Inflation: an OPAC interface for social scientists

Inflation : an OPAC interface for social scientists

by

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Abstract

The matching of user's vocabulary with library terminology has always been a problem for libraries and information centres. Various methods have been devised to improve it but it has continued with the automation of libraries and the advent of OPACs. Many approaches to improve the results of OPAC subject searches have been suggested. The development of a novel user-friendly interface to a database is one of them.

In the present study a new user-friendly interface using HyperCard on Apple Macintosh is designed, keeping in view the information requirements of users of social science literature. A sample database of monographs (with table of contents for enhancing the subject content of records to improve retrieval performance) and articles published in journals on 'inflation' has been created and linked with an interface. The interface has been evaluated by end users and findings are discussed.

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CHAPTER ONE

Introduction

Information is a powerful instrument. Its retrieval is very important in the present day world of information technology. As computers in libraries are becoming more powerful, and as more textual material becomes available electronically, the search scenario is changing in libraries and the information environment. Previously, information specialists conducted electronic searches using online databases. Today the technology is available for end users to interact directly with computers to locate information.

1.1 Problem statement

Online Public Access Catalogues (OPACs) are now in widespread use and in many libraries they offer the primary access points for material. But end users of online catalogues have realised that these OPACs are not always user-friendly and are sometimes difficult to use. Novice users especially may find it difficult to use these OPACs.

OPAC research studies have revealed a number of common problems experienced by users. Some major problems are : too many failed searches (searches that result in no items retrieved or that result in an unmanageable number of items retrieved), confusion during the search process, lack of familiarity with controlled vocabulary used for subject access in OPACs and unfamiliarity with different approaches of retrieval and search methods employed in today's online

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catalogues. Most OPACs provide keyword searching facilities with the use of Boolean operators. Boolean operators have their own limitations. Effective Boolean query formulation is not a simple task, and it requires some training and understanding of the operators and their effects. End users of OPACs seldom receive such training. A review of research on online catalogues (Borgman 1986) points out that even the brightest college students often encounter difficulties in using relatively straightforward retrieval systems such as OPACs. Their difficulties increase as the retrieval task grows more complex. Some OPACs provide automatic Boolean facilities. In some systems the OPAC adds 'and' between two terms.

A major problem of these OPACs is subject access or lack of effective subject information. One reason for this can be the format of OPAC records. Records in most OPAC databases lack details of the contents of the monographs. Provision of tables of contents with bibliographical data will help users in finding their appropriate topics. It can improve retrieval performance.

On the basis of various studies (Markey 1984; Frost 1987) two basic problems of subject access in OPACs have been found. These two problems are :

Search failure

Information overload

Many approaches to improve the results of OPAC subject searches have been suggested. These will be discussed in later chapters. Two of these options are, better user training and greater system support.

The first approach, user training, tries to relieve the burden on the user of learning the Library of Congress List of Subject Headings (LCSH) and the use of Boolean operators. The second option requires an enhanced system capable of offering guidance. The present study is based on the second approach i.e. better system support . Based on this approach subject access in online catalogues can be enhanced by :

a)   Addition of new access points; and

b)   by designing a more user-friendly interface

1.2 Research objectives

The purpose of this study is to design a novel user interface for social scientists, based on user models, by using HyperCard on the Apple Macintosh. It is hoped to provide easier access for end users to the database.

1.3 Methodology

Economics, being a major social science discipline, is chosen as the subject through which discussion of this approach is undertaken. As the study is limited , an aspect of economics, i.e. 'inflation' (which is at present a burning question internationally), has been taken as a subject for the interface development.   An Apple Macintosh PC and its software HyperCard have been used for the study. This combination of hardware and software offers several desirable features. The direct manipulation capabilities of the Macintosh allow the user to choose actions and objects without knowledge of commands and syntax. HyperCard's card concept is very popular in the library and bibliographical environment and

HyperCard has become a standard authoring tool for many kinds of Macintosh applications.

Based on windows, menus, icons and mouse pointer a user-friendly interface has been developed. The information requirements of social scientists are kept under consideration while developing the said interface. The design is based on the personal experience of the author in handling user queries in a major social science library in India and on some other studies on the information needs of social scientists undertaken in the U.K. A database of about one hundred records on inflation including books and articles from journals has been created. The records of the monographs in the database contain tables of contents with bibliographical data which provide additional access points to the database. A user-friendly navigation system in the database is provided. The interface is evaluated and on the basis of evaluation, the findings are discussed in the later chapters.

1.4 Thesis organisation

The study has been split into five chapters. Chapter two deals with current developments in subject access. The problems encountered by end users while conducting subject searches in OPACs are studied and some of the methods that have been proposed to enhance subject access in OPACs are discussed.

The information requirements of social scientists are studied in chapter three. The two important studies, undertaken in the U.K. namely INFROSS and Information Needs of Social Scientists, by Margaret Slater are reviewed. Their findings

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have been used as a user model for designing the interface.

The interface for social scientists is described in the fourth chapter. Data on the subject was collected, and a database created and linked with the interface to make a complete information retrieval system.

The interface was evaluated by a small group of end users, and the findings of the evaluation are discussed and conclusions are drawn in chapter five.

Three appendixes are added at the end of the thesis. Appendix A is the questionnaire used for the evaluation of the interface. Appendix B consists of the various access screens of the interface. Appendix C gives all the records in the database developed for the system.

CHAPTER TWO

Current developments in subject access

2.1 Introduction

The matching of users vocabulary with library terminology and efforts to improve this has been a problem of libraries and information centres from the very beginning. During the past years the entire approach to information processing and handling has undergone drastic changes due to automation. Trends in education, communication, business and industry demand improved efficiency in access to information. During the past ten years serious attention has been directed to the problems of providing subject access.

A library catalogue usually provides an inventory of the items a library contains and how to gain access to it. But finding books by subject in large libraries is a difficult task. Since users seldom think of their topic in terms of library subject headings, they encounter problems in finding matches, between their terminology and that of the catalogue.

2.2 Problems in subject access in the card catalogue

Subject access is one of the important problems of both card catalogues and OPACs. Before the advent of the online catalogue in most of libraries, subject access to books followed standard library practice, through subject headings listed in Library of Congress Subject Headings (LCSH) and used in the subject card catalogue. Some other tools like Sear's List of Subject Headings and various schemes of knowledge

classification were also used by the libraries. But matching with user's natural language was not easy.

Cataloguers assign subject headings to fit the book as a whole and leave many informative portions in obscurity.

Cataloguers vary considerably in the way they assign headings and even the same person may not always use the same terms when indexing several similar documents. As a result, any topic can be represented by a variety of headings.

The construction of headings (subdivided, inverted, or phrase) sometimes does not seem to follow a logical pattern. In some cases a geographical area is added last and in other cases it is added first e. g. India- Population and Education-India, Public expenditure is represented as Expenditure, Public etc.

2.3 OPACs

As card catalogues have grown in age, size and complexity they have placed increasing demands of time, costs and space on libraries and their staff. Because of all these problems many libraries have converted their traditional card catalogues and have adopted in their place computer based information system to serve their users.

These online information systems go under a variety of names. They have been called "Online Public Access Catalogues" (or OPACs), "Online Library Catalogues", (OLC), or simply "Online Catalogues". Some libraries use the term "Library Information Systems".

Most of the online catalogues developed in the late 1970's and early 1980's were produced by individual libraries and lacking common standards. A "survey of online systems in US academic libraries" conducted in 1985 in USA (Camp *et al.* 1987) found that only about 12% of the libraries had a computerised catalogue system. 65% had plans to acquire them within the next five years. The goal for most early OPACs was simply to provide the full bibliographical information and access points (author, title and subject) available in card catalogues. Goals for later developed systems include the possibility to provide some "new" methods of access, like keyword searching, and Boolean operators.

2.4 Subject access in OPACs

2.4.1 First-generation OPACs

First-generation OPACs were derived from circulation or cataloguing systems such as Geac (developed in Canada but widely found in Europe and the USA), WLN (Washington Library Network, now the Western Library Network, in the USA) etc. They were primarily designed for staff at the circulation desk or for cataloguers. Subject access in the first generation online catalogues required that the user specify at least the leading portion of a complete subject heading, using the correct spellings and word order for headings, which because of their complexity frequently leads to search failure.

2.4.2 Second-generation OPACs

Second-generation OPACs borrowed the information retrieval (IR) characteristics of other well established online retrieval

systems, such as DIALOG, BRS. In second-generation OPACs both keyword indexes and complete field indexes are provided, and searching combines simple matching with Boolean operators between multiple keys and fields. Keyword Boolean searching removes the burden of exact specification of headings, and can thus improve recall, when compared to simple matching.

The important characteristic of second -generation OPACs is their word searching capability (or post-coordinated searching of keywords). They increase the number of access points because every single word of a bibliographical record is accessible.

2.4.3 Beyond the Second-Generation

It can be seen from the above description that first-generation systems were library oriented and the second generation systems were oriented towards online bibliographic systems. These two approaches are now merging. In the words of Hildreth :

"Today's second-generation online catalogs represent a marriage of the library catalog and conventional online information retrieval (IR) systems familiar to librarians who search online abstracting and indexing databases via DIALOG, BRS, DATASTAR, MEDLINE, etc. Improved card catalog like 'main entry' searching and browsing by heading capabilities have been joined with the conventional IR keyword and Boolean searching approaches". (Hildreth 1989, p.7).

2.5 Problems of subject access in OPACs

The primary problem of these OPACs is subject access or lack of effective subject access. Various surveys have been conducted on subject access in OPACs. Some of the observation by Matthews *et al.* (1983) are :

1. Subject or topical searches accounted for up to 59% of searching.

2. Subject searches were most likely to prove problematic to users among all search types with 43% reporting difficulty in formulating a subject search.

3. Enhancements to subject and topical searching were the most desired additions to the capabilities of existing online catalogues, with 45% desiring the ability to see words related to their search terms and 42% desiring additional access points (the ability to view the index or table of contents of a book).

Larson (1991) has summarised the major problems with subject searching in OPACs as follows:

1. Users have little knowledge of Library of Congress subject headings, and often fail in subject searching due to this lack of knowledge.

2. Users often have problems with the mechanical and

conceptual aspects of query formulation, including misspelling and lack of understanding of Boolean operations.

3. Successful subject searches often retrieve too much material to evaluate (information overload), and the user often does not know how to, or does not try to refine the search.

4. Subject searches that succeed in retrieving bibliographic records and avoid information overload, may still fail to meet the needs of the user because of problems in specificity or an inappropriate choice of search terms.

On the basis of the various studies, two basic problems of subject access in OPACs have been found. They have been reported by many researchers.

The two major problems in subject access in OPACs are :
1. Search failure
2. Information overload

2.5.1 Search failure (Subject search problems)

Search failure in most OPAC studies is usually defined as a search that retrieves no matching bibliographic records or headings. Most users have problems in predicting a correct heading for subject searching.

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2.5.1.1 Query formulation:

In a subject search, the user must translate their information needs into a form that may be acted upon by the OPAC system, to obtain desired information. This process is usually referred to as query formulation. Users convey their ideas about their information need into some specific statement. The OPAC, in return, must return to the user the bibliographic information corresponding to (or matching) the user's query statement in a usable form.

Many studies of subject access in card catalogues and OPACs reported that catalogue users do not do a very good job of predicting what terms will be used to index a particular item. Markey (1984) suggested that the majority of OPAC users attempt to use "whatever popped into the searcher's mind" for their subject query. (Markey 1984, p.70).

In some cases (over 20%) (Markey 1984), the user may achieve a particular match with LCSH, the controlled vocabulary of most online catalogue systems. Most of the users are not even familiar with LC subject headings and other classification and indexing techniques. Besides phrase-heading searching, OPACs provide keyword searching, through which the user's requirements are partially fulfilled.

Lipetz and Paulson (1987) studied the changes in catalogue use during the introduction of new subject searching capabilities at the New York State Library and observed that search failure decreased to some extent, when keyword subject searching was introduced. But this keyword search leads to another

subject access problem which is called "Information Overload".

2.5.2 Information overload (Subject search problems)

With the growth of a collection, and expansion of a library, the OPAC database grows. Increasing numbers of bibliographical records will match the user's subject search. When the system is keyword based, the rate of increase is rapid. Use of system features, such as truncation and Boolean "OR" operators, also increase the number of records that match a given search. Users are faced with a large number of matching records. Too much information creates a problem of evaluation. This problem is called information overload.

Wiberley and Daugherty (1988) suggested that most users are satisfied by looking at less then 35 retrieved records. Similar findings have been reported by other researchers.

2.6 Subject searching and experienced users

User experience with OPACs has the effect of reducing the amount of subject searching carried out by the user. According to Blazek and Bilal (1988), about 75% of the search problems of the users who approached reference desk, were related to subject searching, but that users with greater experience had far fewer problems relating to subject access.

2.7 Enhanced subject access in OPACs

Larson (1991) has proposed enhancements for OPAC subject searching.

2.7.1 Database layer

The OPAC database provides the information to meet the objectives of a catalogue. Most of the catalogues derive this information from Machine Readable Catalogue (MARC) format records. In these MARC records, in the area of subject cataloguing or indexing, the problem of inconsistency is very common. In the USA, LCSH and MESH (Medical Subject Headings) are used for subject headings. In U.K. and Canada PRECIS (Preserved context Indexing system) has been used to provide subject headings for machine readable records. Classification schemes like Dewey Decimal Classification (DDC), Universal Decimal Classification (UDC) and Library of Congress Classification (LCC) are also used in MARC bibliographic records.

Subject access in OPACs can also be improved by providing additional access points to the catalogue records.

Mandel (1985) suggested that there are three types of subject information in MARC records. These are :

    a)   Classification

    b)   Subject Headings from a controlled vocabulary, and

    c)   Keywords from various parts of records.

Markey (1984) provides a useful field by field enumeration of the areas in the MARC record, that can provide subject or topical information.

Some other proposals for enhancing subject information in MARC records are :

Classification enhancements

a) Provide fuller (more specific) class notations in the records.

b) Provide additional class numbers for multiple facets of a work.

c) Add terms derived from classification schedules and indexes to the record based on its assigned class.

Subject heading enhancements

a) Assign more LCSH to the record.

b) Supplement LCSH with terms from specialised thesauri.

c) Exploit the machine-readable version of the LCSH to provide expanded lead-in vocabulary to the records.

Keyword searching enhancement

a) Add natural language words, phrases and abstracts to the record.

b) Add words from the tables of contents and indexes of the books to the record.

Provision of new access tools

Providing new access tools based on special or separate indexes to the topical contents of the books.

All the above mentioned enhancement will offer better recall and precision.

2.7.2 Database management system layer
(search and retrieval mechanisms)

The search and retrieval mechanism of many conventional Database Management Systems (DBMS) are not well suited to direct application in OPAC. Some DBMS, for example perform "keyword searching" of a given field only by reading and scanning through each record in database. For adequate speed in searching a large database, OPACs should include indexes to the searchable fields of bibliographical records. The DBMS programs are responsible for constructing these indexes and for using them in searching a database.

The most common form of an index is an inverted file, which contains a list of each unique searchable element such as a complete field, keyword etc. These can be combined using Boolean operations (AND, OR and NOT) during the search process.

In more sophisticated inverted files, (for example in keyword inverted files) the position of the keyword in a field or record might be included in order to permit proximity searches. A variety of term weights may also be included. Belkin and Croft (1987); Salton (1989) provide information about term weighting schemes and advanced information retrieval techniques.

2.7.2.1 Limitations of Boolean operators

Boolean operators have their own limitations. Hildreth (1989) observed that effective Boolean query formulation is not a simple task, and that it requires some training and

understanding of the operators and their effects. OPAC users seldom receive such training and have to face the problems of search failure and information overload.

These problems can be solved by using the methods derived from information retrieval research. These include, partial matching and "stemming" of keywords, ranking of retrieval output according to probability of relevance, automatic mapping from input search terms to controlled vocabulary terms through thesaurus lookup and relevance feedback. These methods have firm theoretical foundations and have been tested in experimental systems.

Boolean "AND" using dates or additional terms are suggested as a way to reduce the size of search results.

2.7.2.2 Beyond Boolean searching

Cleverdon (1984) suggested that the use of natural language for searching and the provision of an alternative to Boolean query formulation can enhance subject searching. He suggested that natural language searching should replace controlled language searching. The same has been adopted by many database producers and online searchers. Many full-text databases do not contain controlled terms and the user has no option but to search with natural language terms.

Automatic query formulation

The possibility of formulating and processing queries automatically is an interest of long standing to information retrieval researchers. The user must supply the query and

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make judgments on the relevance of the items retrieved, but all the processes in between these two activities should be performed by the computer with little human involvement. Simplicity for searcher is achieved by hiding the use of Boolean; output is in blocks in order of decreasing match with the query and there is always some output to inspect.

Ranked retrieval

In order to get output in a refined ranking a technique of term weighting is employed. The purpose is to enable queries to be matched with document records automatically by calculating a mathematical match value.

Relevance feedback

The searcher's judgments of retrieved items as either relevant or irrelevant is important. The system can be asked to perform another search modified automatically by relevance feedback to provide a new ranked output list.

Query processing and expert systems

Query processing includes accepting queries in natural language, automatically creating stems from query words, displaying suggested additional search terms and identifying spelling terms.

Third-generation OPAC system designers (Hildreth 1989) should move beyond simple matching and Boolean operations towards these more sophisticated search and matching techniques.

The CITE (Computerised Information Transfer in English) system developed at the National Library of Medicine (Doszkocs 1983), is one of the earliest and best known of third generation online catalogue systems. In the CITE system, a weighted stem index derived from the headings, references and scope notes of the MESH thesaurus is used to retrieve and display the thesaurus and text terms most likely to represent the users natural language subject query. The headings that seem relevant to the user's subject need can then be selected by the user, and bibliographic records retrieved based on the selections.

The above mentioned method of stemming and thesaurus lookup helps in avoiding search failure, and ranked output reduces information overload.

2.7.3 Subject access in OKAPI

OKAPI is a experimental online catalogue developed at the Polytechnic of Central London and now based at City University. Various search methods are being used in OKAPI to enhance subject access. The first version of OKAPI used different search and matching methods, called "Search trees". The following steps are involved in a search tree:

1) Exact phrase (field) matching of the query.
2) Partial (truncated) phrase matching of the query.
3) Boolean "AND" of all keywords in query.
4) Weighted "best match" search of keywords in the query and ranked output.

There were two types of searches - books about something or specific books. For a subject search the words of user's search were looked up in an index containing words from title-like fields and subject headings, and from corporate names. The system would first perform an implicit AND on the search words. If this failed, words were assigned weights and output is received in an decreasing score order. For specific item search, the system presented the user with a form filling type of screen on which could be entered a title and/ or an author's name. The system would follow different paths (search tree) according to the data elements which the user had entered and the results of initial searches.

A later version of OKAPI system (Walker 1988) concentrated on improving subject access by providing some remedies to subject search failures in the earlier version. In OKAPI 86 a "Best match" search method was used. It was supplemented by two levels of stemming for search terms, automatic generation of cross references for many terms and interactive semiautomatic spelling correction of many mistyped words. A recent development in OKAPI is the introduction of 'relevance feedback' (Walker 1990).

2.7.4 The database management system interface layer

DBMS interface layer of the OPAC supplies the required details about the catalogue database, the DBMS, and the search methods, so that queries can be resolved without user knowledge of the structure and procedural requirements of those layers of the system. The primary task of the DBMS

interface layer is that of translating the users commands or menu selections into the appropriate sequence of database operations.

The DBMS interface layer provides the critical link between what the user sees on the screen or types at the keyboard and the storage and retrieval of information in the database. The role of DBMS interface in subject access is more important in systems providing multiple search techniques.

2.7.5 User interface

As seen earlier, all database systems need an interface which allows users to access data in a convenient and easy to use way. IR systems specialists have recently realised that even the best system will not be used if its interface is poor. The purpose is to improve systems from the user interaction point of view.

OPACs are information retrieval systems used by end users. OPAC users form a very large population with varied needs and backgrounds. As designers of computerised IR systems, and specialists in information handling, processing and retrieval, we must be aware of the problems, users encounter when interacting with our systems.

OPACs offer access to items in the library catalogue. They are essentially interactive information retrieval (IR) systems and can offer access to items by data in any field of the bibliographic record. As most catalogue users are untrained in IR techniques, it is essential that any complexity should be

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concealed and that the system capabilities be represented in such a way that the OPAC is usable at sight by all users. This ease of use should be achieved by the implementation of a dialogue between system and the user in the user interface. It is the design of the interface alone which can guide the user successfully through a search.

The user interface may have a greater impact on a user's initial satisfaction with an OPAC than any particular retrieval technique. The user interface layer of an online catalogue consists of those parts of the system primarily concerned with the interchange of information between the users and the system. It is the most visible part of the OPAC system and therefore has a large influence on user opinion about the system.

A well designed and simple to use interface can help the users in a subject search. In systems using exact phrase matching, a list of headings alphabetically close to a search can be displayed for user selection. It will avoid search failure to some extent. Improved user interface will increase browsability of existing subject headings.

Many recent experimental interface designs have been implemented as "front end" software running on personal computers. The Macintosh computer, using its HyperCard software (which permits easy design and development of graphical "point and Click" interactive methods), is being used for a number of enhanced front end interfaces for online catalogues.

The Bibliomac interface (Case *et al*, 1989) based on HyperCard, offers simplified interaction with UCLA's ORION online catalogue systems.

In the BOOK HOUSE a graphical direct manipulation environment is provided. The user may click on the icons to move to new areas for browsing (Pejtersen, 1989).

2.8 Future research

There is still much work to be done in this field. The way forward must lie in the development of subject access systems as described by these two authors.

"Subject access in next-generation OPACs will combine all of these search mechanisms available in first and second-generation OPACs, (i.e. exact and truncated heading matching and keyword Boolean matching with proximity operators) along with the probabilistic "best match" weighting and ranking schemes derived from information retrieval research" (Larson 1991, p. 227.).

"The ultimate solution, however may be to devise a completely new subject access system, built upon a strong theoretical base which takes into account both search behaviour and computerisation" (Holley 1989, p.7).

CHAPTER THREE

Information needs of social scientists

3.1 Social sciences : definitions, nature and scope

The term social sciences refers to the disciplines concerned with man, his culture, and his environment (Li 1990). The social sciences today are recognisably different from what they meant in an earlier age. Like most subjects it evolved from philosophy. The earlier conception was that society was the result of the political capacities of mankind. This earlier concept that man was a political animal, was changed or broadened to the view that man was a social animal. With the application of the word "social", its connotation was associated with the individual. The science which came to deal with the activities of individuals in groups came to be known as social science. Though this application of the term has been very recent, the discipline dealing with the group(s) activities was described by what was known as social studies. This term is still applicable in many countries.

During the last half century the study of the subject has increased very rapidly. This has been because of the rapid change in the social environment due to many factors including communication, decolonisation, industrialisation and wars. This has created many problems in society like those involved in labour, working conditions, job opportunities etc., which require special attention.

The social sciences are concerned with human personality. The

complexity of human behaviour and the social environment is changing constantly. Although many things in human beings are common, no two person or groups of persons are identical. The purpose of social sciences is to discover, explain and predict human behaviour in the same manner as scientists do in relation to physical or biological forces.

It is stated in Essays on research in social sciences (1968). "The natural scientist is dealing with material that is helpless in his hands. It does not react emotionally or in terms of personal interest. It has no preconceived notions, no deep rooted beliefs; it is not offended at anything the investigator may say about or do to it. Quite the reverse is true of the subject matter of the social sciences. Their matter is man, and man does react emotionally to the findings of the investigator. Man does have special interests and enjoys privileges which he regards as rights. He is full of preconceived notions, prejudice and unverified beliefs".

There is no clear agreement on which disciplines should be included in the field. Prof. Edwin R.A. Seligman (1963) in his article 'what are social sciences'? in the Encyclopaedia of social sciences has categorised the social sciences in the following three categories :

1) Pure social sciences
2) Semi-social sciences, and
3) Sciences with social implications.

3.1.1 Pure social sciences
Politics;

Economics;

History;

Jurisprudence;

Anthropology;

Penology; and

Sociology

The first four social sciences are considered as older disciplines and the last three as the newer social sciences or those of recent origin, a result of modern curiosity as to the social relations.

3.1.2 Semi social sciences

These are the sciences which are social in origin and still retain partly social content.

These are :

Ethics, and

Education

3.1.3 Sciences with social implications.

These, although independent in origin, have acquired in part a social content, these are :

Biology (as applied to human beings);

Medicine;

Geography;

Linguistics; and

Art

International Encyclopaedia of the Social Sciences (Berelson 1968) describes the Scope of social sciences as follows :

Anthropology; Economics; Political Science;
Psychology; Sociology;   History and Statistics

In 1969, Maurice Line stated that " the social sciences fall somewhat between the humanities and the sciences, and share something of the characteristics of each.   Indeed, the definition of the social sciences is far from decided, but perhaps an acceptable definition for the present purpose would be the area of knowledge concerned with human beings interacting or acting in groups.

Any definition would include sociology, political science, economics, social anthropology and social psychology. Social, economic and political history are common to both the humanities and social sciences, while psychology and statistics are common to science and social sciences. Education and law are problem areas, but they do come within the definition of social sciences suggested above, and they are certainly not sciences or humanities.   There are also the 'applied' studies of management, commerce, marketing, advertising, social work and social administration.   Although boundary disputes tend to be unprofitable, the very difficulty of setting accepted limits to the social sciences constitutes one of the major aspects of the   information problem" (Line 1969, p.2).

Slater (1989, p.3) in her studies Information needs of social scientists has defined the social sciences as follows:

"Social science (I think) is the study, by quantitative and

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qualitative methods, of human groups (as distinct from primary focus on the human individual).

It is concerned with the causation, nature and structure of groups, both large and small - eg from family to nation - and with interaction between groups, and interaction of individuals within groups and interaction of the individual with the group. In short, social science is the study of society, both as concept, and as an incarnated actuality, in the past and at present".

She has listed the main social science disciplines in the following rank order :

The main social science disciplines, in rank order*

	POSITIVE MENTION		NEGATIVE MENTION	
	Definitely	Possibly	No mention	Definitely not
1. Sociology	98%	-	2%	-
2. Politics	76%	3%	18%	3%
3. Economics	68%	-	32%	-
4. Psychology**	49%	19%	32%	-
5. Social work/ Service	43%	16%	41%	-
6. History**	43%	8%	49%	-
7. Anthropology	41%	5%	54%	-
8. Geography**	32%	14%	54%	-
9. Demography/ Statistics	24%	5%	71%	-
9. Criminology	24%	3%	73%	-
9. Education	24%	14%	54%	8%
10. Business/ Management	22%	11%	53%	14%
11. Environmental Studies/Science	14%	19%	64%	3%
12. Communication/ Media	14%	3%	83%	-
13. Philosophy	11%	5%	81%	3%

 * Rank order of frequency of mention.

 ** Sometimes, but not invariably, qualified by " social" and/ or "economic", indicating that this is a social science in part, rather than in totality, in the view of some respondents.

Beside the above mentioned subjects some other disciplines are considered to be social sciences. These include: Archaeology, Information studies, Linguistics, Psychiatry, Comparative religion, Industrial relations and employment studies.

In this study, all the subjects have been explored, and on the basis of that, a detailed list has been given. This list, as given below, covers all the disciplines of social sciences.

1. Anthropology - including folk lore and customs, ethnography and ethnology.
2. Business studies and human resource management - including personnel management and training, marketing and market research, business and social activity.
3. Children and young persons - their place, rights and problems in society, covering welfare, adoption, fostering, delinquency, abuse, exploitation,development, socialisation, etc.
4. Communication - covering all its various possible forms and including media studies.
5. Computers, information technology and systems - social aspects thereof, man-machine interface, user-friendliness, the information society, etc.
6. Community - studies, needs, welfare, etc.
7. Disability and rehabilitation.
8. Drug dependency and addiction.
9. Economics.

10. Education and training - at all levels, primary, secondary, tertiary, and both formal/qualifying and informal

11. Employment and the labour market

12. Environment, conservation, pollution, nuclear issues

13. Family - family structure, including marriage as a topic

14. Housing, including homelessness

15. Industrial relations, including trade unions.

16. The law, laws and policy at all levels, including government, local government, the legal system, penology and criminology, policy, politics.

17. Old age, elderly and old people, pensions, pensioners.

18. Population studies, demography.

19. Psychology, especially social psychology.

20. Race relations, discrimination, (other) minorities - eg religious.

21. Social (or human) geography.

22. Social history.

23. Sociology or social science (singular) - theoretical and applied, research and practice, methodology.

24. Women's studies - social role, equal opportunities, sexism, the women's movement groups and group behaviour characteristics of women.

3.2 The concept of information use

It is difficult to distinguish between information use, needs, demands, wants and requirements. The reason for this confusion according to Wilson (1981) is because of the "troublesome concept of information". Wellish (1972) identified 39 definitions of information. To overcome such difficulty, some authors tried to distinguish between "data",

"information" and "knowledge". Thus information falls between data and knowledge.

Although it is difficult to define information, we can say it is something between data and knowledge which is "communicated or received concerning a particular fact or circumstances" (Random House Dictionary, 1973) in order to reduce the users uncertainty by meeting their needs.

The most cited and perhaps the most useful definition of information is "that which reduces uncertainty" (Faibisoff 1978).

Wilson (1981) points out, the problem does not merely lie with the lack of a single definition as with the failure to use a definition appropriate to the level and purpose of the investigation.

In simple words we can conclude that "information use" is that seeking behaviour that leads to the use of information in order to meet an individual's need (Bouazza 1989).

3.3 Information needs of social scientists
A large number of studies to assess the information needs of scientists have been made. According to Martyn (1974), the use of scientific and technical information has traditionally been the area "in which information problems were most generally felt and in which information workers were most active".

According to Maurice Line's observation, their number "ranges

from 400 to 800 depending on how you reckon them"
(Line 1969). In the second stage, some attention was paid to
the social sciences. Recently these studies concentrated on
the humanities. The number in the social sciences, however, is
rather small. Brittain in 1970 has identified 18 user studies
in the social sciences that have used empirical methods
(Brittain 1970).

3.4 INFROSS

A comparative study was undertaken in the social sciences:
"Investigation into Information Requirements of the Social
Sciences" (INFROSS) at Bath University, during 1968-70.

The methodology used was a combination of circulation of
questionnaires, interviews with researchers and practioners
and day by day observations of a small number of social
scientists. The objective of the study was "to provide
material useful for the design of information systems"
(Line 1976).
"A main underlying, if implicit, objective of most user studies
is to obtain data that is capable of accumulation and synthesis
and that can be used, directly or indirectly, to develop or
improve information systems and services" (Skelton 1976).
According to Line, "There is no point in conducting a survey of
information needs for its own sake; the only point in doing so
is to collect data which can be used for the improvement of
information systems, or for the design of new ones"
(Line 1971).

At the conclusion of INFROSS, Line felt that "no major

patterns were detected which could be of use for information system design purposes" (Line 1976).

3.4.1 Problems identified by INFROSS

(1) Terminological difficulty in using abstracting and indexing services, affects the use of the library catalogue. INFROSS respondents experienced difficulty with library catalogues and book indexes and suggested the creation of an authoritative thesaurus of social science terms.

(2) INFROSS findings indicated that a citation index was needed and would be well received. Subsequently, the Social Science Citation Index duly appeared.

(3) Consecutive and conjunctive use of books by social scientists was an interesting behaviour pattern traced by INFROSS. Respondents of INFROSS were about equally divided in the habit of using books sequentially one after other or in using several at once.

(4) A lack of and need for current awareness tools in the social sciences was noticed by the INFROSS team. Shortly after the publication of INFROSS results, current awareness tools began to appear in the fields of education, psychology, sociology, management and economics.

(5) Language problem: a severe foreign language barrier was identified in social sciences. A need for a

convenient translation service for the social sciences was felt by INFROSS.

3.5 Studies followed INFROSS

One of these projects involved the establishment of an 'Experimental Information Officer' in the social sciences at Bath University. The aim was to observe social scientist's use of information and of such a service at first hand. DISISS (Design of Information Systems in the Social Sciences) was another achievement of 1970's. The purpose was to examine the information systems and needs of social services departments in local governments. INISS (Information Needs and Services in Social Service Department) based at the University of Sheffield Postgraduate School of Librarianship and Information Science, under the directorship of T. D. Wilson and with D. Streatfield as principal investigator was an important five year project commencing in 1975. Project LOGI was also based at Sheffield under Wilson. It ran from 1978-80 as an observational study of "Local Government Information Needs". During the last twenty years (1970-1990) various other smaller scale studies also took place.

A study of information needs of social scientists was carried out for the British Library Research and Development Department, between October 1987 and May 1988. This study by Margaret Slater showed developments in the social science field since INFROSS, and the current situation in relation to information demand and supply. The aims of this project according to her was :

"(a) To monitor change over an eighteen year period up to

the present i.e. to update INFROSS and its sequels as much as possible by means of this small scale study; and

(b) to see if any of the needs uncovered by INFROSS or its successors remained, and remain unmet in 1988" (Slater 1989, p.122).

Some of the information problems of the social scientists have been identified in the report.

3.6   Information Problems of the Social Scientists

3.6.1 Time   pressure

Time pressure and time management have been identified as a problem for social scientists.   Lack of time to do the job properly was a major problem.   Information acquisition and digestion is labour intensive and time consuming.

3.6.2 Keeping   up-to-date

The need to know what is going on in the research area is an important aspect of research. Researchers need to know who is working on what, where and how. They also need to know about recent developments and trends in the theory of the field of research.

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3.6.3 Communication   problems

Effective communication of research information is also vital. Transmitting the digested result of published, semipublished and other information coming into a research organisation, to the right people in the right way, is usually an exercise in judgment for the senior researchers.

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3.6.4 Increased conjunctive use

Trends towards increased conjunctive use of library materials by the social scientists would warrant reconsideration of restricted access or closed access to collections as found in some libraries. It will have implications for loans policy also.

3.6.5 Foreign language barrier

It seems to be generally accepted these days that social scientists appear to possess limited skills in reading foreign languages. This can be a serious barrier to keeping up with research published in foreign languages.

There is a communication gap between research and practice in the social sciences. Field and research workers have no time to read research reports. Lack of time to seek and absorb is still present.

Subject interests and terminology used by social scientists continue to proliferate. Consequently, search and retrieval difficulties increase for both user and intermediary. Such problems are endemic in social sciences and it should be noted that keyword indexing reportedly provides no palliative for today's intermediaries.

Keeping up to date, keeping track of research in progress, use of informal channels charted by Line, have also recurred.

3.7 Kind of information needed to do the job
Background information

The nature of social sciences is reflected in wide-ranging

information needs. Background information in the subject of research, development or remedial work was an ever-present need.

Statistical data

Statistical data may also be needed for regular desk research or to forward development planning and forecasting, or as supportive background to active research.

Policy, social trends analysis and forecasting information and legislation is important to developers, planners, administrators and welfare workers. A need to know where society may be going and what are the government policies in relation to such trends is evident.

Keeping up to date with developments is a constant requirement in a fast changing field and surrounding world.

More and better registers of research and development work in progress are believed to be needed.

3.8 Conclusions

Social scientists have a paramount need for information support, particularly to keep them up to date with the fast pace of development in their fields of work. At the same time intermediaries are subject to allied pressures. At different times different disciplines may be taught as social sciences. Similarly, other subjects may drop out of social sciences for the time being. Such changes create problems for intermediaries. This effects the structure of retrieval

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mechanisms and the creation of indexes. Simple keyword use is not always helpful in social sciences. The constantly changing concerns of the social sciences and their terminology create problems in recording and retrieval for intermediaries. Considering the nature of the problem, computer database format and online access is essential. Computers can and do help the intermediary and users considerably in maintaining a consistent level of service with reduced staff. Some of the problems of intermediaries and social scientists in information supply can be solved by computers. End user research is not yet common in the field of social sciences. Indexing and retrieval problems have not yet been fully mastered by existing computer databases.

Some of these problems can be solved by developing user-friendly interfaces to databases. Records in the most catalogues and OPAC databases lack contents of monographs. Development of a database with access to document contents, that is compatible with the users needs/requirements criteria and an interface which supports the choice of search strategy can be a useful solution. Enhancing subject content of records can improve retrieval performance, based on the use of natural language index terms developed from table of contents of documents.

Development of new access points will help in solving the problems of search failure and information overload. It will solve some of the indexing problem of intermediaries and the retrieval problems of users. New access points will help in quick search and solve the problems of controlled vocabulary

and indexing, saving the time of intermediaries.

A similar interface to a sample database called "inflation database" is designed and discussed in chapter four. This interactive information retrieval system can be used by novice users and expert users without any training and assistance.

CHAPTER FOUR

Inflation : an interface for social scientists

4.0.1 Needs for an interface

As seen in a previous chapter, there is a growing need to improve subject access in online catalogues, and to improve the kinds of improved vocabulary used for this kind of work. Today the majority of the world's recently generated research literature is accessible in the forms of bibliographical references through computerised online search services. Most of the databases and catalogues are available online and they are updated. Their main problem is subject retrieval. Their improvement is a challenge for designers.

System designers do not always think in terms of end users. User interfaces have become a major focus of research in recent years. It is the important part where users formulate their requests and transmit them to the system and the system in return conveys its messages back to the users. Interface design has also become important because pleasant, attractive, easy to use software sells well.

It is becoming essential for users of information to need access to a large number of different databases. At the same time it is very difficult for a novice user to get information easily from these databases because of the use of different indexing techniques, absence of both vocabulary control and user modelling. Since a large number of bibliographical databases are now available with powerful technological

capabilities added to the traditional tools, the main concern has, therefore, been the improvement of the interfaces with new front end systems. This present study is an attempt to provide such an interface for users of social science literature.

In the present study, the users of social science literature only are considered. The scope of the social sciences is very broad and it is, therefore, difficult to design an interface covering all social science disciplines. Economics, being a major discipline in the social sciences, has been taken as the sample for this study. Other reasons for choosing economics are the importance of economics as a discipline among other social science disciplines; the importance of economics in our daily practical life; the volume of economic literature available in social science libraries; and the volume of literature available in National Social Science Documentation Centre, (ICSSR), New Delhi, India.

So far as the scope of economics is concerned it is again very broad for designing a prototype interface. As the study is time bound, it is difficult to develop an interface for a major social science discipline like economics in the stipulated time. Therefore, an aspect of economics i.e. inflation, being a current international economic problem has been taken as the sample for interface design.

4.0.2 Developmental work
First phase
The first phase of work started in late January, 1992. To

begin the project, two software packages namely FileMaker Pro and HyperCard were studied. Most of the time in this phase was spent on learning the environment of the Macintosh computer and the use of mouse.

Second phase

After gaining some understanding of the two above mentioned software, two experimental databases, one each in HyperCard and FileMaker pro were developed and tested to get some information about the functioning of the interface. After separate testing of each interface it was found that although FileMaker Pro is a good database manager and provides facilities for coloured screens, but when compared to HyperCard it is not as flexible for searching. After comparison of both software and keeping in view the flexibility for searching, the HyperCard was found more suitable for designing an interface and the same was finally selected for designing the present interface.

Third phase

The work was carried out in three stages.

a) Creation of a database

A database called "inflation database" of about one hundred records of monograph and articles from journals, covering all aspects of inflation and available in Pilkington Library was created for this purpose. The main criterion of selection of entries in database was to include all types of literature like

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books, articles and pamphlets in database and to collect the material on every possible aspects of inflation.

Efforts were made to improve the look of the database and after several trials a layout was selected for data entry and the database was created.

b) Designing of an interface

An interface was designed and tested several times. It was frequently modified and suggestions of supervisors from time to time were incorporated.

c) Linking of interface with database

Finally with the help of scripting the interface was linked with the database and it was tested and modified several times to meet the requirements of users.

4.0.3 Use of HyperCard and Macintosh

As mentioned above, for the purpose of the interface design in the present study HyperCard software and Apple Macintosh microcomputers are being used. This combination of hardware and software offers several desirable features : (1) HyperCard has basic facilities for entering and editing text. All of the standard editing tools are present for adding, changing and deleting text as well as for moving blocks of text and formatting margins, font styles, etc. (2) HyperCard comes with a complete set of painting tools which can be used for graphics. (3) Its built-in programming language called

HyperTalk, looks like ordinary English. (4) The direct manipulation capabilities of the Macintosh allow the user to choose actions and objects without knowledge of commands and syntax. (5) HyperCard's card concept is very popular in the library and bibliographical environment and (6) HyperCard has become a standard authoring tool for many kinds of Macintosh applications.

4.0.4 Social Sciences

Chapter three of the present study describes in detail the definition, scope and nature of social sciences. As has been emphasised the social sciences are concerned with human personality. The complexity of human behaviour and social environment are changing constantly. Although so many things in human beings are common, not two person or groups of persons are identical. The purpose of social sciences is to discover, explain and predict human behaviour in the same manner as scientists do in relation to physical or biological forces.

Before designing an interface it was essential to highlight the characteristics of economic literature.

4.0.5 Characteristics of economic literature

"Economics is one of the 'hardest of the social sciences and the way in which the literature is used is frequently more akin to use pattern in the physical sciences than other social sciences (with the exception of psychology)" (Fletcher 1982).

According to Fletcher, monographs are important, but an

unusual feature for a social science is the very heavy use of periodical articles. Even on reading lists for students it is not uncommon to find that 50 per cent of the references are to articles rather than books. Citation analysis of research level material shows a heavy use of periodicals. Keeping this fact in view the periodical articles are included in a sample database used for the purpose of this study.

Use of statistics is another important feature in economic literature. "Statistics are an important adjunct to economics research and whilst in the past these have been in serial form and mainly from official sources, both national and international, there is a move to make future databanks of statistical information more widely available" (Fletcher 1982).

All the users of economic literature make use of statistical source material in addition to generating their own. Researchers working in the field of market research, advertising, industry and commerce will also be interested in more general statistical data.

4.0.6 Inflation

Inflation nowadays is a worldwide phenomenon. Both developed and developing countries are facing the problem. Developing countries have to spend more for their developmental work, which in the absence of production development creates inflation. Inflation generally means rising money prices of goods and services. It reduces the purchasing power of money.

Laider and Parkin (1975) define inflation as follows :

"Inflation is a process of continuously rising prices, or equivalently, of a continuously falling value of money".

Inflation is considered to be undesirable because of its adverse effects on income distribution, lending and borrowing etc.

4.0.7 Retrieval of Social Science Literature in Libraries

In most of the social science libraries, documents are arranged according to a particular scheme of classification. This system helps in identification and retrieval of literature and arrangement of literature on library shelves. But these classification schemes do not provide any help for content analysis. This system offers the advantage of uniqueness in the arrangement, identification and retrieval of an individual document, but it is of little help for the users with needs related to the contents and other aspects of documents.

As a usual practice most of the documents in libraries are not classified according to the needs of the users but according to the bibliographical data and the provision provided in the schemes of classification used for the purpose in a particular library.

At the same time it is difficult for a big library to change the class numbers of documents according to demand.

As mentioned in the previous chapter these problems can be solved by designing a database with access to documents

contents that is compatible with the users request/ needs criteria, and by the design of an interface to the database that supports their choice of search strategy. It will not disturb the class numbers used by the library for arrangement of books on the library shelves.

Any such design of a database with a representation of document contents that reflects end users formulations of their information need will be helpful.

Conventional classification and indexing schemes have been developed to reflect the contents of a document in terms of its relationships with the knowledge structure of the subject field to which it belongs. The document analysis and representation usually does not take care of users requests.

4.0.8 User modelling

Building up a model of user or user population helps in making design decisions. 'Know the user, know the task' should be the motto of an interface. Knowledge about users is extremely important in designing an interface. Any design for use by people should be based upon some knowledge of the users and the task(s) they will perform with the designed object. In order to design a successful interface we need to know something about the users, their information requirements and the procedure they follow in order to meet their requirements, when using the interface.

There are several approaches that can be taken to find out more about users in order to form a clear picture of the

population that is being designed for. The actual mechanisms by which information about users may be obtained are many and varied. In general such information can be gathered by direct observation, indirect observation, or by employing some form of survey. The choice of methods depends upon two important factors, time and money.

As mentioned earlier in this chapter, the study is time bound, due to shortage of time the survey method of user modelling could not be applied in the present study. Therefore, the design is based on direct observation.

Direct observation
The modelling is based on the personal experience of the author as reference librarian in one of the important social science libraries of India, namely National Social Science Documentation Centre, Indian Council of Social Science Research, New Delhi,India.

The findings of the two important undermentioned studies in social sciences undertaken in U.K. have been utilised in the present study.
   1 INFROSS
   2 Information Needs of Social Scientists

4.0.9 Classification (Conventional)
Most libraries and OPACs use the Dewey Decimal Classification scheme for arrangements of monographs on library shelves and Library of Congress List of Subject Headings as controlled vocabulary for assigning subject

headings in card catalogues as well as OPACs. Their limitations are mentioned in the previous chapters.

The provision given in DDC 20th edition and LCSH 11th edition is reproduced below :

LCSH	**DDC**
	332.41 Value of money
	Class here inflation,
	stagflation,deflation

Inflation (Finance) *(May Subd Geog)*

- BT   Circular velocity of money

    Economic policy

    Finance

    Money

- RT   Currency question

- NT   Accounting - Effect of inflation on

    Banks and banking -Effects of inflation on

    Consumer credit - Effect of inflation on

    Corporate profits - Effect of inflation on

    Escalator clause

    Expenditures, Public -Effect of inflation on

    Government securities -Effect of

        inflation on

    Housing - Effect of inflation on

    Income - Effect of inflation on

    Income distribution -Effect of inflation on

    Income tax - Effect of inflation on

    Indexation (Economics)

- Effect of energy costs on
    BT Power resources - Costs

- Effect of government paperwork on
    BT Government paperwork

- **Effect of productivity on**

    BT   Industrial   productivity

- **Effect of taxation on**

    BT   Fiscal   policy

          Taxation

- **Mathematical   models**

    NT   Phillips   curve

- **France**

    NT   Assignats

- **United   States**

    NT   Greenbacks

Inflation   (Finance)   and   accounting

    USE   Accounting   -   Effect   of   inflation   on

Inflation   (Finance)   and   income

    USE   Income   -   Effect   of   inflation   on

Inflation   (Finance)   and   public   expenditures

    USE   Expenditures,   Public   -   Effect   of

                  inflation   on

Inflation   (Finance)   and   taxation

    USE   Taxation   -   Effect   of   inflation   on

Inflation   accounting

    USE   Accounting   -   Effect   of   inflation   on

Inflation   pressure   of   automobile   tyres

    USE   Automobiles   -   Tires   -   Inflation   pressure

DDC   20th   edition   does   not   provide   a   facility   for   detailed
classification   of   a   subject   like   'inflation'.   For   it   DDC   provides
a   class   number   (332.41),   which   can   be   divided   geographically
and   for   source   material   on   inflation   some   provisions   are

available, but for other access points like theories and models, causes of inflation, control of inflation, effects of inflation, the DDC does not provide any facility.

LCSH being a detailed list of subject headings is also not suitable for users because of its terminology and other factors. It provides the facility for classifying the subject geographically but does not provide any facility for classifying a subject like sources, theories and models, time, causes, and control. Although it gives a long list of effects of inflation on various aspects of the economy.

In the present study a new approach to the design of the classification system is derived from the analysis of user enquiries in the libraries and keeping in view the information requirements of social scientists. The present classification is primarily based on information requirements of the users. Due to psychological factors there is often a gap between users requests and their real needs.

4.1.0 Classification (New approach)

There are clearly several ways of structuring the literature. In the present study for convenience the subject inflation has been classified into twelve major groups (Figure 1) namely areas, sources, theories, time, causes, control, effects, deflation, hyperinflation, recession, stagflation and Statistics. Inflation has been classified by area, by time, by sources, by theories and models and lastly by trends. Each group is again subdivided into subgroups. Before structuring, the subject, the information needs of social scientists and features of use of

economic literature have been taken into consideration.

Figure 1

4.1.0.1 Area studies

Area studies are very significant in social sciences. With the advent of the concept of planned development, area studies programmes have gained great importance. To formulate development programmes of an area without complete knowledge of the people of the area, i.e. their social, political and economic life, their historical background and the nature of territory inhabited by them is not possible. Keeping in view the importance of an area in the study of social sciences, the topic of the present study i.e. 'inflation' has been classified by area (Figure 2). The areas have been classified in four sub areas:

Communist Countries

Developing Countries

EC Countries

Individual Countries

Some areas, though geographically separated, have similar characteristics, like developing countries, communist countries etc.

<u>Figure 2</u>

Individual countries

A world map has been provided in the interface (Figure 3) for the easy use of users and different countries like China, India, U.K. and USA are marked. Only those countries are marked whose data is available in the database. Any other country and area may be represented in the same manner. Necessary information on the map, for use of novice users has been provided.

Figure 3

4.1.0.2 Causes of inflation

Inflation as mentioned earlier is a current international economic problem. Both developing and developed countries are facing the problems of inflation in their economies. Any specific problem, national or international, has its own causes and consequences. Some measures are required for control. Social, economic and political conditions are responsible for different economic problems. Similar economic, political and social conditions give rise to similar problems and similar measures can be taken to control such problems. Keeping in view the same ideology the inflation is classified in the following sub groups :

Causes of inflation (Figure 4)

Control of inflation, and (Figure 5)

Effects of inflation (Figure 6)

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There are many causes of inflation. But some causes are very common.

Economic reforms

Money supply, and

Wage-push

Figure 4

Economic reforms

Various measures of economic reforms also cause inflation. Deficit financing which is used as a tool by developing countries for their economic development often causes inflation.

Money supply

If this policy is used to meet the money requirements of a government it ultimately creates inflation.

Wage-push

Increase in wages means increase in money supply which again

creates inflation. Trade unions are to some extent, responsible for the wage-push. The wage-push has been further divided into trade unions.

4.1.0.3 Control of inflation

Various control measures are required for checking inflation. These may differ according to the social, economic and political conditions of the economy. But some measures are very common and are being used by almost all the countries to check their inflationary conditions. Based on this the control measures are again divided into three sections:

<div align="center">

Indexation

Money supply

Policies

</div>

<div align="center">

Figure 5

</div>

4.1.0.4 Effects of inflation

Any economic problems have good and bad effects, based on the situation both within and outside the country. Inflation,

although it is considered as an instrument for the development of backward economies, has several effects. It affects the various aspects of an economy. Some major effects are as follows :

Effect of inflation on

Accounting

Banking

Employment

International

Politics

Taxation

Wages

Figure 6

4.1.0.5 Interdisciplinary approach

Interdisciplinary studies are very important in the social sciences. Economic policies are influenced by political decisions. It may be noted that social science research is also characterised by the interdisciplinary approach, that is the

interdependence of social, political and economic forces in the solution of social problems. The subdiscipline of social sciences overlap one another. They also overlap other fields of knowledge. The scope of the present study is not interdisciplinary, however the subject is again divided and related terms have been used as additional access points.

Deflation

Hyperinflation

Recession

Stagflation

4.1.0.6 Sources of information on inflation

Most research workers beginning a new project, or extending their present one, feel the need for a complete list of what has been, or is about to be written on their subject. A researcher may be interested in various definitions, reading lists on their topic of research, periodical articles indexed and any such other sources of information. These sources of information on a particular subject are very important for researchers for their research work. Sources of information on inflation have been divided as follows : (Figure 7)

Bibliographies

Dictionaries

Encyclopaedias, and

others

Figure 7

| | Find | Sources | Please click on the buttons for more information |

Other Sources

Encyclopaedia

Dictionaries

Bibliography

4.1.0.7 Theories and models of inflation

Theories and models being an important aspect of social sciences have been chosen as an access point in the present study. Users may like to use only a specific theory . On the basis of the literature available on the database, it has been divided as follows : (Figure 8)

Hicks

Keynes

Phillips

Tobin

Others

Figure 8

4.1.0.8 Time

Social and economic studies for a particular period of history may have some relevance with the present day situation. Based on the literature covered in the database the period has been divided as follows : (Figure 9)

Before 1900

1920

1940

20th century

Figure 9

4.1.0.9 Statistics

Statistics are also a primary source characteristic for social science research. They are used and produced in great quantities, specially in the area of economic research, and especially in all levels of national, regional and local administration. A new access point called statistics has been provided detailing statistics regarding the following :

<div style="text-align:center">

Current inflation development

Future inflation projections

</div>

4.1.1 Author, keyword and title as access points

Author, keyword and title have been provided in the main menu (Figure 1) being the conventional access points. Users of even card,catalogues should find it convenient and friendly. Unlike any card catalogue and online catalogue the present database enables a user to find books, articles in journals and articles appearing in books of which either the author, the title or the subject is known. It also shows what the database contains by

a given author or on a given subject.

4.1.2   Issues in interface design

The purpose of this study is to design an attractive and user-friendly interface, usable by novices. The main idea is that the interface could be used by unattended novices. It avoids the need to memorise commands and command syntax, and to type commands. Retrieval operations are very simple and invoked by selection from menus, pointing and clicking.

Any design for novice users must take into consideration how they will encounter the system. The design should be able to provide answers to questions like 'why should I use this system? and 'how do I use it'? An easy entry point is provided in the present design.

4.1.3   Layout

To lay out the information on interface and database two metaphors are being used. Inflation being an economic process is usually represented by graphs which shows the trends of this process. Keeping this in mind, the graph metaphor is selected for the interface as a whole. Main menu (Figure 1) and all sub menus are represented by graph only. For the database a metaphor of printed book has been selected.

The user views the book and moves from the first to the next page. The book metaphor is important because books are normally consulted by the users. A novice user should feel friendly with the book. Like an ordinary book, the book

metaphor contains preliminary pages, contents, actual text and indexes. The user can use any part according to his/her convenience. The user can go through text or use the indexes for quick reference. A layout is shown in figure 10.

Figure 10

Keeping in view the consistency the same layout has been used for all types of record i.e. monographs, articles, and indexes except statistics.

4.1.4 Search strategies

The purpose of search strategy is that the users should be given a choice

(1) how they want to access the subject

(2) how they wish to use it (to match searching styles or requirements) and

(3) how much assistance they want from the system

it will make the system usable for direct use by a variety of users, both trained and untrained, experienced and inexperienced. Three types of search strategies are provided in the interface.

Conventional techniques

Conventional techniques like author, keyword and title searches have been provided, keeping in view the requirements of novice users. A list of all authors and co-authors, keywords and titles available in the database is provided and are linked with the actual record. Multiple access paths are required to make the data accessible. Novice users will be seeking different sorts of information and using different strategies in the process. Because novices need to be initiated into the traditional access paths. The interface helps its users to perform tasks similar to those which they did on consulting a bibliography or card catalogue.

Querying

For text strings a 'find' button is provided in the database main menu and sub menus. It can search for any word (in natural language) used in the database. It also searches the words used in the table of contents of monographs provided in the database.

Browsing

The activity in which a user scans a set of records is called browsing. Browsing searching is the most useful and preferred approach, when the search is not specific. It enables the user

to build up a search profile composed of options from the database.

4.1.5   Navigational system and buttons

By navigational system we mean a set of features that allows users to know where they are and where they can go.   To answer the question ' where am I?' a simple title system is used in the database.   Each record in the database has a title, which indicates to the user where he is.   The following titles are used in cards for all types of records in the database:

Article (in   Journal)
Article in book
Book
Author index
Keyword index
Statistics
Title index

To make the choices of users clear, the use of buttons, rather than keyboard or other means of commanding have been made throughout the design.   Every choice is a button. In every screen buttons have been provided and with the help of scripting these buttons are linked with other screens and the database to make search easier.   The user is required to click any of these buttons to get   the required information.

An exit button with a graph icon (which represents the main menu of interface) is provided in all sub menus and each record

in the database, which brings the user back to the point from where he/she starts.

Any search initiated from any one place in the database brings the user back to the same place from where he initiated the search.

For easy navigation, records in the database contain the following buttons:

>Author
>Exit (back to the main menu)
>Find
>Go back
>Keyword
>Title

If a particular search finds more than one record, it will take the user to the last record and brings him/her backwards through all the records to the point from where the user initiated the search.

4.1.6 Presentation of data in database

The presentation of data in the database is relatively conventional and familiar. Contents page for monographs is provided (Figure 11). The text screen provides find, exit, author, keyword and title buttons besides the text. These features illustrate how the interface allows old and new access methods to coexist. The interface attempts to bring all the information on the subject together in a convenient manner.

<u>Figure 11</u>

4.1.6.1 Features of inflation database

Table of contents

Records in most databases lack tables of contents of monographs. Provision of these along with bibliographic data will help users in finding their appropriate search. It will help to solve problems such as information overload and search failure. Creation of such a database with a representation of document contents, that reflects the users information needs will be helpful.

Inclusion of journal articles

Periodical articles are used very heavily by social scientists. Even students use more journals than textbooks. Keeping in view the importance of periodical literature in the modern academic environment, periodical articles are included in the database.

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Statistics

Statistics being the primary source of characteristics for social science research. have been included in database.

Printing of bibliographical records

Each record in the database has been provided with a print button. Any particular record required by the user can be printed. Thus it makes information retrieval an integrated part of the writing process.

4.1.7   Main menu

The main menu of the interface represents all twelve major divisions of the subject of inflation and three (author, keyword and title) indexes. All the major divisions are linked with further subdivisions (sub menus) and finally with the actual data in the inflation database. The necessary information for users to click the appropriate place is provided in the menu. Two buttons are provided: one (Find) for finding any information in database and second (Go back) for going back to any record just consulted. Efforts are being made to make the main menu as simple as possible, so that a novice user can use it without any confusion and find it friendly.

The interface has several advantages. Typing has been reduced to a minimum, thereby reducing the chance of user errors. Users can scan through lists of author, title and keywords, recognise and choose them without the need to generate descriptions. Users do not need to use Boolean operators. The

commands for checking out material and printing records have been eliminated.

CHAPTER FIVE

Evaluation and conclusions

5.1   Evaluation

5.1.1   Introduction

Evaluation helps the designer in a number of ways. It assesses what has been achieved and what needs to be done next. Effective evaluation goes beyond casual opinions. It asks searching questions regarding the content and appearance of the system. It helps the designer to assess whether major changes are required. Evaluation during and after design of an interface can prevent the designer and the design from loosing direction.

The purpose of any evaluation is to force the designer to make decisions. If evaluation reveals something is inappropriate then it should be changed. Evaluation encourages a process of encouragement and revision and if begun at an early stage can help prevent a major redesign after completion of the system. As soon as anything is designed it may be evaluated.

Evaluation of IR systems becomes important because of users involvement. The information retrieval literature provides no clear guidance as to how to evaluate IR systems. There are three major evaluation criteria or conceptual approaches proposed and used to date, relevance, utility, and user satisfaction (Nicholas *et al.* 1985). Measures based on the third criterion (user satisfaction) are concerned with user's judgment of multiple aspects of the information retrieval

process and products. The advocates of this approach argue that document output is not the only important factor that should be considered in evaluation, although it has been the most studied aspect. Other aspects such as user interaction, feeling of comfort, ease of use are also equally important. This criterion is being followed in the present evaluation.

5.1.2   Purpose of the evaluation

The purpose of present evaluation is to know the functioning and effectiveness of the interface and also to find out (i) whether is it user-friendly or not; (ii) how the novice users interact with the system; and (iii) how far this interface supplements already existing interfaces of OPACs.

5.1.3   Selection of subjects

Six post-graduate students of the Department of Information and Library Studies of Loughborough University of Technology with various educational backgrounds participated in the evaluation. All of them were essentially novice users. Of the six students, three had a social science background and economics as a major subject at their graduation and post-graduation level. The other three had no social science background. Almost all the participants had little or no experience with Macintosh computers or HyperCard software.

5.1.4   Methodology

A questionnaire (Appendix A) in two parts was designed for this purpose. The first part contains test questions with options and the second part contains evaluation questions. The questionnaire was given to all six participants. They were

asked to answer the questions in any order. Ten minutes time was given to each participant to answer the questions. General instructions on how to use the mouse (for some cases) were given before evaluation.

All the five questions were attempted by all six participants. Of six participants only two could not reply to the fifth question which was comparatively difficult. The reason for not finding correct answers might be that the keyword button on keyword index was missing.

5.1.5 Qualitative analysis

All six participants were interviewed for fifteen minutes. They were asked to give their comments freely. Participants were asked whether they felt the system was easy to learn to operate and to navigate within the stack, whether the organisation of information on the screen was clear, whether the terminology used was clear, whether the graphics provided were helpful in understanding the content, and whether the sequence of the screens caused any confusion. They were also specifically asked whether the find search was useful. Besides this the following five questions were asked as a second part.

The first question in this second part concerned problems faced by participants in attempting all the five questions of the questionnaire. As mentioned in the above table, four participants had no problems in attempting any of the five questions, whereas two had problems in attempting the fifth question.

The second evaluation question was about the various aspects of inflation covered in the present interface. Although three of the participants were from economics backgrounds, they did not feel that any aspect of inflation had been left out. The remaining participants were not able to suggest any ideas as it was too specific a subject for them.

The third question was about screen layout. Participants were asked about the opening screen, subject screen, differentiation between books and articles in database, onscreen instructions, control buttons and search facility. All the participants were satisfied with the layout.

The fourth question was about general comments on the system. Overall reaction of this evaluation was very positive. Some of the general comments given by participants were :

(1) One participant suggested that, like an OPAC screen, the interface screen should give examples.

(2) Another participant suggested that the main menu screen should provide information in alphabetical order.

(3) Title index should be in bold letters.

(4) The information provided in the database on inflation statistics was difficult to consult.

Regarding general comments, of the six participants four found

the system very useful and very user-friendly. One participant commented that even secondary education level students could use this system. Participants with no social science background also found the system easy to use. The aspects that were appreciated by all six participants were ease of use and search facility available in the interface.

On the basis of evaluation we can conclude that the overall reaction to evaluation was very positive and the participants found the system simple and user-friendly. In general participants seemed very satisfied with the control buttons.

5.2 Conclusions

The interface has been evaluated by six users and preliminary testing results have shown the interface to be both effective and satisfactory. User testing demonstrated high levels of user satisfaction. In brief the following conclusions are arrived at.

First of all the interface opens a new dimension in the domain of social sciences. Not only does it help the social scientists in their daily needs for pursuing their professional career but it also has a profound impact for students and other users of social science literature. With the help of the interface the ill organised topics of social science can be brought under a well organised tree structure. It can solve, to some extent, the subject access problems of social scientists.

In this context, the application of the interface to one of the major disciplines of the social sciences, viz 'economics'; is

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dealt with. Similarly the same interface can be slightly changed to suit the needs of social scientists dealing with other social science disciplines like sociology, commerce, psychology, management etc.

It may be that the interface is not very suitable for a large public or academic library, where a lot of subjects are dealt with, but this sort of interface has a profound impact in dealing with the problems of special libraries, where it can meet the users needs. So, for example, any library which deals with commerce, industry, tourism etc. can make slight alterations to this interface and apply it to the needs of the bulk of its users without many changes.

Following similar lines, such interfaces can be designed to meet the requirements of users regarding industry, deflation, recession etc. or even the same interface can be used making minor changes to meet the requirements as and when they arise.

The new approach to classification applied in the present study can also be applied with modifications to other disciplines.

Keeping in mind the above points the utility of an interface can rightly be called a blessing of information technology to users of all branches of social sciences. It provide a justified and well organised approach to meet the problems in the social sciences.

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APPENDIX A
Questionnaire

.

Inflation : an interface for social scientists

Test Questions

This is an experimental computer system designed for meeting requirements of social scientists. It is linked with an 'inflation' database, which contains about one hundred records (books and articles from journals) and can be used for getting information on inflation and related subjects.

Please attempt the following questions.
Questions

1. Give the author of any one book with the following title :-

    a) Theories of inflation. --

    b) Inflation accounting in the UK.--

    c) A text book of economic theory --

2. Give the title of any one book by the following authors :-

    a) Capie, Forest H. ---

    b) Friedman, Milton ---

    c) Garkoti, S.C. --

3. Give the author and title for any one book on the following subjects :-

    a) Causes of inflation ---

    ----

    b) Effects of inflation on wages ---

    ----

    c) Devaluation ---

4. Give the author and title for any one article on the following subjects :-

    a) Deflation ---

    b) Recession --

    c) Devaluation --

5. In which year was inflation highest in the UK?

Evaluation Questions

1. What problems did you have attempting any of the questions?

Q1 :-

Q2 :-

Q3 :-

Q4 :-

Q5 :-

2. Are there any aspects of inflation which are not covered by the system?

3. Have you any comments on the screen layout?

Opening screen

Subject screen

Are book and article screens differentiated properly?

Were the onscreen instructions clear?

Was the word search facility [Find] useful?

Were you clear about the functions of the control buttons?

4. Have you any general comments on the system?

APPENDIX B

Interface

INFLATION : AN OPAC
INTERFACE FOR
SOCIAL SCIENTISTS

BY
S.C.GARKOTI

INFLATION : AN OPAC
INTERFACE FOR
SOCIAL SCIENTISTS
BY
S. C. GARKOTI

An Interface, submitted in partial
fulfilment of the requirements for
the award of the Master of Philo-
sophy degree of the Loughborough
University of Technology.
November 1992.

Supervisors :
Ann O'Brien & Alan J. Poulter
Dept. of ILS

INFLATION | Please click on the buttons for more information

Find

Stagflation
Recession
Hyperinflation
Deflation

Effects
Time
Control
Theories
Causes
Statistics
Sources
Areas

Author
Keyword
Title

Find | Areas | Please click on the buttons for more information

Individual   countries
EEC   countries
Developing   countries
Communist   countries

Find | Please click on the buttons for more information

Wage Price Push

State Expenditure

Economic Reforms

Trade Unions

Policies

Money Supply

Indexation

Wages

Taxation

Politics

International

Employment

Banking

Accounting

Other Sources

Encyclopaedia

Dictionaries

Bibliography

Tobin

Phillips

Keynes

Hicks

20TH CENT.

1940's

1920's

BEFORE 1900

Please click on the buttons for more information

AUTHOR INDEX

A - F ○

G - L ○

M - S ○

T - Y ○

Please click on the buttons for more information

Author | Title | Keyword | Find

AUTHOR INDEX A- F

Please click on the name of the author you want to know about

Ambler,   Steve
Auerbach, R. D.
Bach, G. L.
Batten, D. S.
Bomberger, William A.
Bresciani-Turroni,
                        Costantino
Byers, J. D.
Cagan,   Phillip
Campbell, Colin D.

Capie, Forest H.
Cardia, Emanuela
Chakravarty, S. P.
Chick,   Victoria
Chopra,   A.
Deane,   Phyllis
Faini, R.
Friedman, Milton
Frisch,   Helmut

Please click on the buttons for more information

Author | Title | Keyword | Find

AUTHOR INDEX   G-L

Please click on the name of the author you want to know about

Giovannini,   A.
Greenwald,   Douglas
Hafer, R,W.
Hamilton,   Earl   J.
Healey, M.N.
Heathfield, David F.
Holtfrerich,   Carl-Ludwig
Huang,   Andrew C.
Ilersic, A. R.
Jackson,   Dudley

Jacobs, Rodney L.
King, Mervyn
Kregel, J. A.
Kuran, T.
Lerner, Eugene M.
Li Yunqi
Liesner,   Thelma
Lomax, D.
Lovett,   William A.
Lui,   Francis T.

AUTHOR INDEX   M-S

Please click on the name of the author you want to know about

MacCafferty, Maxine
Mckenzie, George
Maier, Charles
Makinen, Gail E.
Morley, Samuel A.
Nogaro, Bertrand
Nove, Alec
Naughton, Barry

Parkin, Michael
Pass, Christopher
Robinson, John
Samuelson, L.
Sandilands, F.E.P.
Sargent, Thomas J.
Seorensen, P.B.
Smith, Bruce D.
Sumner, Michael
Sundararajan, V.

AUTHOR INDEX   T-Y

Please click on the name of the author you want to know about

Takagi, Y.
Toniolo, G.
Tullock, Gorden C.
Turner, H.A.
Vernon, J.R.
Warren, Bill
Webb, Stephen B.

Welfe, Aleksander
White, Andrew Dickson
Wilcox, M. G.
Wilkinson, Frank
Wilson, George W.
Wolf, T. A.
Yenal, Oktay

KEYWORD INDEX

A -H O

I - W O

Screen 1:

Please click on the buttons for more information

| Author | Title | Keyword | Find |

KEYWORD INDEX A- H

Please click on a keyword you want to know about

ACCOUNTING
BANKING
BIBLIOGRAPHY
CAUSES
CHINA
CONTROL
COMMUNIST
     COUNTRIES
DEFLATION

DEVELOPING
     NATIONS
DICTIONARIES
E E C COUNTRIES
ECONOMIC REFORMS
EFFECTS
ENCYCLOPAEDIA
EMPLOYMENT
HICKS
HYPERINFLATION

Screen 2:

Please click on the buttons for more information

| Author | Title | Keyword | Find |

KEYWORD INDEX I- W

Please click on a keyword you want to know about

INDEXATION
INDIA
INTERNATIONAL ASPECT
KEYNES
MONEY SUPPLY
POLITICS
PHILLIPS
RECESSION
STAGFLATION

STATE EXPENDITURE
TAXATION
THEORIES
TOBIN
TRADE UNIONS
UNEMPLOYMENT
UNITED KINGDOM
UNITED STATES
WAGES

Screen 3:

Please click on the buttons for more information

| Author | Title | Keyword | Find |

TITLE INDEX

A - DI ○
DO - HU ○
Hy - IN ○
IN - MO ○
MO - RE ○
RE - WO ○

TITLE INDEX
A- DI

Anticipated inflation and aggregate employment : the case of costly price adjustment.
Cagan's hypothesis and the first nationwide inflation of paper money in world history.
China's inflation : causes , effects and solutions.
Chinese reforms, inflation and the allocation of investment in a socialist economy.

Please click on a title you want to know about

Conditions in which very rapid inflation has appeared.
The crisis that America needs.
Deflation reconsidered : Japan in the 1920's.
The demand-.pull theory of deflation and inflation.
The determinants of monetary expansion in the German inflation, 1914-23 : causes and effects in international perspective.
Dictionary of economics.

TITLE INDEX
DO-HU

Do trade unions cause inflation ? Two studies : With a theoretical introduction and policy conclusion. 2nd edn.
Encyclopaedia of economics.
Ends of four big inflations.
Exchange rates versus credit policy; analysis with a monetary model of trade and inflation in India.
Fiat money inflation in France.
Fighting inflation in Britain.
Fresh thinking on anti-inflation policy.

Please click on a title you want to know about

A good recession.
Government budget and inflationary expectations as determinants o money supply in Germany, 1919-23.
The Greek hyperinflation and stabilization of 1943-1946.
The Hungerian hyperinflation and stabilization of1945-46.
Hungary,s recent monetary crisis and its theoretical meaning.

TITLE INDEX
HY- IN

Hyperinflation in China, 1937-49.
Hyperinflation and the supply of money.
The impact of international factors on U.S. inflation : an empirical test of the currency substitution hypothesis.
Indexing for inflation.
Inflation : a disaggregated model approach.

Please click on a title you want to know about

Inflation accounting : a brief guide to the report of the Inflation Accounting Committee.
Inflation accounting in the U.K.
Inflation and cumulative debt outstanding of less developed countries.
Inflation and its effects on banks and finance houses.
Inflation and politics. Fiscal, monetare and wage-price discipline.

TITLE INDEX
IN- MO

Inflation and the labour market.
Inflation and unemployment.
   2nd edn.
Inflation and wages in under-
   developed countries, India,
   Peru and Turkey, 1939-1960.
Inflation causes, consequences
   and cures.
The inflation in China.
Inflation in communist
   countries.
Inflation in history.
Inflation in the United Kingdom.

Inflation in United kingdom.
   (A Bibliography).
Inflation, indexing and
   economic development.
International aspects of
   inflation.
A Keynesian approach to
   inflation theory and policy.
Major inflations in history.
Monetarist economics.
Monetarist views on inflation.
Money, prices and wages in the
   confederacy, 1861-65.

TITLE INDEX
MO-RE

The monetary dynamics of
   hyperinflation.
The monetary and fiscal
   programs of the confederate
   government, 1861-65.
The national finances, the
   inflation and the
   depreciation of the Mark.
Natural resources and inflation.
The New inflation : causes,
   effects, cures.
The 1920-21 deflation : the role
   of aggregate supply.

On gredual monetary reform
   [Delors plan].
Optimal anti inflation programs
   in semi industralized
   economies; orthodox versus
   heterodox policies.
Perspectives on inflation :
   Models and policies.
The politics of inflation in the
·   twentieth century.
Reform, inflation and
   adjustment in planned
   economies.

TITLE INDEX
RE-W

Review of Bresciani-Turroni's,
   The economics of inflation.
The role of war in American
   economic development :
   prices, income and
   monetary changes in three
   wartime periods.
The role of war in modern
   inflation.
Six ways to define recession.
Some colonial evidence on
   two theories of money :
   Maryland and the Carolina's.

The speed of adjustment of
   the inflation rate in
   developing countries; a
   study of inertia.
State budget and inflation
   processes.
Taxation, inflation and asset
   accumulation in a small
   open economy.
Theories of inflation.
Why has economic reform led
   to inflation?
Worlds next inflation.

STATISTICS

RECENT INFLATION DEVELOPMENTS ○

INFLATION PROJECTIONS ○

APPENDIX C
Database

Ambler, Steve

Cardia, Emanuela

Optimal anti inflation programs in semi industralized economies; orthodox versus heterodox policies.

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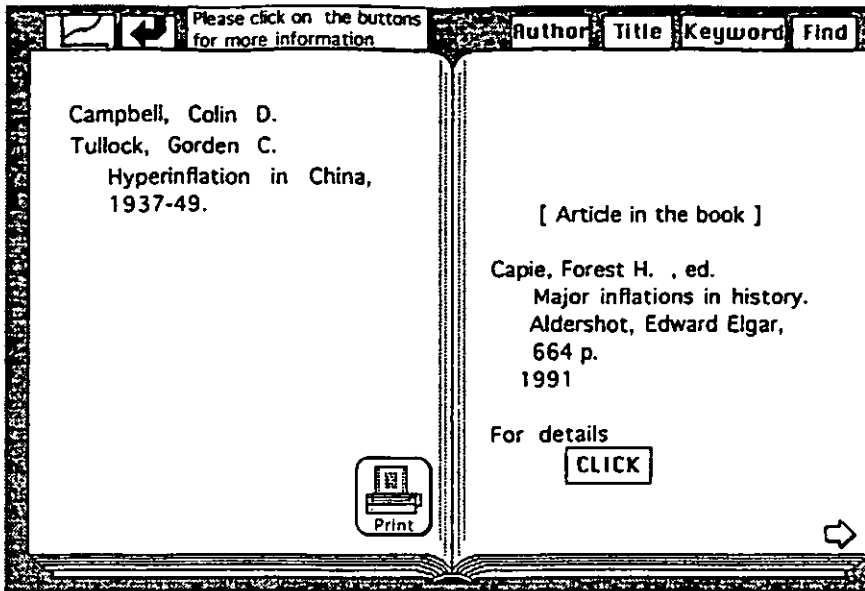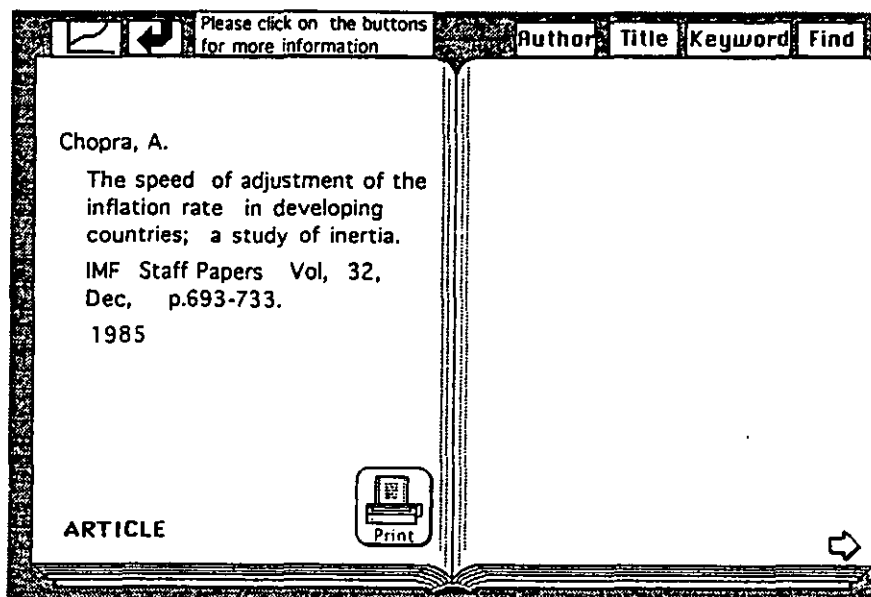London, Longman,1979.
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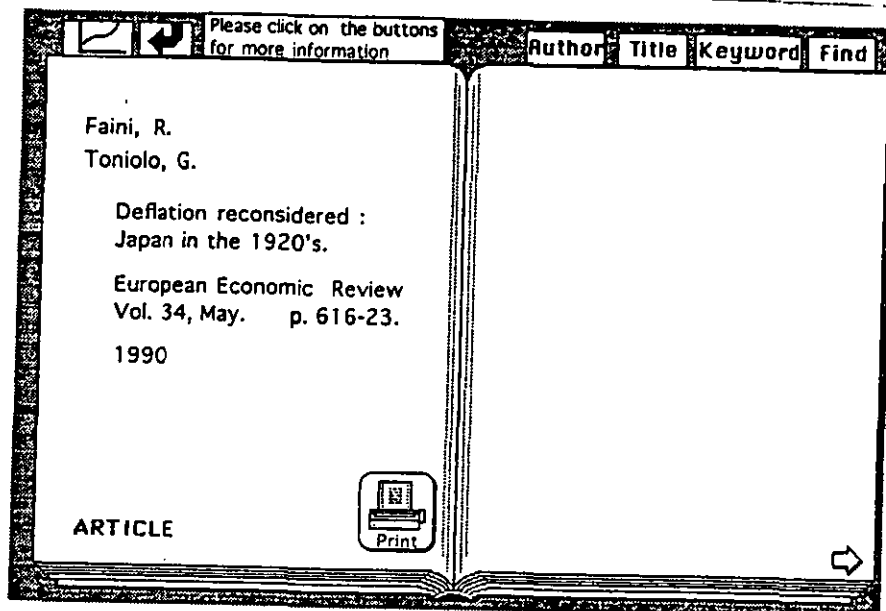Major inflations in history.
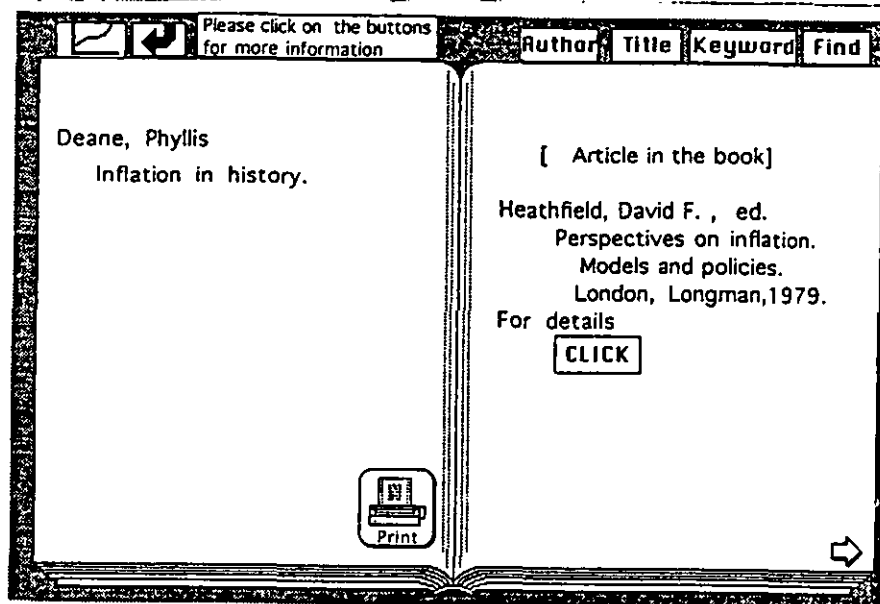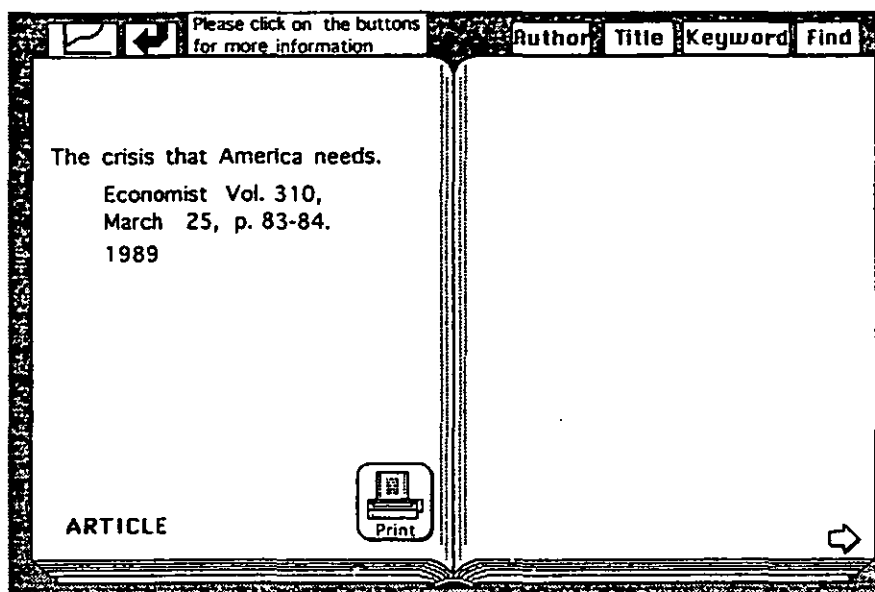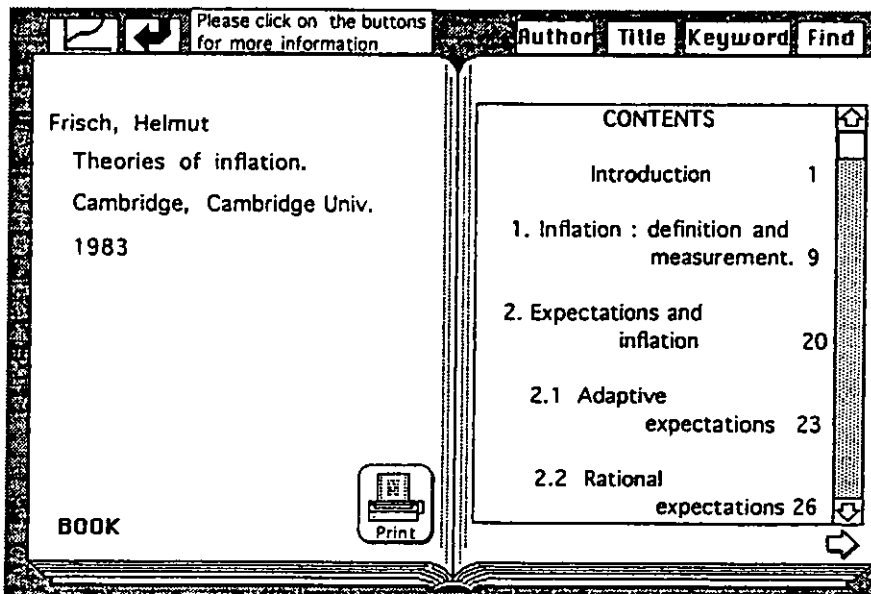Aldershot, Edward Elgar,
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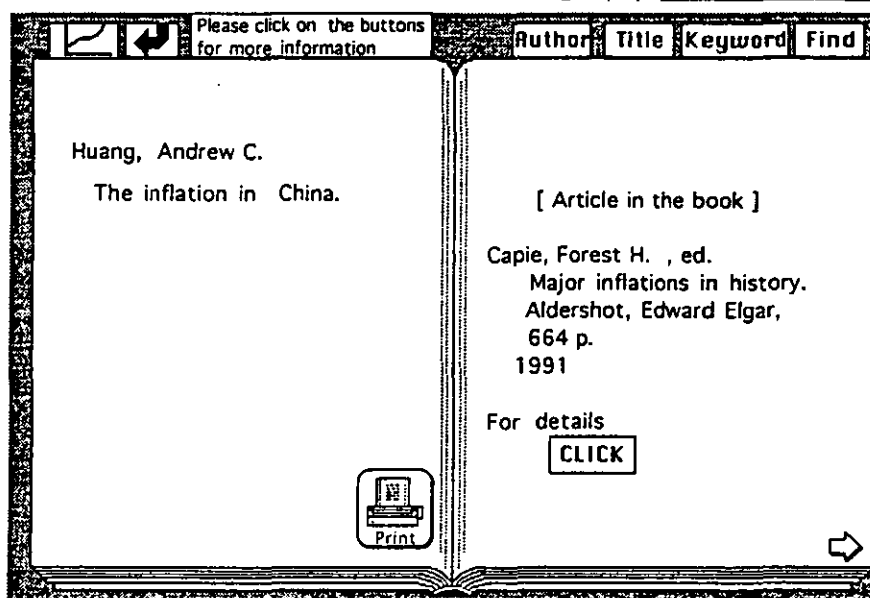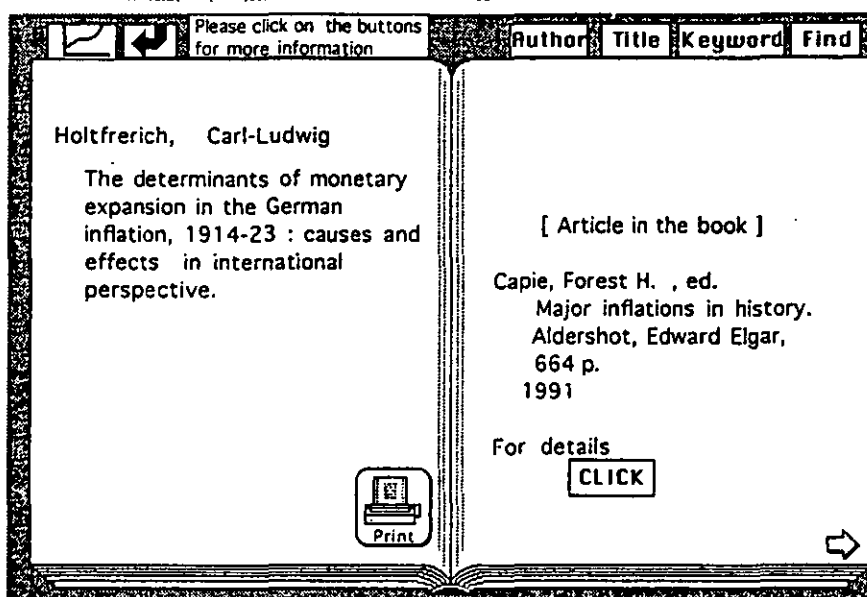A Keynesian approach to inflation theory and policy.
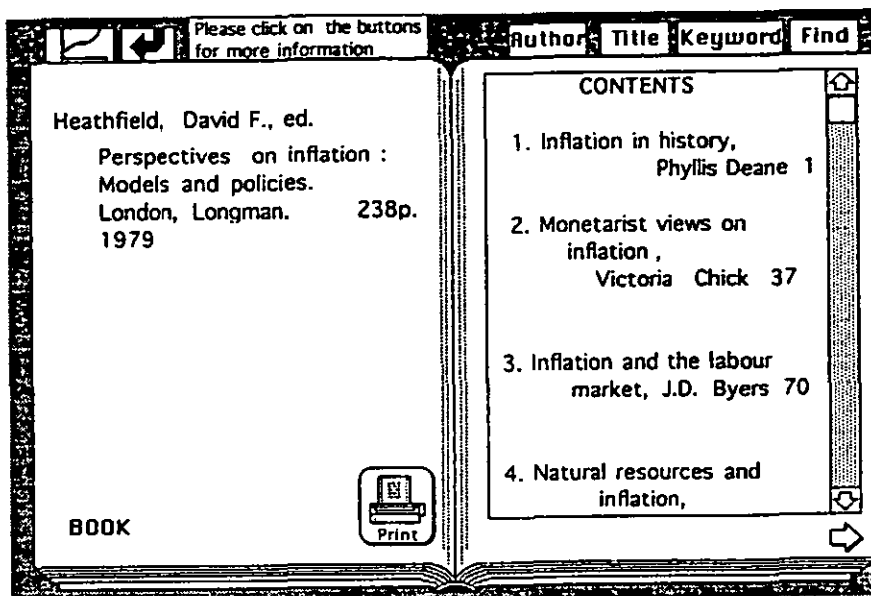
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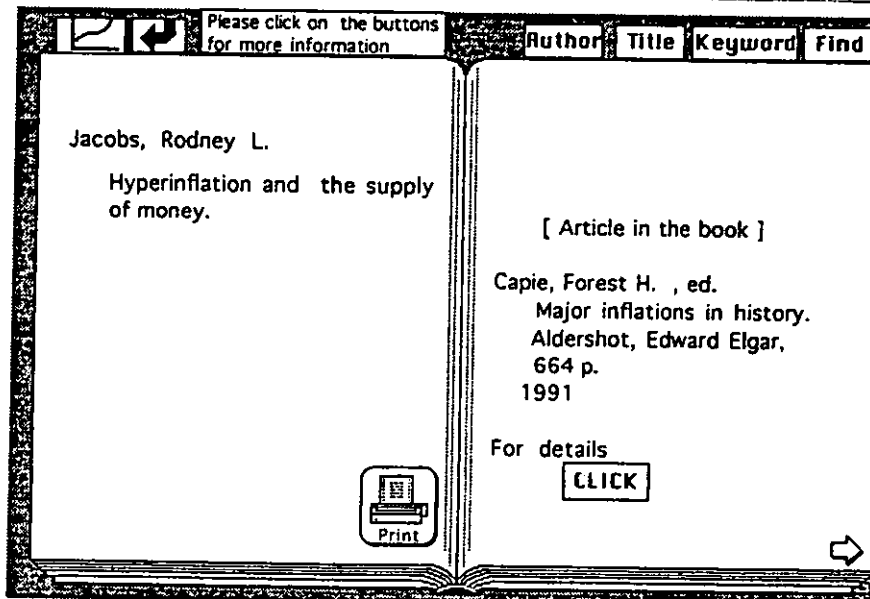
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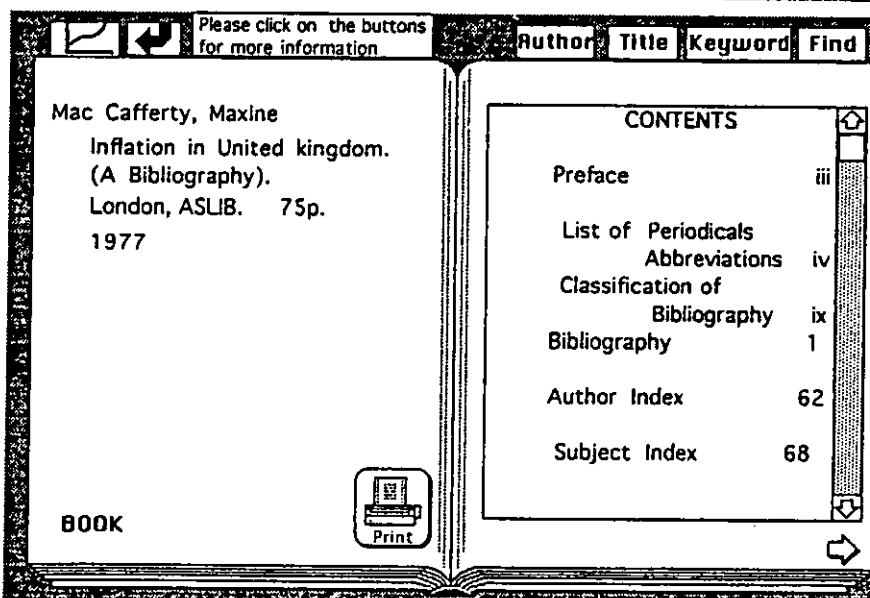Lexington Books,   268p.
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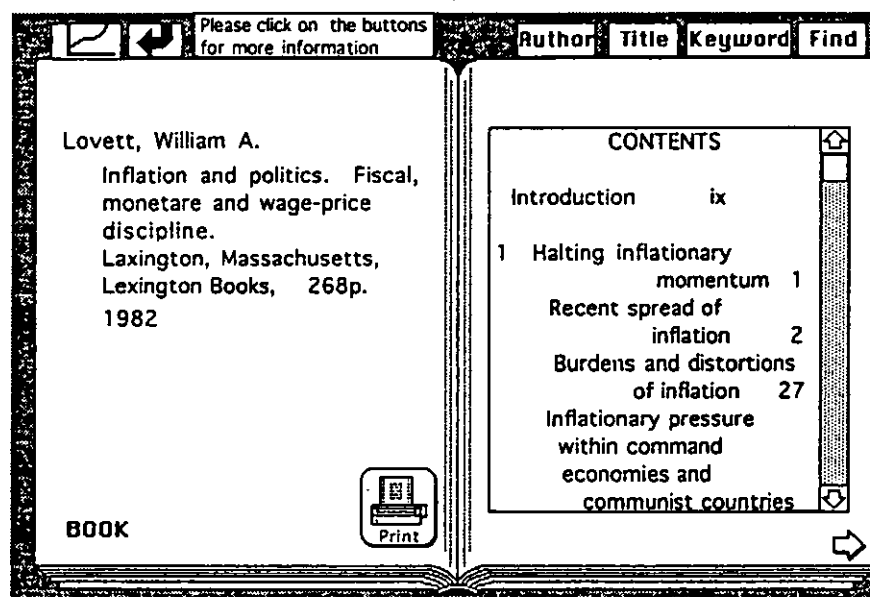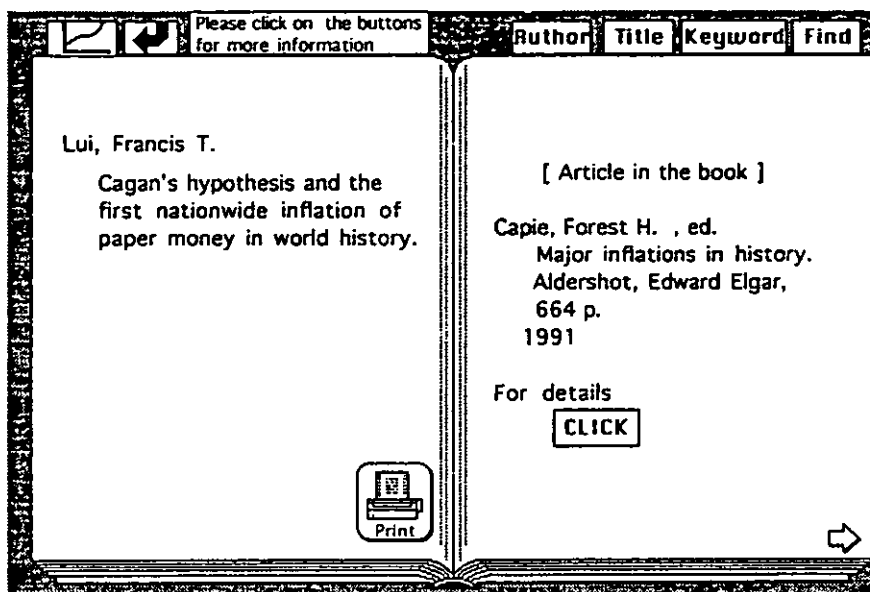
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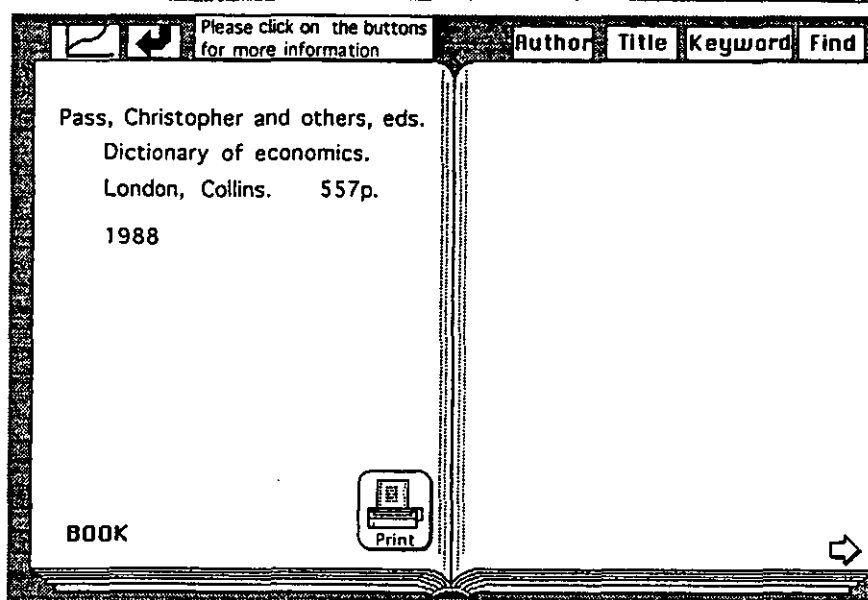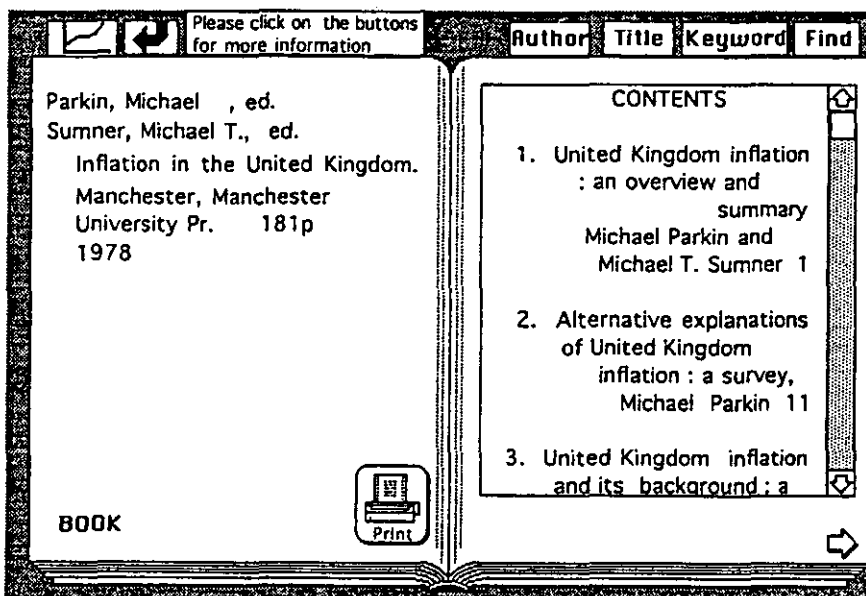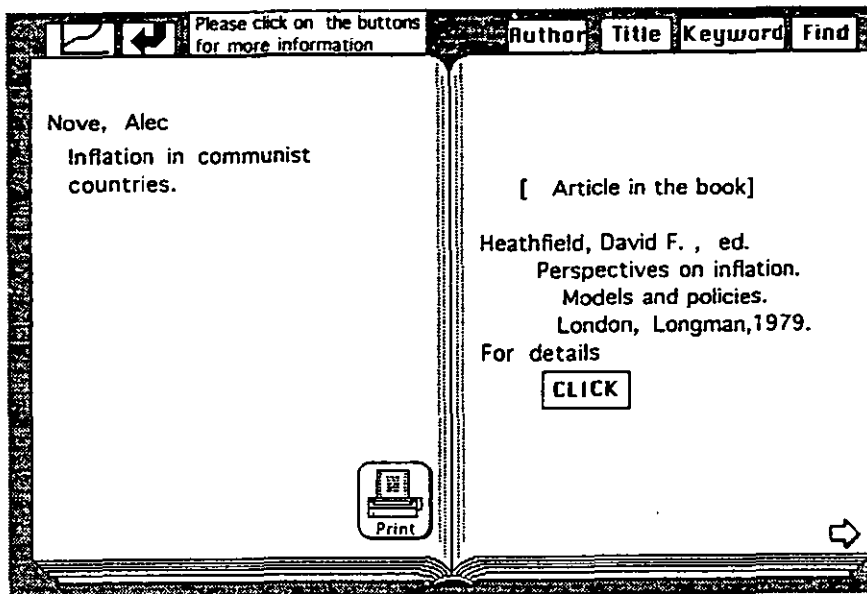Vol. 81(1) p.207-11.
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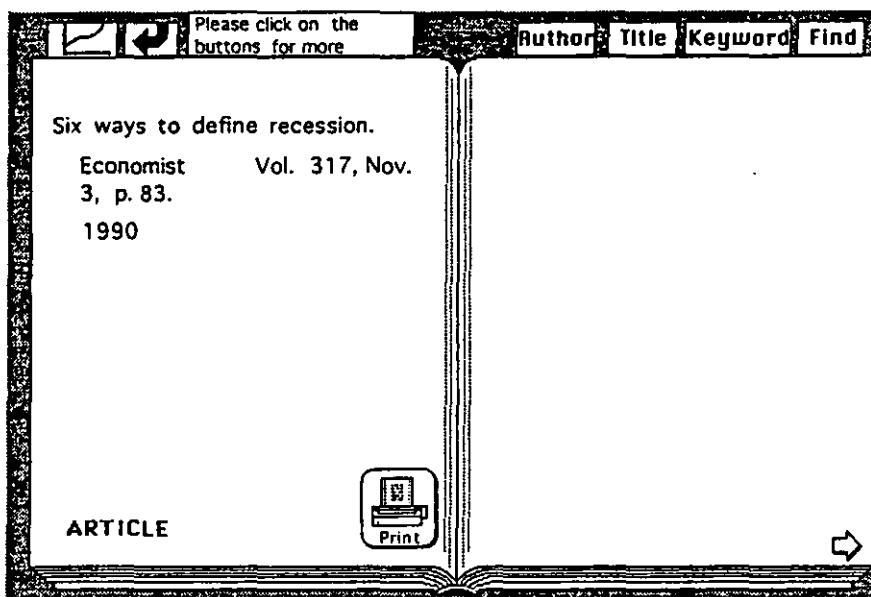economic development.

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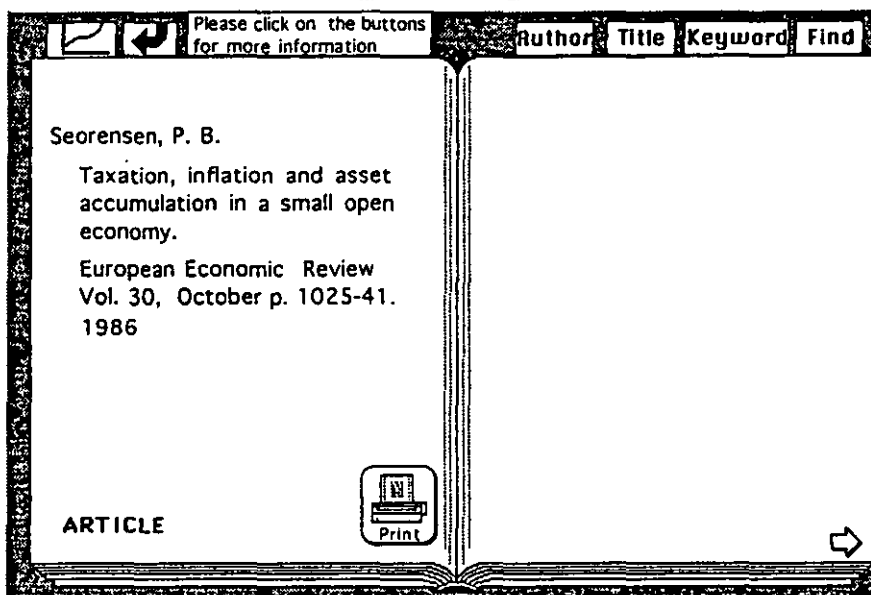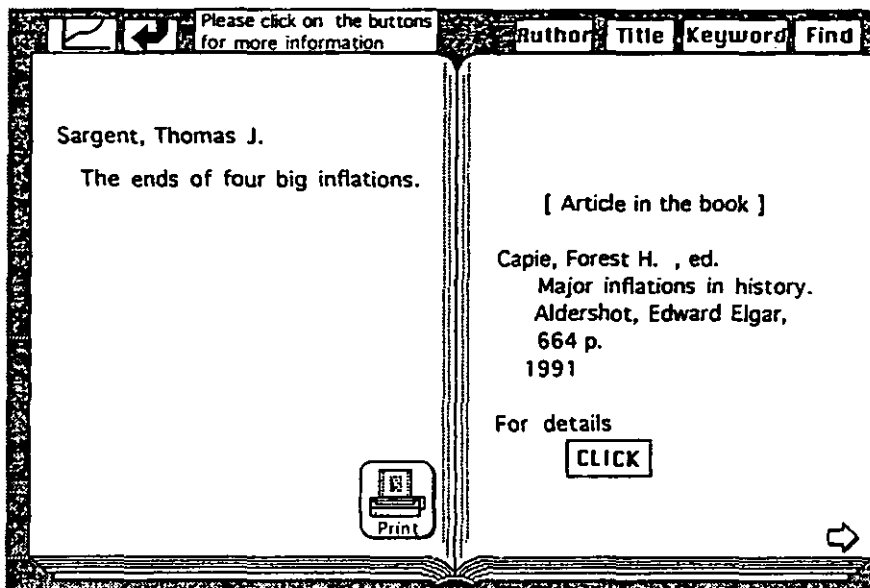
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RECENT INFLATION DEVELOPMENTS
PRODUCER PRICES (manufacturing)
Percentage changes from previous period, not seasonally adjusted

	At average annual rate				12 months to March 1992	6 months to March 1992
	Average 1979-88	1989	1990	1991		
USA	3.7	5.1	4.9	2.1	0.9	0.5
JAPAN	0.6	2.1	1.6	1.7	-0.6	-0.4
Germany	2.5	3.4	1.5	2.0	2.3	0.7
FRANCE	6.3	5.4	-1.2	-1.3	-3.6	-1.7
ITALY	--	5.9	4.1	3.3	1.3	1.1
U K	6.7	5.1	5.9	5.6	4.5	2.4
CANADA	5.4	2.0	0.3	-1.0	-1.4	0.7
Total of above countries	4.4	3.3	2.o		0.3	0.2

INFLATION PROJECTIONS
GDP deflators In major OECD countries and country groups
Percentage changes from previous period,seasonally adjusted at annual rates

	Average 1979-88	1989	1990	1991	1992	1993
USA	5.6	4.4	4.1	3.6	2.8	2.8
JAPAN	2.0	1.9	2.1	1.9	1.7	1.6
Germany	3.2	2.6	3.4	4.6	4.5	3.8
FRANCE	7.9	3.2	3.1	3.0	3.1	2.7
ITALY	12.8	6.1	7.6	7.3	5.3	4.4
U K	8.3	7.1	6.4	6.9	5.1	3.7
CANADA	6.3	4.7	3.0	2.7	1.9	2.2
Total of above countries	5.4	3.8	3.9	3.7	3.0	2.8
Other OECD countries	9.2	8.1	7.4	6.8	6.0	5.6
Total OECD	6.0	4.5	4.4	4.1	3.5	3.2