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Bringing Census Data into the Classroom: World Wide Web Access and Teacher Networking

by William H. Frey and Cheryl L. First, Population Studies Center The University of Michigan

Once Upon A Time
As Jackie, a college sophomore, puts together her fall schedule, her interest is peaked by courses which address current social issues, such as Sociology 202, which focuses on marriage and childbearing trends. Her enthusiasm for SOC 202 wanes slightly when she sees that it meets at 8:30 am. Karen, Jackie’s roommate, reminds her that she needs to fulfill the statistics requirement and that STAT 402 meets at 11 am, a definite plus. Jackie groans, “That class will put me back to sleep anyway.” Like many students, Jackie dreads the statistics course because her math skills are not strong. Furthermore, word on campus is that it is a dry course that has nothing to do with real life. Jackie opts for SOC 202; she will put off STAT 402 for as long as possible.

From The Same Old Story To A New Perspective
Any resemblance to the living or dead in the above story is not accidental, it is inevitable. This dilemma is played out on most campuses every semester. To many, the dilemma may not seem especially problematic because “Jackie” must eventually complete the statistics requirement.

However, two major problems are created by a curriculum which presents theory and data analysis as separate entities. First, this curriculum structure leads the student to believe that the compelling questions and possible solutions to today’s pressing social issues are somehow distinct from quantitative reasoning. In other words, why and how are presented, and consequently understood, as two completely different questions. The second problem is of a more practical nature, but nonetheless troublesome. When students put off the quantitative element of their degrees, they are postponing their opportunity to take the more substantive upper level courses which require data analysis skills. Consequently, the quality of their undergraduate training, and its relevance to their eventual careers, decreases.

In light of these problems, the Social Science Data Analysis Network (SSDAN) project seeks to make empirical data analysis explorations an accessible, available, and desirable component in introductory social science courses. It combines engaging course material on American society with basic data analysis exercises which utilize data from the U.S. Census and other sources. Issues that can be addressed with U.S. Census data include:

- Immigration and the Increasing Diversity of the American Population

Changes in the Roles of Women and the Structure of the Family

Industrial Restructuring and the Shrinking Middle Class

The Civil Rights Movement’s Impact of Black-White Inequality

By “marrying” theory and data analysis in an active learning setting, these courses illustrate that quantitative reasoning skills are relevant to social issues. Furthermore, the courses prepare students for applied upper level courses and careers that utilize data analysis skills.

In addition to designing course material and preparing datasets, the SSDAN project provides support for instructors who are committed to, but not necessarily experienced in, incorporating “hands on” data analysis in their courses. This support includes in-person and “virtual” internet accessible workshops, a World Wide Web Homepage (See Exhibit A for SSDAN Homepage) and electronic E-mail groups. Through these mechanisms, instructors not only receive support from SSDAN staff, but also have the opportunity to network with each other. A more comprehensive explanation of these mechanisms, and other SSDAN materials, will be provided later in this paper.

The most innovative objective of this project is to introduce networking capabilities that link data and research expertise at the University of Michigan Population Studies Center with faculty at two and four year colleges. This link will enable interactive feedback on development of curricular materials over the Internet. The computer network will be used to: (1) aid in the creation of datasets and curricular (i.e. faculty will suggest exercises and relevant datasets to be produced at Michigan); and (2) to provide continuous sharing of these materials and feedback among faculty via conferencing.

The Nuts and Bolts of Building A New Approach
In order to introduce faculty to this new approach and help them create data exercises appropriate for their courses, the SSDAN project has implemented both traditional in-person workshops and a “virtual workshop” — via the Internet — that enables social science faculty at two and four year colleges to exchange data and ideas through the project’s World Wide Homepage and electronic E-mail groups. Through these channels, we have already developed an extensive network of over four hundred interested faculty...
SSDAN World Wide Web homepage address:
http://www.psc.lsa.umich.edu/SSDAN/

Social Science Data Analysis Network

Census Data and Exercises for College Classes
Located at the Population Studies Center, University of Michigan in collaboration with the Great Lakes Colleges Association.

Contact: William Frey, Project Director
Population Studies Center, University of Michigan
william.frey@umich.edu

What is SSDAN?
¥ Answers to Questions About SSDAN
¥ Send me a "Start-Up Package"/Put me on Mailing List

Summer Workshop in Ann Arbor
¥ Workshop for Faculty of GLCA Colleges
¥ Workshop for All Others

SSDAN Census Data Sets
¥ About SSDAN Data Sets
¥ Data Sets for Downloading

Classroom Resources
¥ Course Exercises
¥ Other Course Aids

Email ssdan-staff@umich.edu for technical assistance.

Check back soon for new features on our web site for the 1996 Fall Semester!

This project is supported by the National Science Foundation and the Department of Education FIPSE with additional funding provided by the Alfred P. Sloan Foundation.
around the country. We have also published a workbook which includes over two hundred student exercises and covers ten American Society topics that can be incorporated into many social science courses. The workbook is bundled with a diskette which contains specially tailored U.S. Census data for 1950-1990 and the Chipendale program, an extremely user-friendly data analysis software for novices.

**In-Person Workshops**

The primary goals of the in-person workshops are: (1) To expose the participants to curricular materials we have developed through lectures, discussions, and extensive “hands-on” use; (2) to make them familiar with computer conferencing and data access features of our computer network; (3) to work with them, individually or in small teams, toward creating data analysis exercises that they will use during the next academic year; and (4) to expose participants to other resources that complement their use of the data analysis exercises they will produce in our workshops.

Our annual in-person summer workshops in Ann Arbor are open to a national audience of instructors. The two workshops, each a week long, that were held during the summer of 1996 introduced 28 college teachers to the SSDAN materials. The participants were selected from some 80 applicants, and represented a variety of colleges and social science disciplines. Primary consideration was given to highly motivated faculty interested in adding a data analysis component into a lower level substantive course they already teach. They can adapt any of the project’s current census data analysis exercises to their classes or, with our assistance, develop new exercises.

Participants were introduced to the resources of SSDAN in “hands on” training sessions, had seminar discussions, worked with SSDAN staff to begin developing classroom exercises specific to their own courses, and practiced exploring the SSDAN materials. Participants were also exposed to PDQ-Explore, a “cutting edge” instructional computer tool which allows users, to conduct U.S. Census data analysis directly over the Internet. The PDQ-Explore program is currently being developed in cooperation with the University of Michigan and will be discussed later in this paper.

Overall, the workshop got high marks from the 1996 participants due to the information presented and the human networking possibilities that were set in place. We are now working with these faculty to design classroom exercise/dataset modules that they will use. These modules and datasets will be posted on our Homepage in order to facilitate sharing among any interested instructors.

**SSDAN World Wide Web Homepage:**

http://www.psc.lsa.umich.edu/SSDAN/
The project Homepage describes the project (See Exhibit A), makes exercises available, and facilitates downloading of census datasets that can be accessed with Chipendale software in both IBM and MAC format. The datasets are indexed according to the variables and the kinds of courses for which the datasets are most suited. The Web page also serves to update instructors on developments related to the project, and provides links to other teaching resources. The Homepage has also been a useful way to advertise the project, and as a result, we have received requests for additional information and datasets among social science faculty in a wide variety of institutional contexts around the world. Although the Homepage is free to browsers, we do ask that they “register” with us first. The Homepage enables project participants and all others who wish to access it, with the ability to send requests and communicate with the project staff.

The project staff is currently developing more features for the web page that will assist both professors and students. Our “new and improved” homepage will include: new datasets and exercises for downloading, references to current popular and scholarly articles relevant to SSDAN; a form for faculty to submit classroom exercises and corresponding dataset ideas to SSDAN staff; and a QuickSurvey for feedback on SSDAN. In future months, we will create a section which targets students. This section, in addition to being a bit more “hip”, will include links to articles which can help them with their coursework, data they may find interesting, and surveys.

**The “Virtual” Internet Accessible Workshop**

The most innovative aspect of this project is the implementation of a “virtual” workshop. This means that faculty from any undergraduate program can participate in the conferencing, data access, and exercise creation activities of this project by communicating with our core faculty and staff over the Internet, or using e-mail. Our “virtual” workshop revolves around two components: (1) an e-mail discussion group for active participants; and (2) a data analysis exercise “bank” that contains text and datasets for individual class exercises which can be retrieved by the instructor over the Internet or via e-mail.

To use our materials, it is not necessary that entire universities, classrooms, or student audiences have Internet access, but rather that the instructor has access, somewhere on campus, to an individual Internet connection, or e-mail account. Hence, a large body of faculty participants in this network can use this system to retrieve data exercises for use in their classes (from the “bank”).

All instructors who wish the Michigan staff to work with them in producing exercises must agree to “try them out” in their own classes and provide feedback to us regarding their effectiveness. This feedback will be recorded into the notes that are attached to the data exercises, deposited in the general bank. These exercises, in addition to those created by
Example 1 Look at the percentage of blacks and nonblacks who were never married, from 1950 to 1990. How has the percentage of each group who have never been married changed over time? What might account for these changes? (MARR5090)

Create a line graph with separate lines for blacks and nonblacks indicating the percentage of each group who have never been married for each year.

Cross Tab = Race / Marital (control for year); Percent Across

<table>
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<th>CurMr</th>
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<td>8.3</td>
<td>2.3</td>
<td>26.4</td>
<td>100%</td>
</tr>
</tbody>
</table>

The answer can be plotted as follows:

Blacks and NonBlacks Never Married 1950 to 1990

KEY

- Black
- NonBlack

Spring 1996
our in-person workshop members, should result in over 300 data exercises at the conclusion of the project.

**"Investigating Change in American Society" Workbook**

Our workbook, *Investigating Change in American Society: Exploring Social Trends with US Census Data and StudentChip* has several Topics (chapters) that are appropriate for almost any social science course. The workbook is flexible enough to be used with a variety of texts, or additional readings, and can easily be integrated into existing courses. The single most important feature of our workbook is its adaptability to a wide range of social science courses in which the instructor wants to introduce one or more "hands on" data analysis modules. See Exhibit B for a sample exercise.

In order to make data analysis interesting and engaging to students, the workbook includes a wide variety of interesting issue-oriented topics. See Exhibit C below for a listing of all ten investigation topics.

These investigation topics (chapters) are self-contained. In other words, they can be “mixed and matched” according to the instructor’s course sequence. Within each Topic (chapter), the difficulty level of the exercises increases as the students read through the topic. At the end of each topic there are “Think Tanks”, broader questions which aim to generate class discussions. These questions are ideal for team exercises.

The students complete the data analysis modules with user-friendly, engaging Chipendale software which comes with the workbook. A full tutorial at the beginning of the book can get teachers and students “up to speed” in one classroom period.

The “look and feel” of our book is not of a statistics or methods book and our exercises are centered on having the students explore data to examine interesting and engaging social issues — rather than to learn more advanced statistical methods or jargon. This is reflected in the heavy use of graphics, and attention to understanding basic sociological concepts and measurements rather than focusing on statistical or specialized methodological concepts.

**The World On A Diskette**

The workbook includes a diskette (students can choose between an IBM or MAC compatible edition) containing Chipendale contingency table software. This software was selected because of the ease of use, low expense for students, and appropriateness for straightforward contingency table analyses of census data. The program is menu driven and extremely user friendly, but also sufficiently unfriendly to allow students to recognize when they have made poor decisions. The program makes it easy for students to recode variables, select controls, and make graphs that highlight their comparisons. Any standalone PC can use the software in virtually any configuration. The Chipendale program is efficient to use on any PC because it takes “input” data as tables or matrices, rather than individual cases. This allows students to manipulate large aggregate-type datasets, such as those from the U.S. Census, in small compact files.

A whole range of topics related to American social, economic and geographic issues can be explored with

---

**Exhibit B**

**INVESTIGATION TOPICS**

- Population Structure: Cohorts, Ages, and Change
- Race and Ethnic Inequality
- Immigrant Assimilation
- Labor Force
- Marriage, Divorce, Cohabitation, and Childbearing
- Gender Inequality
- Households and Families
- Poverty
- Children
- The Older Population

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IASSIST Quarterly
SSDAN datasets. The datasets are drawn from the U.S. Census and include variables such as: race-ethnicity, gender, immigration status, earnings, education, occupation, cohabitation, and workhours. Some allow analyses of trends over the census years 1950, 1960, 1970, 1980, and 1990. Others permit more in-depth comparisons across social and demographic groups and geographic areas from the 1990 U.S. census.

U.S. Census Data
The most comprehensive dataset needed to assess the kinds of over-time changes that we have been discussing are available from the U.S. Census. The wide range of statistics collected by the decennial census is especially useful in social science research. This is because this information is collected for a large number of people and detailed social and economic information can be gathered for tiny population subgroups and small geographic areas. Unlike many small surveys, the census information is rarely limited by having “too few observations” to be statistically representative.

SSDAN Participants
This project especially targets groups and institutions that have often been neglected in advances of quantitative work in the social sciences. Specifically, this means concerted efforts to include women, minority and disabled faculty, as well as two-year undergraduate institutions and historically Black colleges and universities. This special targeting is made explicit in the recruiting for our in-person workshops in Ann Arbor, and in our efforts to engage off-site instructors, interactively, in creating exercises for their classes.

Funding
SSDAN is currently funded by the National Science Foundation Undergraduate Faculty Enhancement grant and a US Department of Education FIPSE Project, building upon earlier funding from the Alfred P. Sloan Foundation and an Undergraduate Initiatives Award granted to Dr. Frey who first developed this approach in his University of Michigan course. The FIPSE project demonstrated the feasibility of incorporating interactive U.S. Census data analysis via the Internet into existing undergraduate curricula in colleges of the Great Lakes Colleges Association. The current project extends this approach to a national community of social science instructors, that has come to be called SSDAN, the Social Science Data Analysis Network.

The Future
In the next year, the teaching approach of this project will be enhanced by utilizing a student version of the PDQ-Explore program and class-room exercises will be made available. As mentioned previously, the PDQ-Explore, a “cutting edge” instructional computer tool where students can conduct direct U.S. Census data analysis interactively over the Internet, is an avenue which the SSDAN will be taking.

PDQ-Explore allows users to request US Census data tables that are immediately delivered to the users computer screen over the Internet. Eventually, this program, along with the Chipendale software, will be modified so that our approach can be available to high school students, as well as undergraduate college students.

The Social Science Data Analysis Network looks forward to continuing to grow, as our network of interested faculty and our “bank” of class-room exercise modules and datasets expands. Please contact us via E-mail or through our World Wide Homepage at:

http://www.psc.lsa.umich.edu/SSDAN/

if you or one of your colleagues would like more information about the project, or would like to participate in developing exercise modules and US Census datasets for your own classroom.


Dr. William H. Frey, Director of SSDAN (Social Science Data Analysis Network) is on the faculty of the Population Studies Center, and the Department of Sociology at the University of Michigan in Ann Arbor. SSDAN draws from an approach he developed with his Michigan course, and later disseminated to faculty of the Great Lakes Colleges Association.

Cheryl L. First MSW is the Project Manager of the Social Science Data Analysis Network. She coordinates the In-Person and Virtual Workshops for the project, and also maintains the SSDAN World Wide Web Homepage.

Acknowledgments: The authors are grateful to Bridget Fahrlan for her editorial contributions.

Spring 1996
Bringing Census Data into the Classroom: World Wide Web Access and Teacher Networking

by Louis R. Gaydosh, The William Paterson College of New Jersey

A Social Science Framework for Technology Assessment.
In order to carry out a complete assessment of the impact of computing technology in the modern world, social scientists should employ an organizing framework within which to place studies addressing the issue. Such a schema should be comprehensive in order to allow for research across the entire range of affects which this technology can and does have on all societies in which it is found. At the same time, it should be simple enough to allow for a parsimonious explanation of the cumulative evidence regarding the consequences of computers on social structure and behavior. A paradigm satisfying both criteria would provide a common context for comparing different analyses and would allow for building a coherent body of knowledge on the subject. In this paper, I would like to suggest a frame of reference which provides for an inclusive yet uncomplicated organization of studies assessing the social impact(s) of computing technology and which can be used to generate hypotheses for further research in this area.

We begin with the observation that technology can have two types of affects on human societies. One affect is quantitative - that is, it can influence the amount of activity(ies) in which people are involved, the time it takes to perform tasks, the economic costs and/or benefits of developing and/or adopting the technology, etc. The other type of affect is qualitative, which includes such factors as the types of social structures which encourage and eventually adopt technological innovation, the consequences of adopting the technology for the social environment, the moral, ethical, and legal implications of technology for the people and groups in society, etc. At the same time, the scale of the impact(s) of technology on society can be seen at two levels of analysis: a macro-level and a micro-level. Macro-level affects ramify through the entire society and/or its major institutions. Micro-level affects are felt by individuals, either singly or in the interpersonal relationships in which they are involved. The intersection of these two independently variable dimensions produces a two-by-two table, in the cells of which any particular study assessing the impact of computer technology can be arranged.

Before applying this framework to the assessment of computing technology, we should point out a major pitfall of all such schemata. This formulation implies that there are categorical distinctions between both types and levels of affects which technology has on social structure. It is probably more valid to conceptualize these categories as endpoints of continua. Kaplan (1964) comments on the differentiation between "quantitative" and "qualitative" phenomena that:

In general, even if we are working with qualitative variables, the frequencies of their occurrence may be of importance to our inquiry, and these constitute a corresponding set of quantitative variables. Similarly, the reliability of a classification into qualitative categories may itself be a quantitative matter. No problem is a purely qualitative one in its own nature; we may always approach it in quantitative terms. (emphasis added) (176)

For example, the term "information anxiety" has a primarily qualitative connotation - referring to a disorientation or malaise people feel when confronted with the overwhelming amount of mass-produced information to which they are exposed in contemporary society. (Wurman, 1989)

However, as social scientists we may also determine the number of people who experience this condition - this is its quantitative dimension.

A similar criticism could be made of the distinction between macro- and micro-level affects of technology on society. That
is, phenomena which may be thought of as characteristic of entire societies penetrate the experiential world of individuals and small groups. People draw on such culturally “universal” concepts as gender, space, and time to structure their everyday roles, identities, and relationships with others. (See Robertson [1987], or any other introductory sociology textbook for examples and summaries of supporting evidence.)

Having indicated the strengths (comprehensiveness and ease of understanding) and weaknesses (oversimplification of differences between types and scale of affects) of the proposed framework, we can conclude that it has value as a heuristic device. Its principal virtue is that it presents a methodology for organizing research on the assessment of computing technology into a manageable number of categories which allow for the systematic development of a theory of the impact of technology on social structure.


When applied to the impact of computing technology on society, quantitative affects refer to the sheer amount of information generated and made available to people, the rate of growth of information and knowledge, the number of people who work in information industries, etc. as these are increased and/or accelerated by computers. Qualitative affects include such phenomena as the structural characteristics of information societies, as well as the “quality of life” issues which have been raised in analyses of the impact of computers on employment, privacy, health, etc. As stated previously, macro-level impacts have society-wide ramifications, including, in the case of computing technology, the transformation of contemporary social structure into an information society. Individuals or small groups are the focus of micro-level affects of computers, as exemplified by the creation of “newsgroups”, “forums”, and other electronic channels of communication between people.

In addition to providing a framework for organizing studies, this schema can also be used to generate hypotheses for research which can contribute to a theory of the effect(s) of the computer on the information society. The following figure is the previous table filled in with concepts summarizing potentially fruitful areas of study and/or generating hypotheses which can advance social scientific knowledge in this endeavor.

The following sections offer commentaries on the types of studies which could be generated by this scheme.

Quantitative Macro-level Affects: Gross Information Product (GIP).

Information can be regarded as a commodity in the contemporary world. Rosenberg (1992) notes that “information is a commodity . . . a product in its own right”. (328) It is an object of commercial exchange – that is, it is produced, bought, sold, and used just as any other commodity. (An important distinction between information and other commodities is that information is not consumed [in the sense of being eliminated], destroyed, or reduced after it is used.) Given the central importance of information and its (at least possible) commoditization in post-industrial society, it is appropriate that we develop some measure of how much of it we produce. Wurman (1990) states that “[t]he amount of available information now doubles every five years...” (32) But, it is virtually impossible to find a precise quantitative measure (or estimate) of information available to people in the United States or any other contemporary society. In an attempt to provide such a gauge, I propose a concept termed “Gross Information Product (GIP)”, by which is meant the total amount of all final information output produced and disseminated in an information society during a given period of time, for example, each year. The concept is analogous to the “gross domestic product” (GDP) produced in an economy each year. GDP is defined as the “total market value of all final goods and services produced in an economy during a year”. (Miller, 1994:170) However, it should be understood that GIP is not intended as an assessment of the monetary value of information (for a methodology for developing such a measure, see Porat [1977]), nor of its utility in facilitating decision-making, stimulating further research, etc. (These considerations are not unimportant; however, their use as components of a quantitative measure of information introduces complications which extend beyond the scope of this paper.) A society’s gross information product is nothing more than the total quantity of information which it generates in a year, irrespective of its economic worth or its practical consequences.

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Spring 1996
I propose this measure in response to a “nagging” concern. In an industrial economy based on the manufacture of products, it is possible to ascertain the total number of units of output in any particular sector. For example, we can determine the number of automobiles, televisions, washing machines, etc., produced by companies in the United States, Japan, United Kingdom, etc. for a given year (or virtually any other time period). It seems fitting that we should have a comparable measure of output for a society in which the production, storage, and dissemination of information is a principal economic activity.

However, like many indices, GIP is more easily proposed than constructed. A major source of difficulty in constructing a measure is the multiplicity of forms in which information occurs in contemporary society. A starting point can be found in Porat’s (1977) distinction between the primary and secondary sectors of “information activity”, defined as “the production, processing, and distribution of information goods and services” (24) in the economy. Porat’s concept of primary information activity refers to any “good or service [which] intrinsically convey[s] information or [is] directly useful in producing, processing, or distributing information”. (Porat, 1977:25) We might adapt this definition to GIP to mean information goods or services made available to the general public, regardless of cost to either the producer or the user of the information. For example, most sites on the World Wide Web are freely available to anyone with a computer, modem, and web browser. Research on the “primary sector” component of GIP would include compilations of the number(s) of any or all of the following:

1) software programs, multimedia presentations, World Wide Web home pages, and other output intended for demonstration or dissemination via electronic media;

2) books, monographs, journal/magazine articles, reports, and other “hard copy” publications (including works of creative writing, such as novels, plays, etc.);

3) mass media broadcasts and productions.

This enumeration includes references to information presented directly through the computer, in print, and over television and radio broadcast(s). The role of the computer in the production and/or distribution of information via these media is evident- it is the principal, if not the only instrument employed in this enterprise.

The “secondary sector” of information activity is defined as “all the information services produced for internal consumption by government and noninformation firms”. (Porat, 1977:4) The notion underlying this concept is that there are many individuals and organizations whose principal output is the production of goods and/or the provision of services which are not directly and immediately informational, but who still generate and rely on information to carry on their enterprise(s). The extent to which computing technology is utilized in this component of GIP might be assessed through such indicators as:

1) the number of inter-office memoranda and other documents intended for circulation within an organization distributed via computing technology (e-mail, fax machines, “floppy” diskettes, etc);

2) the number of documents (letters, reports, etc.) exchanged between individuals and/or organizations via computing technology (e-mail, fax machines, “floppy” diskettes, etc.).

This secondary component of GIP points up the fact that computing technology is brought to bear on the production and dissemination of information within and between entities whose main objective is not to generate publicly available information, but which nevertheless create and exchange information in the course of their routine activities.

Together, these two components make up a society’s Gross Information Product. What is called for is a composite measure of the total amount of primary and secondary information produced in a society in a specified time period.


In the category of “Structural Properties of the Information Society”, I include analyses of the social structure of contemporary information societies, including examinations comparing this societal type with other social forms, such as agricultural societies, industrial societies, etc. Any such discussion should begin with an acknowledgment that there is not a universal consensus among social scientists that what is commonly referred to as the “information society” is a distinct type. (Kumar, 1995) Bell (1981) estimated that, in 1970, only 28.6 percent of the civilian work force in the United States worked in the “industry sector” of the economy, while fully 46.4 percent worked in the “information sector” and another 21.9 percent were in the “service sector”. On the basis of these figures, Bell concluded that we have become a “post-industrial society” and, given the ascendance of the information sector, it seemed appropriate to use the term “information society” to describe the new social structure. An alternative interpretation which has been preferred is that what is termed the “information society” is simply an adaptation of capitalism to a social context in which industrial production has been replaced by information generation and dissemination. (Kumar, 1995) Among other observations, proponents of this viewpoint have pointed out that the so-called information society is characterized by concentration of capital in a few corporate structures (Microsoft has
replaced General Motors as the symbol of economic success), just as occurs in an industrial economy.

While it may still be an open question as to whether the information society represents a new and different social structure, contemporary developments have brought about certain changes in our social behavior(s). These changes have the potential to react back on society and have an affect(s) on its structural characteristics. I have in mind one relatively indisputable fact: the dominant locus of social activity in the information society is the household.

Information technology, directed by a whole host of big business interests, has been increasingly put at the service of home-based consumption. Entertainment is the most obvious example. 'Going out' has been replaced by 'staying in'. (Kumar, 1995:155)

Television, VCRs, audio cassette players, and CD changers are obvious technological appliances which allow people to bring various forms of entertainment into their homes. Computers can also contribute to this phenomenon by enabling people to play a wide variety of games, either alone or interactively with a small or large number of others, as well as allowing people to learn and/or play certain (simulated) musical instruments. But, it is not simply in providing entertainments that computing technology makes for a home-based society. Other examples include 'tele-banking', whereby a growing percentage of the population utilize electronic funds transfer to have their paychecks deposited directly into their accounts and pay their bills electronically either through a direct-debit payment arrangement or some variant thereof, or through software which allows them to write checks from their accounts. "Tele-shopping" makes it possible for people to purchase virtually the entire panoply of consumer goods available in the market without having to leave their homes. (See Forester [1981] and Rosenberg [1992], among others, for additional material on computing technology and "home-centeredness". For illustrations of the variety of software applications, see almost any introductory textbook on "computer literacy, for example, Capron [1992], Laudon, Traver, and Laudon [1995], and Shelley, Cashman, and Waggoner [1995].)

In a different, but related, vein, 'tele-education' enables people to study a broad range of disciplines and subjects, either for institutional credit or not, through their televisions and/or computers. "Distance learning" is becoming a popular mode of instruction in many institutional contexts. There are institutions at which students can earn baccalaureate, master's, and doctoral degrees through various combinations of correspondence, videoconference, and other technologically communicated courses. The Open University in England is an example; even the venerable London School of Economics offers a limited number of degree programs in this mode. People interested in learning some foreign language(s) may do so through instructional software. Those who want to prepare for certain college/graduate school admission examinations can avail themselves of the relevant program(s). Those who wish to improve their skills in selected fields of mathematics, science, or the humanities may use their computers to run software or communicate with instructional resources via communications programs. (See the "Education" pages of any software distributor catalog for examples of the variety of programs available in this area.) However, it is not simply as consumers or recipients of externally generated information that we observe this tendency toward a home-based society. Given the (growing) preponderance of the information sector of the contemporary economy, large numbers of employees are directly involved in information activity. It follows that many of these workers can, with a home computer, modem, and necessary software, do their jobs from their homes. Such work arrangements are termed telecommuting. "Telecommuters" may work entirely at home or they may simply take work home from their office(s). The category may include an extraordinarily wide range of employees, from computer programmers who must, of necessity, be in continuous contact with their offices, to part-time typists, data entry operators, and other clerical workers whose only contact with their employers may be limited to sending and receiving job assignments. In 1991, a National Work-at-Home Survey by Link Resources found that approximately 5.5 million part-time and full-time employees spend normal daily business hours working from their homes. The Conference Board has found that between 15 and 20 percent of the firms it studied offered formal telecommuting arrangements to at least some of their workers. Moreover, almost 80 percent of the surveyed firms allow telecommuting on an informal basis. (Filipczak, 1992) The growing numbers and prevalence of telecommuters in the work force has led some commentators to use the term "Electronic Cottage" to describe the trend toward home employment. (Toffler, 1981)

As the preceding paragraphs suggest, computing technology has the potential to allow for the creation of a social environment in which people can carry on most, if not all, vital socially relevant activities without having to leave their places of residence. This might lead us to conclude that we are witnessing a return to a society in which the family and kinship institutions are the dominant forms of social organization. But, what appears to be happening is that people are engaging in these various computing technological behaviors as individuals, rather than in terms of their group roles as family members. (Kumar, 1995) One spouse may use his/her computer independently of or in isolation from the other; parents may not know about their children's use of the "family" computer. In fact, many non-family households have and use computers. The implication of these comments is that, because it is conducive to
individualized and private usage, computing technology in its present form may have the affect of weakening the bonds between people which are the foundation of any social order. If this proves to be the case, a distinguishing characteristic of the information society will be a relatively weakened solidarity in comparison with other types, such as agricultural societies, industrial societies, etc.

On the other hand, computing technology may also contribute to the integration of the information society, at least in its political aspects. Groper (1996) presents a rationale explaining how e-mail can bring about increased participation in the political process by facilitating communication between citizens and their elected officials. He cites two illustrative cases- the Legislative Information Network (LIN) in Alaska and Public Electronic Network (PEN) in Santa Monica, California- both of which appear to have this affect, at least initially. (The QUBE project in Columbus, Ohio failed to have the desired affect on political participation (Rosenberg, 1992) but it was not based on e-mail which allows for interaction between people and their representatives. Instead, it simply provided for a limited number of electronic responses to political speeches.)

It is my opinion that probably the most plausible resolution of this matter is to recognize that, under some conditions, computing technology may weaken the solidarity of information society, while, under other conditions, it can contribute to strengthening social solidarity. What is needed is research documenting which affects of computing technology are associated with particular social structural variables.

Quantitative Micro-level Affects: Personal Productivity Measures.

Studies of “personal productivity measures” would include research on the number of tasks for which individuals and/or small groups use a computer in the accomplishment of the task, as well as the number of times the computer is used for said tasks. In 1981, Weizenbaum, citing another computer scientist, wrote:

For home use, [computers] have potential for catalogue shopping, activity planning, home library and education, and family health... family recreation, including music selection and games; career guidance; tax records and returns ... and budgeting and banking. (Weizenbaum, 1981:553)

This quotation suggests several questions for research on the ways in which individuals and/or families use their home computers today. For example, how many people purchase consumer products through a computerized shopping service? What types of products do they buy most often? least often? How many household members use “personal information management” software to organize their own or their family’s daily (weekly, monthly, yearly, etc.)

schedules? How many individuals use the computer to prepare and file their state and federal income tax returns? How many households keep track of their income and expenditures through a computer program? In a related vein, how many people do their banking and other financial transactions through a computer? These questions are a sampling of the possibilities by which individuals and families have come to replace earlier, non-electronic means of organizing their lives with computing technology.

An entire set of questions for research is suggested by the growing prevalence of the internet. How many computer users are connected to the internet? For those who are connected, how much time do they spend on a daily, weekly, monthly, or yearly basis communicating with others via the internet? browsing the World Wide Web? using ftp, gopher, or telnet to glean information from the internet? How many users regularly participate in newsgroups? “chat” rooms? bulletin boards? How many individuals have more than one internet connection (for example, an on-line service, such as CompuServe, and a local internet service provider) on their computers?

The essential concept underlying this category of analyses is that individual people and small groups can and do employ the technology of the computer as a tool enabling them to carry out more tasks more frequently and in more areas of their lives than was possible before the mass production, distribution, and utilization of the technology. Moreover, the tremendous interest in and growth of the internet demonstrates that they tend to use their computers to establish connections with others, albeit in different formats and for different purposes. It would be informative to devise a quantitative measure detailing exact patterns of computer utilization among individuals and households in the information society. This would be a measure of actual usage, not purchases of software, nor subscriptions to on-line services or other internet service providers. I have in mind a methodology by which a random sample of computer users would serve as a panel, analogous to the sample of television viewers whose program preferences are monitored by the A.C. Neilson Company. The procedure for such a study would follow these guidelines.

1) A device similar to the “people meter” through which the Neilson ratings are compiled would be attached to the computer(s) in a random sample of households.

2) The device would be activated every time the user boots up his/her computer and would record the following:

   a) the date and time when the computer is operative;

   b) the operating system in use during the session;
c) the application program(s) in use during the session, as well as the number of minutes each program is activated;

d) the internet connection(s) in use during the session, as well as the number of minutes each connection is active;

e) [For multitasking systems] the number and types of simultaneous applications and/or internet connections active during the session.

3) Provision would be made for recording certain demographic data about the sample of computer users--age, gender, income, occupation, race, etc.--which data could be correlated with the usage data.

The technology needed to implement such a plan exists and could be adapted for the purpose of gathering the relevant information. What is needed is financing and an institutional structure to carry out the project.


The “techno-social construction of reality” category is intended to include studies of the ways in which people come to rely on the computer to validate their “knowledge” of the world in which they live, as well as to justify their actions. From the perspective of the sociology of knowledge, we know that interaction with and feedback from others are integral components of the process by which people develop a body of knowledge or world-view. (See Berger and Luckmann [1966] and Stark [1991] for detailed explanations of this process and its consequences for human society and behavior.)

This is an ongoing process in which people create material and nonmaterial cultural products which become parts of “objective” reality and which are used to structure everyday interaction. Through socialization, these cultural products are passed on to and accepted by new members of society. The reality we know is thus created, sustained, and transformed through the give-and-take of organized social activity. If we apply this line of reasoning to the information society, it raises potentially interesting questions. How much of an individual’s understanding of the world is, if not directly gleaned from the computer, at least mediated by his/her dealings with the technology? Furthermore, if the individual receives contradictory information from the computer and other sources of behavioral cues (for example, other people or institutions), to which source does he/she accord greater weight in deciding on a response? Allow me to sketch two possible (hypothetical) scenarios to illustrate the issues raised here.

Scenario 1 involves a bank officer who must decide whether or not to give a small business loan to a 35 year old African-American male who would like to open a music store on the border of a minority neighborhood in a large city. The manager presents the relevant information to a committee of bank personnel for review and evaluation. The committee recommends that the manager not offer the loan to the applicant. At the same time, the manager enters the same relevant information into an expert system computer program. Its recommendation is that the manager should grant the loan to the applicant.

The second scenario concerns an undergraduate student at an eastern university who must write a term paper for an English course demonstrating that a number of short stories written under several different pen names are in fact the work of the same author. (Assume that the student has started this paper sufficiently early in the semester so that he/she is under no time constraints; also assume that his/her primary motivation is not to get a good grade, but to write a correct analysis.) The student can take either of two approaches to this project. He/she can content analyze each short story him/herself, noting the occurrence of the same or similar phrases, terminology, or other evidence of the author’s writing style and conclude, on the basis of his/her own examination, whether all of the stories were written by the same author. Or, he/she may enter the data into an artificial intelligence program designed to recognize word or grammatical patterns and base his/her decision as to the authorship on the results of the computer program.

These two scenarios are, admittedly, fictitious, but they are not completely out of the realm of possibility. (Indeed, readers of this paper may be familiar with comparable episodes.) In both cases, the individuals are in a position in which they face a choice as to whether to place greater confidence in their own or their colleagues’ judgment or in the output from computing technology. By virtue of placing the individuals in such a dilemma, these scenarios may be thought of as 1990s updates of Asch’s (1952) famous studies of group influence on individual judgments. For the bank manager, the advantage of trusting the human actors in this situation is that he/she can be assured of the social support they provide. For the student, there is the satisfaction of knowing that he/she was able to complete the project on his/her own. On the other hand, in both instances, the persons involved can point to computing technology as the basis for their behavior. Such an “explanation” not only rationalizes the chosen alternative, it also can be viewed as absolving the individuals of any responsibility for their conduct. Given the similarity between the nature of the subject matter here and in the Asch studies, it might be possible to set up small group experiments in which subjects would be placed in a setting where they would have to choose between a computer-generated recommendation for action and a contradictory one emanating from other group members (confederates of the experimenter).

We began this paper by presenting a heuristic two-by-two
table which could be used to organize studies of the impact of computing technology on society and social behavior. We noted its value as a device for generating hypotheses for further research in these areas. I have tried to demonstrate the utility of the framework in the preceding four sections. What remains to be done is the empirical research which can clarify our understanding of this most complex topic.

References


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Using Computers to Present Sociological Principles

by William Feigelman and Thomas Taylor, Nassau Community College, Garden City, New York.

Against the backdrop of the revolutionary changes in today’s computing technology, it is remarkable that instruction in undergraduate introduction to sociology courses has remained virtually unchanged from what it was 25 years ago. Most of today’s sociology students still start studying the discipline much as their parents did, aided by conventional textbooks, anthologies, and paperback monographs.

Today, many instructors feel that unless one has sufficient time, it may be best to leave computers out of the fundamentals courses, introducing them later on in the undergraduate program. Yet, we would maintain that the first social science course provides an excellent opportunity to introduce the use of computers to beginning students.

The present approach is based upon working with real social science data. It draws from the General Social Surveys, done by National Opinion Research Center, based on national probability samples of the U.S. adult population and offer publication-quality data for students to analyze.

The present approach is also based upon the popular data analysis software developed by MicroCase Corporation, known as the MicroCase Analysis System. This program is extremely straightforward and easy to use for beginning data analysts. With a minimum of keystrokes students generate easy-to-understand bar graphs, with accompanying descriptive statistical summary data. This software also provides clear cut crosstabulation analyses, making it possible to do two and three-way contingency tests almost instantaneously.

Campuses with ample personal computer resources offer the ideal situation for using this approach: but having a classroom with a computer for every student is not necessary for employing this approach. Instructors with a PC on a movable cart, a projection panel, and an overhead projector, will be able to demonstrate the software in their regular classrooms on one to three occasions. Once the instructor devotes several classes to teaching computer and software use, students should be able to work independently at their own home computers or at campus facilities. Then, students follow a set of workbook exercises in Hands On Sociology (NY: McGraw Hill, 1993).

The book leads them though sets of multiple-choice and essay questions which they answer while working at their computers running the MicroCase software. The various assignments correspond to topics ordinarily presented in Introductory Sociology textbooks: Culture, Socialization, Social Stratification, etc.

Then, the EZ-Quiz answering disk software is introduced, enabling students to log their answers to the groups of multiple-choice questions onto an electronic record. Later, after students complete their activities, instructors can quickly evaluate their work by reading students’ output disks (or campus network records) with an accompanying program. Many instructors who have attempted to use computers with their introductory students have found that reviewing students’ computer work is often a painstaking and laborious enterprise. Yet, with EZ-Quiz the instructor can see at a glance just how much students have learned from the available batteries of multiple-choice questions.

EZ-Quiz can also be easily reconfigured into a powerful review and self-study tool, offering students immediate answer feedback. Thus, EZ-Quiz can be adapted for two academic purposes: to administer computer-based multiple choice examinations or to enable instructors to readily create their own self-study tutorial exercises.

Data and Social Science Rhetoric: Policy and Instruction

by Kenneth P. Jameson', University of Utah

The 1996 American Economics Association Presidential address was given by health economist Victor Fuchs (1996) and frames the issue of this paper quite well.

After quoting a 1965 article by George Stigler that "the age of quantification is now full upon us" and that it will be "a scientific revolution of the very first magnitude" (p. 6), Fuchs goes on to note that the revolution is still in the future: "(b)ut the shallow and inconclusive debate over health policy in 1993-94 contradicts (Stigler's) expectation that this research would narrow the range of partisan disputes and make a significant contribution to the reconciliation of policy differences." (p. 6)

There are many other examples of contemporary social issues, and related policies, whose resolution seems immune to the insights claimed by social sciences: environmental disputes ranging from the northwest salmon to the Utah wilderness, welfare reform, in particular the treatment of teenage welfare mothers, or even the inheritability of intelligence with all of its racial and social darwinist implications. Does the continued intransigence of social issues and the stubborn intractability of social policy imply that all of the developments in data collection, data storage, and data analysis have come to naught, that the age of quantification is a bust and that the millennium should see social science move in a different direction? I don't draw that conclusion, though I accept the problem as quite real.

I believe that social science and empirical investigation can make important contributions to our understanding and to resolution of policy issues, but only if we are clear on the nature of social science and the role of quantification. In particular we must admit the limits of our truth claims, their communal nature, and the possibility of their being utilized to serve vested interests. We must then be very clear about our potential contribution and must educate our students and the public about what we can offer. Finally, I think that we must find ways of broadening access to our basic data and analyses in order to include a wider array of interests in the dialogue. Visualization techniques graphics-based policy simulations may be fruitful in this regard. If so, we social scientists and social science data managers will still be active participants in the issue/policy discussions and our data and analysis could have an even greater effect on those debates.

This view implies a very different set of challenges for social science data librarians and for social science data users, one which will be interesting and potentially quite helpful for social scientists as well as for social policy.

The Nature of Social Science: Rhetoric

Fuchs offers three possible explanations for the unsatisfactory state of affairs he describes: that health economists cannot agree among themselves, that the results were not disseminated adequately to influence policy, and that differences in values could not be bridged by empirical research. He developed a questionnaire to examine the issue and concluded that on "positive (i.e. logical positivist) issues," there is substantial agreement among health economists (seventy-two percent gave the same answer to seven of his questions). There is less (thirty-four percent) agreement on "policy-value" questions. So he concludes that value differences account for the irrelevance of economic analysis to the health care reform debate, though the inability to convince policy-makers about the "positive" results also contributed. (p. 15)

Fuchs settles comfortably into the mainstream understanding of what economists do and even quotes its central document, Milton Friedman's Essays in Positive Economics (1953). It is based on a distinction between positive or scientific statements by economists and normative or value-laden statements. That seventy-two percent of health economists agree with Fuchs on seven propositions is taken as evidence of the possibility of positive economics; Fuchs claims that this realm should be expanded to find those positive components of policy-value issues, i.e. that economists can solve social and policy issues in the degree that they can succeed in attaining positive scientific results.

There is a different and more satisfactory way of understanding the very real problem that Fuchs highlights. It starts again from a particular understanding of the nature of economic science, in this case that economics uses "rhetoric" to arrive at conclusions whose status and limitations can best be understood within that context. Let us examine this approach. In an important article in one of the central journals of the economics profession, D. McCloskey (1983) argued that economics is best understood as a form of argumentation or persuasion rather than the value-free scientific endeavor that logical positivists would have us believe. This effort does allow economists and other social scientists to "make knowledge," but it is a contingent knowledge which depends greatly on the operation of the scientific community of economists, the times, the biases or...
ideologies of researchers, the historical development and context of the issues, and the technical capacities of the scientists. Rorty(1987) describes this as "pragmatism" and suggests that the aspiration of scientists should be to find mechanisms to bring about "unforced agreement" among themselves, rather than to reach some objective Truth. Examination of the main economics journals indicates that McCloskey's perspective is gaining a very slow and gradual acceptance(Sims, 1996). However, this methodological perspective remains controversial (Maki,1995), and, for the most part, economists remain minimally introspective about their methodology.

When economics is viewed from the perspective of rhetoric, the shortcomings of the age of quantification are not surprising. Data-based empirical analysis is only one among many approaches to persuasion/knowledge. Indeed for Aristotle, data are "extrinsic" to making an argument, i.e. not an inherent part of the process. As Crowley(1994) notes:

Ancient philosophers seem to have had a clearer understanding of the limited usefulness of empirical facts than moderns do. Perhaps because of their skepticism about the nature of facts, ancient rhetoricians were equally skeptical about the persuasive potential of facts. Aristotle wrote that facts and testimony were not truly within the art of rhetoric...He considered extrinsic proofs to be outside of the art of rhetoric because a rhetor only had to pick them up and display them to an audience.(p. 6)

For the Greeks the intrinsic components of arguments were the proofs and the canons or principles. Proofs can be logical or "logos," pathetic (emotional) or "pathos," and ethical or "ethos," all of which can and do play a role in persuasion, even in economics. The canons prescribe how a persuasive argument is structured, its arrangement, style, delivery, and memory (or links with other pieces of shared knowledge)(Covino and Jolliffe,1995).

Making a convincing argument about a social issue or policy is very complex from this perspective. Data and quantitative analysis play a role, one which has certainly increased in importance since the nineteenth century. But many other elements enter into any research, influence what is accepted as true, and determine what is persuasive in policy. Indeed, much of McCloskey's original article is concerned with illustrating how metaphors, appeals to authority, analogies, etc. are immanent in good economic argument.

To understand how we might approach data and empirical analysis differently and enhance its role in arguments over social issues and policy, let me illustrate the claims that I am making with several specific cases.

Social Science Rhetoric Observed
I have chosen three case studies to illustrate different aspects of the claim that rhetoric best describes what we do in social science. One comes from "psychology" considered very broadly, one reports on a recent treatment of advances in macroeconomics and economic policy, and the final example is an overview of the debate on NAFTA (the North American Free Trade Agreement) and the role of economic analysis.

A. Social Darwinism in Modern Clothes
Darwin's evolutionary theory with its mechanism of natural selection provided a powerful metaphor for viewing society.4 It easily lent itself to categorizations of societies and of societal groups as superior and inferior. Herbert Spencer's "survival of the fittest" aphorism provided a handy shorthand for this supposed process and was the basis for "social darwinism," the belief that the elite of society had attained that status because of their evolutionary superiority.5 The development and application of the IQ test around the turn of the century provided a new quantitative measure which could be used to document the differences between the superior and the inferior, be it in terms of economics or race or gender. After this analysis was carried to its logical extreme, in the eugenics movement, all became aware that there were many confounding factors in the environment which could account for most of the variation across groups. Advances in social scientific knowledge combined with a realization of the potentially terrible implications of eugenics to discredit such simple stratifications. This seems an excellent case in which quantitative analysis resulted in reaching a truth, i.e. that individual variation has a strong biological basis, though most differences across broad groups are better explained by cultural and environmental factors.

However, the debate is newly joined, history is in the process of being repeated. Biology and evolution have once again become quite dynamic, and genetic determinism is being explored in every area of the individual, from the prevalence of cancer to aggression and criminal behavior to homosexuality. Evolutionary ecologists use the biological framework to examine the whole gamut of societal differences from children's food preferences to marriage behavior. And though biologists and evolutionary ecologists are careful to delimit their claims, it was inevitable that the new biology would spawn a return of social darwinism and of scientific racism. The latter had continued to exist in the backwaters of social science and in non-standard journals, and it received much more widespread consideration through its identification with Arthur Jensen of University of California and Richard Herrnstein of Harvard.

The more recent and more interesting case, from a social science perspective, is the social darwinist manifesto <begin underline> The Bell Curve. </end underline> (Murray and Herrnstein,1994) The argument is simple: that the demands of the modern economy and society require higher levels of cognition and, as a result, a cognitive elite has emerged.
Entry into the elite is largely determined by genetic inheritance of IQ (sixty percent roughly). While "social murrayism," i.e. "rule by the fittest," is not new, it is presented in a thoroughly modernist manner, i.e. with reams of data and statistics. Indeed the 552 pages of text are accompanied by over 100 pages of statistical appendices and tables of regressions and other tests, symbolic of "the quantitative age." At the same time the book illustrates the failure of that age. It was a best seller and reached a wide audience. It was widely reviewed, and, as noted by Gould (1994), most of the reviewers immediately disqualified themselves from assessing the quantitative claims of the book. It gained a great deal of credibility simply for its many pages of tables, for its quantitative argument. The very presence of tables became an important part of the book's rhetoric on the issue. And they disqualified many participants from the discussion because of their self-admitted inability to assess the quantitative basis for the argument.

Goldberger and Manski did examine the quantitative analysis, and they found that the authors' claims were not supported by the data and statistical analyses. They wrote: "(w)e conclude The Bell Curve. is driven by advocacy for HM's vision, not by serious empirical analysis. America may or may not be on the way towards a custodial state. Policy interventions may or may not be effective. We know no more after studying The Bell Curve. than we did before." (p. 775)

Although Herrnstein was a psychologist, the book can be seen as a political tract that has consciously and extensively adopted the quantitative rhetoric of social science, with notable success. In any case, the issues which the book focused on forced the American Psychological Association to issue a report of a task force on "Intelligence: Knowns and Unknowns" (Neisser, 1996) which followed an earlier statement of the American Association of Physical Anthropologists. These are reminiscent of anti-social darwinism/racism statements issued by the American Anthropological Association in 1938 and UNESCO in the 1950s (Degler, 1991, pp. 203-204). The APA report supports the work that has been done in measuring intelligence while at the same time noting its limitations. They conclude: "what is responsible for (group differences in test performance)? The fact is that we do not know. Various explanations have been proposed, but none is generally accepted." (Neisser, p. 94)

In any case this debate illustrates that one of the central issues that was posed in the 1880s—and seemingly solved through quantitative analysis—remains open to dispute. This is despite the incredible increase in availability of data and in technical sophistication of quantitative analysis. The advances of the Quantitative Age have not been successful in resolving the century old issue. If we are to reach any conclusions, we must bring to bear a much wider range of mechanisms for discourse, including ethos and pathos as well as the empirically based logos which is accepted as the substance of contemporary social science.

B. Modern Macroeconomics

Sims (1996) provides another excellent example, in this case from contemporary macroeconomics, which again illustrates the nature of economic discourse and the inability to reach agreement based solely upon logical positivist canons. His conclusions are quite different from my own, however.

Macroeconomics, the study of economic processes at the national level, is dominated today by a theoretical approach termed "new classical" economics. One of its founders, Robert Lucas, was honored with the Nobel Prize for Economics in 1995. There are two outstanding elements of new classical economics: it is consistently based on the reigning deductive economic theory of markets and maximization, and it allows little role for government policy in affecting the macro economy. The newest work in this genre deals with one of the remaining puzzles, the existence and explanation of business cycles. Its approach is to use "computational experiments," computations which are not based directly on empirical or econometric work. This is a departure from traditional quantitative approaches in economics, though it remains fundamentally quantitative. The Sims article is a critique of this approach and makes the case that normal empirical investigation of economic phenomena can lead to scientific progress.

His concerns have many parallels with Fuch's. The underlying question is why social science disciplines seem to be turning away from empirical investigation, moving toward anthropological ethnography on the one hand or toward non-empirical quantitative model solving and calibration on the other. He concludes that "the popularity of the critiques (of traditional empirical work) probably arises from the excesses of enthusiasts of statistical methods." (p. 109) The promises of empirical investigators have gone beyond what can be delivered, which contributes to the isolation of economists from policy debates. My conclusion is that we should be more careful of our claims, and we should realize that they are simply one input into the argument, the rhetoric, about significant economic and policy issues.

Sims's suggestion is quite different and diametrically opposed to Fuch's. He uses the metaphor of economic researchers as a priesthood or guild whose purpose is to perpetuate a given body of knowledge. (p. 107) That knowledge he terms "data reduction," his term for advances in natural science and for potential advances in social science. Traditional data managers and users will find support from Sims. He catalogues many advances in empirical macroeconomics gained by applying probability-based inference to the new class of dynamic, stochastic,
general equilibrium models which are at his frontier. This may be tempered by his suggestion that those who persist in "technically demanding forms of theorizing and data analysis" should spend less time criticizing and more time reading each other, i.e. should join their priesthoods and guilds together.

From my perspective, such a step would only reinforce the separation of economic researchers from economic policy discussions, the problem highlighted by Fuchs. And given the theme of this paper, that we need to find mechanisms to open up our discourse to a wider community, the direction that Sims suggests is inconsistent. From the standpoint of data managers and social science computing specialists, creating greater solidarity among guilds would simply extend and expand the isolation that troubled Fuchs. It would cause data to be further removed into the realm of a very narrow "discourse community" insulated from broader discussion and from participation in public policy debates.

C. The NAFTA Debate and Economic Analysis

The debate over the North American Free Trade Agreement was characterized by incongruous alliances, shifting alignments and deep divisions over the merits of the pact. Fast track authority was approved in response to fears of an unmanageable contest among special interests. NAFTA was approved by a narrow margin after supplemental agreements over labor and environmental issues were added and after last minute bargaining by the Clinton Administration. The debate was acrimonious and often gave way to polemics. Orme (1993:2) has argued that the debate was not about the agreement itself but was instead about "competing domestic political agendas and irreconcilable world views." However, most of the debate was not conducted in these terms. Combatants presented their arguments as scientific facts, based upon sophisticated empirical analysis, above reproach and self-explanatory to all who would honestly examine them. A series of articles appeared from both sides whose objective was to dispel the myths and fallacies of opponents. (Orme 1993) Opposition was equated with faulty thinking, incomplete reasoning or plain stubbornness. Particularly divisive was the debate over the employment and wage effects of the NAFTA.

Economists entered this debate in an unprecedented manner and seemed to be integral to the debate in contrast with the health care debate. Seemingly, every position required an economic model churning out specific supporting numbers. The model of choice during the debate became the computable general equilibrium (CGE) model. Its highly mathematical nature tended to recast the debate in terms of who had the best numbers rather than addressing the multifaceted divide separating opposing viewpoints. In Congressional Hearings, little mention was made of the various structural considerations within the models nor was attention given to the implications of various assumptions.

Instead, numbers of jobs to be lost or gained were quoted back and forth. Because of the lack of transparency of CGE modeling, the policy discourse tended to focus on the sheer volume of studies supporting a particular position, or on the source of the studies.

As the debate reached its finale, ideas and observations seemed to subside in favor of an endless numbers game. Various models generated the number of jobs which would be lost and the number of jobs which would be created under the proposed agreement. Wild variations existed between the most optimistic and the most pessimistic projections. The Clinton Administration eventually settled on a figure of 200,000 job gains. Almost all of the modelers advocated or opposed NAFTA. There was little discussion of the possibility that an agreement could have positive impacts under certain conditions, with negative effects in other circumstances; the collapse of the peso showed this to be a major failing. The debate, then, was over whose numbers were better and which study was more scientific and impartial. Indeed, discussions of the jobs issue often incorporated phrases such as "every reputable study" and "a distinguished economist."

A Joint Economic Committee report recently concluded, "The predictions of the studies [of the effect on jobs of NAFTA] are widely contradictory and the utility of the studies in reaching policy conclusions on NAFTA is extremely limited." (Glenn, 1993, p. 1) The arguments based on CGE models tended to obscure rather than illuminate the policy debate. Their complexity and sensitivity to specification tended to focus arguments on the quality of the model, rather than on its policy significance.

The most advanced CGE and econometric models represent the state of the art in terms of internal consistency and mathematical elegance. However, these models contain a huge number of equations and entail many hidden assumptions about unknown parameters: elasticities of supply and demand, cross-elasticities of demand, substitution rates between capital and labor, expenditure functions, and so forth. The solutions require high-powered mathematical algorithms. Often the results look as if they came from a classic black box: only the authors of the models, and perhaps a few other scholars, understand all the ingredients (Hufbauer and Schott 1992, p.51).

Economists were central to debate over NAFTA, however the debate was cast in terms of these highly mathematical models. This effectively limited discussion within policy circles to the results of these models, with legislators quoting numbers back and forth amongst themselves. The result was a debate filled with studies and statistics, all of which seemed to add little to effective communication. Further evidence of the limits on the role of economic analysis was the 51-49 vote for NAFTA despite the heavy weight of
economists and their studies on the pro-NAFTA side of the debate.

So NAFTA provides a third example of the inadequacy of empirical analysis for resolving public policy debates. In this case the most advanced and sophisticated approaches to economic analysis were marshaled for the debate. The end result of the effort was a complete analytical stalemate, with the resolution of the issue depending upon politicians' commitment rather than the persuasiveness of economic analysis. Indeed the widely varying projections and the clearly interested participation of economists was probably counterproductive.

What conclusions can be drawn from these three experiences? And what direction might we go as economists, as social scientists, as data managers and data users, to change the manner in which we enter the public policy debates and the manner in which we teach social science?

What Lessons for Instruction?
McCloskey's original article advocated the rhetorical stance because economists would write better, teach better, have better relations with other disciplines, make better arguments, and have better dispositions--quite the promise! (1983, pp.512-515) It is not clear that increasing use of rhetoric has not changed the discipline, i.e. there is no evidence that economists have become more even tempered in the last thirteen years. Nonetheless, McCloskey's claim about teaching should be taken seriously. He argues that:

"economics is badly taught, not because its teachers are stupid, but because they often do not recognize the tactitness of economic knowledge, and therefore teach by axiom and proof instead of by problem-solving and practice...It is frustrating for students to be told that economics is not primarily a matter of memorizing formulas, but a matter of feeling the applicability of arguments, of seeing analogies between one application and a superficially different one, of knowing when to reason verbally and when mathematically, of what implicit characterization of the world is most useful for correct economics."

(p. 507)

This perspective has very important implications for instruction and, implicitly, for democracy as well. The key to defining the difference is that rhetoric as an approach to knowledge is based upon persuasion, is based upon discourse, and strives to reach "unforced agreement." Thus to teach a discipline requires more than simply amassing a set of axioms, proofs and facts that are then transmitted and embodied in explicit knowledge of the students. It requires engagement and active knowledge-making on the part of students.

The difference from traditional teaching is seen quite clearly in instruction in social science. If there are few truths to be transmitted, students must be empowered to become actively involved in investigating issues and in reaching the level of agreement that they can. Of course the best results and the best techniques of social science should be used, and the best and most extensive sources of data should be brought to bear. But all of the most sophisticated approaches available must be combined with the broader issues of persuasion, with the compelling metaphor, with the ethical stance of the argument and those making the argument.

This makes a very different challenge out of teaching and forces a reworking of the goal of the educational process. The process is likely to involve much more collaboration among students and many more efforts to transmit tacit knowledge of a discipline. Students must first be convinced to become involved in the discourse, in the effort to "make knowledge." While they will not reach an irrefutable truth, they can gain greater knowledge about issues, using data and other extrinsic proofs, and they can then defend a position and contribute to reaching some better resolution of the issues involved. When they have a stake in the outcome, their attention to the data and the techniques increases.

Teaching based upon rhetoric also may alter the definition of the task of the data manager, the data librarian. The challenge of finding information, finding data, and knowing the methods with which to peruse the data remain. But the challenge now is to enable student interaction with the data, student research or investigation or knowledge-making. And the data can only be part of the argument. So active access to and interaction with the quantitative element of economic discourse becomes the goal, and learning is facilitated to the extent that is achieved. The new technologies are challenging the very meaning of data, for the usual organizational categories agreed upon through the Library of Congress are becoming virtually irrelevant. The new organization is keywords and thesaurus based, implying that students can create their own organization of data and redefine it in that fashion. Of course the meaning of thesaurus comes into play here, i.e. storehouse or treasury. One of our social science librarians had her students do a search using a new web based search engine, and each student returned over 500,000 references for the term selected. How can they organize that data?

What Lessons for Public Policy?

The policy problem is more complex. Very rarely can a policy be advocated without support of a social science analysis. Even the Utah State Legislature attempts to base its parochial attempts to return to an earlier age upon social science analysis, albeit research which is used in a way opposite its author's intent. (Wilson, 1996) And there are now mechanisms in place which allow each side to have its own analysts, e.g. the whole industry of think tanks in Washington and in state capitals who collaborate with and often serve legislators and even lobbyists. In this regard
policy analysis has come to resemble forensic testimony more than science. From a logical positivist standpoint, this would be a very unsatisfactory state of affairs; truth should not depend on the discourse framework. From a rhetorical perspective, however, this is understandable and speaks to the importance of social science. At least each position does have to have a justification that can be understood in terms of social science. This is to the good and a testimony to the importance of social science analysis. That opposing viewpoints can have their defenders often simply reflects the partial and contingent nature of social science knowledge, though at times disputes may represent an abuse of knowledge and research. However, the inability of social science to give definitive conclusions may contribute to cynicism about the process and to dismissal of social science as a contributor to the debate. So in the long run, this situation may turn unfavorable to the social sciences.

In summary, the use of data and social science analysis in instruction and in policy illustrates both the positive and the negative of current approaches to social science. In the case of instruction, adoption of a rhetorical understanding is indeed likely to improve instruction and to give to students, particularly undergraduate students, a better sense for how social science relates to their lives. In the case of policy, the opposite trajectory seems to be underway. While we can understand why all sides have their experts, in the long run social science may be sullied and will have much less importance in policy debates.

How might social science and data (quantitative analysis) be used more effectively in policy debates?

What Avenues Are Open?

I believe that the combination of "rhetoric" and the new technologies opens up new avenues of linking social science approaches with policy issues. The task is to make our approach and analysis more accessible to wider groups of persons. How can this be done? We are beginning the attempt to use "visual rhetoric," i.e. to present the analyses in visual terms rather than in our more common statistical terms. This approach of visualization is becoming more accepted and used in science. There are major projects at NCSA and Argonne in Illinois and at Cornell. The former are termed "CAVES" and combine three dimension projection of audio and video with high performance computing power. They have produced a number of simulations of complex processes in visual form, e.g. the cooling of molten metal running down an inclined plane. To my knowledge they have not simulated economic or social science processes, though Cornell does talk of Sociological problems.

We are experimenting with different display devices for exhibiting data and for allowing the viewer to maneuver through the data to investigate relations that may appear. This is a very inductive approach which we hope may broaden access to data and data interpretation. We will see if the conclusions drawn differ from those the statistical procedures had indicated. As you can see there is no need for knowledge of sophisticated statistical techniques, that anyone with visual acumen could examine the information and search for patterns.

The second approach that we will be using is development of simulations of social science phenomena, e.g. the role of education in expected incomes and health outcomes of children in Utah. Here we hope to put in sets of transitional probabilities and allow the observers to change the amounts of education and see the differing outcomes for categories of children, based upon previously calculated statistical relations. This draws much more upon the deductive framework used in economics. It should allow a much broader range of participants into the discourse and open up active interaction with the issues and the underlying analysis. We hope that this could be a useful input into public policy discussions and could even guide some decisions.

While this work is only in its beginning phases, there is evidence that the impact of "visual rhetoric" can be substantial. What is needed now is its application to closing the breach between social science and the social policy by broadening access of the public to the results of social science analysis.

Finally, this effort may provide a new role for the data librarian and the data analyst, one which places emphasis on the interaction with data as much as with its location and access. For to the extent that the information can be presented visually it should allow much wider access to the data and to the possibility of its interpretation, and therefore it should broaden the range of persons who can be included in the discourse on a particular issue. Whether this will result in a partial response to the query of Victor Fuchs and will allow better use and more influence of economic analysis remains to be seen. And whether policy will be better made, is yet another question that is far from being answered.

References


Endnotes


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My thanks to David Plante for his assistance, and to the members of the "Rhetoric in the Disciplines Study Group" at the University of Utah for continuing stimulation and support, especially to Chris Oravec, Susan Miller and Mary Reddick.

2. The earliest controversy I worked on was the safety and desirability of nuclear power. We organized a multidisciplinary team to examine its various dimensions, work which resulted in a book (Sayre, 1978) The subsequent decimation of that industry indicates that we had a better sense of the complexity of the issue than the firms involved in the industry at that time.

3. There are no criteria for differentiating "positive" statements from "policy-value" statements. Indeed, there often seems little distinction, aside from the level of agreement among the economists.

4. Purcell(1973) convincingly traces the late nineteenth creation of modern social science and our social science disciplines to the intellectual ferment created by Darwinian's evolutionary theories.

5. Karl Degler(1993) provides an excellent history of social darwinism and its demise, and then the recent resurgence of biology which again opened the door to social darwinism.

6. Purcell's(1973) treatment of the relation of democracy and social science in the early twentieth century is an excellent point of reference on this important issue.

7. One current case in point comes out of "medical science," which used the statistical experimental techniques also used in social science. A drug test of "bio-equivalence" of four thyroid drugs was suppressed by the contracting company which apparently did not like the results and therefore raised a series of objections. (Wall Street Journal, April 25, 1996)

8. There are a number of Internet Web sites related to this issue. Much of the external information for this section was taken from them.
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