



## Use of Computer in Social Science Research

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### ABSTRACT

*This paper is intended for anyone who is curious about how computer resources enhance the practice of social research. Comprehensive treatments of different computer applications make this paper an extensive resource of practice for social scientists. Based on contents explained in this paper any researcher can easily understand the potential role of computer in any area of research.*

**Keywords : CATI, SPSS, SAS and Atlas.ti**

### Introduction:

One of the major debates in education today concerns how to prepare students for a society that is increasingly computerized. According to John V. Lombardi[6], Professor of History, Louisiana State University, Baton Rouge, computer literacy means 'the ability to recognize problems for which the computer may be a useful part of the solution'.

During the past 25 years many new computer capabilities have transformed the practice of social and behavioral research. Computers continue to be drawn into every facet of social research, including such unlikely tasks as textual analysis and field note-taking, which were totally untouched by computers only a few years ago. In order to harness the power of the new technology every social scientist needs the skills, understanding and attitudes to:

1. Evaluate the appropriateness of specific applications of computers.
2. Select and use computer programs as needed.
3. Find and read technical information in order to make wise consumer decisions for home or workplace.
4. Evaluate the validity of computer-produced output.
5. Communicate with computer programmers and other computer specialists as needed.
6. Be aware of the long-term social consequences of the computer for individuals and societies.

Each of these requirements can be translated into specific learning objectives and used as guidelines for learning activities and programs.

The classification of computer applications in the social science research is summarized as below

1. Introduction and Symbolic Representation of Social Data
2. Searching and Synthesizing the Literature
3. Simulating, Modeling and Planning
4. Managing Data
5. Analyzing Quantitative Data
6. Analyzing Qualitative (textual) data
7. Graphing
8. Writing and Rewriting

### 1. Introduction and Symbolic Representation of Social Data:

One important theoretical task that can be computer-facilitated is the logical exploration of axioms, which sometimes uncovers hidden implications in one's assumption. Before engaging in such an exercise, one should give intensive attention to the symbols explicitly or implicitly embedded within

one's theory. The Science of computer management of information has yielded some concepts and procedures that can greatly improve the refinement of social science constructs and make it more possible to test theoretical notions with collectable data.

### 2. Searching and Synthesizing the Literature:

Social Scientists have pioneered work on computer methods for bibliographic retrieval, as evidenced by Janda's[1] (1968) book Information retrieval. During the past two decades, this area has become part of the field of information science. While a decade ago individual students and researchers had to use a library or similar institution to gain access to bibliographic data files, now they can obtain such services from their home or office using computer.

### 3. Simulating, Modeling and Planning:

Models, simulations, and projections are primarily used to extend theory. They do so through refinement of the theory itself, by applying it to empirical data or by illustrating elements of the theory for instructional purposes. During the past two decades, Computer simulation models were developed in such diverse areas as cognitive psychology, Economics, Political behaviors. Over the past few years, much of the work in computer simulation for the social sciences has shifted from theory development to either policy analysis or instructional methods.

Projection methodology, especially in demography and population analysis, depends heavily upon computer programs. The wide availability of spreadsheet oriented software and graphics has made projection techniques more widely available to social researchers. Because computer simulation models generally have numerous constraints as well as strengths, social researchers must exercise considerable caution and restraint in their applications.

### 4. Managing Data:

Data Management is central to social science research. There are several distinct areas within the overall flow of the research tasks where data management is especially critical. One of these areas is data collection. A number of computer-related strategies, most notably computer-assisted telephone interviewing (CATI), have become common in social research. Other tasks depending heavily upon data management systems include the edition or cleaning of data and the preparation of data for analysis.

Many software packages claiming to perform data filing or data management can be purchased, but many will not do

exactly what a social researcher requires. Consequently, one must develop a sufficient understanding of database concepts such as relational and records so as select and use only those tools which are truly helpful.

### 5. Analyzing Quantitative Data:

The statistical analysis of data has been dramatically affected by computers. In fact, the impact has been so great that it is difficult to imagine performing an adequate statistical analysis without the use of computers. Statistical analysis continues to be one of the most active areas of continuing change and development. Statistical packages are expanding to address more of the tasks of data manipulation, storage, and presentation. The look and feel of such programs is becoming more sophisticated with greater possibilities for interaction, impressive graphic displays, and the beginnings of machine intelligence. The future of this area promises to be as auspicious as it's past.

Number of statistical packages like Statistical package for the Social Sciences(SPSS), the Statistical Analysis System (SAS), Microsoft Excel , Minitab, Systat, and many other statistical analysis packages were conceived, created, refined and distributed wide in the social research community.

### 6. Analyzing Qualitative (textual) data:

There are at least three important approaches to the analysis of textual data. They flow from very different traditions, treat the data differently, and address distinct analysis issues. These approaches are content analysis, computerized qualitative analysis and natural language understanding. The content analysis has the longest tradition of the three approaches and has both quantitative and qualitative elements. Many of computer oriented qualitative analysis techniques resemble content analytic procedures. Qualitative analysis and content analysis are evolving toward greater similarity, and some have suggested they may provide a basis for an eventual rapprochement between quantitative and qualitative research traditions within sociology. Language understanding is still relatively new and is directly related to the artificial intelligence approaches.

Computer programs for content analysis provide assistance in one or more of the following tasks: classifying words into semantic families; counting the occurrence of words and word families; and coding segments of text, such as sentences or paragraphs. Recent computer-assisted projects include the scoring of answers to questions in psychiatric interviews, the coding of open-ended answers in public opinion polling, the categorization of descriptions of how people spend their time, and the characterization of printed news and similar forms of the mass media. Qualitative analysis relies heavily on the analysis of text, but not all textual analysis is strictly qualitative.

Some of the work in content analysis is highly quantitative. The analysis of text is generally quite different from numeric or statistical analysis and must be considered separately. Textual analysis often addresses different conceptual issues, generally requires more complex data files, requires more complex procedures for mapping text into a meaningful computer representation than are typically required for numbers, and , when used in qualitative research, relies upon simultaneous rather than sequential data collection and analysis. Atlas.ti is widely used software to analyse the qualitative data.

### 6.1 Encoding Text for Machine Reading:

A major task which has limited the use of text-based approaches in the past has been the initial encoding of text in machine-readable form for analysis. This is still a bottleneck,

but a few, because many kinds of text are routinely available already in machine-readable form.

Content analysis programs typically are capable of generating a variety of analyses of text. Word frequency lists can be generated that rank words by their frequency of occurrence and report their frequency; they are capable of ignoring common words such as "is" and " the" .etc. However, word-oriented analyses are limited as tools for social scientists. In many cases the researcher is concerned with examining a broader theoretical construct such as achievement imagery or traditional, practical, emotional, and intellectual contexts. To perform such an analysis, researchers categorize synonyms and phrases as well as single words into the content categories and explicit rules for assigning words to categories.

### 6.2 Organization:

We begin by identifying important steps in the creation and analysis of qualitative field notes and the special concerns of the qualitative researcher that constrain that process. Then we examine three methods for applying computers to qualitative research through the use of word processors, database managers, and artificial intelligence.

### 6.3 The creation and analysis of Field Notes:

Quantitative research is typically characterized by a single pass through cycle of research and is oriented to a relatively stable theoretical framework that forms the basis of an initial design, the collection of data, and analysis of those data to prove or disprove the hypotheses. Such research is marked by a steady progression from one task to the next in a rigid prescribed sequence.

### 6.4 Recording:

Recording of data for future reference often relies upon hand written notes that must later be typed. Many affluent researchers use tape recorders, video equipments, or electronic coding equipments. However, such equipment is usually reserved for quantitative systematic observation.

### 7. Graphing:

The methodology called computer graphics refers to the development of drawings, charts and other displays that convey one or more message. Many social science researchers have come to rely on computer graphics systems to produce maps, charts summarizing statistical data, and network diagram.

The two major types of graphics software are called presentation graphics packages and graphics editors. Presentation graphics programs are those allowing the users to display data in a variety of optional forms such as bar graphs, line charts, pie charts, and scatter diagrams. Users save a great deal of time by not having to write a program that instructs the computer to draw every line a specific way; however , the main trade-off is the inflexibility of the presentation graphics package, making it impossible to produce a graph exactly the way researcher needs it each time. Graphics editors compromise between canned presentation graphics programs and special purpose drawing programs with options that make graphs easy to assemble and save a wide variety of visual images.

### 8. Writing and Rewriting:

Writing is at the same time a social process, a cognitive process, and a physical process. Work processing software, and supplementary programs such as spelling-checkers, outlining packages, data management systems, and indexing programs, greatly extend the human ability to compose ideas and images with the written work. Yet switching from written work to computer package may not uniformly improve one's writing productivity.

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