

Socratic Teaching Method

(A Textbook for:
Socratic Questions 101).

by Mark Saiki

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Socrates

Abstract: The Socratic Teaching Method is the technique, which law and medical schools use to get their students to critically analyze information. This sixty-three page How to Book discusses the method and provides procedural information. It was written in 1993 when I was taking courses at the University of Northern Colorado to get my teaching license and before I went to graduate school for a Masters in History.

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Introduction <p>Let me start with a joke. In the law we write legal "briefs" to present various points of law. What follows is a brief paper about the Socratic teaching method. For readers who are unfamiliar with the Socratic Method this book is designed to be a How To Guide. For readers who are somewhat familiar with the Socratic Teaching Method, I hope my book will spark some thoughts and provide useful lesson plan ideas.</p>
Chapter One. Organizing Ideas. <p>Active: a five letter word derived from French meaning requiring action or exertion, practical and producing real effects. Active Learning.</p> <p>Passive: a seven-letter word derived from Latin meaning mentally inactive, lifeless, unenthusiastic, unresponsive. Passive Learning. The mind is wholly passive in the reception of all its simple ideas. John Locke, 1700.</p> <p>Converge: an eight-letter word derived from Latin meaning to come together at one point. Convergent question.</p> <p>Diverge: a seven-letter word derived from Latin meaning to go in different directions, variant. Divergent question.</p> <p>Much learning does not teach understanding. Heraclitus, 460 B.C.</p> <p>We learn by doing. Aristotle, 300 B.C.</p> <p>Note: I have two reference books at home, which I find useful in drafting lesson plans. They are Webster's Dictionary, unabridged, and Bartlett's Familiar Quotations.</p>
I. Background. <p>Have you ever had the feeling that a review of the literature study is just a long series of quotations? It is a "Yeah, what he said" type of paper. My initial purpose in writing this paper was to avoid reinventing this wheel. I decided to go to the library and find out what, if any, ideas and insights I could find concerning the Socratic teaching method.</p>

I had thought that would be few resources and next to no empirical studies. To my surprise there is a wealth of information. Many individual professors, pilot projects, states, grade levels, content areas and countries have shared their thoughts and experiences.

I did not locate any "How to Manuals" (like Chilton's Automotive Manuals) nor any textbooks. I think that this is unfortunate. I believe that the Socratic teaching method would be a useful addition to teacher education programs. Since teachers as a group are better followers than leaders, a "How to Manual" might be useful.

On the one hand there is something very positive about each individual reinventing their own wheel. There is also something positive about learning from experience. Because I believe that writing a textbook on the Socratic teaching method will make it more likely that teacher colleges will someday begin offering courses on the Socratic teaching method, I would like to attempt to fill this textbook void.

In general textbooks are written by middle of the road editing committees. Textbooks are often dumbed down (put through a thought flavorizer) to ninth grade levels. Many of my teachers, professor and fellow students might therefore testify that I am a good choice to write such a textbook. At any rate, my purpose is to create a resource, which other instructors can turn to for ideas. Perhaps some instructor might want to reduce their own workload (and unfortunately their own individuality, creativity and spark) by reinventing this same Socratic wheel.

II. Why Should Teacher Education Programs offer courses on the Socratic Teaching Method?

Several independent educational researchers have voiced a need for more Socratic teaching in our classrooms. Adler, 1982,Sizer 1984, and Goodlad 1983. Sociology teacher, Linda Kay and college curriculum and sociology professor, Jerry Young, "Socratic Teaching in Social Studies," Social Studies, Jul-Aug 1986, v77, n4, 158.

I believe that the following teacher education course should be offered at the University of Northern Colorado, Socratic Questions 101. There are four basic styles of teaching: lecture, discussion, Piaget and the Socratic Teaching Method. That UNC education courses would choose to teach only the lecture method is questionable. Some rebellious, creative or unorthodox instructor might want to take a class on the Socratic teaching method. This thought has occurred to me.

In addition most alternatives to lecture focus in on inquiry methods. Higher-level questions are at the root of discovery learning, discussion, and inquiry learning. Cooperative group learning is a middle ground. It may use higher-level questions. It may be a method or processing lecture notes.

I have attended three different: junior high schools, senior high schools and colleges including the block plan at Colorado College. I attended one law school. My enrollment at UNC means

that I have taken classes in all of Colorado's major institutions of higher learning. I believe that my academic background helps me evaluate different teachers and teaching methods.

Law school professors do not take classes in the Socratic teaching method. Perhaps they should. The Socratic teaching method at the University of Colorado School of law is diverse with varying degrees of effectiveness.

My attraction to the Socratic teaching method is not primarily due to law school, although I admit that as an attorney I have taken the required classes namely Conceit 302 and Ego 405, which I passed with flying colors. I believe that the Socratic method is a better motivator, attention getter, and attention focuser. It develops critical thinking and reasoning. It is a more active learning method than lecture.

I have been interested in the Socratic teaching method for a period of time. I was disappointed to note that UNC does not offer a course on the Socratic teaching method. I was disappointed to find that there wasn't a textbook on Socratic teaching method. As I am willing to teach such a course, hold seminars, and write such a textbook, perhaps this will come to pass.

III. Lecture vs. the Socratic Method.

The major teaching method in all levels of public schooling appears to be lecture. Homework consists of reading. Lecture is a passive regurgitation of the reading for those who did not do the assignment. For those who did the assigned reading, it provides another viewpoint. Lecture is teacher dominated and centered. It sets up the wise man on the hill. If you want to know the major ideas of psychology, I will tell you everything you need to know.

A lecturer might be viewed as a talking book. In this sense their lesson plan is the same as pushing the play button on a cassette recorder.

A front door analogy might illustrate this point. A lecturer walks up to a house, explains in great detail the purpose and function of the front door, the house and the doorknob. The lecturer opens the door and asks their students to follow them inside. The problem with this scenario is that the teacher does most of the thinking. The teacher decides which house to enter. The teacher decides which portal to enter. The teacher decides which subjects to study. Should we cover locks and keys. Should we cover addresses? Should we cover private ownership? Should we cover jammed door latches? The students are asked to passively follow along.

The Socratic teacher sneaks around and enters the house through the back door. This teacher calls out to their class to find their own ways to enter the house. This teacher uses guiding questions to point out different methods, which might help them gain entry. These students must do most of the thinking. They must decide which portal to enter through. They must decide how to operate doorknobs. Ultimately the students should ask themselves, why are they studying doors in the first place. A student might reason that entering the house through the garage means negotiating two different types of doors. Is there value to poking around the garage and entering

through a side door?

In sum, a lecturer attempts to disseminate information. They might reason that students are devoid of knowledge. Students should be tipped on their ears and filled up with knowledge. By contrast, a Socratic teacher attempts to draw knowledge out of the students. In the constructivist sense, a Socratic teacher attempts to pose problems, which allow the student to reformulate, reconstruct and reorganize their own existing knowledge into building blocks of knowledge. The goal is not to give information or answers. The goal is to build blocks of knowledge based upon the student's own raw materials (experience, common sense and logic) which inherently exist within each student.

IV. Other Applications.

Medical School. In 1989 57 medical students experienced a new teaching method in their third year surgery clerkship at the University of Kentucky. 22 students were in the control group. They received traditional Socratic instruction. 35 students were in the problem based learning group. The problem based learning group reported higher performance scores. Richard W. Schwartz, "Developing Student's Cognitive Skills in a Problem Based Surgery Clerkship," Academic Medicine, Fall-Spring 1990-91, v67, n1, 53.

Canada. The Socratic teaching method is exciting and effective. Secondary school teacher, David Snell, "Teaching Canada's Charter," History and Social Science Teacher, 1987, v24, n2, 17.

Legal Aspects of Geology is an interdisciplinary undergraduate course with twelve students per class. Our emphasis on Socratic discussion develops communication skills and a better understanding of the law. Students and faculty need to be trained in the value of the Socratic Method. This method is more effective with certain personality types. Ronald W. Tank, "An Undergraduate Course in Legal Aspects of Geology," Journal of Geological Education, May 1984, v32, n3, 155. Netherlands. My goal is to get fifth grade students in the Netherlands to ask questions. You need to assess the effect of prior knowledge on the type of questions students ask. Department of Education, Hans van der Mirj, "Question Asking: to Know that you do not Know is not Enough," Journal of Educational Psychology, Sept 1990, v82, n3, 505.

Law School. The Socratic teaching method is the dominant teaching style in United States law schools. It presumes that the students have read the assigned cases. Frank Guliuzza III, "In-class Debating in Public Law Classes as a Complement to the Socratic Method," PS: Political Science & Politics, Dec 1991, v24, n4, 703.

V. My opinions.

Consider the traditional justification for the Socratic Method in law school. Law schools attract the best and the brightest. Law students are bright and motivated. We can expect them to act like adults and do their reading. In part we reward them by using the rarefied Socratic Method in those classrooms.

Perhaps we have this scenario upside-down. We take the teaching style, which focuses attention and teaches higher order thinking skills the best. We use this method on those students who are already the best and the brightest. We take the most boring teaching style (presumably lecture), which teaches fewer thinking skills, and use this for garden-variety students. Humm?

Likewise perhaps we have the advanced placement scenario upside down. We take advanced placement classes on field trips and to movies. Perhaps we should take the remedial classes on field trips and to movies and leave the rest at home.

My experience with the Socratic Method in law school and at Colorado College has convinced me that it is a better method of teaching all subjects and all grade levels. I can foresee remedial math being taught with the Socratic Method. I believe that the same skills, which help law students to see complex relationships, to apply real life experiences and to make difficult balancing decisions in the law, can be used to create active learning situations for third grade science students.

A good video example on the subject is the National Science Foundation, "Meet Kay Tolliver," 1993. This video featured a black teacher who taught an at risk school in Harlem, New York. She used a dramatic and inventive Socratic Method for teaching sixth grade math. Her energy, creativity and personality were her own. Her teaching style, whether intentional or unintentional was Socratic.

Chapter Two. Socratic Teaching Method.

I. What is the Socratic Teaching Method?

The Socratic teaching method involves open ended, higher level questions designed to elicit discussion, debate and analysis. The Socratic teaching method works well in discussing values and ideas. It works well in small group discussions, which average around fifteen students in the Colorado College block plan.

The Socratic teaching method works fairly well in large introductory law school classes of seventy students such as Contracts. All seventy students listen and attempt to formulate answers. Some pay attention because they are interested in the subject matter and/or passing the course. Some listen because they do not know who will be called on next. They don't want to be caught off guard. They mentally prepare answers. They seek to avoid embarrassing themselves (peer pressure) in case they are called on for the next answer.

II. What is the **purpose behind the Socratic Method?**

Good questions require the student to do more than remember an answering strategy. Students learn from good questions. A good Socratic question should have several acceptable answers. This reduces the student's tendency to stop after they get one right answer (Baird and White

1982). The teacher should prepare questions, which cater to students of mixed abilities. Good questions motivate critical thinking. By contrast, Simpson, et. al. 1987 report that teacher directed instruction appears to be successful only in teaching low level procedural skills. Australian Catholic University teacher development professor, Peter Sullivan and math professor, David Clarke, "Catering to All Abilities through 'Good' Questions," Arithmetic Teacher, Oct 1991, v39, n2, 14.

An average person learns from his own mistakes. A genius learns from the mistakes of others. Since most of us are not geniuses, we must learn from our mistakes. Math is not a spectator sport. Donald M. Fairbairn, "The Art of Questioning Your Students," The Clearing House, Sept 1987, v61, n1, 19.

Chairman Mao said that one should not merely accept material at face value. One must probe to discover its validity and practicality. Jeffrey O'Malley, a curriculum specialist, "Asking the Right Questions," The Social Studies, March-April 1990, v. 81, n2, 89.

III. Active vs. Passive Learners.

Our school system selects for good students. Good students have the passive role of selecting the one right answer. In the past fifteen years, students have been less active in politics and community service. Students are more interested in money, status and power. Lecture selects for effective listeners who are able to regurgitate. Lecture selects for confining, intellectually uninteresting teachers who are consumed by routine and managing problem students. Robert V. Bullough, "On Making Good Students," Journal of General Education, 1986, v38, n2, 85.

Most educational activities foster a passive and dependent quality. Socratic questions call for inductive reasoning. Systematic questioning should culminate in a universal definition or a comprehensive generality. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

The Socratic method is teaching by questions. Particularly in social studies it helps develop powers of understanding and communication. It promotes better self-images. It motivates students to learn. Its high expectations help students to grow through the knowledge that somebody believes in them. It has a tremendous effect on a class. If the teacher does not know something, they don't have to appear to as if they know everything. Guide the students to sources of information. Sociology teacher, Linda Kay and college curriculum and sociology professor, Jerry Young, "Socratic Teaching in Social Studies," Social Studies, Jul-Aug 1986, v77, n4, 158.

The Socratic teaching method encourages active participation. It requires the students to critically evaluate their own beliefs. It requires them to articulate reasoned concepts behind their beliefs. Socrates believed that teachers should not lecture. They should tap into the knowledge that lies deep within everyone. I try to help students discover answers for themselves. I try to facilitate discussion rather than provide answers. The Socratic Method has been applied to psychotherapy. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

IV. What are good Socratic Questions?

A good Socratic question is open-ended with more than one "right" answer. It is designed to get the student to think. Take book learning and apply it to real life problems. Evaluate an idea against the student's own experiences, thoughts and logic. Students should compare, synthesize and evaluate their own ideas. They should form rules, principles, models and concepts based upon an introspective analysis of their own thoughts. Project and speculate about casualty. Predict future problems and other implications. Search for eternal knowledge, learned generalizations and universal definitions. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

Socratic questions rarely evoke factual information. The intent is to bring information, which has already been processed into the student's awareness and helps them evaluate it. Avoid questions that have a correct answer. Your questions should promote imagination, creativity and divergent thought. If a student answers, "I don't know," rephrase the question or provide an example. Repeating the question or dropping the question does not facilitate learning. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

Good questions are the core of effective teaching. They are the essence of good teaching. Lecture features teacher domination. Socratic discussion involves students as equal participants. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: An Effective Teaching Method," The Clearing House, May 1990, 420.

Socratic questions challenge the students to think critically about their own behavior and beliefs. Socratic questions should recognize and revere the limits of human knowledge. Questioning helps students understand basic ideas and values. This will assist them in making the wisest possible choices about the conduct of their lives. Carolyn J. Sweers, a high school philosophy teacher, "Teaching Students to Examine Their Lives (Using the Socratic Method in Secondary Education)," Educational Leadership, May 1988, v45, n8, 20.

Socrates went to actual people with strong opinions and examined them carefully about what they thought they knew. The unexamined life is not worth living. Begin class by having each student state their point of view in writing. This gives them a vested interest in the topic. Carolyn J. Sweers, a high school philosophy teacher, "Teaching Students to Examine Their Lives (Using the Socratic Method in secondary education)," Educational Leadership, May 1988, v45, n8, 20.

Chapter Three. Effectiveness.

I. Is the Socratic Method effective?

A. Collins and D. Steve's 1982 study found that inquiry methods were effective in teaching thinking skills and deep understanding. Dave Schumaker's 1985 study revealed that students pay better attention, and listen to each other. They gain a better understanding of concepts. Their test scores and written work improved. Robert J. Kloss, English professor, "Toward Asking the Right Questions: the Beautiful, the Pretty, and the Big Messy Ones," The Clearing House, Feb 1988, 245.

Three instructional methods were compared in a University of Missouri at St. Louis sociology class, Quantitative Techniques in Sociology Class. This was a required class with 175 students. Each class contained three fifty-minute lectures and one fifty-minute lab. In three successive years the same course was taught with three different methods: traditional lecture, Socratic Dialogue with active learning and Keller's Personalized System of Instruction. There was no significant difference in GPAs, major GPAs or IQ (based on the Missouri IQ test scores). The Socratic method was given a positive course rating by 63% of the class versus 60% for lecture. Keller's PSI system received a 82% positive course rating. The mean grade on the final was 84.8 for the Socratic method and 80.3 for lecture. Keller's PSI system's mean grade on the final was 85.4. Professor of Sociology, H.W. Smith, "Comparative Evaluation of Three Teaching Methods of Quantitative Techniques: Traditional Lecture, Socratic Dialogue and PSI Format," Journal of Experimental Education, Spring 1987, v55, n3, 149.

Kay's 1985 study concerned fifteen juvenile males in a correctional facility government class. This class met twice a week for six weeks. This class was based on a Request Model, which attempts to facilitate learning rather than using an authority figure (a teacher) who dispenses information. The teacher was trained under the Manzo method where students are guided toward sources of information. For example, the students read the First Amendment. The students asked the teachers questions about the topic. After all of the student questions had been answered, the teacher would ask the students questions about the reading. The teachers would start with factual knowledge questions. They moved to answers, which could be implied, from the readings. Finally they asked application questions. Under the Socratic method students learned more, $F=4.312$. $P=.035$. They had a positive attitude toward learning $F=.858$. $P=.452$. Sociology teacher, Linda Kay and college curriculum and sociology professor, Jerry Young, "Socratic Teaching in Social Studies," Social Studies, Jul-Aug 1986, v77, n4, 158.

A yearlong study by the Educational Testing Service of Princeton, New Jersey found that the Socratic method increased scores in English, Math and Science. Richard W. Paul, "The Socratic Spirit: An Answer to Louis Goldman," Educational Leadership, Sept 1984, v42, n1, 63.

The root cause of poor performance among at risk students in grades 4-7 is not inadequate practice. According to Brown 1982, the primary cause is inadequate metacognitive skills. They do not understand what it means to work with ideas. They do not hypothesize, predict or generalize. Stanley Pogrow, "A Socratic Approach to Using Computers with At-Risk Students," Educational Leadership, Feb 1990, 61.

HOTS-Higher Order Thinking Skills, blends CAI-Computer Aided Instruction and Socratic dialogue including drama. One computer application is Oregon Trail. Ten studies demonstrate that a computer aided instruction program combined with Socratic questions is effective. Stanley Pogrow, "A Socratic Approach to Using Computers with At-Risk Students," Educational Leadership, Feb 1990, 61.

Traditional remediation (drill and practice) is usually not effective for remedial students. Those students continue to fall further behind. Dr. Stanley Pogrow's HOTS computer program with Socratic discussions was implemented in 800 schools grades 4-7. The students worked with the program for 35 minutes, four days per week. The teachers refused to accept one-word answers. They made the students defend everything they said. They acted as guides rather than providers of information. Right or wrong answers had no place in this program. After this program, these remedial students made tremendous gains on standardized achievement tests. A National Diffusion Network Study reported that these remedial students scored 67% higher than the national average in reading and 123% higher in math. These students were highly motivated. At the end of the year almost all of the students had tested out of this remedial program. They did not come back. Educator Linda Shalaway, "Learning How to Think, Helping Discouraged Learners Succeed," Instructor, Sept 1990, v100, n2, 16.

II. My thoughts.

The Socratic method is at least as effective as traditional lecture on standardized achievement tests. In general standardized achievement tests do not test for critical thinking. If in theory the Socratic method also teaches critical thinking, then this is icing on the cake. In general traditional lecture does not purport to teach critical thinking.

III. What studies indicate that the Socratic Method is not effective or less effective?

A University of Melbourne Engineering Design class tested the Socratic Method against a control group. Each class had fifty students. The Socratic Method did not significantly affect performance in the design project work. Its effect on the examination is too complex to deduce from the data. A.E. Samuel, "Student Centered Teaching in Engineering Design," Instructional Science, v15, 1986, 213.

IV. Is merely asking better questions useful?

F.P. Hamkis' 1968 study of 1st thru 8th graders revealed that students attain more when asked higher order questions. Dennis Palmer Wolf, assistant education professor, "The Art of Questioning (How Teachers use Questions to Teach Students)," Journal of State Government, March-April 1987, 81.

Pressley, Martin and Pressley 1991 report that merely asking a "why" question promoted learning even when an answer was not generated. Higher order questions lead to mental elaboration. Educational psychologists Michelle Perry, Scott W. VanderStoep, and Shirley L. Yu, "Asking Questions in First Grade Mathematics Classes: Potential Influences on Mathematical Thought,"

Journal of Educational Psychology, March 1993, v85, n1, 31.

Dillon's 1982 study of high school discussion classes revealed that 86.6% of student responses were at the same or at a higher level as the teacher's questions. Ask low level questions and students give low level answers. Ask high level questions and 86.6% of the time students give high-level responses. Thema Harms, curriculum development professor, Roberta Woolever, from the child development center, and Richard Brice, an assistant professor of education, "A Questioning Strategies Training Sequences: Documenting the effect of a new approach to an old practice," Journal of Teacher Education, Sept-Oct 1989, 40.

V. Are Socratic Methods Programs are effective in modifying teacher behavior?

Joan Tough's 1976 study compared 89 elementary education teacher undergraduates. They were given eight weeks of on campus instruction on the following subjects: reporting questions (memory of text), logical reasoning questions, predicting questions, and projecting questions. Reporting questions required factual recall from the textbook. Logical reasoning questions relied upon logic. Projecting questions dealt with what might happen if a trend continued. Predicting questions asked the student to imagine what might happen next. Those students then spent eight weeks student teaching.

Questions	Pretest	Posttest
Reporting Questions	86.7%	67.5%
Logical Reasoning	9.2%	15.4%
Projecting Questions	1.4%	9.5%
Predicting Questions	2.7%	7.5%

Other studies concerning the effectiveness of teachers who were trained in questioning strategies have had mixed results. Thema Harms, curriculum development professor, Roberta Woolever, from the child development center, and Richard Brice, assistant professor of education, "A Questioning Strategies Training Sequences: Documenting the Effect of a New Approach to an Old Practice," Journal of Teacher Education, Sept-Oct 1989, 40.

A counter study. Iowa State University tested the effect of the Socratic teaching method on the level of questions teachers might ask. Teacher education college juniors were chosen. There were 50 female students and 24 male students. The average age was 21. Seven students were provided a handout and given verbal instructions concerning the Socratic teaching method. Seven students were in the control group. Their peer teaching sessions were tape-recorded. Four independent raters evaluated the levels of questions asked. At the end of the third peer session there was a significant increase in the number of divergent questions ($p =$ evaluative questions. However overall there were no significant differences in the quality of questions asked. Karilee

Watson, "The Socratic Method and Levels of Questioning," College Student Journal, v14, n2, Sum 1980, 130.

VI. My Thoughts.

One generalization about the above two studies, merely handing the teachers a brochure (presumably a brochure which was less extensive than my book) is not effective. Some additional instruction and training is needed to boost the level of questions asked.

There appears to be good empirical evidence that the Socratic method works well. Some elementary schools, middle schools, high schools and colleges have tried it. A variety of different content areas have tried it. Different cities, countries and socioeconomic and ethnic groups have tried it.

I believe that the empirical results are somewhat skewed. By and large instructors who have turned to the Socratic Method were probably more innovative than their peers. As a group those innovative instructors probably were somewhat brighter and more talented than the teachers who decided to continue the tradition of lecture. They were bright enough to find out about the Socratic method on their own. They were independent enough to buck the system and implement those changes on their own, largely without funding or support. Perhaps they were fairly effective teachers when they lectured. By contrast a teacher who simply follows the textbook is not likely to be either the best nor the brightest. If an entire school attempted the Socratic Method, the results probably would not be as dramatic. The dissenters and the norm would probably drag the norm down.

In a sense this creates harmony. Only the best and the brightest teachers are likely to attempt the Socratic Method. Perhaps this is a good policy in that only true believers should make the attempt. Perhaps diversity is the best policy.

Other factors skew the results. First, there is probably some placebo effect of trying any new lesson plan. Students like variety. I believe that if you decided to teach by peering into a bowl of water (like Nostradamus), students would at first be enthusiastic and put their best foot forward just because you were trying a novel approach.

Second, the teachers who decided to try the Socratic Method were obviously excited about the change. You can see it in the articles they wrote. Their increased enthusiasm itself probably translated into somewhat higher achievement test scores.

Many studies have indicated that the Socratic method is more effective than lecture in achievement test scores. Since implementing Socratic teaching is relatively inexpensive, it probably is worth a try.

One UNC professor voiced a concern that discovery learning might be more difficult in classes with a large number of students. He opined that lecture was more suited to large undergraduate classes. I would agree with that particular comparison. A school would require massive change

and major inputs of time and money if they decided to turn to individualized teaching methods. In particular the Keller Personalized System of Instruction, which seeks an individual teaching method for each student, would be costly.

By contrast the Socratic method has been successfully used in large introductory classes. The teacher holds a one on one dialogue with one student at a time. The rest of the class actively follows along because they worry that they might be called on next. See also Chapter Five, Acceptance, II. Student Acceptance and large class size.

A related observation is that student note taking in a Socratic classroom is different. Most students are used to occasionally taking notes when the teacher is speaking. When another student is speaking, many quit writing. In a Socratic classroom the important points should be made by the students. The students will need to adjust their note taking accordingly. As an adjustment to my own note taking, I frequently write the initials of the student or professor beside the point they are making. This helps me connect up and relate to the flow of the discussion.

Chapter Four A Radical Alternative?

I. If the Socratic Teaching Method is Effective, why isn't it more widespread? A cynical answer.

M. Gall 1970 reports that left to their own devices teachers typically ask only low level factual recall questions. Thema Harms, curriculum development professor, Roberta Woolever, from the child development center, and Richard Brice, an assistant professor of education, "A Questioning Strategies Training Sequences: Documenting the Effect of a New Approach to an Old Practice," Journal of Teacher Education, Sept-Oct 1989, 40.

Four studies reveal that left to their own devices teachers typically ask only low level factual recall questions. D.L. Daves and Tinsley 1967. M. Gall 1970. S. Gallagher 1965. V.L. Hare and C.M. Pullman 1980. Roberta M. Woolever, associate professor of teaching and learning, "A New Framework for Developing Classroom Questions," Social Education, Oct 1987, 407.

D. Wolf's 1987 study revealed that teachers know that skillful questions are an art. They believe that their superiors do not value this art. Therefore few are willing to devote the time and energy to learn this art. Robert J. Kloss, an English professor, "Toward Asking the Right Questions: the Beautiful, the Pretty, and the Big Messy Ones," The Clearing House, Feb 1988, 245.

Teachers live in a school culture, which believes that nothing can be learned from students. They assume that knowledge is a ladder. Students must be taught basic skills before they are allowed to go onto higher levels of inquiry at the high school or college level. Dennis Palmer Wolf, an assistant education professor, "The Art of Questioning (How Teachers use Questions to Teach Students)," Journal of State Government, March-April 1987, 81.

II. If the Socratic Teaching Method is Effective, why isn't it more widespread? A more

optimistic answer.

Teachers do not learn questioning strategies from teacher education courses. They pick them up ad hoc from remembering their days as a student. Selma Wasserman, "The Art of the Question," *Childhood Education*, Summer 1991, 257.

English teachers spend far too little time learning to ask effective questions. College professors rarely take the time to teach questioning skills. Seldom do prospective teachers have the opportunity to observe a good questioner at work. Yet questioning is perhaps the central skill in the learning experience. Robert J. Nash and David A. Shiman, college education professors, "The English Teacher as Questioner," *English Journal*, Dec 1974 at 38.

Learning to engage students in Socratic dialogue is not easy. Teachers need to learn how to understand student's answers rather than classifying them as right or wrong. Teachers need to probe responses so that students can construct their own understanding of the concepts. Teachers should guide students' discussions rather than dispense information. Stanley Pogrow, "A Socratic Approach to Using Computers with At-Risk Students," *Educational Leadership*, Feb 1990, 61.

III. What are the drawbacks?

The Socratic teaching method is around 2,500 years old. Surprisingly there is little negative literature on this subject. This might be explained by the fact that this teaching method is not widespread. Not enough instructors practice it. Therefore not enough pundits have had the opportunity to criticize.

The Socratic method teaches students to question authority before they have the necessary experience. Students may find the Socratic method to be upsetting and unnerving. It leads to Socratic doubt. After all it led to Socrates' death. Louis Goldman, "Warning: The Socratic Method Can be Dangerous," *Educational Leadership*, Sept 1984, v42, n1, 57.

A journalism ethics class at Northwestern University used the Socratic method to help students evaluate their assumptions and values. Skillfully worded questions were arranged to lead the answerer toward a revelation. We had three main purposes, to provide awareness of one's own ignorance, to teach virtue and to provide precise definitions for concepts and principles. 15-26 students were in each class. The class held 45-90 minute discussions. Discussion sessions can break down if students begin playing devil's advocates, or if students are allowed to argue among themselves. Student may focus on the instructor's game plan not the substance of the classes. However if Socratic discussions are used with the proper frequency, students look forward to them. Richard A. Schwarzlose, "Socratic Method Adds Zest to Ethics, Law Classes," *Journalism Educator*, v33, n1, Apr 1978, 9.

A handful of students may monopolize the teacher's time. This danger can be avoided if the professor selects various respondents. This trial and error method may be unduly time consuming. St. Lawrence University professor Douglas Charmichael, "I'm Sick of Socrates,"

IV. The Socratic Teaching Method as a nonradical alternative.

Lecture is the traditional teaching style. Most teacher education courses suggest that Bloom's taxonomy should be used as a test blue print. Some teacher education courses suggest that Bloom's taxonomy should be used to stimulate "critical thinking."

High-level questions in Bloom's taxonomy are the same as good Socratic Questions. Most teachers I have observed occasionally ask Socratic questions. In a two-week period, some teachers occasionally ask three Socratic questions.

The only difference with a Socratic lesson plan is that higher-level questions are the core. Questions are designed to get the students to discuss. Students and not the teacher are supposed to do the thinking and make the important points. There is a reliance on the brilliance of the class, instead of the brilliance of the lecturer. The teacher becomes a guide and questioner instead of the answer grape.

A series of Socratic questions has its own life and power. Student answers become a self-reinforcing focus. Answers build self-esteem. Thinking and problem solving become valued skills. Peer pressure stimulates good answers. The idea that any particular student might be called on next is a powerful reinforcer, which motivates preparation.

Connecting to reality is a natural bridge. Concentrate on the three most important ideas in a chapter. Your questions should draw upon the student's real world experience. A good day one lesson:

What is biology?
Why do we study biology?
Who uses biology in the real world?

Although these questions are generally not covered by most textbooks, students can figure out these answers on their own. It is good to reinforce and touch base with reality. Reality is a motivator and attention focuser in and of itself.

The Socratic method does not always produce dramatic results. In my first four Socratic lessons, the conversations were lively and animated. In my fifth lesson, the class was either average or flat by comparison. We covered the material by the assigned time coordinates. In hindsight there are ways I could have structured the lesson to make it more lively.

In general the Socratic method is likely to spark more lively discussions than lecture. The Socratic method is more likely to spark active learning than small group discussions. Don't quit after the first lesson if you do not earn a Pulitzer Prize during your first hour.¹

I am a student at UNC. I will be around campus for one more semester. I would like to offer a

series of free lectures on the Socratic method. I am available to teach a teacher education course on the Socratic method. I am a resource. I am around. Feel free to drop in on my future classes and see whether or not my Socratic results are as good as advertised. You are welcome to quiz me about my ideas or to get a second opinion on drafting lesson plans.

I understand that some colleges prefer Masters and PhDs to teach classes. Perhaps my JD will suffice. However this is a field where there are no recognized experts. There are no PhDs in the Socratic Method. Law school professors do not take nor offer classes in the Socratic Method. In my ERIC and CARL searches there is no review of the literature study. There are no textbooks nor how to guides. In a very real sense to the extent that I wish to refer to myself as an expert on the Socratic Method, I might well be.

Chapter Five. Acceptance.

I. Will students approve of and accept the Socratic teaching method?

At first answering a series of questions can be intimidating for the students. A small number of students never gain the self-confidence to be fully participatory in the discussions. However, the attrition rate has decreased. The number of As has increased. Reading and comprehension skills have increased. Written student evaluations were overwhelmingly favorable. J.K. Heeren, *Journal of Chemical Education*, 4/90, v. 67, n. 4 330.

Although some students view the Socratic Method as threatening, it is generally well received. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," *The Social Studies*, March-April 1992, v83, n2, 77.

The vast majority of general psychology course students had favorable comments on their course evaluation forms. There was a decrease in content coverage but an increase in involvement. This was the most stimulating course this professor had taught in fourteen years. Norman Ferguson, "Encouraging Responsibility, Active Participation and Critical Thinking in General Psychology Students," *Teaching of Psychology*, Dec 1986, v13, n4, 217.

A basic speech and communications course at the University of Calgary used the Socratic Method. Each section had twenty-two students. The class met twice a week for one hour and fifteen minutes. We tested four separate projects designed to increase participation. The Socratic teachers were given direction concerning when to ask open-ended questions with unlimited potential responses. They learned about closed questions with a limited number of responses and leading questions. The Socratic methodology simulated more accurately the bi-directional process of teaching in public schools rather than the unidirectional process of a public speech or television report. The students practiced working the material into their own ideas instead of simply receiving information. Student responses were favorable in every class. Not one student expressed disapproval of this approach. The majority praised the usefulness, practicality and relevance. They appreciated student interaction. Their apprehension about

communication was decreased. They appreciated the creative potential. Professor Richard Firodo, "University of Calgary's 'Participation' Project," Education Canada, v25, n4, Win 1985, 30.

The University of Utah School of Medicine decided to alter their curriculum. Students had expressed that there was insufficient study time to achieve a complete understanding. They spent significant time memorizing details, which were soon forgotten. They found their lectures to be of poor quality and little time was left for questions. 89% of the sophomores expressed a desire for increased contact with their instructors. The message from the students was simple, they felt they were being lectured to death. Daniel A. Brinton, MD, Joseph Q. Jarvis, BD, Donna L. Harris, PHD, "A Small-Group Instruction Experiment in Medical Education," Journal of Medical Education, Jan 1984, v59, n1, 13.

The University of Utah School of Medicine decided to give students a choice of lecture or small group Socratic teaching. The Socratic students were assigned readings. They had to explain the information, relate it to their experiences, and discuss different perspectives. Each class had 100 students with 6-8 hours of class work per day. 67% applied for the Socratic Method. Most medical students preferred the small Socratic groups. Persons who scored high on the feelings, intuitive personality portion on the Myers Briggs test were attracted to this course. Daniel A. Brinton, MD, Joseph Q. Jarvis, BD, Donna L. Harris, PHD, "A Small-Group Instruction Experiment in Medical Education," Journal of Medical Education, Jan 1984, v59, n1, 13.

II. Student Acceptance and large class size.

After taking the Socratic classes, 85% of the 100 sophomores surveyed preferred the Socratic Method. They listed as advantages better opportunity to get questions answered, increased motivation to prepare for class, improved interactions, active participation, and in depth learning. They felt that it was a more adult form of education. It encouraged independent reading. Disadvantages mentioned were not covering all of the material on the examination and increased preparation time for each class. Some students reported that they learned as much as they would have from lecture. Some students reported that they learned considerably more. Daniel A. Brinton, MD, Joseph Q. Jarvis, BD, Donna L. Harris, PHD, "A Small-Group Instruction Experiment in Medical Education," Journal of Medical Education, Jan 1984, v59, n1, 13.

111 students, from a class of 160, responded to a freshman chemistry class evaluation. 73.3% responded positively towards the Socratic method. They said that it improved understanding. They reported that it made a large classroom seem more intimate and personal. It featured more one on one interaction. 51% believed that students benefited from giving a wrong answer. Student interest was increased in all individuals. In order for this method to succeed, student must complete the assigned reading. As a result they are better prepared to enter the discussion. Most students find that its diversity kept them from daydreaming. Chemistry Professor, Thomas A. Holme, "Using the Socratic Method in Large Lecture Courses: Increasing Student Interest and Involvement by Forming Instantaneous Groups (studying chemistry), Journal of Chemical Education, Dec 1992, v69, n12, 974.

III. Will instructors accept the Socratic teaching method?

The Socratic method is more entertaining for the instructor. The need to respond quickly and to redirect questions artfully keeps professors alert. This intellectual challenge is stimulating and rewarding. By all indications the Socratic method has increased the level of student interest in this entry-level course. Chemistry Professor, Thomas A. Holme, "Using the Socratic Method in Large Lecture Courses: Increasing Student Interest and Involvement by Forming Instantaneous Groups (studying chemistry), *Journal of Chemical Education*, Dec 1992, v69, n12, 974.

In general the Socratic Method was well received by the faculty. Many professors remarked that there were few incentives for increasing the amount of effort they put into teaching. They said that most of the rewards went for research. Small group teaching required more faculty time, which reduced faculty support. Daniel A. Brinton, MD, Joseph Q. Jarvis, BD, Donna L. Harris, PHD, "A Small-Group Instruction Experiment in Medical Education," *Journal of Medical Education*, Jan 1984, v59, n1, 13.

A 1983 Irvine, California task force studied teaching critical thinking skills in grades k - 12. They offered teachers two half-day training seminars in questioning and response strategies, in service programs and peer coaching models. Those seminars taught strategic wait time and nonjudgmental responses. The results showed an increase in flexible thinking and higher quality thoughts from the students. An increase in independent application of thought in playground and social situations. Higher level thoughts in oral and written communication. One teacher remarked, "Too often we are trained in isolation with little follow-up or support. This project gives us the opportunity to grow together." Marilyn Tabor, project coordinator of the Thinking Project, "Better Student Thinking Through Changing Teacher Behaviors," *Educational Leadership*, April 1988, 49.

IV. Why have some innovative instructors decided to turn to the Socratic method?

In 1980 this professor was stunned by the failure of his lectures. He discovered that his brilliant lectures and thrilling demonstrations passed thru the minds of prospective elementary teachers and science majors without leaving a measurable trace. He reasoned that bombarding passive students with physics fails to implant conceptual understanding. He decided to alter his teaching style. Several recent studies demonstrated the relative success of active engagement methods. He developed the Socratic Dialogue Inducing Lab Method. He has applied this method in large enrollment classes of 90-120 students. Richard Hake, Ph.D. in Physics, "Socratic Pedagogy in the Introductory Physics Laboratory," *The Physics Teacher*, Dec 1992, v30, n9, 546.

A few years ago this professor, from Trinity College, in Hartford, CT, began writing a textbook. When his rough draft was finally completed and published, he felt that it would be pointless to continue giving formal lectures. He did not see the point in providing oral presentations concerning the same subjects, which were so carefully covered by his textbook. For a change of pace, he decided to try the Socratic teaching method in his organic and general chemistry classes. The Socratic method was so successful that thereafter he used it exclusively in his classes. J.K. Heeren, *Journal of Chemical Education*, 4/90, v. 67, n. 4 330.

This professor sought to increase participation and critical thinking in his General Psychology undergraduate course. He decided to try the Socratic method on his twenty-seven students. He was worried that too many teachers viewed students as passive learners. They were being treated as vessels to be filled. Norman Ferguson, "Encouraging Responsibility, Active Participation and Critical Thinking in General Psychology Students," *Teaching of Psychology*, Dec 1986, v13, n4, 217.

Flexibility. The Socratic method provides hands on interactive experience. It is more adaptable to a wide range of situations. This method is flexible and easily modified. It is well received and popular. It is good training for an instructor. Professors can discover undreamed of learning problems if they shut up and listen to the students. It is fun for the instructor. It provides a good example of inquiry learning for prospective teachers. Richard Hake, Ph.D. in Physics, "Socratic Pedagogy in the Introductory Physics Laboratory," *The Physics Teacher*, Dec 1992, v30, n9, 546.

V. Coverage.

15-20% less text was covered by the Socratic method but the students felt that their understanding improved. Chemistry Professor, Thomas A. Holme, "Using the Socratic Method in Large Lecture Courses: Increasing Student Interest and Involvement by Forming Instantaneous Groups (studying chemistry)," *Journal of Chemical Education*, Dec 1992, v69, n12, 974.

A chemistry professor found that he could cover more material in a semester, around twenty questions. J.K. Heeren, *Journal of Chemical Education*, 4/90, v. 67, n. 4 330.

When an instructor switches from a lecture to an inquiry method, there is an initial slowing up period. This is compensated for by an increase in understanding. English professor, Robert J. Kloss, "Toward Asking the Right Questions: the Beautiful, the Pretty, and the Big Messy Ones," *The Clearing House*, Feb 1988, 245.

VI. My Thoughts.

My hope is that exposure to the Socratic Method will further its use. I realize that the few doctors and lawyers, who were exposed to the Socratic Method in graduate school, decide to change careers and become high school teachers. In a sense this is unfortunate. In a sense perhaps this is fortunate because some extremely conceited, arrogant, and insensitive attorneys would not have made good high school teachers anyway. Believe it or not I am neither the most conceited nor the most arrogant attorney I know.

I do not believe that the Socratic Method will ever become a national school reform issue. The method is too complex to fit into a sound byte. Reading about the Socratic Method or hearing about it second hand is not likely to convince anyone. The real power of the Socratic Method is seeing it in action. You need to see it in order to understand it. You need to watch a group of high school minds working together.

Even middle school minds are a thing of wonder. A math teacher asked her students what product a hypothetical store was going to sell. One student said that we should sell mechanical teachers so that we wouldn't have to put up with the real thing. A reading teacher wrote that you are judged by the company you keep. One student said, "Sorta like an accomplice." These students were operating at a mental level, which is way above their grade level. The point of the Socratic Method is to use higher thinking skills to teach eighth grade math and seventh grade reading.

My informal observation is that around one in thirty UNC teacher education majors might have some curiosity about the Socratic Teaching Method. A few professors might have such an interest. I believe that some of them would benefit greatly by seeing the Socratic Method in practice. The best way to accomplish that is to offer a college class like, Socratic Questions 101. Naturally the class would be taught in the Socratic Method. That would be good modeling.

Hopefully some instructors will turn to the Socratic Method later in their careers out boredom, frustration or for a change of pace. I enjoy the stories of the chemistry and physics professors who taught introductory level courses for fourteen years, got bored and decided to try the Socratic method. My hope is that some of the people who are exposed to the Socratic Method will make a mental note. In the future if they find that they are getting bored, they might grab my textbook and implement a new teaching style.

VII. The Counterintuitive Nature of Socratic lesson plans.

I can think of a whole host of reasons why frightful and insecure teachers, as a group, are unlikely to adopt the Socratic Teaching Method. My next paper will probably deal with, The Dead Sea Scrolls. This is my icon for teachers who teach as if all knowledge is dead. History is a faded written word on a piece of wrinkled parchment, which has no current use. Intelligence is a game of trivia designed to test your knowledge of useless fact, which are broken down into meaningless fragments.

There is one intellectual hurdle a Socratic teacher needs to make. The Socratic Method is largely counterintuitive. I volunteered to be a guest speaker at an eighth grade English class. I created two lesson plans, a client interview and a job interview. My goal was to teach them how to think like an attorney. One might say that since I was the one in the room with the most experience (ten years) as an attorney, I should do most of the talking. That is not how a Socratic teacher would approach the problem.

I introduced myself and then explained the following scenario. I volunteered the teacher to play the role of the client. The class was to act as the attorney. I would call on those students who raised their hands. I said, "A client walks into your office. She has had a car accident. What do you ask her?"²

Student: Were you drinking?

Mark: Why would you want to know that?

Student: Because like if she were drunk, she might have caused the accident.

Mark: Directs the question to the client (the teacher).

Student: What were you drinking?

Mark: Why do you want to know that? What difference does that make?

Student: If she had been drinking alcohol she might be legally drunk.

Mark: Directs the question to the client.

These exchanges lasted around forty minutes. The students asked about location, lighting, speed of the cars, drugs, defective vehicles and amount of sleep, etc. In that time period most of the questions, which an attorney with one year of experience would have asked, were asked by this class of twenty-five. Not only did Bradford's Legal Form checklist not do a better job, but the student's questions were worded better. They contained less jargon.

Before the bell rang that day, the teacher asked them each to write a paper on what happened and whose fault the accident was. I corrected and graded those papers. I compare these high level questions, which the students asked with the more generic eight grade questions. For example I observed a show and tell about a trip to Australia.

How cold was it?

How hot was it? (It was really hot!)

Where did you stay? (In a house.)

Did you see a kangaroo? (Yes.)

Comparing the former with the later, the first class of eight graders behaved like rocket scientists. I like to think that the questioning skills I demonstrated that day had some long-term effect.

In summary, the counterintuitive portion of my client interview lesson was that I had the most legal knowledge and experience in the room. The way I chose to help them think like an attorney was to get them to act like attorneys. I engaged their group mind. They learned to think like an attorney by acting like an attorney. They worked through a real life problem the way a real attorney would have. I resisted perhaps the more natural impulse to lecture about my own experiences.

VIII. Resist being the Answer Grape.

Another perhaps natural tendency which should be resisted is do not tell your students the "right" answer. Let them figure the answer out for themselves. For example, one student asked where then 170-degree angle was. She said, I don't see any 170 degree angles here:

I got flustered because I couldn't come up with an instant guiding question. I said, "I can see a 240 degree angle there. I pointed toward ABDG. She said, "Oh I get it." When her friend subsequently asked her for help on the same problem, she explained to her friend. "Just pretend line BC is invisible."

In another example a student asked me what an "oceanarium" was. As I frequently did I said, "I don't know. Perhaps that word is in the dictionary." Even when I knew the answer, I still generally said, "I don't know" to help get them in the habit of looking up words on their own. I went to the shelf and handed them a dictionary and pointed out the page. There was no such word in that dictionary. I asked the student what words made up "oceanarium." They said that "ocean" was one of the words.

I asked them, "What words sound like oceanarium? What is an "arium?" What words contain the word "arium." Fortunately the sixth answer down was "aquarium." Ok, what then do you think an oceanarium is?

Student: Like an aquarium for fish. Like an aquarium which is like the ocean.

Fortunately, my hunch was right and a larger dictionary later confirmed my "answer." My point is that you need to resist the urge to simply give them the right answers.

Chapter Six. Low Level Questions.

I. Low level questions.

Stevens' 1912 study indicated that 80% of the school day is spent asking questions. M. Gall's 1970 study and Clegg's 1971 study revealed that teachers ask an average of 395 questions per day. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," The Clearing House, May 1990, v73, n9, 420.

In 1912 Stevens' research indicated that two-thirds of the teacher's questions called for mere memorization of the text. Bloom's taxonomy should be used as a question blueprint. English professor, Robert J. Kloss, "Toward Asking the Right Questions: the Beautiful, the Pretty, and the Big Messy Ones," The Clearing House, Feb 1988, 245.

R. Stevens' 1912 study revealed that 66% of classroom questions merely asked the students to recite information gained from reading the textbook. M. Gall's 1982 study revealed that 60% of classroom questions sought factual answers. 20% concerned classroom procedure. Less than 20% sought any type of inference, transfer or reflection. Dennis Palmer Wolf, assistant education professor, "The Art of Questioning (How Teachers Use Questions to Teach Students)," Journal of State Government, March-April 1987, 81.

<p>Daines' 1986 study indicated that 93% of teacher questions were low level reading comprehension questions. What is two plus two? Name the Russian researcher who noticed that laboratory dogs salivated upon hearing footsteps. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," The Clearing House, May 1990, v73, n9, 420.</p>
<p>Delva Daines 1986 study indicated that 93% of elementary and secondary teachers' questions are on the literal level of reading comprehension. 88% of the required answers require only the lowest level of cognition. Robert J. Kloss, English professor, "Toward Asking the Right Questions: the Beautiful, the Pretty, and the Big Messy Ones," The Clearing House, Feb 1988, 245.</p>
<p>Teachers ask too many who, when, and where questions. They call for too little reasoning. Teachers should ask more how, why and what if questions. Educational psychologist, John F. Check, "Finding and Initiating Questions in Class," The Clearing House, Feb 1985, v58, 270.</p>
<p>Most questions are simple factual recall. They seek small bits of information. Many questions are managerial, Why don't you get your book out and read it? Many questions are rhetorical, Marilyn can't you sit properly? Higher-level questions seek analysis. They require imagination and generalization. Lower level questions are closed ended. They have perhaps one intended right answer. Most higher-level questions are open-ended. They are susceptible to a variety of answers. English teacher, Ted Wragg, "Light Shed on Leading Questions," Times Educational Supplement, Feb 21, 1992, n3947, 10.</p>
<p>50-90% of teacher questions are low level. This is especially true in groups larger than twenty-five. Convergent questions ask who, what, when and where. Convergent questions foster rigid narrow minds. Divergent questions ask how and why. Divergent questions encourage creative thinking and discovery learning. James Gallagher's 1965 study revealed that 50% of teacher questions are strictly memory questions. Allen C. Ornstein, "Questioning: the Essence of Good Teaching," NASSP Bulletin, May 1987, 71.</p>
<p>Hamblen's 1988 study revealed that less than 20% of teacher questions required critical thinking skills. Often the teacher answered their own questions. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," The Clearing House, May 1990, v73, n9, 420.</p>
<p>Between 1976 and 1978 Goodlad studied 1,000 elementary and secondary classrooms. He included 129 elementary schools and 887 secondary schools in a nationwide sample. One trained observer was sent to each classroom. In the elementary schools only 3% of the time was devoted to corrective feedback. 100% of classroom time was teacher dominated. In secondary schools less than 2% of the time was devoted to corrective feedback. In junior high 90% of classroom time was teacher dominated. In senior high 80% of classroom time was teacher dominated. Teachers out talked their students by more than a three to one ratio. Kenneth A. Sirotnik, UCLA, "What You See Is What You Get," Harvard Education Review, v53, #1, Feb 1983.</p>

Around 5% of the time was spent questioning students. Most of the questions were simple factual recall requiring yes or no answers. Less than 1% of the questions were open ended or required complex thinking. Positive corrective feedback was almost nonexistent. The hidden curriculum creates a dependence on authority. It fosters passive learning and mediocrity. This situation has changed little since 1912. By contrast an increase in academically engaged time will increase achievement test scores. Kenneth A. Sirotnik, UCLA, "What You See Is What You Get," Harvard Education Review, v53, #1, Feb 1983.

Although the author had hoped that college professors asked low-level questions in introductory classes and higher questions in higher-level classes, this was not found to be the case. Carole Barnes 1983 study showed that an overwhelming percentage of college professors asked the lowest level cognition question regardless of subject level. Robert J. Kloss, English professor, "Toward Asking the Right Questions: the Beautiful, the Pretty, and the Big Messy Ones," The Clearing House, Feb 1988, 245.

II. What is the effect of asking so many low level questions?

Rote learning produces scribes and clerks. The educational product is employability rather than intelligence. Inquiry learning produces authors and mathematicians. Dennis Palmer Wolf, assistant education professor at Harvard, "The Art of Questioning (How Teachers Use Questions to Teach Students)," Journal of State Government, March-April 1987, v60, 81.

John Goodlad's study of 129 elementary, 362 junior high and 522 senior high school classes revealed that students seldom talked in their classrooms. Students were out talked by teachers three to one. 70% of the talk was teacher talk. Less than one percent of the time a student was asked to express an opinion or explain their reasoning. When the teacher solicited student input it was more often than not fill in the blank type questions. Teachers engaged in long and extensive games of trivia. What is the capital of Wyoming? Who was the 16th President of the United States? Robert V. Bullough, "On Making Good Students," Journal of General Education, 1986, v38, n2, 85.

Many instructors believe that the sign of a good lecture is that there are no student questions at the end. The classrooms were devoid of shared laughter and enthusiasm. They were emotionally flat. A tremendous amount of life and energy were displayed when the bell rang. There were fights, doors and lockers were slammed and girlfriends hugged. The passive and dependence mode of the classroom fosters self-centered young people. They become organization men not bold and intelligent risk takers. Their talents never fully develop. Students are encouraged to accept a life spent in spectatorship. Robert V. Bullough, "On Making Good Students," Journal of General Education, 1986, v38, n2, 85.

Children come to school as natural inquirers. School tends to halt student progress as questioners. Decades of research reveal the preponderance of teacher talk over student talk.

Questions should be used to find out what students know (assess prior knowledge). Who, what, where, when and why questions should be used to develop the content. Students should read the assignment and write down their own questions after each section. Class questions and factual questions should be asked first. Then the instructor should move forward and ask application and judgment questions. Small groups can discuss or research such questions. Assistant Professor of Language Education, Sally Hudson-Ross, "Student Questions: Moving Naturally Into the Student-centered Classroom," *The Social Studies*, May-June 1989, v80, n3, 110.

A teacher monopoly on questions destroys rather than builds a shared spirit of investigation. Three common types of questions are: Read it and repeat it. Bland and boring questions which expect only an "uh-huh" reply. And rhetorical questions like, "Are we ready to begin now." Questions can be used to embarrass. Some students may skip class to avoid such humiliation. Dennis Palmer Wolf, assistant education professor, "The Art of Questioning (How Teachers Use Questions to Teach Students)," *Journal of State Government*, March-April 1987, 81.

III. What are the international implications of low-level questions?

This study examined the type of math questions, which first grade teachers asked in Japan, Taiwan and the United States (Minneapolis, Minnesota). 311 lessons were observed. Each question was ranked on a scale of one to six reflecting the degree of conceptual knowledge the answer called for: computation or rote recall, rule recall, computing, make up your own problem (application), problem solving skills and conceptual knowledge. Native trained observers recorded the types of questions asked in four different forty-minute lessons. None of the observers were unaware of the hypothesis of this study (blind). Each of the questions was then coded into six mutually exclusive categories representing a hierarchy. Cross coding reliability on the forty-five lessons was 87%. Educational psychologists Michelle Perry, Scott W. VanderStoep, and Shirley L. Yu, "Asking Questions in First Grade Mathematics Classes: Potential Influences on Mathematical Thought," *Journal of Educational Psychology*, March 1993, v85, n1, 31.

The Japanese school had a raw score of .37 on conceptual knowledge questions as compared with .02 for the US. The Japanese school had a raw score of .63 on problem solving strategy questions as compared with .24 for the US school. In each of these measures the Japanese school asked at least twice as many higher order questions (presumably .37 is more than eighteen times higher than .02). Asian teachers expected their students to be able to deal with complex conceptual questions. US teachers did not. This study concluded that Asian students are challenged more by their teacher's questions compared with US students. 61% of the Japanese questions required higher order thinking. 46% of the US questions required higher order thinking. Educational psychologists Michelle Perry, Scott W. VanderStoep, and Shirley L. Yu, "Asking Questions in First Grade Mathematics Classes: Potential Influences on Mathematical Thought," *Journal of Educational Psychology*, March 1993, v85, n1, 31.

This article went onto to discuss other factors, which might affect achievement test scores.

Better Textbooks. 320 math topics were examined. 91% of the topics were covered by the

Japanese textbook. 80% of the topics were covered by the Chinese textbooks. 78% of the topics were covered by the US textbooks. By the fifth grade 86% of the topics were covered by the Japanese textbooks. 66% of the topics were covered by the US textbooks.

Time Allocation. Stigler et. al. 1987 found that US children worked alone more than half of the time. Japanese and Chinese children spent most of their time paying attention to the teacher.

Teaching Methods. Perry 1989 found that first grade students in Taiwan learned about addition and subtraction by decomposition and recomposition. Adding five plus eight. Five is equal to two plus three. Eight plus two equals ten. Ten plus three equals thirteen. Therefore five plus eight equals thirteen. US students learned about families. Five and eight make a family of thirteen.

Other potential casual factors include longer school years in the Asian countries, more tightly organized school systems, cultural differences, more classroom discipline, and more time in school.

Educational psychologists Michelle Perry, Scott W. VanderStoep, and Shirley L. Yu, "Asking Questions in First Grade Mathematics Classes: Potential Influences on Mathematical Thought," *Journal of Educational Psychology*, March 1993, v85, n1, 31.

Lecture is the predominant teaching method in Latin America. The Socratic method should be used to discuss philosophy and theory. Catholic University Professor Frederick Turk, "The Formation of Critical and Creative Minds in Latin America," *Catholic Educations Review*, v66, Apr 1969, 819.

IV. Another International Comparison.

Professors of Psychology, Harold W. Stevenson and James W. Stigler, *The Learning Gap* (New York: Summitt Books, 1992).

Our focus has been on elementary school children and their parents and teachers. We have studied the children's daily environments both in school and out. We have visited hundreds of classrooms. We have heard from thousands of parents and children. We have observed scores of teachers in Beijing, China, Sendai, Japan, Taipei, Taiwan, and the United States.

1. Learning Gap.

The International Association for the Evaluation of Education Achievement conducted its first large-scale study in 1964. The same organization completed a similar study in the early 1980s. Average students in other countries often learn as much math as the best students learn in the United States.

Data from the Second International Mathematics Study show that the performance of the top 5 percent of US students is matched by the top 50 percent of students in Japan. Our very best

students, the top one percent, scored lowest of the top one percent in all participating countries.

On tests given to students from twenty countries: American eighth graders ranked tenth in arithmetic, twelfth in algebra, and sixteenth in geometry. Twelfth grade American students fared just as badly. When compared to students from fourteen other countries, they were in the lowest quarter in geometry. In algebra they were second from the bottom.

American businesses now spend more than \$25 billion each year on remedial education for their employees, virtually all of whom are products of the nation's public schools.

2. Time.

American children are at school approximately six hours each weekday. Only first graders in Asia spend so little time at school. In Beijing, as in Sendai and Taipei, children from the second grade on are at school more than eight hours every weekday. They return for four hours of classes on Saturday.

American children spend about half of their days of each year in school. Chinese and Japanese children spend two thirds.

Frequent breaks punctuate the elementary school day in Asia. After every forty to fifty minute class period, there is a recess during which children play vigorously. In contrast to the four or five recesses a day, which are typical in Asia, American children often, have no more than a single recess.

3. Student Values.

Most Asian students see school as central to their lives. Most American students do not. 94% of the children in Beijing said they liked school. Only 78% of the children in Chicago said that they liked school.

Children in Sendai, Japan spent 5.7 hours per week reading for pleasure, compared with 4.3 hours in Taipei and 3.8 hours in Minneapolis.

From our data we see that Japanese children spend even more time watching television than Americans, while greatly surpassing American children in academic performance. Japanese children watch two hours of television per day versus 1.8 hours a day in the US. Chinese and Japanese parents are more likely than American parents to make television viewing dependent on the completion of homework. Instead of being displaced by television viewing, homework takes precedence over it.

4. Parent Values.

Education does not play as central a role in the American conception of the tasks and

responsibilities of childhood. According to most Asian parents, the major goal of childhood is to obtain a good education.

Americans were more likely to assign greater importance to innate ability than were Chinese and Japanese. Americans tended to believe that test scores revealed innate ability. Japanese and Chinese parents tended to believe that test scores reflected effort and hard work. If one subscribes to the effort model, errors are seen as a natural part of the learning process. Under the ability model, errors may be interpreted as an indication of failure.

Chinese and Japanese parents hold high standards for their children's academic achievement. Their children accept those standards and work hard to meet them. By contrast American parents and children hold lower standards. As a result, American children have fewer reasons to study diligently.

Parents' reluctance to raise their expectations may be based on a fear that higher parental expectations lead to higher levels of stress in children. There is no evidence to support this fear. We have not found great stress among Asian elementary school children. There is no reason to believe that it would increase here.

We are left with the depressing conclusion that American parents' low academic standards and their tendency to overestimate their children's accomplishments work strongly against children's motivation for high academic achievement.

5. Teacher Values.

Asian teachers assign large amounts of homework. Asian children devote significant portions of their time to getting it done. Fifth graders in Minneapolis spent slightly more than four hours a week on homework. This was significantly less than the six hours in Sendai. This was a vastly smaller amount of time than the thirteen hours in Taipei. Homework was assigned to Asian children not only during the school year, but during the rest of the year as well.

American teachers viewed mistakes as an indicator of failure. Japanese and Chinese teachers and students regarded mistakes as an index of what still needed to be learned. They expected that with persistence and effort, student would eliminate errors and eventually make the correct response.

6. Discipline.

American teachers devote much more time to discipline than their Asian peers. We observed the following scene in a Japanese first grade classroom. The teacher tried to begin the daily mathematics lesson. The children were noisy and continued their loud conversations. The teacher paused and looked at the class. The teacher called on the child who was the day's classroom leader. "The children are too noisy. Until they are quiet, I cannot teach," she said matter of factly. The young leader sprang into action. She stood, faced the class, and announced, "Please stand up. We are so noisy, teacher can't teach." The children quickly became quiet. The

leader turned to the teacher and reported: "We are quiet now." The children bowed to their teacher and sat down. The teacher announced, "We will begin."

By contrast, American parents are less supportive of teacher efforts at discipline. At times American parents held the teacher responsible for their child's errant behavior.

The most frequent form of evaluation used by American teachers was praise. That technique was rarely used in either Taiwan or Japan. Praise cuts off discussion and highlights the teacher's role as the authority. It encourages students to be satisfied with their performance rather than informing them about where they needed improvement.

7. Teaching Methods.

Asian teachers subscribe to what would be considered in the West a constructivist view of learning. Knowledge is something that must be constructed by the children rather than as a set of facts and skills that can be imparted by the teacher.

One teacher we interviewed told us of discussions she had with fellow teachers on how to improve her teaching practices. A great deal of time was spent talking about questions to be posed to the class. Which words work best to get students involved in thinking and discussing the material? One good question can keep a whole class going for a long time. A bad question produces little more than a simple answer.

In the United States the purpose of a question is to get an answer. In Japan, teachers pose questions to stimulate thoughts. A Japanese teacher considers a question to be a poor one if it elicits an immediate answer. This indicates that students were not challenged to think.

American teachers place little emphasis on the constructive use of errors as a teaching technique. American teachers generally asked questions that were answered by a simple yes or a no, or with a short phrase. They sought a single correct answer. They continued calling on students until one produced it. The situation is very different in Asian classrooms, where children are likely to be asked to explain their answers. Other children are then called upon to evaluate their correctness.

Chinese and Japanese teachers had a low tolerance for errors. When errors occurred, they seldom ignored them. Discussing errors helped to clarify misunderstandings. It encouraged argument and justification. It involved students in an exciting quest assessing the strengths and weaknesses of the various alternative solutions that had been proposed. Discussing a wrong answer may hasten understanding of why the correct procedures were more appropriate.

8. Lesson Plans.

In Japan and Taiwan, teachers concentrated intently on only a few problems. In America teachers placed a high premium on their ability to cover a large number of problems. They may

have regarded that as the mark of an expert teacher.

It is not uncommon for an Asian teacher to organize an entire lesson around the solution of a single problem. The teacher leads the children to recognize what is known and what is unknown. The teacher directs the student's attention to the critical parts of the problem. The teacher attempts to see that all the children understand the problem. Lessons concerning mathematical computation are presented in the context of solving a problem.

A teacher walked in carrying a large paper bag full of clinking glass. What's in the bag? She pulled out a pitcher, a vase, a teapot, a beer bottle. I wonder which one holds the most water? How can we know who is correct? Fifth grade math, Japan.

There is a total of thirty-eight children in Akira's class. There are six more boys than girls. How many boys and how many girls are in the class? This lesson began with a discussion of the problem and the children's proposed ways to solve it. The teacher handed each student two strips of paper, one longer than the other. She told the class that the strips would be used to help them think about the problem. She asked the children to line up the strips next to each other and to decide which one represented the boys. A student pointed out that the amount the longer strip protruded beyond the shorter strip represented how many more boys than girls there were in the class. The procedure for solving the problem then unfolded as the teacher, through skillful questioning, led the children to the solution. Fourth grade math, Japan.

9. Teacher Comparisons.

What has impressed us in our personal observations and in our data is how remarkably well most Asian teachers teach. It is the widespread excellence of Asian class lessons that is so stunning.

When we witnessed the dynamic teaching in Chinese and Japanese classrooms and began to find out what was behind it, we were hit full force with the reason why much elementary school teaching in the United States is so unimpressive. As long as teachers are in front of a classroom for hours on end, we cannot expect to find the versatility, energy, and inventiveness needed to rejuvenate American education. We should provide large rooms where teachers can meet and work together. This would foster more frequent interaction among teachers and reduce their isolation.

Japanese teachers, beginners as well as experienced teachers, are required to perfect their teaching skills through interaction with other teachers.

American teachers need adequate time to prepare lessons. They need time to work outside of class with individual students. They need to perfect their teaching practices by interacting with each other and with master teachers. Until such changes are made, it is going to be difficult if not impossible, to change what children learn and do in school.

Why are American teachers often reluctant to encourage students to participate at greater lengths during mathematics lessons? One possibility is that teachers feel insecure about the depth of their

own mathematical training. Placing more emphasis on students' explanations requires teachers to relinquish some control over the direction the lesson will take. This can be a frightening prospect for a teacher who is unprepared to evaluate the validity of novel ideas which students inevitably propose.

Professors of Psychology, Harold W. Stevenson and James W. Stigler, *The Learning Gap*, Summitt Books, NYC, 1992.

IV. Elements.

One of my pet peeves is listing of elements. Name the three-part freedom of religion Lemon test. What are the atomic particles, which make up an atom? What are some examples of indefinite pronouns? A list of elements is common to most content areas. In normal lecture style the teacher drones off the list of elements just like they did the year before. This is an excellent opportunity to begin thinking about Socratic Questions. Ask each student to list one of those elements. Write those answers down on the board. In almost every class there is generally a 40% minority who has read the chapter. They welcome the opportunity to demonstrate their knowledge, exercise their brains and do something active. Better yet ask them an evaluation or application question where they are required to utilize those elements. If the list of elements is not implicit in their answer, the instructor or another student might ask for clarification.

Answer Strings. If you ask an open-ended question with several possible right answers, consider asking each student to give one answer. This makes the discussion more lively. If you ask, What were the causes of the civil war? All too often your brightest and boldest student will rattle off most of the obvious answers. This tends to sterilize the class discussion. Leave some obvious answers for slower students. Don't allow the class to rely on one bright shining star. When you call on your bright student, ask for just one answer.

Chapter Seven. High Level Questions.

I. High Level Questions.

Higher-level questions ask how would you do this? What is the relationship between behaviorism and what you will be teaching in a classroom? Ask, "Why"? Higher-level questions seek deeper thought. They require the students to listen carefully, analyze, and to think critically. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," *The Clearing House*, May 1990, 420.

Lower level questions seek details. Higher-level questions seek the big ideas and the big picture. Higher-level questions ask the student to demonstrate what they know and how much they understand. Students are required to articulate ideas. Socratic questions require the teacher to focus in on the big ideas, which are worth teaching. Selma Wasserman, *The Art of the Question*, *Childhood Education*, Summer 1991, 257.

II. What types of Questions should I Avoid?

Avoid asking questions with only one right answer. Convergent questions foster authoritarian thinking. They foster minds that look for simple rights answers and simple solutions. Such students assume that the right answer depends on authority rather than on rational judgment. Right answers are based on knowledge not personal experience or philosophical thought. This breeds rigid narrow minds. These students fail to recognize that facts and figures are screened thru a filtering process or a social lens. Allen C. Ornstein, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

Avoid multiple-choice questions. Avoid fill in the blank questions like, "The new frontier occurred during whose presidency?" Avoid leading questions like, "Why was Andrew Jackson a great president?" Allen C. Ornstein, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

III. Socratic Questions and Critical Thinking.

The term, critical thinking, has a number of different meanings. In the broad sense, it refers to higher-level cognitive functions like analysis, evaluation, comparison, application and synthesis.

The Socratic Teaching method teaches critical thinking by requiring the student to listen carefully to the question. The student must evaluate, synthesize, analyze, examine, compare, contrast and apply their own knowledge and experience in an attempt to answer the question.

In sum, the Socratic method teaches critical thinking. A student's facts, beliefs, and assumptions will be questioned by the teacher and evaluated by the class. Students are required to articulate reasons behinds their answers and explain the basis for their assumptions.

In a philosophic sense, the focus of knowledge is shifted. Lecture implies that teachers are full of wisdom. Students are empty vessels. The teacher attempts to fill their empty heads with knowledge. In a Socratic classroom the answers lie deep within the students. The teacher's role is to elucidate, clarify, challenge and compare the student's answers with their own thinking, facts, beliefs, and assumptions. A student's thoughts and experiences are the focus, not the teacher's.

The moral is to think for yourself. Do not rely upon some authority figure to do your thinking for you.

Chapter Eight. Procedure.

I. How do you create Socratic Lesson Plans?

An instructor creates Socratic lesson plans by reviewing the assigned reading. Select three to

five main points, big ideas or important concepts. Write down open ended, evaluative questions, which get at those three main points.

You might start your lesson with one question and let the class discussion continue until the last person has had their say, until the last spark of enthusiasm has been drained. An advantage of this method is that it encourages freedom of thought and flexibility. It gives the students the self-reinforcing idea that their thoughts really do matter. It provides an outlet for intensity rather than coverage.

You might set a goal that you want to spend fifteen minutes discussing each question. After fifteen minutes, you can suddenly (or artfully if you prefer) shift gears and ask your next question. You might compliment the class on their interest and intensity. Then suggest that a moral consensus might require several hours to reach. Then move on to the next question.

Your lesson plan might outline the three main questions. Write down a checklist of factors you would like your students to consider. Use guiding questions to lead students toward points, which they do not cover, on their own. This has the advantage of coverage and the disadvantage that your guiding questions might lead the students toward your points rather than their own points. You might seek a few student answers and then guide them toward your points, if you believe that your students won't come to your points naturally.

You might write out your lesson plan in sentence form as you might for a lecture. Outline the main points. Write down three questions, which get at your main points. Refer to your outline, not your written materials.

You might give the class some background facts and then ask them to discuss or work with those ideas. You might then ask Socratic questions.

In the Socratic method there is always a delicate balance of how much information you present and how much information you expect to draw out of your students. Your first preference should be to answer a question with a question. Presumably this is because it is better to lead a horse to water than to try and force them to drink.

My experience is that your class will cover most of the factors, ideas and points you had intended to cover. I believe that it takes around three class periods for your class to get used to the Socratic method. However even the first class catches on fairly quickly. Some instructors start with a one question example and say, this is how I would like to conduct this class, Are you comfortable with that (a leading question which is not a good Socratic Question)? After your class becomes comfortable with your style and with a little pulling and tugging, most points will be covered by your class without prompting.

John Dewey said that people learn best through problem solving. If facts are arranged in a meaningful way they are retained longer. Look for the organizing principle or idea. Connect it with the student's life and understanding will come. Lessons should revolve around the big ideas. Our goal should be to build deep understanding and develop critical thinking. Headlines

and challenging statements can be used for motivation. Problem solving is the highest level of motivation. John Eulie, secondary education and social studies teacher, "Teaching Understanding and Developing Critical Thinking," The Social Studies, Nov-Dec 1988, v79, n6, 260.
Arrange the questions in a logical sequence. Have the students repeat the question before answering it. This focuses attention. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," The Clearing House, May 1990, 420.
It is better to ask stupid questions in class than to give stupid answers on a quiz. Ask why questions. Wait three seconds before calling on someone. Donald M. Fairbairn, "The Art of Questioning your Students," The Clearing House, Sept 1987, 19.
This professor assigned 10-12 pages reading per each fifty-minute class period. He told his students to be thoroughly familiar with the written material. Be prepared to answer questions. During the class period a number of students solved problems on the blackboard and then explained their answers to the class. The class asked them questions about their solutions. J.K. Heeren, Journal of Chemical Education, 4/90, v. 67, n. 4 330.
One Socratic lesson plan is to make a list of the key terms from the reading. The professor then made up spontaneous questions from that key word list. Another Socratic lesson plan is to have detailed questions. Have the students write down answers before they begin their discussion. J.K. Heeren, Journal of Chemical Education, 4/90, v. 67, n. 4, 330.
<p>II. Socratic Procedure.</p> <p>Use knowledge level questions to assess ability. Use Who, What, Where, When and Why questions to probe deeper thoughts. Prepare the questions in advance. Arrange them in a logical sequence. Repeat the question before taking answers. Wait three to five seconds before calling on a student. Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," The Clearing House, May 1990, v73, n9, 420.</p> <p>Write down four or five major questions. Focus in on pivotal questions. Bloom's taxonomy might be used as a guide. Other questions will emerge during the lesson. Make your questions concise, challenging, open ended, evaluative, and divergent. Seek inquiry, discussion and learning. Mix subjective and objective questions. High-level questions demand patience, clarity, timing, sequencing and phrasing. This is no easy task for even the experienced teacher. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.</p> <p>Incorrect answers should be redirected to another student. Or rephrase the question for the same student. Get the students to clarify their answers. Follow-up yes/no questions with opening</p>

ended questions like why. The teaching cycle includes directing, redirecting, probing, structuring, focusing attention, soliciting and eliciting responses. Reacting to responses, modifying and clarifying responses. Positive reactions like, "Good, Correct, That's True," should be used. Honest praise should be used. Ten studies have indicated that praise is used less than 6% of the time, less than five times an hour, in elementary schools. There is less praise in secondary schools. Allen C. Ornstein, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

Our modified Socratic method may be used in almost every area of higher education. It may be used exclusively. It may be used to balance lecture and casual discussion. It transforms passive students into active ones. Our college class modified the Socratic method. A reading was assigned. The class was asked to draft Socratic questions. The teacher selected a few questions and wrote them on the board. The students copied down the questions. The teacher explained why particular questions were selected. Then the class held a Socratic discussion. Eugene Kuziriam, "Everyman His Own Historian: Socratic Inquiry for Teaching European History," Improving College and University Teaching, v28, n3, Sum 1980, 124.

We introduced one procedural change in our Socratic method. The students would spontaneously form small groups of four or five students who were sitting together. After the small group discussed the problem, they answered as a group. 60% of the students preferred this answering method. Professor of Freshman General Chemistry, Thomas A. Holme, "Using the Socratic Method in Large Lecture Courses: Increasing Student Interest and Involvement by Forming Instantaneous Groups (studying chemistry), Journal of Chemical Education, Dec 1992, v69, n12, 974.

III. My Thoughts.

Review the content material. Summarize the three main points (big ideas). Write down three divergent questions, which get at those three main points. You might outline the points, which hope to lead the students to. In the constructivists sense the goal is to get the students to construct their own building blocks of knowledge.

Pose the problem. Don't give them the answer. Don't force them to drink. Make the water available. Use guiding questions to direct them toward the water. Your initial question should call for big inferential leaps. Guiding questions should call for progressively smaller and smaller leaps. Resist the temptation to be the answer grape. Resist the temptation to believe that they won't get it. Break it down and make it easy toward the end, not at the beginning. Do not start by giving them a cake question.

For example, a big idea from the US Constitution is pluralism. The idea that people have rights against the government. People do not exist to merely to carry out the King's will. People are more than pawns in a royal chess game.

I might begin my lesson by writing the word pluralism on the board. I might ask, What is pluralism? I might have assigned some background reading about the Magna Carta, the Six

Nations of the Iroquois Confederation or John Locke.

Resist the urge to think, these are dumb high school students. They know nothing about pluralism. They do not care about pluralism. They are empty vessels, which I need to fill up with my knowledge. Here is what I think pluralism is (lecture). Here is a definition of pluralism (regurgitation). Do you agree that pluralism is a good thing? This yes or no convergent question kills dialogue. It does not foster it.

IV. How can I take advantage of the Group Mind?

One advantage of the Socratic method is that it makes better use of the class' group mind. When thirty minds with an average IQ of 110 work together, their IQ is raised to somewhere in the 180 range. Their combined IQ may be off the scale. They tend to think of more alternatives, new alternatives and discuss alternatives you yourself had not thought of. They discuss points among themselves (student to student interaction). They become more critical of their own thinking. They are encouraged and required to express themselves more clearly. When working together, somebody is likely to remember and contribute the missing fourth binomial in a given quadratic equation.

For example I worked as a teacher's aide in a high school government class. In day one, I outlined the facts of the Denver Nativity Scene case. I had my students outline, identify and discuss the main arguments, which the Plaintiffs and Defendants should make. In one hour the class came up with the nine main arguments. They came up with a definition of what the First Amendment Freedom of Religion clause meant in this case. In the actual State case, four main attorneys had worked on the case. Each side probably spent one hundred hours brainstorming the issues. We could have been two hundred times more efficient by getting my high school class to discuss those same concepts. I guess it goes to prove the old adage that thirty high school students can outthink four lawyers.

My high school class' accomplishment was no small feat. I don't believe that a very intelligent college student could have come up with those nine arguments. I don't suspect thirty college students could come up with those arguments on their own. I do however believe that thirty college students could come up with those arguments, if I led them in a Socratic discussion.

V. What are Guiding Questions?

Use guiding questions to sharpen student answers, which are less than brilliant. Have them restate unclear answers. Have them articulate an incomplete thought or a vague answer. Go with, extend and/or project a good thought. Work with and develop a novel idea. Have them evaluate their own bad or poorly thought out answers.

Guide students towards your points. "I don't think the nativity scene is a big deal. Nobody is forced to look at it. I wish they would stop whining about it."

Ok Pete (a hypothetical high school student), let us say I talk with Norm Early and Wellington

Webb, I convince the State Legislature to allocate \$1 million dollars to build the Colorado State Church in Fort Collins. I ask for and receive an annual salary of \$65,000. Nobody is forced to come to my church. If you disagree with the religious messages I am broadcasting on television, you are free not to listen. Is this constitutional? Shouldn't you be prevented from whining about it?

VI. Examples of Guiding Questions.

I have observed a high school teacher who used the Socratic method. I believe that an expanded section on guiding questions would be appropriate. Socratic questions should be designed to stimulate lively discussions. They should enliven the passions, spark interest and generate controversy. They should invite your students to take a position, get involved and to think. However, ad hoc guiding questions may be needed for kindling. Guiding questions might be needed to reduce the number of sterile discussions.

Questions have two main purposes, to access prior knowledge and to start discussions. If a student or a class is stumped by your Socratic question, you can rephrase, redefine or move on. If you find that the student has not done their reading, you can move on or you can rephrase the question drawing on common sense, experience, guessing and/or logic.

Suppose a class is stumped by a question like, How would you evaluate the value of air power in World War II? The class listens intently, thinks for five seconds and no answers are generated. Time for guiding questions:

How would you compare the value of air power in World War I vs. World War II?

How would you compare World War I aircraft vs. World War II aircraft?

How would you compare the value of air power vs. submarine or naval power?

What are the purposes of aerial bombardment?

How effective is a machine gun mounted on an airplane for killing soldiers?

Where would you look to find out how many military aircraft there were as opposed to the number of ships? As opposed to the number of tanks?

Where would you look to find out how many soldiers were killed by airplanes as opposed to machine guns?

Where would you look to find out the number of US soldiers in the Air Force as opposed to the Navy?

Where would you look to find out how much was spent on the Air Force as opposed to the Army?

All of these guiding questions would be good topics for group discussion. The later four questions form the basis for research projects, which would help answer important historical questions.

VII. Guiding Question Categories.

Advantages. Suppose a class is stumped by a question, How would you evaluate the effectiveness of Behaviorism? What are the advantages of behaviorism? What is the purpose of

behaviorism? What behaviorist applications can you identify in this school?

Analogy. Suppose a class is stumped by a question, How does foreign debt effect the national economy of Mexico? Suppose you owe \$10,000 to Bill, how might that affect your finances? What might happen to Bill if you filed for bankruptcy?

Best Case Scenario. Suppose a class is stumped by a question like, How does the salary cap affect the NFL? If you were a football owner with an unlimited budget, what players would you hire? What affect do you think that would have upon your won/loss record? What is the relationship between money and success?

Caveman Example. Search for a base example, which more people can relate to. Suppose a class is stumped by a question, What does a dollar bill represent? What is the value of a dollar bill to a caveman? Under what circumstances would that dollar bill become useful to him? Under what circumstances would that dollar bill become useless to him?

Compare them to you. Suppose a class is stumped by a question like, What does a \$350 per capita annual income mean to a person living in China? What is the per capita annual income of the average American? As a ballpark figure how much does your family make? How much would it cost you to operate a 1991 Chevy truck?

Definitions. Suppose a class is stumped by a question, How does geography affect socialism? What is geography? What is socialism? What can a map tell you about economics?

Differences. Extreme Examples. Alter one variable. An extreme example may be easier to evaluate. Suppose a class is stumped by a question like, How viable is our capitalist economic system? Would a pure capitalist system have welfare? What do you think would happen if we abolished the welfare system overnight? Would a pure capitalist system have a Federal Reserve Board, a Securities Exchange Commission or an Environmental Protection Agency? What would happen if we abolished each of those agencies overnight?

Disadvantages. Suppose a class is stumped by a question, How important was gold to the Spanish Armada? Why did they seek gold? What are the disadvantages of a gold based system of monetary exchange? What are the advantages? What is the intrinsic value of gold?

Elements. Suppose a class is stumped by a question like, What can American industries do to reduce water pollution? Ask what are the elements involved? The elements involved in water pollution are a pollutant and water. How can we reduce or prevent water pollution? We can prevent the pollutant from entering the water. We can filter, purify or distill the water after it is polluted. We can add microorganisms to eat the pollution. We can use distance and allow mother nature to clean the stream herself. We can wait until the hydraulic cycles cleans itself.

Example. Suppose a class is stumped by a question like, Do you believe everything you read in the newspaper? If you read an article that throwing dice cured warts, would you believe that dice were a cure for warts? How many such tests would it take to convince you of that fact? What

additional information would you want?

General to Specific. Suppose a class is stumped by a question, How does the Communist inefficiency of full employment affect the Russian economy? Suppose your name is Ivan and Levi Jeans proposes to modernize your plant and eliminate economic inefficiency. What would be your reaction? How might capitalist efficiency affect your job security?

Move From the Known to the Unknown. Suppose a class is stumped by a question like, What was the impact of international military alliances during World War One? If I shoot a Crip, what will happen? If a Blood shoots a Crip, what is likely to happen? How does gang warfare and revenge compare to international military alliances?

Predictions. Suppose a class is stumped by a question like, How did the Civil Rights movement in the 1960s affect American society? Suppose the civil rights movement in the 1960s never happened, what might our society be like today? Suppose Martin Luther King never led a bus strike in Alabama, how might that affect our society?

Projections. Suppose a class is stumped by a question like, What is the future of communism? What economic factors led to the downfall of communism in Russia? Are those factors present in China? What pressures does that put on Cuba?

Purpose. What is the purpose behind the idea? Suppose a class is stumped by a question like, How would you evaluate the importance of democracy in America? What are the purposes of democracy? Are we achieving those ideals? Why not? What can we do to improve the system?

Ranking. Suppose a class is stumped by a question like, How important were international intelligence (spies) during World War One? Were spies more important than trench warfare? Were spies more important than chemical warfare? Were spies more important than tanks? What are the advantages of using spies? What are the disadvantages of using spies?

Similarities. Suppose a class is stumped by a question like, How do you evaluate the Religious Right's hatred for homosexuals? How did slave owners' justify slavery by reference to the Bible? What comparisons can be made with the slave owners' Biblical justification for slavery?

Specific Example. Suppose a class is stumped by a question like, How does the Russian culture compare to US culture? Provide an everyday chronological example, which they might be able to relate to. This might help them fill in the pieces. It is midnight in Moscow, what do you suspect most citizens of Moscow are doing? The alarm rings at 7:00 a.m. on a winter's morning. Given your knowledge of Russian agriculture how is Ivan likely to spend the rest of the day until he returns to sleep?

Specific to General. Suppose a class is stumped by a question, What was Thurgood Marshall's role in Black History? Do you think it made a difference that a black attorney argued the case of Brown vs. Board of Education? What do you think a black Supreme Court Justice symbolizes? What is the power of one?

Start at the Beginning. Suppose a class is stumped by a question like, What conditions are favorable to the development of democracy? If two ancient people met in a forest, what might they do? Which of those scenarios would be consistent with democracy?

Worst Case Scenario. Suppose a class is stumped by a question, What is the value of freedom of religion? Suppose a US President outlawed all religions except one, what would happen? How would that affect your lives? Who should decide which one correct religion would be mandated? How would they decide that?

Chapter Nine. More Procedure.

I. Classroom Management.

Direct the questions to the entire group and then call on an individual. Call on nonvolunteers when you believe that the question will be answered correctly. Call on nonvolunteers around 15% of the time. Call on disruptive students. Change your position and move around the room. Author, Allen C. Ornstein, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

Ask students to explain ideas and show relationships. Call on disruptive students. Change your position and move around the room for variety. The teaching cycle involves directing, redirecting, and probing. Structure questions to focus attention. Allen C. Ornstein, Professor at Loyola University, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

Honest praise and positive reactions are effective. Ten studies indicate that praise is used less than 10% of the time. It is used less than five times an hour in elementary school. Honest praise is used even less in secondary schools. Allen C. Ornstein, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

II. Socratic patience and wait time.

The average teacher waits less than one second for an answer. Wait 3-5 seconds before calling on someone. Wait time encourages deeper thought. It provides more time for divergent ideas to emerge. Attention and class focus are better maintained when each student is given time to reflect upon the question. Students tend to formulate an answer as if they might be called on. Allen C. Ornstein, "Questioning: the Essence of Good Teaching - Part II," NASSP Bulletin, Feb 1988, 72.

Wait 3-5 seconds before calling on someone. Wait time encourages: careful listening, analysis of your own thoughts, critical thinking and acting independently. Professors of Education: Imogene Ramsey, Carol Gabbard, Kenneth Clawson, Linda Lee and Kenneth T. Henson, "Questioning: an Effective Teaching Method," The Clearing House, May 1990, 420.

Romjett Stevens' 1912 observation of 100 classrooms found that teachers ask around 395 questions per day. Typically teachers wait less than one second for an answer. An optimal wait time of three to five seconds fosters higher cognitive thinking. The length and quality of the answers increase with time. Confidence and motivation are increased. Achievement and complex thinking are encouraged. Student to student exchanges are increased. "I don't know" answers are reduced. Virginia A. Atwood and William W. Wilen, "Wait Time and Effective Social Studies Instruction: What can Research in Science Education Tell Us?" *Social Education*, March 1991, v55, n3, 179.

Acheson and Gall 1987 report that high school teachers ask an average of 400 questions per day. A two or three second wait time is best. A 60-40% mix of factual and higher level questions is best. Question stratification increases short term and long-term memory. Middle School Principal, Jo Roberts and Assistant Professor of Education at an Alternative High School, Melody Zody, "Using the Research for Effective Supervision: Measuring a Teacher's Questioning Techniques," *NASSP Bulletin*, March 1989, v73, n515, 8.

Answering your own question is a poor technique. One procedure is to display a question on an overhead. Have the students write down their answers. Walk around the room and look at the answers. I let students know that I expect each one to participate and to work on these problems in small groups. Donald M. Fairbairn, "The Art of Questioning Your Students," *The Clearing House*, Sept 1987, v61, n1, 19.

Research has indicated that teachers wait an average of about one second for an answer. They made no adjustments for the cognitive level of the question. On a test measuring science comprehension, the longer the wait time (5.9 seconds) the greater the student achievement. We tested thirty preservice teachers and five elementary pupils. Students who were asked 100% comprehension questions had a mean score of 16.58. Students who were asked 50% comprehension and 50% knowledge questions had a mean score of 19.81. Students who were asked 100% knowledge questions had a mean score of 17.27. J.P. Riley, Department of Science Education, University of Georgia, "Teacher Wait Time and Comprehension," *Journal of Research in Science Teaching*, Apr 1986, v23, 335.

III. My Thoughts.

I have been developing a Socratic lesson plan, which is different, but very consistent with the traditional Socratic Method plan. My lesson plan is to find the active portion of each scenario. Try and put the students in the active role. In my earlier client interview lesson, the active person in an attorney/client relationship is the attorney. I set up a very quick lesson plan putting the class in the active role of the attorney.

In my earlier government class lesson on the Denver Nativity Scene, I had more trouble. In my first lesson we had a lively general discussion, which set the stage and identified the issues. On the second day I tried to fit the lesson plan into my active/passive role model. I figured that the active role in reviewing a State Supreme Court decision was to be one of the Supreme Court

Justices.

I told the class that they had done well the day before and that I had decided to promote each of them to Supreme Court Justices. I mentioned their salary and then I told them that the First Amendment Freedom of Religion, Establishment Clause and Colorado Constitution Article II Preference clauses were similar to the law school concept of a bundle of sticks.

I drew a bundle of sticks icon on the blackboard. I reviewed yesterday's work. One of the sticks, elements or protections we had added to the First Amendment was that Government should not fund religion. Another was that government can not support religion. Each individual concept when added together became the freedom of religion bundle. The class then articulated and voted on whether or not to add particular sticks to the bundle. I mentioned that their legal decisions needed to be fair and just.

I drew an icon of a wheel on the board. I mentioned the college level concept is that your decision should take into account the wheel. Those people who sit on top today might be the minority of tomorrow. Sometimes what goes around comes around. Your decisions should make sense while you are on top. Hopefully your decision will make sense if you are on the bottom and somebody else is on the top.

I see great power in Socratic Lesson plans. A good question sparks good discussions. My natural ability to polarize a conversation with extreme statements helps turn sterile conversations into lively discussions. A good question sort of sparks its own energy. It motivates students by its mere utterance. Ask a good question, connect it to something in the student's life, which they care about, and great power will be unleashed.

IV. Classroom Discipline.

I have been thinking about extending the Socratic method into the area of discipline. Many of us can relate to our fathers coming home, listening to mom's gripes and then giving us the lecture. Perhaps we should reconstruct that fond childhood memory under a Socratic light. If a student misbehaves in school some teachers suggest that we ask them:

What are you doing?

What should you be doing?

Perhaps we should extend that.

Why do you think that I find your behavior less than acceptable (perhaps it violates school rules)?

What do you think the purpose of that rule is?

Do you think that rule is fair or unfair?

What do you think an appropriate punishment would be (perhaps a warning or leniency for a first offense)?

My recollection is that I tuned out my father when he began his lectures. Part of the reason was that I knew ahead of time what he was going to tell me. Likewise I believe that most students are able to give you cogent explanations concerning why their behavior was improper. If a student sincerely has no idea of what he did wrong, then this is a teachable moment. Perhaps they need information and guidance.

V. Other Uses.

A couple of other uses of the Socratic method should be mentioned. It can be used to humble cocky law students. This method can be used to show how little the students know and perhaps how much the professor knows. Socrates would not approve of this.

The Socratic method can be used to embarrass. Socrates would not approve of this.

The foundation of Socratic knowledge is to realize that eternal truth and knowledge are difficult to come by. Generally the most we can say is we are uncertain about that which we claim to know. Perhaps we only know that we do not know. Using the Socratic method to embarrass goes against Socrates' philosophy. There are probably more effective uses. One might recall that one of Socrates' lessons is that we are all uncertain about absolute knowledge and eternal truth. Because we are all uncertain, we all sail together in the same boat. We all seek truth. The student seeks knowledge by answering the questions. The teacher seeks knowledge by asking the questions. You are never too old to learn. Moments before Socrates sipped that fatal glass of hemlock, perhaps he was asking life's eternal questions and pondering life's eternal mysteries.

Chapter Ten. Examples of Socratic Questions:

These examples are listed by content area. They are in alphabetical order. I hope that regardless of your chosen content area, you read all of the examples. Transferable ideas are an important thing. Socratic teaching is an approach to lesson planning. A textbook, which provided canned Socratic questions, would fail to draw upon the teacher's own experiences, interests and ideas. Canned questions might fail to draw upon the student's own experiences, interests and ideas. However, big ideas can be borrowed. Culture can be diffused.

Art. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

How did Picasso organize colors, shapes, and sizes to produce images?

Biology. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

What are the common causes for cell breakdown in the cases of mutation, cancer and aging?

Chemistry, college. Professor of Freshman General Chemistry, Thomas A. Holme, "Using the

Socratic Method in Large Lecture Courses: Increasing Student Interest and Involvement by Forming Instantaneous Groups (studying chemistry), *Journal of Chemical Education*, Dec 1992, v69, n12, 974.

The instructor had arranged for an assistant to turn off the lights. He asked,

"What happened? Some student generally answered that somebody turned off the lights.

What is electricity?

Are electrons the only thing that can lead to electricity?

How do electrons cause light?

Engineering Design, college. A.E. Samuel, "Student Centered Teaching in Engineering Design," *Instructional Science*, v15, 1986, 213.

How would you get information about the carbon content of steel used in torsion bars?

How do we get information on the strength properties of torsion bar material?

How do we assess the strength of the supporting structure?

English, 10-11. Professor at Loyola University, Allen C. Ornstein, *Questioning: the Essence of Good Teaching - Part II*, *NASSP Bulletin*, Feb 1988, 72.

How does Hemingway's experience as a news reporter affect the story, "A Farewell to Arms"?

Who can distinguish between fact and opinion in the article we just read?

How does John Steinbeck use his characters to discuss the notion of friendship in, "Of Mice and Men"?

Geography-physical. Jeffrey O'Malley, a curriculum specialist, "Asking the Right Questions," *The Social Studies*, March-April 1990, v. 81, n2, 89.

What countries border Country X?

What are the major fault lines in Country X?

What type of government does Country X have?

Government Class, high school. Sociology teacher, Linda Kay and college curriculum and sociology professor, Jerry Young, "Socratic Teaching in Social Studies," *Social Studies*, Jul-Aug 1986, v77, n4, 158.

Under the Manzo Request Model students read a passage from the First Amendment to the Constitution. The students then ask the teacher questions. After all the student questions have been answered, the teacher asks the students' questions. The instructor begins with factual based content questions. The next group of questions require the student to make implications based on their readings. The last group of questions asks the students to apply their learning.

History, European, College, Eugene Kuziriam, "Everyman His Own Historian: Socratic Inquiry for Teaching European History," *Improving College and University Teaching*,

v. 28, n. 3, Sum 1980, 124.

If history is the memory of things, which were said and done, how do we decide what is fact and what is fiction when we have to rely on a variable such as memory?

What does the Magna Carta tell us about women in 12th Century England?

Journalism, College. Richard A. Schwarzlose, "Socratic Method Adds Zest to Ethics, Law Classes," Journalism Educator, v33, n1, Apr 1978, 9.

Given a news scenario: How long a story would you write?

How much of the available information would you include?

Where would you display this newspaper story?

What further investigation would you conduct?

Math. Teacher development professor, Peter Sullivan and math professor, David Clarke, "Catering to All Abilities through Good Questions," Arithmetic Teacher, Oct 1991, v39, n2, 14.

Write numbers between 5.1 and 5.2.

A number is rounded to 5.8, what number might that be?

How many box designs can you make with 24 cubes?

Math, 4th and 5th Grades. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

How have triangles influenced architecture?

Math, grades 6-8.

What is the best air route to take from New York City to Moscow? Why?

Math. Donald M. Fairbairn, "The Art of Questioning Your Students," The Clearing House, Sept 1987, v61, n1, 19.

Avoid chorus response questions like, What type of quadrilateral is ABCD class?

"Why" is an important word in a student's vocabulary.

Instead of asking, "Is AB greater than CD?"

Ask, "Why is AB greater than CD?"

Years ago I bought a 1966 Mustang Convertible for \$800. I later sold it for \$2,400. I later bought the same car back for \$4,000 and then sold it again for \$5,600. Did I gain, lose, or break even on my wheeling and dealing?

Math, Sixth Grade. Kay Tolliver, my mental notes from the video, "Meet Kay Tolliver," National Science Foundation, 1993. This is a black teacher who taught at an at risk school in

Harlem, New York.

She put on a sandwich type billboard with a drawing of a raisin box. She played the familiar, "I Heard It Through the Grapevine" music on a cassette.

How many raisins are in the box in front of you? Don't open up the box just yet. I want you to guess.

She put on a conical wizard's cap and had a magic wand.

I have placed some ublix in front of you. Tell me what it is?

What can you tell me about it?

What are its properties?

One of her opening day exercises is to take the class outside for a field trip walk about their Harlem, New York neighborhood. "We need to go outside and find the math."³ Her students took notes, asked questions and discussed. She used this field trip as a motivation tool. Her students saw math in speed limit signs. There was math in the angle of tree branches. They saw money and accounting in nearby stores. There was weighing, counting and money exchanged in drug deals. There was geometry in buildings and architecture. Another one of her points was for the students look around. If you don't succeed in life, you might end up homeless and/or drunk and laying in the gutter. One way of succeeding in life is through hard work and school.

How many cars did you see?

How many cars do you think pass by here each hour? Each day?

How many bricks did it take to construct that wall?

Now I called on Salvatore. Is your name Salvatore? If not then please be quite and let Salvatore have a chance to come up with an answer.

Music. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

Who can write a simple melodic line?

Physics, college. Richard Hake, Ph.D. in Physics, "Socratic Pedagogy in the Introductory Physics Laboratory," The Physics Teacher, Dec 1992, v30, n9, 546.

Why did you put a horizontal force vector on your sketches?

Why is the iron disk moving?

Did it feel as if you were exerting a horizontal force?

Political Science. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

Who can show the fallacies of Hitler's Mein Kampf?

Problem Solving. One large company has reason to believe that its high tech secrets are being stolen and sold to a foreign power. You are called in to investigate this problem. Carolyn J. Sweers, a high school philosophy teacher, "Teaching Students to Examine Their Lives (using the Socratic Method in secondary education), Educational Leadership, May 1988, v45, n8, 20.

What do you do?

What is your next step?

How would you prove that in court?

Problem Solving, college. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

If you see an adult male approach a young girl who is playing with toys in a department store. They talk briefly. He picks her up and carries her out of the store. The girl yells, "No, no put me down. I don't want to go."

Is this an emergency?

What would you do?

Psychology, college. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

Generate a definition of what is abnormal behavior.

What are its common elements?

Psychology, college. Norman Ferguson, "Encouraging Responsibility, Active Participation and Critical Thinking in General Psychology Students," Teaching of Psychology, Dec 1986, v13, n4, 217.

What does it mean to be blind?

Research Methodology, college. Assistant Professor of Psychology, James C. Overholster, "Socrates in the Classroom," The Social Studies, March-April 1992, v83, n2, 77.

If you saw a television video about a new treatment, for example eating five carrots a day as a cure for depression, would you trust the new treatment?

How would you evaluate one testimonial?

How many such testimonials would convince you?

If the treatment group did no better than the control group, would you then be sure of the cause?

Science, grades 2-5. Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

How would you compare living conditions on Mercury with Earth?

What planet other than earth would you prefer to visit if you were an astronaut? Why?
Science, grades 9-11: Professor at Loyola University, Allen C. Ornstein, Questioning: the Essence of Good Teaching - Part II, NASSP Bulletin, Feb 1988, 72.

How is water purified?

Science, Dale Bradtke and Barbara Regnier, education students and Joland Mohr, professor of education, "An Interdisciplinary Unit Comes to Life," The Clearing House, Sept 1985, v59, 23.

What is rain?

Do UFOs exist?

Social Studies. This instructor shows the students cartoons and headlines. He has them read articles and stories about Civil War corruption. John Eulie, secondary education and social studies teacher, "Teaching Understanding and Developing Critical Thinking," The Social Studies, Nov-Dec 1988, v79, n6, 260.

What enabled corruption to flourish during the Civil War?

What are other examples of political corruption?

What are other examples of economic corruption?

What happened to Boss Tweed?

What are the causes of corruption?

What are some recent examples?

How can society work to minimize corruption?

The lesson he drew was that the price of a democracy is eternal vigilance.

World War II, Action in the Pacific. Show the students a map. Carolyn J. Sweers, a high school philosophy teacher, "Teaching Students to Examine Their Lives (Using the Socratic Method in Secondary Education)," Educational Leadership, May 1988, v45, n8, 20.

Where is Pearl Harbor?

Why did the Japanese bomb Pearl Harbor?

Why didn't the Japanese go further?

What was the effect on the American people?

What does a football coach mean when he talks about strategy?

How do generals use strategy?

How would you plan the Pacific campaign?

Writing. Stanley Pogrow, "A Socratic Approach to Using Computers with At-Risk Students," Educational Leadership, Feb 1990, 61.

What is the different in perspective if a writer is riding in a hot air balloon as opposed to watching the balloon from the ground?

Writing. This professor has a writing procedure where students sit in a circle. They hold press conferences. Each student tells the class what topic they want to write about. The class brainstorms and the student writes down what the class would like to know about that particular subject. The student makes a rough draft based on the content questions the students have asked. The students research their subjects and then write a paper. The students meet in study groups of four to five students to proofread each other's papers. Based on that input the papers are clarified and revised. Assistant Professor of Language Education, Sally Hudson-Ross, "Student Questions: Moving Naturally Into the Student Centered Classroom," *The Social Studies*, May-June 1989, v80, n3, 110.

This exercise teaches them to think like real writers. They must consider form, length, reputable sources, the age and sophistication of their audience, and the type of magazine they would be writing for. The student articles are grouped by subject and published. What is most exciting here is that students come up with most of the questions teachers would have presented anyway. Discussions are livelier. Misunderstanding and student interest lead to teachable moments. Assistant Professor of Language Education, Sally Hudson-Ross, "Student Questions: Moving Naturally Into the Student Centered Classroom," *The Social Studies*, May-June 1989, v80, n3, 110.

Writing. Assistant Professor of Language Education, Sally Hudson-Ross, "Student Questions: Moving Naturally Into the Student Centered Classroom," *The Social Studies*, May-June 1989, v80, n3, 110.

I read one sentence from a Time Magazine article, then I ask, "What would you want to know next?"

I read from an article about Africa: The students ask questions like,

How hot is it in the summer?
How cold does it get in the winter?
Does an oasis move over time?
Where is Ethiopia and why are the people starving?

I read from a paper about immigration, the students ask:

How many people went thru Ellis Island?
Where are immigrants coming from today?
How many Americans emigrate? Why?

Writing. The Socratic Method is particularly suited to writing classes. Applebee 1981 reports that less than 20% of class time is spent on students expressing their own ideas. Less than 10% of class time is spent sharing ideas. We spend too much time on mechanics as opposed to ideas. We make little use of interactive learning or peer responses. In my writing classes I assign a paper to be written. I have a series of three Socratic conferences with each individual student. We have content conferences where we ask what do you want to write about? The emphasis is on

finding a topic, which they are interested in writing about. We have design conferences where we try and identify our audience (who we are writing for) and the writer's voice (whose perspective the story should be told from). Finally we have editing conferences where we discuss, grammar, spelling, rewriting, rethinking and making a final presentation. I try and lead poor writers to do what writers do naturally: think, write, rethink and rewrite. We focus on thoughts, which are worth communicating. I encourage my students not to give up too soon on their own ideas. Patricia Austin, "Brian's Story: Implications for Learning Through Dialogue," Language Arts, v66, n2, Feb 1989, 184.

Chapter Eleven. More suggested Socratic lesson plans.

Here are some of my lesson plans. Some of these have not yet been kid tested.

Classroom Management, high school.

I would like to spend the first few periods creating a list of class rules. I have written down the first rule, Mark will do whatever is necessary and proper to maintain good order. I would like to spend the rest of the period working out and drafting the rest of the rules.

The active part of the legislative process is drafting or rule making. This lesson might give the class a stake in finding out how legislation is drafted. It might give them some insight into how democracy works. How courts and police work to interpret legislation. How Congressmen work to pick words, which will be interpreted correctly. It might give them some understanding of the social contract theory of government. It might make my class rules seem more legitimate via the consent of the governed. When I actually test this lesson, I believe that I will be pleasantly surprised that my class will adopt most of the rules I would have suggested anyway. In my experience, the group mind is not only brighter but more moral, more conscientious, and more pious.

Constitutional Law.

Class I have some good news and some bad news. The bad news is that the monster Rodan has landed in Washington DC and destroyed our government. He has eaten up all of the law books. The good news is that this high school class has been selected to create a new Constitution.

The active part in discussing the Constitution is to be one of the framers. I also want to give the students an active stake in future lessons by having them write out, discuss and vote on drafting their own Constitutions, before they see and US Constitution (which might limit their creativity).

Geography, high school.

a. How many time zones are there?

Why do we have different time zones?

Why are there 24 time zones?

How many degrees between each time zone?

Why?

b. What is the purpose of having the sun overhead at noontime in each time zone?
What alternative hour of the day measurements might we have adopted?

c. How does the earth move in relation to the sun?
What evidence is there that the earth is flat?
What evidence is there that the earth is round?
What evidence is that that the sun revolves around the earth?
What evidence is that that the earth revolves around the sun?

d. Why did cavemen domesticate corn?
How did cavemen domesticate corn?
What effect did domestic corn have upon society?

e. What effect did hunting and gathering have upon the placement of population centers?
What effect did domestic livestock have upon the placement of population centers?
How do you domesticate wild animals?
What effect did domestic animals have upon society?

f. Why was NATO formed?
What are the benefits of joining NATO?
What are the disadvantages of joining NATO?
How much sovereignty does a nation have to give up to join NATO?

g. How is the world's population distributed on the globe?
Why?
How does population expand?
How does rapid population growth affect the environment?
How does rapid population growth affect society?
What effect does rapid population growth have upon the standard of living?
What effect does rapid population growth have upon the distribution of wealth?
What factors limit or control population growth?

h. How is the world's wealth distributed on the globe?
What factors help determine a nation's wealth?
How does geography affect agriculture?
How does geography affect the placement of industry?

Government, high school.

Why do we have governments?
What are the proper purposes of government?

Why do we have schools?

What are the proper purposes of schools?

Why do we have policemen?

What are the proper purposes of policemen?

What are proper police procedures?

Why do we have lawyers and courts?

What are the proper purposes of lawyers and courts?

What is the proper role of an attorney?

Law for Classroom Teachers, college.

What is freedom of expression?

What is the purpose of freedom of expression?

What are the limits to free speech?

Math. In many ways I believe that math is one of the most natural applications for the Socratic Method. Many of the points are logical. This is a subject matter where it is easier to digress and find smaller, easier guiding questions to ask. If a student is stuck on multiplication (What is five times four?), a good guiding question would concern addition (What is five, plus five, plus five, plus five?). By contrast some math teachers take a more dichotomous position that five times four is twenty because I said so. Drill and practice and then move on. However there is reason behind the rules. There is reason behind the definitions. There are rules behind the reasons. If you give your students more roads to Rome, this broadens their understanding. It provides more detail, which aids long-term memory. It helps make sure they wind up in Rome.

Math Perhaps the day should begin with questions designed to probe and to deepen the class' understanding of the mathematical concepts to be covered that day. Send several students to the blackboards to solve problems, show their work, and then explain their thinking to the class.

Math, high school. A typical day at the office goes like this. From the Pythagorean theory we know that in a right triangle, $x^2 + y^2 = h^2$. Do you follow that? In an equilateral triangle we can draw a median down the middle. Then we have two right triangles. Do you understand that? Does that make sense? The students are handed a worksheet of problems to solve. Then some individual teaching takes place when and if they raise their hands. The next day the teacher goes over the problems.

What would a Socratic teacher say about that? They are asking closed questions. The anticipated response is, yes I understand that. Yes I follow.

How can we work divergent questions into this lesson to perhaps boost comprehension?

The answer is easy if you take it Socratically. Paul Simon, 1980s.

Draw an equilateral triangle on the board. If each side has a length of six, how do we figure out the area?

How would you solve this problem?
What step would you take next?
How could we determine the height of this triangle?
What theories would you apply to solve this problem?

What is known?
What is unknown?
How can we alter our diagram to make it look like something, which we could solve by using our prior knowledge?
If we dropped a median down the middle, what would be the measure of the angles, which would be created?

What do we know about triangles where one of the angles is equal to ninety degrees?
In an equilateral triangle what is the measure of each angle?
If we bisect that angle, how many degrees is the resulting angle?
What do we know about 30, 60, 90 right triangles?

Our next step would be to handout the worksheet and answer individual questions. The next day we can subdivide the blackboard and have one student show their work on each of the problems. If each student outlines their work on one of the problems, this will achieve efficiency. Call on other students to evaluate their approach, theory, and calculations. At the end of the unit we can close by asking, what mathematical properties do we know about triangles. This will be good note taking review. It will help them translate what they learned into narrative form. This alternative modality may boost comprehension and retention.

Media Manipulation, College.

a. Headlines. Display several different headlines from the same day. The following discussion questions might be asked.

Why do different headlines appear in different papers?
Do the same news events have equal prominence in different papers? Why or why not?
Who decides which stories are front-page material and which stories wind up on page 43 B?
What affect does this have upon society?

b. Newspaper Articles. Hand out five different newspaper articles to five different groups of students. Each group member should read the article and write down the basic facts. Have each group member rewrite that story from a different perspective.

For example some headlines on the Rhonda Lee Maloney story might have included: Maloney's killer found with several handguns and ammunition. Maloney's killer found in a den of pornography. White girl raped and murdered by Black boy. Maloney killed by Policeman's son. Maloney killed by former juvenile delinquent. Bad grades led to a bad end.

The following discussion questions might be used.

What are the implications of running a provocative headline like, White girl raped and murdered by Black boy?

Would this be considered objective reporting?

What does "objective" mean to a reporter?

What biases do reporters bring to their jobs?

What biases do editors bring to their jobs?

How is news manipulated towards particular viewpoints?

What types of pressures affect the business of news reporting?

Who determines which stories are to be investigated?

Who determines which headlines are used?

How would an ordinary person be affected if the headline inserted the term "alleged killer?"

Who determines how long an article is?

Who determines which "facts" are emphasized?

Who determines which "facts" are left out and which are left in?

Who determines whether to write that the alleged killer was found with numerous pornographic magazines or two issues of Playboy?

How might those same "facts" be interpreted to support a different political agenda?

Who determines whether or not to add pictures?

Who selects those pictures? Why?

c. Television Commercial. Have the class watch five selected television commercials. Pick one commercial. Write a five-page paper concerning the following discussion topics.

What messages is this commercial trying to convey?

Does advertising work?

Why do corporations spend millions of dollars on advertising?

Do corporate sponsors feel that they are getting their money's worth? Why?

Why do corporations advertise?

Is advertising effective? Why?

Why do some products advertise while others do not?

What sociological assumptions underlie advertising?

How does this ad use color to enhance its message?

How does this ad use editing?

How does this ad use camera angle?

How does this ad use movement?

Why do advertisers hire professional photographers to shoot their commercials?

How does this ad use lighting?

Why do advertisers hire directors and use professional stages to film their commercials?

How does this ad use sound?

Why do advertisers spend tens of thousands of dollars purchasing music copyrights?

How are these actors being used?

What parts do beauty, grace, glamour, clothing, race, height, nervousness, voice, close-ups and image play?

Why do advertisers spend thousands of dollars hiring professional actors?

How might this ad be using subliminal messages?

What are subliminal messages?

Is subliminal advertising effective?

How can you detect media bias?

What can you do to guard against media bias?

How can you find and evaluate alternative viewpoints?

How can you influence particular outcomes?

Psychology for Teachers, college.

What do behaviorists believe?

Why do they believe that?

How do you evaluate behaviorist theories?

How could you apply behaviorist theory to the classroom?

Chapter Twelve. Concluding Ideas.

My initial goal in designing a Socratic lesson for a physical education class was to stretch and show a creative application. But the longer this lesson plan has rested in my mind, the more value I attribute to it. In most sports, especially football, many people say that we are not just learning how to tackle and kick field goals. Our students are learning about life, sportsmanship and teamwork. Why not access those skills directly thru discussion? Why should we just assume that these implicit messages are being absorbed? Why not have chalk talks about social values?

Perhaps my Socratic method focus might be ruining my lecture style. I find Socratic questions creeping into my thinking. In the country-dance classes I start each six-week block with the Socratic question, "Why do people dance?" I realize that dancing is mostly performance rather than theory, but I believe that this question is a good icebreaker. It focuses the class' attention. It touches base with some reasons why they are taking the class.

My unorthodox writing style is partly the result of the way I think. I enjoy short sentences. I enjoy them so much that I purposely create incomplete sentences, which are short and

understandable. I find that complex sentences are hard to follow. The style of building ideas and points around citations is also purposeful.

I leave you without a conclusion. I leave the loose ends as loose ends. I hope this paper sparks some useful ideas. Anyone with enough patience to read this far is either very interested or they have some other external motivation. In a sense this paper is easy to read. In a sense this paper is hard to read.

An interesting parallel to an article about parenting. Steven W. Vannoy, "The 10 Greatest Gifts I Give My Children, Excerpt in, The Rocky Mountain News, Dec 16, 1993 at 100.

I didn't think I was a very good parent so I decided to write a book about parenting. It was a crazy Saturday. My daughters are eight and ten years old. I started giving orders, put that away, clean up the kitchen, and be quiet. After a few hours I noticed it wasn't working. The more orders I gave them, the more I could see that they quit thinking and quit taking responsibility. The more I said "no" and "don't," the more they just tuned me out and resisted me.

I said we need to have a little chat. We sat down at the kitchen table and made a cup of tea. I said that Saturday is kind of our special family day to take care of the house. What are some of the reasons why that is important? The girls joked at first, but I kept sitting there with pen and paper ready to take notes. They started to say things like, Well I like having my friends over, So that we know where things are.

They discussed the best ways to get the household chores done efficiently and then pitched in and finished their jobs. My role was to keep asking loving questions, listen deeply, acknowledge their ideas, be a good role model, notice their accomplishments and to thank them. Within an hour or two it was amazing how much more peaceful it was. They went right back to taking charge, to knowing they were responsible. I was seeing their self esteem go back up.

Most parents focus on problems and assume that they, not their children, are supposed to solve them. I would always charge in their like King Dad and try to fix the problem. Those old control tactics only work when the parent is right there with a big whip. They don't give kids internal motivation. Consequently the kids are not very prepared for life. The old style of parenting, ordering kids to be responsible, demanding to know why they aren't responsible, and threatening punishment if they don't start being responsible, leaves parents, not kids, with the sense of responsibility.

A nice summary. Bruce B. Hudgins an education expert at Washington University in St Louis has a suggestion for teachers based on ten years of researching children's thinking. Talk less and encourage students to think more. "Teachers should not talk as much as we do. Most of us in the teacher's role talk our students to death. We do most of the work. We organize everything. We do the thinking and consequently the children don't learn to think. Teachers should be less directive in the classroom. Instead of telling children what the problem is and how to solve it, teachers should take steps to encourage children to think for themselves. Rocky Mountain News, August 24 1993 at 3C.

DISCLAIMERS: Most of the students and professors who are indirectly mentioned in this paper are largely fictional. In an attempt to demonstrate a point, I may have interpreted, altered or reworded some of the statements I have attributed to them. My intent was not to put them in a bad light. In a philosophical sense this paper is intended to be a teaching tool. Like a Socratic dialogue, some statements and arguments have been reworked to prove a point. This paper is not intended to be a historical document. In general I have learned from all my teachers. I thank you for your contributions. However in the spirit of fairness, I am willing to alter any references if you report an unfairness to me. Mark Saiki 1536 S. Queen Curt, Lakewood, CO 80232, 763-4999.

This is the sixth draft of this paper. This is not a final product. More style, wit, grammar, words, ideas, and polish will be added later. In a sense this paper is consistent with the theory of a word processor. If you have a good use for another copy of this paper, please call me.

OTHER PROJECTS. During the Christmas 1994 vacation, I have been working on IBM-PC computer generated social studies quizzes. Students might use these for review, or knowledge bowl. The quizzes are written in PC-CAI shareware format. I can give you some disks with the program and some of the questions I have drafted. If we each write our own questions, this will create a nice test bank of questions. Students could use these test bank questions to review before tests. You could redraft, reword and reorder questions to compose your own tests. We could periodically share our questions. Together we might compile the one thousand most important information bits concerning Social Studies, English, Math or various different subjects, which an educated person needs to know in 20th Century America.

ADVERTISING: I wouldn't go quite so far as to suggest this monstrous paper would make a nice Christmas gift for that special instructor friend in your life. It might be more accurate to note that if that instructor friend has nothing better to do and is current on each and every New York Times crossword puzzle since the birth of Edward R. Murrow, then they might enjoy reading this paper.

CONTRIBUTIONS. Your comments, feedback and other contributions are welcome. If you would like to add a chapter or a comment, let me know. My thinking is that the Socratic teaching method is a useful alternative to lecture. My wishful thinking is that it is difficult to read this paper and not spark some creative lesson plan ideas. By and large teaching is a lonely profession. We draft our own lesson plans and we do our own teaching behind closed doors. If you would like to run a proposed Socratic lesson plan by me or run some related idea by me, let me know. I am available for seminars and perhaps continuing education credits.

END NOTES.

1 In rethinking my fifth lesson, my fifth lesson concerned abortion and the Constitutional right to privacy. I had anticipated that this would be a hot topic and I would have to struggle to get them to move on. In reality the class and I came out a little flat. One unanticipated problem was that the day before I volunteered to teach that day, I was handed an updated version of the textbook.

Their textbooks did not contain the case of Roe v. Wade. I spent around ten minutes encouraging them to read the book, use the index and work together to find that case in their textbook. I finally gave them some of the facts and our discussion hobbled along.

My initial decision to access prior knowledge with a question was a good idea. After I had found out that that case was not in their copy of the textbook, I might have backed up and switched roles. I might have given them two or three of the facts and asked them what else they would like to know about the case. This would put them back into an active role of thinking of and asking questions. My answers would be more active than lecture since I would have been responding to their questions.

2 I would like to try this same interrupting analysis with a reading class. Have a student read a story.

Student: Maffutu was a thirteen-year-old boy. He lived on a remote Pacific Island. He was the son of a chief. Maffutu had yet to face his biggest fear.

Instructor: What is the importance of him being thirteen years old?

What does it matter that he is the son of a Chief?

What do you think will happen in the climax of this story?

3 Her ideas have sparked a similar idea for my classes. Lets go outside and find the government. Lets go outside and find the history. Lets go outside and find the English language. Lets go outside and find physics. There might be some problem translating this exercise into a high school setting. Junior high students are more wide eyed and energized by a field trip. High school students are more mature and laid back. However the points are the same. Connecting with reality is a powerful motivator. A visual demonstration that government has real life implications is important.

XI. Distribution and Shareware.

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Demonstrations. I am willing to travel a reasonable distance to demonstrate my methods. My reasonable fee probably will be \$500-\$1,000 plus expenses. I would like at least ten or twenty interested persons. I would like them to download, allocate, begin reading my discussion packets and make notes in the margin. I generally start small group discussions in the first half hour, and then large group discussions in the next hour. Mark Saiki (970) 330- 0394.

All rights reserved. I am self-publishing my books for now, and I probably will try to formally publish them some time in the future. Edition: 2.21, updated 1995