were noted and classified as follows:

I. SEARCH AND FOCUS

A. Scanning and Holding--Comprehension

1. Search was shallow and unfocused. Materials were read once but not returned to when developing or testing hypotheses.
2. Relevant facts and dates were ignored, so that the subjects missed the significance and meaning of documents. All subjects read through the preamble to the Resolves without focusing upon the long title of the Port Act which provided a brief, direct answer to the question. The hated East-India Tea Company is mentioned in the sixth resolve, but none of the students focused upon or returned to it later. Symbols used in the poem and engraving were also misinterpreted. The figure of an Indian woman, the symbol for British America, was mistaken for Paul Revere by one senior.

3. Materials were read without generating questions.
4. Documents were not compared and contrasted.

B. Generate and List--Knowledge, Analysis
1. Hypotheses were not used to generate questions or guide research design.
2. Few and/or irrelevant source needs were suggested. There was general unfamiliarity with primary and secondary sources.
3. Few test implications were produced.
4. Only one student attempted to state an argument.

II. RECONSTRUCTION

A. Order, Relate, Recall--Interpretation
1. Historical knowledge was vague, general, and/or incorrect.
2. Students did not make use of relevant facts and dates to reconstruct events and establish the sequence of events.
3. False inferences were based upon the above two errors.
4. Hypotheses based upon these inferences were broad and remained unrefined by further questions or later evidence.
5. Hypotheses were mono-causal and confused necessary with sufficient causes.

B. Order, Relate, Recall--Analysis and Evaluation
1. Students did not relate the pieces of evidence to each other.
2. Students did not refer to evidence when testing hypotheses, but made the blanket statement that the evidence confirmed their conclusions.
3. Evidence was read in terms of and made to fit the hypothesis.

In reviewing the error types, it becomes evident that errors in the first reading phase become accumulative, producing more mistakes during the Reconstruction phase. Many of these errors are clearly related to the absence of the heuristics available to this historian: Extensive Search, Means-Ends Analysis, Factoring, Withholding Judgment, Multiple Hypotheses, and Questioning. Perhaps this last one is the key to the rest, since questions guide search, suggest alternatives, raise corrective doubts, and allow the individual to measure progress in terms of the number of answers found. If we would train students to perform historical research, then heuristics must be taught along with the tasks, processes, and skills of problem solving. Fundamental to all the rest must be instruction in the historian's questioning strategies. In teaching historical thinking, we must stimulate the spirit of inquiry.

Through an information-processing approach, it is possible to identify the structure of historical knowledge and the skills requisite to its storage, organization, and recall. Knowing these things together with the entry level knowledge and skills of students will enable us to direct teaching to their weaknesses and to evaluate progress toward the acquisition of processes, skills, and heuristics, as well as content. College students can be taught to think more like historians once these fundamentals are known and converted into instructional objectives.

NOTES

[1]For a discussion of the Piagetian approach, see Michael A. Zaccaria, "The Development of Historical Thinking: Implications for the Teaching of History," The History Teacher, XI (May, 1978), 323-340.

[2]This problem was based upon the research for my article "Tobacco and Sex: Some Factors Affecting Non-Marital Behavior in Colonial Virginia," Journal of Social History, XII (Fall, 1978), 57-75.

[3]For a fuller account of transcript analysis, see Allen Newell and Hervert A. Simon, Human Problem Solving (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1972), 288-290.

[4]For a more detailed discussion of the methods, findings, and implications of this study, see Lee A. Gladwin, "An Information-Processing Approach to Historical Problem Solving," (unpublished dissertation, Department of History, Carnegie-Mellon University, 1980).

[5]These and other cognitive processes are described in Sylvia Farnham-Diggory, Cognitive Processes in Education: A Psychological Preparation for Teaching and Curriculum Development (New York: Harper & Row, 1972), 98.

[6]Ibid., ch. 8.

[7]See Benjamin S. Bloom (ed.), Taxonomy of Cognitive Objectives: The Classification of Educational Goals, Handbook 1: Cognitive Domain (New York: David McKay Co., Inc., 1956); and Norris M. Sanders, Classroom Questions: What Kinds? (New York: Harper & Row, 1966).

[8]Sanders, ch. 6.

[9]Bloom, 206-207.

[10]Ibid.