

Statistical Literacy: Twentieth Century References

Milo Schield, W. M. Keck Statistical Literacy Project. Minneapolis, MN.

Abstract: As a phrase, “statistical literacy” is not as common as “statistical reasoning” or “statistical thinking.” But it has a 50-year history among statisticians and is becoming increasingly important. This paper reviews the sources published through 2000. Sources are classified as books or articles and by whether statistical literacy appears in the title or just in the body.

Keywords Statistical literacy, syntax, semantics.

INTRODUCTION AND APPROACH

As a phrase, “statistical literacy” is not as common as “statistical reasoning” or “statistical thinking.” This is seen in both Google hits and in Google-Scholar entries as of April 2012.

Exact Phrase	Google Hits	G-Scholar Entries	Main reference based on Google Scholar citations
statistical reasoning (SR)	287K	14,600	Walley, Peter (1991). Statistical reasoning with imprecise probabilities.
statistical thinking (ST)	241K	8,750	Porter (1999). Rise of Statistical Thinking: 1820-1900
statistical literacy (SL)	100K	2,970	Gal, Iddo (2002): Statistical Literacy: Meaning, Components, Responsibilities,” International Statistical Review, 70, pages 1–52.

1. Statistical Literacy in Books and Articles

Among books published before 2001, one used statistical literacy in the title while six referenced it in the text. Among articles published before 2001, 34 used statistical literacy in the title and 41 used statistical literacy in the body. These 82 articles are organized chronologically within each of these four categories: 35 used the statistical literacy in the title, while 47 used it only in the body of the article. Since quantitative literacy was the focus of a major ASA-NSF project, uses of that phrase are also included. Although most uses of numeracy refer to school mathematics, those uses involving statistics may be included.

For most sources, excerpts are shown that indicate the context in which the phrase ‘statistical literacy’ was being used.

Status: In progress with Google Scholar: 1981-1990. Have completed all prior years.

2. Analysis

Of those articles mentioning statistical literacy that were published before 2001, Google scholar identifies the following as having the highest number of citations.

CONCLUSION

APPENDIX A: BOOKS REFERENCING STATISTICAL LITERACY

Books that used "Statistical literacy" in the title.

1979: **Statistical Literacy** by [Dennis Haack](#). The phrase "statistical literacy" does not appear anywhere inside this book.

Books that used "Statistical literacy" in the text but not in the title.

- 1978: *How to Use (And Misuse) Statistics* by Gregory A. Kimble; Prentice-Hall. "What I want you to come away with is an appreciation of a style of thought and a respectable level of statistical literacy. I see no necessity, with these as my objectives, to dwell on formulas and computations."
- 1991: *Quantitative Methods for Historians: A Guide to Research, Data, and Statistics* by Konrad H. Jarausch, Kenneth A. Hardy; University of North Carolina Press. "In attempting to meet the distinctive needs of methodological context, computer experience, and statistical literacy, this book seeks to render research design transparent, to help with establishing data bases, and to provide... "
- 1992: *Understanding Social Science Statistics: A Spreadsheet Approach* by Roger P. Bakeman; Lawrence Erlbaum Associates. "I assume that your goal is basic statistical literacy -- *the ability to understand and critique the statistical analyses others perform*, and the ability to proceed... "
- 1997: [The Assessment Challenge in Statistics Education](#). Edited by Iddo Gal and Joan B. Garfield. Excerpt: "Goal 1: Understand the purpose and logic of statistical investigations. Goal 2: Understand the process of statistical investigations. Goal 3: Master procedural skills. Goal 4: Understand mathematical relationships. Goal 5: Understand probability and chance. Goal 6: Develop interpretive skills and statistical literacy. Goal 7: Develop [the] ability to communicate statistically. Goal 8: Develop useful statistical dispositions." (pp. 3-5) **Verify quote**
- 1998: *Reflections on Statistics: Learning, Teaching, and Assessment in Grades K-12* Book by Susanne P. Lajoie; Lawrence Erlbaum Associates. "and their views of statistical literacy. One of the outcomes of this...possible to increase our overall statistical literacy ..." "thereby promoting the notion of statistical literacy."
- 1999: *Improving Statistical Reasoning: Theoretical Models and Practical Implications* by Peter Sedlmeier; Lawrence Erlbaum Associates. "Statistical literacy, *the art of drawing reasonable inferences from an abundance of numbers provided daily by the media*, is indispensable..."
- 2004: *More Damned Lies and Statistics: How Numbers Confuse Public Issues* by Joel Best; University of California Press. <***Need quote***>

APPENDIX B: ARTICLES WITH STATISTICAL LITERACY IN THE TITLE

Articles that used "Statistical literacy" in the title.

- 1951: **Statistical Literacy in the Social Sciences** by Helen M. Walker. *The American Statistician* Vol. 5, No. 1 (Feb., 1951), pp. 6-12. Excerpts: "definitions of verbal literacy may give us some useful clues as to the meaning of **statistical literacy**." "The ideas which the modern citizen must understand are becoming more complicated and many of them cannot be grasped without some degree of statistical as well as verbal literacy." "In the same way that complete verbal illiteracy is a stone around a man's neck making it impossible for him to pursue a skilled trade or to rise to a position of leadership among his fellows, even so does complete **statistical illiteracy** hamper a man in many vocations, interfere with the wise conduct of many of his personal affairs and drastically curtail his understanding of social issues." "To a very striking degree our culture has become a statistical culture. Yet the level of **statistical literacy** among the practitioners of the social sciences is appallingly low. To bridge the gap in the system of communication between statistician and social scientist, substantial improvement is necessary in the social scientists' ability to use quantitative language." "One reason why the students of Social Studies do not make more rapid progress toward statistical literacy is that their statistical experiences are too largely limited to the courses in which they study statistics. They need to read more statistical material in their other courses." "The computational skills of

- our field [statistics] can be acquired in a fairly short time. Judgment, the ability to interpret, the clarification of concepts and the ability to plan a survey or an experiment are of slower growth. Consequently the one-semester introductory course in which students learn a variety of computations will inevitably turn out a large number of semi-literates." "Sometimes a reader's disability comes from carrying over into statistical reading the habits of very rapid skimming which he has found to be an asset in reading purely verbal material. Those of us who teach first courses in statistics may be able to suggest to our students that they learn how and when to change gears."
- 1979: [Teaching Statistical Literacy](#) by [Dennis Haack](#), *Teaching Statistics*, 1, 74-76. Abstract: "More people have to read and understand others' statistics than have to carry out their own statistical research. A first course in statistics should therefore concentrate on statistics as a language." Text: "A first course in statistics should teach statistics as a language rather than as a research tool. Emphasis should be on interpreting statistics rather than on calculating statistics."
- 1980: [A Note on 'Teaching Statistical Literacy'](#) by [Dennis Haack](#), *Teaching Statistics*, 2, 22-23. Abstract: "In his previous article Dennis Haack discussed the philosophy behind his course in teaching statistics as a language. Here he looks at some ways of assessing students taking such a course."
- 1981: [Questioning strategies and sample problems for a course in statistical literacy](#) by Eleanor Jordan, *ASA Proceedings of the Section on Statistical Education*, 103-108.
- 1981: [Teaching Statistical Literacy to Nurses](#) by [Dennis Haack](#). *ASA Proceedings of the Section on Statistical Education*, 101-102.
- 1983: [Statistical Literacy](#) by Mike Perry, *ASA Proceedings of the Section on Statistical Education*, 92-96. "A definition of "Statistical Literacy" should include statistical thinking and communicating statistically. "Statistical thinking" requires dealing with ambiguities and open ended situations. This is a significant leap for the student from the methodological processing of algebra. It is one of the characteristics of the subject which distinguishes it from being "just another math course." The nurturing (teaching?) of "statistical thinking" must be an objective of the introductory course."
- 1990: [Statistical Literacy in the Community](#). An invited session at ICOTS-3. Invited papers: "[Statistics for All: Why, What, and How?](#)" by David Moore (USA) p. 414-415 and p. 423-428. "[Statistics in China](#)" by Liang Zhishun (Guangzhou, China) p. 416-422. Also "[The Role of Statistics in Achieving Numeracy for All](#)" by Jean Thompson (Wellington, New Zealand) p. 429-432. Panel discussion: Professor Paul Bungartz of Bonn University, Germany; Professor Toby Lewis, retired from the Open University, England; and Professor Jagdish Rustagi of the Ohio State University, USA.
- 1990: **Raising statistical literacy for manufacturing productivity**, TN Goh - *International Journal of Quality & Reliability* Vol 7, Iss 3. www.emeraldinsight.com. Abstract: The key to increasing productivity in the manufacturing sector does not lie solely in high technology, but also in an environment in which personnel at all levels are operating with rational decisions and actions based on organised information. Inasmuch as ..."
- 1990: "[The Role of Statistics in Achieving Numeracy for All](#)" by Jean Thompson (Wellington, New Zealand) p. 429-432. "Our society accepts the fact that the quest for literacy - learning to read and write - is a crucial element of education and I certainly do not argue with that. What I do argue is that we need more than literacy. We live in an age when qualitative understanding is not enough. Numbers and measures are everywhere. We need numeracy together with literacy as joint crucial elements of education for the 21st century." "Why is literacy accepted as a basic requirement to progress in every subject area? Because it is acknowledged as important for all. Gaining literacy skills is expected. Small children are told reading is fun, reading is good, reading gives you information. Then these facts are demonstrated and constantly re-iterated and indeed embedded into the entire learning process. Now use the parallel of learning to read and write for teaching numeracy skills. We need to expect our children to grasp numeracy skills. We need to demonstrate and constantly re-iterate and indeed ensure that numeracy is embedded into the entire learning process." "To achieve this embedding, and so have the opportunity to demonstrate and reiterate, I suggest we use Statistics. Statistics is the collection, arrangement and interpretation of numerical facts or data. Here we have the ideal vehicle for this transformation, the means by which we can demonstrate the relevance of numeracy skills instead of just calling for them. Note here that I am not talking about theoretical statistics, but about the sensible use of numbers, the use of display techniques such as graphs and charts, and the ex-

- traction of information from numbers. These ideas can and should be applied in all subject areas. This is how we can make sure our material is constantly linked to real situations. However, rather than taking situations out of other subject areas and carrying them into the mathematics and/or statistics lessons, how about taking basic statistical tools into the fabric of all school activities?"
- 1992: **Instructional Design and the Development of Statistical Literacy** by Kenneth C. Bessant. *Teaching Sociology* Vol. 20, No. 2 (Apr., 1992), pp. 143-149. "Statistical literacy" is only used in the title -- not in the body of the article. See [JSTOR](#).
- 1993: **Enhancing Statistical Literacy: Enriching Our Society** by [Katherine K. Wallman](#). *Journal of the American Statistical Association* Vol. 88, No. 421 (Mar., 1993), pp. 1-8. Excerpts [bold added]: P. 1, "my hope that by enhancing statistical literacy, we may succeed in enriching our society." "My aims are ... to highlight some avenues we can pursue to enhance our citizens' statistical literacy." "As I gathered and read materials on 'statistical literacy' from many sources, the diversity of views I encountered mirrored the breadth of perspectives our colleagues within and outside the statistics profession bring to this subject. The perspective I offer is this: **Statistical literacy is the ability to understand and critically evaluate statistical results that permeate our daily lives -- coupled with the ability to appreciate the contributions that statistical thinking can make in public and private, professional and personal decisions.**" "These mis-es [misunderstandings, misperceptions, mistrust and misgivings], I contend, are rooted in society's lack of **statistical literacy.**" P. 3, "As a society we face many issues. These ... difficult problems stand to benefit from the contributions that statisticians can make to our understanding, and from increased **statistical literacy** from both policy makers and the public." "There are among those responsible for the education of our citizens many who fully understand the importance of promoting statistical literacy. I think of Dean Hubbard, President of Northwestern State University, who is working to establish a "statistics for the common man" course as a requirement of the university's core undergraduate curriculum." "The lack of **statistical literacy** extends as well to industrial settings." P. 4, "Most vexing of all is the problem faced by our citizens, who encounter statistics at every turn in their daily lives, yet often are unequipped with the **statistical literacy** required to evaluate the situation." "Numerous pathways, some already being traveled, others awaiting our footsteps, may be taken as we work both within the ASA and with colleagues in other disciplines and professions to enhance our citizens' **statistical literacy.**" P. 6, "To advance our citizens' **statistical literacy**, I would advocate further development of clear, simple, meaningful terminology and notation that could be promoted and used by our popular media in their reporting of statistical information." P. 7. "Those of you who are out in the real world are in the best position to inform the fundamental question, "How can statistics be of use to our citizens?" You will be the key to working with the popular media -- and thus enhancing our citizens' **statistical literacy.**" "A major theme of his address [Peter Moore's 1990 RSS Presidential address], as I read it, is that we must educate the consumer -- and the potential consumer -- to better understand statistics and more fundamentally [to understand] statistical thinking -- [and] to add **statistical literacy** to his or her skills. (Moore, 1990)" "If we wish to continue to heed the mandate of our founders -- "to be of service to science and society" -- we must heed the needs of customers both in our professional society -- the ASA -- and in the larger society we seek to serve -- our customers in government and industry, whether they are on the front line or in the computer room; our customers in the education system, whether they are college presidents or classroom teachers or students; and our customers in the media, who most often bring our work to the ultimate customers -- our fellow citizens. It is these audiences **to whom we must bring statistical literacy** -- and those audiences will determine whether statistical thinking makes a difference in their personal and professional pursuits." P. 8, "As we endeavor to to enhance statistical literacy, I believe we will enrich both our professional society -- the American Statistical Association -- and the society in which we live."
- 1993: **Conceptualizing applied statistics: A current need** by Sharon L. Weinberg in the ASA Proceedings of the Section on Statistical Education, 233-238.
- 1993: **Improving Statistical Literacy among consultants and clients**, Patricia Busk, *ASA Proceedings Section Statistical Education*, 239-246.
- 1993: **Statistical Literacy for whom: The case of the two-year colleges** by Miriam Grosop & Hyman Sardy, *Proceedings of Statistical Education Section*, 247-253.
- 1993: **Comment on "Improving Statistical Literacy"** by Juliet Shaffer, *ASA Proceedings of the Section on Statistical Education*, 254-257.

- 1995: **Statistical Tools and Statistical Literacy: The Case of the Average** by Iddo Gal, *Teaching Statistics*, 17, 97-99.
- 1995: **Statistical literacy: A link between mathematics and society** by Jane Watson. In A. Richards, G. Gillman, K. Milton, & J. Oliver (Eds.), *Flair: Forging links and integrating resources* (pp. 12-28). Adelaide, SA: Australian Association of Mathematics Teachers. Reprinted in *Reflections*, 20(3), 36-45, August, 1995.
- 1997: [The Need for Statistical Literacy in Australia](#) by Jane Watson Science News
- 1998: **Fedstats promotes Statistical Literacy.** Cathryn Dippo. [Communications of the ACM; Apr98 Vol 41 Issue 4, p58-60](#). Abstract: "The major statistical agencies of the federal government in the U.S. have created a publicly accessible digital library called FedStats." Body: "promotes knowledge discovery through statistics and improved statistical literacy, extensive research and development efforts are needed to address not only the technical issues ..."
- 1998: **Statistical literacy: What's the chance?** Jane Watson in *Reflections* 23,6-14.
- 1998: [Statistical Literacy -- Statistics Long After School](#) by Jerry Moreno, ICOTS-5.
- 1998: [Assessing statistical literacy through the use of media surveys](#) Jane Watson ICOTS-5
- 1998: [Statistical Literacy And Adolescent Risk](#) by Jonathan Moritz, ICOTS-5.
- 1998: [Statistical Literacy For Law Students: Six Hours To Teach!](#) by Anne Porter. ICOTS-5.
- 1998: [Stumbling Blocks On The Road Towards Statistical Literacy](#) by Herman Callaert. ICOTS-5.
- 1998: [Statistical Literacy and Evidential Statistics](#) by Milo Schield. *ASA Proceedings of the Section on Statistical Education*, 187-192. "To achieve statistical literacy for all, introductory statistics must be expanded to include evidential statistics– the use of statistics as evidence in arguments involving practical reasoning about causality."
- 1999: **Teaching Statistical Literacy** by Peggy B. Cerrito (U. Ky) *College Teaching*; v47, n1 p9-13 Win 1999. Eric Abstract: "Argues that statistical literacy is a necessary component of a complete college education and important in combating growing innumeracy in American society, and describes a general education course at the University of Louisville (Kentucky) that includes it. Instruction focuses on societal issues, sometimes controversial, for which an understanding of statistics and their use is crucial." Extracts: "Statistical literacy is no longer a luxury; it is a necessity." "The public can be duped by almost anyone capable of spouting numbers, percents and p-values." "How can statistical literacy be taught effectively? ... It must be introduced into a general education course." For-pay download at [Routledge](#): Taylor and Francis Group
- 1999: **Statistical literacy: Conceptual and instructional issues** by Iddo Gal
- 1999: **Conceptualizing statistical literacy: An assessment perspective** by Iddo Gal at SRTL-1.
- 1999: [Using Chance Media to promote Statistical Literacy](#) by J. Laurie Snell, ASA.
- 1999: [The dissemination of statistical literacy among citizens and public administration directors](#) by Luigi Biggeri and Alberto Zuliani. ISI-52.
- 1999: [Statistical Literacy: Thinking Critically About Statistics](#) by Milo Schield. 1999 APDU Of Significance. Vol 1, No 1. P. 15-20. Abstract: "Statistical literacy is the ability to read and interpret data: the ability to use statistics as evidence in arguments. Statistical literacy is a competency: the ability to think critically about statistics. This introduction defines statistical literacy as a science of method, compares statistical literacy with traditional statistics and reviews some of the elements in reading and interpreting statistics. It gives more emphasis to observational studies than to experiments and thus to using associations to support claims about causation."
- 2000: **Statistical literacy: Conceptual and instructional issues** by Iddo Gal in D. Coben, J. O'Donoghue, & G. FitzSimons, (Eds.), *Perspectives on Adults Learning Mathematics* (pp. 135-150). London: Kluwer Academic Publishers.

- 2000: [Statistical Literacy and Mathematical Reasoning](#) by Milo Schield. International Conference on Mathematics Education (ICME-9), Tokyo. Abstract extract: "Statistical Literacy, the study of statistics as evidence in arguments, is proposed as a new course – a bridging course to better prepare students for the traditional statistics course. Statistical Literacy can also be a stand-alone course with its focus on observational studies and confounding factors. The mathematics involved in statistical inference of traditional statistics are reviewed. Causes of student difficulties are located in two areas: conditional probability and the relation between chance and confounding. These two problems are related to two areas of mathematical thinking: conditional thinking and contextual thinking. A statistical literacy course designed to remedy these deficiencies is proposed."
- 2001: [Statistical Literacy: Reading Tables of Rates and Percentages](#) by Milo Schield. *ASA Proceedings of the Section on Statistical Education*, ??-??.
- 2001: [Statistical Literacy and Statistical Competence](#) by David Moore, IASE slides
- 2001: [Statistics Literacy](#) by Brian Phillips, IASE slides
- 2002: [Adults' Statistical literacy: Meaning, components, responsibilities](#) by Iddo Gal, *International Statistical Review* 70(1), 1-25.
- 2002: **Developing statistical literacy: Towards implementing change** by Iddo Gal. *International Statistical Review*, 70(1), 46-51.
- 2002: [Preparing for Diversity in Statistics Literacy: Institutional and Educational Implications](#) by Scott Murray and Iddo Gal. ICOTS-6.
- 2002: [Towards a Statistically Literate Society: What Statistics Everyone Should Know](#) by Jerry Moreno, ICOTS-6.
- 2002: [Promoting Statistical Literacy: A South African Perspective](#) by P. Lehohla, ICOTS-6.
- 2002: [Three Kinds of Statistical Literacy: What Should We Teach?](#) by Milo Schield, ICOTS-6.
- 2002: [Promoting Statistics Literacy: New Opportunities for the Training of Institutional Research Professionals](#) by Linda Hewitt. ICOTS-6.
- 2002: [Statistical Literacy and the Media](#) by W. Martin Podehl, ICOTS-6.
- 2003: **Expanding conceptions of statistical literacy: An analysis of products from statistics agencies** by Iddo Gal. *Statistics Education Research Journal*. 2(1), 3-22. (Electronic refereed journal: www.stat.auckland.ac.nz/serj)
- 2003: **Teaching for statistical literacy and services of statistics agencies** by Iddo Gal, *The American Statistician*, 57(2), 80-84. "Teaching for statistical literacy and services of statistics agencies...interrelated concepts such as statistical literacy (Wallman 1993), quantitative...ability will be termed here "statistical literacy following an early use of this... "

APPENDIX C: OTHER ARTICLES USING STATISTICAL LITERACY: Part 1.

These articles contain the phrase "statistical literacy" but that phrase appears only in the body – not in the title or in the references.

- 1940: **Statistical Trends** by William Fielding Ogburn. *Journal of the American Statistical Association* Vol. 35, No. 209, Part 2: [Proceedings of the Centenary Celebration] (Mar., 1940), pp. 252-260. Excerpt: "In the early days when statistical literacy was low, those who could read and write this new language were set off and apart from the others. They were labeled statisticians. But now most any social scientist can compute a correlation coefficient and can read and write the statistical language to some extent. Indeed, the arithmetics for eighth grade in the public schools now have sections on statistics. So a degree of statistical literacy will be universal in the future since 100% of the children go to the elementary school and 65% to the high schools."
- 1962: **Statistics We Live By** by Martin R. Gainsbrugh. *Journal of the American Statistical Association* Vol. 57, No. 297 (Mar., 1962), pp. 1-9. Excerpts: "In our rush to develop and articulate the framework of economic intelligence, we have been too quick to assume a higher level of statistical literacy and of general public understanding than the facts warrant. Many texts, perhaps too many, are now devoted to the fields of statis-

- tical techniques, sampling procedures and the impressive mathematical contributions of the last quarter century from which the statistician has so richly benefitted. Few, indeed, are the contributions dedicated to placing before the lay consumer the descriptive, qualitative, conceptual materials that are prerequisites to assure an adequate understanding of the statistics we live by." "Even the sophisticated user of [economic and social] accounts knows there is no easy path through the jungle of descriptive literature in which are hidden the details on weighting, classification, conventions, imputations, and the myriad qualifications with which each key statistic is surrounded." "The data we compile has never been more universally followed than they now are. Each of us can wrestle with his own conscience in replying to the inevitable corollary to such an observation: Are they better and more widely understood?"
- 1962: **Statistics in Army Research Development and Testing** by Clifford J. Maloney. *The American Statistician* Vol. 16, No. 3 (Jun., 1962), pp. 13-17. Excerpt: P. 14, "Primary responsibility for the adequacy of the Army's utilization of statistical principles rests with this group, but the task would be overwhelming in the absence of a high degree of 'statistical literacy' on the part of the R&D personnel whose specialties lie in other directions and on a corps of contractor personnel and part-time expert consultants -- usually academic."
- 1965: **The Concept of Panchayati Raj and Its Institutional Implications in India** by Iqbal Narain. *Asian Survey* Vol. 5, No. 9 (Sep., 1965), pp. 456-466. Excerpt: P. 463, "Related to this [our professed goal of a socialist society] is the role education (as opposed to mere statistical literacy) is to play in enriching the content of rural democracy in participatory terms."
- 1967: **Subjective Aspects of Applied Statistics** by A. F. Bissell. *The Statistician* Vol. 17, No. 4 (1967), pp. 385-400. Excerpts: P. 392, "One must avoid the allure of PIPE: Plausible, intuitive, and Probably Erroneous." P. 396, "The results of an analysis may be misinterpreted by the client unless guidance is given.... There is probably no universal escape from this dilemma -- the solution must be adapted to the particular problem, and to the statistical literacy of the client."
- 1967: **Ideologies and Attitudes, Academic and Judicial** by Glendon Schubert. *The Journal of Politics* Vol. 29, No. 1 (Feb., 1967), pp. 3-40. Excerpts: P. 11, "Academic ideologies tend to determine academic attitudes toward the study of judicial attitudes. Attitudinal differences imply differing choices among such core components of academic attitudes as modes of discourse, logic, statistical literacy, rationality, empiricism, methodology and scientism." P. 15, "Statistical literacy" -- the title of a section.
- 1970: **The Dimensions of Comparison, and of Comparative Education** by Reginald Edwards. *Comparative Education Review* Vol. 14, No. 3, Papers and Proceedings: Annual Conference of the Comparative and International Education Society, Atlanta Georgia, March 22-24, 1970 (Oct., 1970), pp. 239-254. Excerpt: P. 253, "In ... the training of educational researchers, D. R. Krathwohl has identified three dimensions, or axes, within which the position of any department of education research could be located. ... the dimensions for our preparation would not be dissimilar. The first axis would be mathematical/statistical literacy, the second would be social science background, and the third professional orientation. The first would require more than just training in statistics. As well as an introduction based on probability theory, a knowledge of matrix algebra, and differential equations is necessary, and there should certainly be some contact with computer programming."
- 1985: "Statistical abuse" cited by Census director. (John G. Keane) by Anita Hess. *American Metal Market* 93.(Nov 1, 1985): p.p18(1). From General OneFile. "... the mail recently. The story was meant to promote "statistical literacy," but there seemed to be a hint of indignation in Keane's words. ..."
- 1985: [Do Pharmacy Schools Need to Increase the Statistical Education of Their Students?](#) JA Hokanson - *American Journal of Pharmaceutical Education*, 1985 - eric.ed.gov "Abstract: A survey of the statistical topics offered to pharmacy students and of the frequency of use of statistical methods in eight pharmacy journals suggests that with increasingly sophisticated statistical methods and increased dependency on literature over experience, pharmacy schools should upgrade students' statistical literacy. (MSE)"
- 1985: [New Directions in Two-Year College Mathematics](#) by Donald J. Albers. *The Mathematics Teacher* Vol. 78, No. 5 (May 1985), pp. 373-375. "Statistical literacy should be a fundamental goal of schooling. Basic mathematics courses should contain elementary statistical ideas and must prepare students for statistics as well as for calculus. Mathematics faculty should be trained in statistics."
- 1986: [New challenges to the ISI Education Committee](#) by J. Gani, ICOTS2 P. 452-460. "On assuming the Chairmanship of the Education Committee in 1977, it became obvious to me that the modest UNESCO grant would not permit a frontal campaign to solve the three major problems of statistical education raised by

- the political, educational and technical changes outlined earlier. It was simply not possible to attack directly (a) the statistical procedures and organization of the developing countries; (b) the statistical literacy of ordinary citizens in both developed and developing nations; (c) the computational literacy of developed and developing countries." "It [the NSF-sponsored Quantitative Literacy Project in the US headed by Richard Schaeffer] addresses the problem 3(b) of statistical literacy of ordinary citizens in a developed country; its principal aims are to provide guidelines for teaching statistics and probability within the mathematics curriculum, to develop inservice training for teachers, to provide curriculum materials and to develop assessment mechanisms for these materials and for teaching skills in statistics." "The three major problems of statistical education outlined in Section 3 continue to face us as members of the international statistical community: how are we to improve statistical services in the developing countries, including China; how are we to increase statistical literacy, not only in the USA and the Western world but in the emerging nations; how are we to spread the use of calculators and computers for statistics among ordinary citizens?"
- 1987: **Buchanan and the Constitutional Bases of Political Decision Making** by Vincent Ostrom. *PS* Vol. 20, No. 2 (Spring, 1987), pp. 242-246. Excerpt: P. 245, "We might expect an increase in constitutional literacy to be accompanied by parallel developments in statistical literacy and mathematical literacy. Constitutional literacy [the reason of rules accompanying the reason of law], if it is to have empirical referents and a computational logics with an empirical warrantability requires application to operational and collective-choice levels of analysis. Mathematical literacy is important in establishing computational logics; statistical literacy is important in establishing empirical warrantability."
- 1988: **What Should the Introductory Statistics Course Contain?** by Gerald J. Hahn. *The College Mathematics Journal* Vol. 19, No. 1 (Jan., 1988), pp. 26-29. Excerpt: P. 20, "the general aim of an introductory course in statistics should be to provide some level of statistical literacy, and an appreciation of the role of uncertainty. It should enable students to apply statistical methods in order to obtain and evaluate their own data." P. 28, "An integral part of the course should be a study: selected, designed, conducted and analyzed by each class member individually -- or in small groups. All this leaves little time for discussions of statistical inference and calculations around which many of our current courses are built (and which are regarded as boring by most non-statisticians)." "When we do discuss specific inference methods, I strongly advocate interval estimation." "We must make clear that statistical methods are based on mathematical theory. Such theory must be part of the foundation in the training of a professional statistician, but it does not belong in a general introductory course."
- 1989: **Graduate Statistics Service Courses in Part-Time Off-Campus Programs** by Gabriella M. Belli; William L. Seaver. *The American Statistician* Vol. 43, No. 2 (May, 1989), pp. 86-90. Excerpt: P. 89, "Recommendations about the need for better textbooks, for computer software that enhances statistical literacy, and for greater use of real data sets ..."
- 1990: **ASA Celebrates Sesquicentennial** by Gary G. Koch; Fred C. Leone; Robert L. Mason. *The American Statistician* Vol. 44, No. 2 (May, 1990), pp. 113-115. Excerpt: P. 114 "In a session, "A Conversation with Experts, Margaret E. Martin chaired a discussion on the successes and failures in that last 50 years with David R. Cox, W. Edwards Deming, Morris Hanson, C. R. Rao, and John Tukey. The successes cited included the increased use of statistical methods and the growth of training programs for statisticians from universities or continuing-education courses. The primary failures discussed were the insufficient statistical literacy in the general public, and a lack of emphasis on practical problems by education programs in statistics."
- 1990: **The Skills Challenge of the Nineties** by Peter G. Moore. *Journal of the Royal Statistical Society. Series A (Statistics in Society)* Vol. 153, No. 3 (1990), pp. 265-285. Excerpts: "The basics of mathematics, of numeracy, and of what I would call statistical literacy are more easily absorbed by young children than by adults, and that will not change during a person's lifetime." "What is needed is 'statistics across the curriculum' so that the art of drawing sensible conclusions from uncertain data can be a natural element of the education process."
- 1990: **Biostatistical Collaboration in Medical Research** by Jonas H. Ellenberg; Peter Armitage; Thomas C. Chalmers; Edmund A. Gehan; Judith R. O'Fallon; Stuart J. Pocock; Marvin Zelen. *Biometrics* Vol. 46, No. 1 (Mar., 1990), pp. 1-32. Excerpt: P. 29, Rejoinder: The biostatistician must be able to deal with the possible confusion or suspicion created by these disagreements [involving medical scientists] in bringing statistical literacy to the public health arena."

- 1990: [Who's a Literate? Assessment Issues in a Global Perspective](#). DA Wagner - Psychology & Developing Societies, March 1990 vol. 2 no. 1 5-16. - pds.sagepub.com " But it is not only individual skills which may change; societal yard- sticks may change as well. Just mentioning computer literacy, geographic literacy, statistical literacy and cultural literacy, to name a few, demonstrates how many societies define what the literate or"
- 1991: **An Undergraduate Concentration in Applied Statistics for Mathematics Majors** by Marie Gaudard; Gerald J. Hahn. *The American Statistician* Vol. 45, No. 2 (May, 1991), pp. 115-120. Excerpt: P. 116, "The program [the proposed curriculum] should also help students which areas of application appear most attractive. As indicated, some will be motivated to obtain more in-depth training later in their careers. Others may eventually move away from statistics, perhaps into the application area itself. These individuals will bring a high level of statistical literacy to their work."
- 1991: **Improving Doctors' Understanding of Statistics** by Douglas G. Altman; J. Martin Bland. *Journal of the Royal Statistical Society. Series A (Statistics in Society)* Vol. 154, No. 2 (1991), pp. 223-267. Excerpt: P. 253, "All doctors need to acquire skills in the critical evaluation of the medical literature but a majority of medical graduates are not going to work in a research environment. Some medical graduates will spend a period in research as an essential part of their career development. A relatively small number of doctors will remain within the academic environment and will continue to pursue research throughout their career. It is clear that the statistical literacy required by the three groups [of doctors] are different."
- 1993: **Software Reviews** by L. Carl Leinbach. *The College Mathematics Journal* Vol. 24, No. 3 (May, 1993), pp. 263-270. Excerpt: P. 270, "America is not going to get a quality education until its managers and workers have some grasp of probability and statistics. -- the lingua franca of quality. Unfortunately, corporate statistical literacy is abysmally low."
- 1995: **Qualitative Research in Applied Linguistics: A Progress Report** by Anne Lazaraton. *TESOL Quarterly* Vol. 29, No. 3, Qualitative Research in ESOL (Autumn, 1995), pp. 455-472. Excerpt: P. 456, "One broad-based survey of 121 applied linguists clearly acknowledged that 'qualitative approaches to data collection and analysis are clearly important for the types of questions asked in linguistic research', however the survey only assessed statistical literacy."
- 1995: **The State of Our Malaise: Introduction** by Robert Weissberg; *Perspectives on Political Science*, Vol. 24. "Access to data and statistical literacy permit anything to be quickly analyzed, at least among those possessing the relevant skills."
- 1996: **The Language of Statistical Understanding: An Investigation in Two Countries** by Jonathan Moritz, Jane Watson and Lionel Pereira-Mendoza. "The importance of statistical literacy as a basis for deeper statistical understanding is recognised widely in the curriculum documents from several countries." Copy at <http://www.aare.edu.au/96pap/morj96280.txt>.
- 1996: **A Look at the Literature (And Other Resources) on Teaching Statistics** by Betsy Jane Becker. *Journal of Educational and Behavioral Statistics* Vol. 21, No. 1, Special Issue: Teaching Statistics (Spring, 1996), pp. 71-90. Excerpt: P. 71, Based on ERIC citations involving 'statistics', "There is little question that in many areas of academe statistical literacy is important." The inclusion of standards for statistical literacy for the mathematics curricula in the NCTM standards has put the force of the main association for primary and secondary mathematics teachers behind the move to introduce statistics to lower grades."
- 1997: **[Bayes for Beginners? Some Reasons to Hesitate]: Discussion** by Thomas H. Short. *The American Statistician* Vol. 51, No. 3 (Aug., 1997), pp. 263-264. Excerpt: 'Berry uses his consulting experiences to illustrate the applicability of Bayesian methods, and Albert incorporates examples from sports and student-generated data into his introductory courses. Both provide a fundamental statistical literacy for their students.'
- 1997: **Essential Topics in Introductory Statistics and Methodology Courses** by N. Giesbrecht, Y. Sell, C. Scialfa, L. Sandals, P. Ehlers; *Teaching of Psychology*, Vol. 24. "Pereia-Mendoza and Swift (1981) recognized a need for statistical literacy and asserted that "individuals need a knowledge of statistics and probability to function in our society."
- 1998: **Statistics among the Liberal Arts** by David S. Moore. *Journal of the American Statistical Association* Vol. 93, No. 444 (Dec., 1998), pp. 1253-1259. Excerpt: P. 1257, "Pinker gives an example that I will use to illustrate the fact that even the most basic aspects of statistical literacy require the regularity of a civi-

- lized environment. High on my list of elements of statistical thinking is the claim that data beat anecdotes."
- 1998: **A one-semester, laboratory-based, quality-oriented statistics curriculum for engineering students** by Russell R. Barton, Craig A. Nowack, Soren Bisgaard, Veronica Czitrom, John D. Spurrier and Stephen Vardeman. (includes comments and reply) *The American Statistician* 52.n3 (August 1998): pp233(11). "He remarked that statistical literacy is a key to Intel's competitiveness, but that the courses engineers ..."
- 1998: **[A One-Semester, Laboratory-Based, Quality-Oriented Statistics Curriculum for Engineering Students]: Discussion** by Veronica Czitrom. *The American Statistician* Vol. 52, No. 3 (Aug., 1998), p. 240. Excerpt: "Craig Barrett, President of Intel, gave an invited presentation at the Joint Statistical Meetings several years ago. He remarked that statistical literacy is a key to Intel's competitiveness, but that the courses engineers receive in college do not teach them the applied statistics they will need at Intel."
- 1998: **Learning to win: nurses have retained a sense of "we-ness" deeper than the urge to close ranks against a hostile world** by Mary O'Brien. *Canadian Woman Studies* 18.4 (Dec-March 1998): p21-7. (6187 words) "... well-educated person meant ease and precision with language, and the much vaunted statistical literacy seems to be indifferent to the death of actual literacy. The danger is ..."
- 1999: **Interpreting & predicting from bar graphs** by Jane Watson and Jonathan Moritz. *Australian Journal of Early Childhood* 24.2 (June 1999): p22. "Viewing graph comprehension as part of statistical literacy (e.g. Watson & Pereira-Mendoza, 1996) implies that students need to develop not only skills for reading the grammar..."
- 1999: **The Future Role of Statistics in Quality Engineering and Management** by A. Bendell; J. Disney; C. McCollin. *The Statistician* Vol. 48, No. 3 (1999), pp. 299-326. Excerpt: P. 299, "Although statisticians are clear on the contributions their discipline has made historically in various aspects of industry and commerce, they continue to be concerned that the business world does not take statistical literacy or statisticians seriously enough."
- 1999: **Statistical Methods for Engineers** by Richard Cleary. Review. *The American Statistician* 53.3 (August 1999): p292. "... grades all suggest that the idea of first forming statistical literacy, and then teaching discipline-specific topics, is gaining currency."
- 2000: **Applying Cognitive Theory to Statistics Instruction** by Marsha C. Lovett; Joel B. Greenhouse. *The American Statistician* Vol. 54, No. 3 (Aug., 2000), pp. 196-206. Excerpt: P. 203, "In the case of statistics education, the emphasis on the 'practice of statistics' can be seen through a number of different changes to course curricula. Course goals no longer refer to a student's ability to derive particular statistical formula or to compute certain statistics by hand, but rather they refer to 'statistical literacy' and students' ability to reason statistically about real-world problems. For example, the course called 'Chance' (Snell, 1996) builds its entire curriculum around statistical problems that arise as current issues in the media."
- 2000: **Developing Concepts of Sampling** by Jane M. Watson; Jonathan B. Moritz. *Journal for Research in Mathematics Education* Vol. 31, No. 1 (Jan., 2000), pp. 44-70. Excerpts: P. 44, Abstract: "Responses [to questions on sampling] were characterized in relation to the content, structure and objectives of statistical literacy." "Another issue [in children's education] is associated with the goal of students' achieving, before they leave school, a level of statistical literacy that will allow them to contribute meaningfully to social decision making based on quantitative data." [Many other references to statistical literacy]
- 2000: **Statistical Thinking and Learning** by Brian Greer. *Mathematical Thinking & Learning*; 2000, Vol. 2 Issue 1, p1-9, 9p. Excerpt: "Gal and Garfield (1997b) listed the following as goals for statistical education: Goal 1: Understand the purpose and logic of statistical investigations. Goal 2: Understand the process of statistical investigations. Goal 3: Master procedural skills. Goal 4: Understand mathematical relationships. Goal 5: Understand probability and chance. Goal 6: Develop interpretive skills and statistical literacy. Goal 7: Develop [the] ability to communicate statistically. Goal 8: Develop useful statistical dispositions. (pp. 3-5)"
- 2000: **Statistics for Social Progress** by Lenne Mikkelsen and Clare Menozzi. *Statistical Journal of the UN Economic Commission for Europe*; 2000, Vol. 17 Issue 3/4, p201, 60p. Excerpt: "The importance of disseminating statistical information raised, in turn, the issue of increasing the general public's "statistical literacy". Increasing the awareness to the fact that indicators often reflect the methodology with which they are elaborated as much as the phenomena they are intended to quantify is only one example."

- 2000: **Assessment in Statistics Education: Issues and Challenges** by Joan Garfield and Beth Chance in *Mathematical Thinking and Learning* 2(1&2), 127-155. Excerpt: "These goals include ... 5. Develop statistical literacy: Students need to learn what is involved in interpreting results from a statistical investigation. This includes how to pose critical, reflective questions about numerical arguments, data reported in the media, and project reports from their classroom peers. For example: (a) How reliable are the measurements used? (b) How representative was the sample? and (c) Are the claims being made sensible in light of the data and sample?"
- 2000: **Toward Understanding the Role of Technological Tools in Statistical Learning** by Dani Ben-Zvi in *Mathematical Thinking and Learning* 2(1&2), 127-155. Excerpt: "On the verge of a new millennium, statistics is more pervasive than ever. We live in a society that is ever more dependent on information and technology. Major political, social, economic, and scientific decisions are made on the basis of data. Politicians resort to more data-based arguments, often reaching different conclusions from the same data. Statistical reports affecting virtually all aspects of our lives appear regularly in all the news media. Accordingly, statistical literacy is becoming a major goal of the school curriculum, regardless of the professional future of the student (Gal, in press). Statistical thinking offers simple but nonintuitive mental tools for trimming the mass of information, ordering the disorder, separating sense from nonsense, and selecting the relevant few from the irrelevant many."
- 2000: **Statistics in context** by Jane M. Watson. *Mathematics Teacher* 93.1 (Jan 2000): p 54(5).

APPENDIX D: OTHER ARTICLES USING STATISTICAL LITERACY: Part 2.

These articles contain the phrase "statistical literacy" but only in the references.

- 1951: **Recent Developments in Statistical Theory** by Palmer O. Johnson; William J. Moonan. *Review of Educational Research* Vol. 21, No. 5, Methods of Research and Appraisal in Education (Dec., 1951), pp. 389-414. Excerpt: P. 390, "Walker (203) contributed an interesting paper on statistical literacy in the social sciences." P. 413, "(203) Walker, Helen M., Statistical Literacy in the Social Sciences. *American Statistician*, 5: 6-12; February, 1951."
- 1982: **Confidence in Confidence Intervals** by Janet Bellcourt Pomeranz. *Mathematics Magazine* Vol. 55, No. 1 (Jan., 1982), pp. 12-18. Excerpt: P. 18, Bibliography reference to *Statistical Literacy* by D. G. Haack.
- 1987: **A Bibliography on the Teaching of Probability and Statistics** by S. Chandra Misra; Hardeo Sahai; Anil P. Gore; Joseph K. Garrett. *The American Statistician* Vol. 41, No. 4 (Nov., 1987), pp. 284-310. Excerpt: P. 294. References to Dennis Haack's two articles in Teaching Statistics. P. 307, Reference to Helen Walker's 1951 paper on statistical literacy.
- 1998: **The Beginning of Statistical Inference: Comparing Two Data Sets** by Jane M. Watson; Jonathan B. Moritz. *Educational Studies in Mathematics* Vol. 37, No. 2 (1998), pp. 145-168. Excerpt: P, 167, Reference: Gal, Iddo (1997). 'Statistical Tools and Statistical Literacy: The Case of the Average.' *Teaching Statistics* 17, 97-99.
- 1998: **Student Projects on Statistical Literacy and the Media** by Andrew Gelman; Deborah Nolan; Anna Men; Steve Warmerdam; Michelle Bautista. *The American Statistician* Vol. 52, No. 2 (May, 1998), pp. 160-166. Excerpt: P. 140, "For a general discussion of statistical literacy, see Bessant (1993) and Wallman (1992)." [Years should be reversed]

APPENDIX E: BOOKS USING QUANTITATIVE LITERACY IN THE TITLE

These articles contain the phrase " quantitative literacy." This term has long been used as a synonym for statistical literacy within the statistical community.

- 1990: Quantitative Literacy Series: *Exploring Probability* by Newman, Obremski and Scheaffer. Dale Seymour/Pearson Education
- 1990: Quantitative Literacy Series: *Exploring Surveys and Information from Samples* by Jim Landwehr. Dale Seymour/Pearson Education
- 1990: Quantitative Literacy Series: *The Art and Technique of Simulation* by Gnanadesikan, Scheaffer and Swift. Dale Seymour/Pearson Education
- 1994: Quantitative Literacy Series: *Exploring Measurements*. Dale Seymour/Pearson Education
- 1994: *Quantitative Literacy: An Alternative Approach to College Mathematics for Students of the Liberal Arts* (University of Colorado, QRMS 1010) by Jeffrey O. Bennett, William L. Briggs and Cheryl Lynn A. Morrow

- 1995: Quantitative Literacy Series: *Exploring Data* by James Landwehr and Ann Watkins. Dale Seymour/Pearson Education
- 1996: *Quantitative literacy: Mathematics for citizenship in the 21st century* by Bennet.
- 1997: *Why Numbers Count: Quantitative Literacy for Tomorrow's America*. Edited by Lynn Steen
- 1997: *Mathematics for Life: A Foundation Course for Quantitative Literacy* (Preliminary Ed) by Don Pierce, Ed Wright and Leon Roland
- 1997: *Quantitative literacy: Course manual* by Stefanos Gialmas.
- 2001: *Mathematics and Democracy: The Case for Quantitative Literacy*. Edited by Lynn Steen
- 2003: *Quantitative Literacy: Why Numeracy Matters for Schools and Colleges* by Bernard L. Madison
- 2003: *Quantitative Literacy through Algebra*. Carnegie Learning.
- 2004: *Achieving quantitative literacy: An urgent challenge for higher education*. Lynn Steen
- 2006: *Current Practices in Quantitative Literacy* by Rick Gillman. MAA Notes.
- 2006: *Literacy and Mathematics: A Contemporary Approach to Quantitative Literacy* by Jay and Mathew
- 2008: *Calculation vs. Context: Quantitative Literacy and Its Implications for Teacher Education*. Edited by Lynn Steen and Bernie Madison.

APPENDIX E: ARTICLES USING QUANTITATIVE LITERACY IN THE TITLE

These articles contain the phrase “ quantitative literacy.” This term has long been used as a synonym for statistical literacy within the statistical community.

- 1986: The quantitative literacy project by Scheaffer, R. L. in *Teaching Statistics*, 8, 34-38
- 1988: Statistics in the schools: The past, present, and future of the Quantitative Literacy Project by Scheaffer, Richard L. in *ASA Proceedings of the Section on Statistical Education*, 71-78
- 1989: The Quantitative Literacy Project -- Its impact on introductory statistics courses by R. L. Scheaffer in the *ASA Proceedings of the Section on Statistical Education*, 25-28
- 1990: [The ASA-NCTM Quantitative Literacy Project: An Overview](#) by R. L. Scheaffer at ICOTS-3, p. 45-49. A1-2
- 1990: [Presentation of Quantitative Literacy Materials in a Math Education Course](#) by Richard Madsen at ICOTS-3, p. 381-384. A8-4
- 1990: [Quantitative Literacy - Implementation Through Teacher Inservice](#) by Gail Burrill at ICOTS-3, p. 50-55. A1-3 "Recognising the link between mathematical literacy and statistical literacy, Everybody Counts, a publication of the Mathematics Sciences Education Board, is typical when it advocates that statistics should be a primary component of a revised curriculum."
- 1990: Quantitative literacy: Leadership training for master teachers Training Teachers to Teach Statistics. By Gail Burrill in the *Proceedings of the International Statistical Institute Round Table Conference*, 219-227 Hawkins, Anne (ed.) International Statistical Institute (Voorburg, The Netherlands)
- 1991: The role of statistics in achieving numeracy for all by Jean Thompson in the *Proceedings of the Third International Conference on Teaching Statistics. Volume 1: School and General Issues*, 429-432 Vere-Jones, David (ed.) International Statistical Institute (Voorburg, The Netherlands)
- 1991: Presentation of quantitative literacy materials in a math education course by Richard Madsen in the *Proceedings of the Third International Conference on Teaching Statistics. Volume 1: School and General Issues*, 381-384 Vere-Jones, David (ed.) International Statistical Institute (Voorburg, The Netherlands)
- 1991: Quantitative literacy -- Implementation through teacher inservice by Gail Burrill in the *Proceedings of the Third International Conference on Teaching Statistics. Volume 1: School and General Issues*, 50-55 Vere-Jones, David (ed.) International Statistical Institute (Voorburg, The Netherlands)
- 1991: The ASA-NCTM Quantitative Literacy Project: An overview by Richard Scheaffer in the *Proceedings of the Third International Conference on Teaching Statistics. Volume 1: School and General Issues*, 45-49 Vere-Jones, David (ed.) International Statistical Institute (Voorburg, The Netherlands)
- 1991: Statistics and probability topics for pre-college students: The quantitative literacy perspective by James M. Landwehr in the *ASA Proceedings of the Section on Statistical Education*, 62-66 *American Statistical Association* (Alexandria, VA)

- 1993: Teaching statistics using the quantitative literacy series by Daniel T. Voss (Disc: p166-168) ASA Proceedings of Section on Statistical Education, 154-159
- 1995: Science quantitative literacy in action by Jeffrey A. Witmer in ASA Proceedings of the Section on Statistical Education, 70-71
- 1995: Secondary quantitative literacy in action by Richard L. Scheaffer in the ASA Proceedings of the Section on Statistical Education, 65-69
- 1997: A foundation course for quantitative literacy by Don Pierce in the ASA Proceedings of the Section on Statistical Education, 175-178
- 2006: Pedagogical challenges of quantitative literacy by Bernard L. Madison in the ASA Proceedings of the Joint Statistical Meetings, 2323-2328
- 2006: The role of statistics educators in the quantitative literacy movement by Joy Jordan and Beth Haines in the Journal of Statistics Education, 14, ---
- 2007: Promoting quantitative literacy K-12 by Shail Butani in the ASA Proceedings of the Joint Statistical Meetings, 2170-2175

Articles that used *Quantitative Literacy* or *Numeracy* in the article content -- but not in the title:

- 1993: [The science lab: An opportunity for real statistical analyses in the schools](#) by Jeffrey A. Witmer in the ASA Proceedings of the Section on Statistical Education, 39-41
- 1993: *Statistics: A new beginning* by Janet L. Norwood in *Chance*, 6, 42-47
- 1994: From home runs to housing costs: *Data resource for teaching statistics*. Burrill, Gail (ed.) Dale Seymour Publications (Palo Alto)
- 1997: [Mere Literacy is not Enough](#) by George Cobb in *Why Numbers Count: Quantitative Literacy for Tomorrow's America* edited by Lynn Steen. College Entrance Examination Board. "The phrase "quantitative literacy" tempts us to think of the analog for numbers: "Can you count? Can you calculate?" But these questions ask about the low end of a continuum, inhabited by those skills whose value is quickly eroding. Value is increasing only at the upper end, and there reasoning is a better description than literacy."
- 1997: Teaching Bayes' rule: A data-oriented approach by Jim Albert (Pkg: p241-274) *The American Statistician*, 51, 247-253
- 1999: Teaching statistics theory through applications by Nolan, D. and Speed, T. P. in *The American Statistician*, 53, 370-375
- 2001: Statistics in preschool by Hilton, Sterling C., Grimshaw, Scott D. and Anderson, Genan T. in *The American Statistician*, 55, 332-336
- 2004: Teaching statistical principles using epidemiology: Measuring the health of populations by Stroup, Donna F., Goodman, Richard A., Cordell, Ralph and Scheaffer, Richard in *The American Statistician*, 58, 77-84
- 2006: Innovations in teaching statistics by Richard J. Cleary and Joan B. Garfield in *The American Statistician*, 60, 99-100

Statistical Thinking and Statistical Reasoning (These term are sometimes used as synonyms for statistical literacy)

...

Quantitative Thinking and Reasoning (These term are sometimes used as synonyms for statistical literacy)

1974: The importance of quantitative thinking by J. R. Zacharias, *National Elementary Principal*, 53(2), 8-13.

CONFERENCES

1998: Statistical Literacy was a topic at ICOTS-8 under "Statistics Education and the Wider Society".