

**REPRESENTATION OF CROSSDISCIPLINARY
SUBJECTS IN INFORMATION RETRIEVAL TOOLS**

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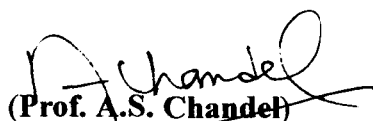
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This thesis is being submitted to North-Eastern Hill University for the degree of Doctor of Philosophy in Library and Information Science.



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CONTENTS

<i>Certificate</i>	<i>i</i>
<i>Acknowledgement</i>	<i>ii</i>
<i>List of Figures</i>	<i>iii</i>
<i>List of Tables</i>	<i>iv</i>
Chapter-1: Introduction	1
Chapter-2: Literature Review	28
Chapter-3: Methodology	63
Chapter-4: Conceptual Analysis of Crossdisciplinary Subjects	78
Chapter-5: Evaluation of Information Retrieval Tools	217
Chapter-6: Analysis and Interpretation	361
Chapter-7: Summary of Findings and Suggestions	374
Annexures	
Bibliography	

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A handwritten signature in black ink, consisting of a long horizontal stroke with a vertical line intersecting it near the center, and a small loop at the end of the horizontal stroke.

(**Lalhmachhuana**)

Dated, Shillong

the 12th August 2003.

LIST OF FIGURES

- Figure-1: Break-Up of Crossdisciplinary Subjects**
- Figure-2: Incidence of Modes of Representation in IR Tools**
- Figure-3: Incidence of Modes of Representation in CC7**
- Figure-4: Incidence of Modes of Representation in DDC21**
- Figure-5: Modes of Representation by Category in LCSH25**

LIST OF TABLES

- Table-1: Modes of Formation of Crossdisciplinary Subjects**
- Table-2: Break-Up of Crossdisciplinary Subjects**
- Table-3: Incidence of Modes of Representation in IR Tools**
- Table-4: Incidence of Modes of Representation in CC7**
- Table-5: Incidence of Modes of Representation in DDC21**
- Table-6: Incidence of Modes of Representation in LCSH25**
- Table-7: Relationship between Modes of Formation and Modes of Representation**
- Table-8: Difference among IR Tools**
- Table-9: Relationship among Modes of Formation**

CHAPTER – 1

INTRODUCTION

1.0 INTRODUCTION

Knowledge has always been in a state of flux - a continual and tumultuous process of unpredictable reconfiguration necessitated by revolutionary changes in research traditions, technology, groundbreaking discoveries, and the increasing fluidity of traditional disciplinary structures. The universe of knowledge, as we know it today, comprises of heterogeneous components of organized bodies of ideas transcending both space and time. Ranganathan (1944) had long remarked that *“knowledge all over the world is being diversified along one line and synthesised along another in a continuous almost bewildering flux in varied media”*. Indeed, in the contemporary academic world, knowledge has become increasingly less compartmentalized and even the most specialized subjects tend to become crossroads where activities from many different directions converge.

The universe of knowledge is a tumultuously dynamic continuum, where new knowledge is continuously created, transmitted and utilized. The dynamics of the contemporary intellectual environment can be observed in the conduct of researchers who are increasingly crossing intellectual boundaries to exchange information, techniques and tools, and colleagues from different backgrounds are now working together to solve common problems. Such interaction, collaboration and interdependence among practitioners belonging to distinct disciplines or specific knowledge domains have led to the phenomenon of "crossdisciplinarity"

(Dahlberg,1994). Crossdisciplinarity refers to the various modes of interaction and exchange of domain knowledge between or among distinct disciplines. Disciplines, after all, are not as clearly bounded as is commonly assumed, and the delimitation of knowledge into distinct compartments is no longer a desirable proposition.

Traditional disciplines constitute a series of overlapping areas of knowledge whose connection with the basic classification of fields is variable and sometimes ill-defined. The heterogeneity and overlapping of traditional disciplines has the further effect that their contents vary from time to time and from place to place. In many fields of knowledge, especially in the social sciences where the same concept is used in different discipline-specific contexts, the literature of that field provides the context in which a term is used and represented. In the social sciences, objects of analysis are now increasingly seen as complex, uncertain and contested spaces. Even when studies do not reflect a crossdisciplinary effort on the part of the researchers, scholars in other fields very often use the methods and results of such research. Indeed, researchers have often sought other conceptual frameworks under which to place issues, realizing perhaps that their own disciplines lack sufficient methodology with which to study the new object/subject. This way, even theoretical research in a discipline is unable to confine within its own field. Crossdisciplinarity in all areas of knowledge has, therefore, become the norm rather than the exception.

1.1 PATTERNS OF CROSSDISCIPLINARITY

The patterns in which disciplines interact among themselves have attracted the attention of library and information science researchers, practitioners, as well as scholars from a range of other disciplines for quite some time now.

In the realm of library and information science, S.R. Ranganathan was a pioneer who, in the course of devising and refining the Colon Classification scheme, readily acknowledged the immense potential of the universe of knowledge in throwing forth new ideas, concepts and subjects in various possible combinations and permutations. His ideas, later enshrined in *Prolegomena to Library Classification* (Ranganathan,1967), constitute the most fundamental contributions towards the formal enunciation of a conceptual model for the study of the universe of knowledge specifically relating to the structure and development of subjects and the identification of the modes of formation of subjects as prerequisite steps towards securing their appropriate representation and helpful sequence in IR tools.

Developmental studies of subjects, i.e., tracing the genesis, history and progress, inevitably lead to the recognition of subject structures at different stages of their growth. This inevitably helps in identifying and distinguishing the various modes of formation of subjects, ultimately leading to better

comprehension of the association among, within and between the constituents of the universe of subjects. While such understanding provides an insight into the nature of the bond among the constituents in the overall scheme of the universe of knowledge, it is equally crucial in designing information systems geared to the requirements of existing as well as potential users. In this regard, the works of Gopinath (1984a;1984b) and Binwal (1992a) have been highly illuminating both for scholars and practitioners in the field.

As regard to the types and structural patterns of subjects, Ranganathan had proposed that a subject could be either a "Basic Subject" or a "Compound Subject" or a "Complex Subject". His conceptual analysis and precise definition of subjects, their component ideas/concepts and their relations forms the basis for the structural study of existing as well as newly emerging subjects. Ranganathan was able to further recognize the various types of relationships among the ideas/concepts of distinct subjects, the patterns of interaction among subjects (including their facets and arrays) and their possible configurations. He has aptly defined these patterns as "Modes of Formation of Subjects". These modes, according to Binwal (1992a), represent *"a typology of relations and act as guiding ideas in recognizing and formulating relations among concepts constituting a subject."* These modes constitute a fundamental contribution to the development of knowledge classification, representation and organization.

Ranganathan, in the course of refining his ideas enshrined in the *Prolegomena*, was able to recognize twelve Modes of Formation of Subjects, namely:

- (1) Loose Assemblage (Kind 1)
 - (2) Loose Assemblage (Kind 2)
 - (3) Loose Assemblage (Kind 3)
 - (4) Lamination (Kind 1)
 - (5) Lamination (Kind 2)
 - (6) Lamination (Kind 3)
 - (7) Denudation
 - (8) Dissection
 - (9) Fusion
 - (10) Distillation
 - (11) Clustering (earlier Subject Bundle)
 - (12) Agglomeration (earlier Partial Comprehension)
- | = Fission

Of the above, the Modes of Formation of Subjects that can be specifically attributed to the formation of crossdisciplinary subjects are:

- (1) Loose Assemblage (Kind 1)
 - (2) Denudation
 - (3) Dissection
 - (4) Fusion
 - (5) Distillation
 - (6) Clustering
 - (7) Agglomeration
- | = Fission

The above seven modes of formation of subjects, which are not to be considered as mutually exclusive, contribute to the formation of new crossdisciplinary subjects through various stages of the growth and

development of subjects over a period of time. In most cases, new crossdisciplinary subjects evolve through several stages of development characterized by the interplay of forces of different modes of formation till the subjects crystallize into formally recognized crossdisciplinary subjects.

Neelameghan (1974) had identified several modes of interaction responsible for the emergence of crossdisciplinary subjects. These modes of interaction are not mutually exclusive and may even occur in a gradual manner starting from stage 1 to stage 5, and are categorized as:

- (1) **Juxtaposition of studies on a phenomenon:** The juxtaposition of studies is the result of work done in different fields of knowledge on a single problem brought together in symposia, reports or handbooks and initiating the process of interaction among disciplines.
- (2) **Borrowing of data:** Interaction among disciplines is often promoted through borrowing of data from one discipline for use in other disciplines. Such borrowing helps in minimizing unnecessary duplication of research efforts besides accelerating the development of the disciplines involved.

- (3) **Borrowing of techniques and tools:** One of the commonest ways in which disciplines interact is through the borrowing of techniques and tools developed in one discipline by another. The application of measuring techniques, mathematics, logic, statistical techniques in such fields as physics, chemistry, biology, agriculture, medicine, linguistics, psychology, political science, economics and sociology are illustrative of the phenomenon of borrowing across disciplinary boundaries.
- (4) **Borrowing of principles and theories:** The fundamental theory of a discipline developed in the form of laws and principles are often borrowed and applied for the development of the theoretical base of another discipline. This provides a closer bond between the interacting subjects than other types of interaction. Piaget (1964) labelled such an interaction as “hybridization” with fruitful recombination or mutual enrichment of the disciplines involved.
- (5) **Convergence of viewpoints:** Convergence of viewpoints is usually the outcome of team research when researchers in different disciplines tackle the same problem simultaneously and synchronize their efforts, exchange findings, draft separate

reports, conduct interdisciplinary dialogue, and integrate their findings into a final report or study.

The above modes of interaction among disciplines put forward by Neelameghan reflect the incidence of crossdisciplinarity in its various stages as a matter of necessity and not mere accident.

A major work relating to the patterns of crossdisciplinarity has been that of Dahlberg (1994) who identified five typologies of crossdisciplinarity through which the “cross-fertilization” of the contents of knowledge domains among one another has led to the emergence of crossdisciplinary subjects. These typologies include:

1) **Interdisciplinarity** - when a discipline is studied under the aspects of more than one other discipline. In other words, interdisciplinarity is generated by the aspects of various knowledge fields influencing a specific other knowledge field. For example, we find investigations in a discipline like Political Science in relation to Geography, Psychology, Sociology, History, Philosophy, and Ethics giving rise to a new crossdisciplinary subject identified with a definite nomenclature as Political Geography, Political Psychology, Political Sociology, Political History, Political Philosophy, and Political Ethics respectively. In other words, interdisciplinarity involves a certain degree of synthesis between two or more disciplines and may generate a new discipline as a result.

2) **Transdisciplinarity** - when the methods of one knowledge field are applied to many other fields, thereby giving rise to new crossdisciplinary subjects. For instance, specific methods of Political Science applied in other disciplines gives rise to subjects such as Energy Politics, Agricultural Politics, Environmental Politics, Financial Politics, Cultural Politics, etc.

3) **Multidisciplinarity** - when only a certain fact or case is studied in its matter and effects from the point of view of many disciplines, thus applying a “multi-aspectism” approach to such a fact or case in order to find clues and methods to tackle a problem. In such cases, there is always one item that is picked out of an original discipline and investigated separately by experts from related disciplines for as long as necessary. Multidisciplinarity is usually ad-hoc and may not always lead to the creation of new or autonomous knowledge fields. Investigations into the properties and uses of Water as a concern in Physics, Chemistry, Agriculture, Forestry, Transportation, Medical Science, Geology, etc., represent a familiar instance of multidisciplinarity. The “mission-oriented” team research efforts of the 1960s and early 1970s on issues concerning Energy, Space, Transportation, Urbanization, etc., are classic examples of the phenomenon of multidisciplinarity.

4) **Pluridisciplinarity** - when a certain property assumes a common research concern in several disciplines. For example, investigations into the problems and solutions involved with “System Security” as a concern in industrial management,

banking, public transportation, power plants, buildings, space vehicles, computer science, etc., are typical pluridisciplinary endeavours.

5) **Syndisciplinarity** - when a certain case or object is studied by a number of disciplines working together in such a way that a synthesis of the result is aimed at. For instance, it involves the cooperation of experts from different fields such as electrical engineering, communication technology, solid-state physics, mechanics, cognitive science, and computer science to construct a rather complex item, such as a | “Nanorobot”.

While Dahlberg’s typologies mentioned above are somewhat overlapping and in some cases don’t appear to be mutually exclusive, taken together they epitomize the nature and changing structure of knowledge. Thus, crossdisciplinarity is generally characterized by instability, lack of predictability, and spontaneous response to politically, socially, and environmentally based issues. Dahlberg’s study has been significant for its definitive clarification of the phenomenon and typologies of crossdisciplinarity witnessed today.

According to Dogan (1997), the patterns of crossdisciplinarity, irrespective of the nomenclature used, involve basically the same mechanisms that fall under two broad patterns, namely, (a) Borrowing or Lending, and (c) Collaboration. These patterns may be described as follows:

(a) **Borrowing/Lending:** The inseparable and most frequently used means of crossdisciplinary knowledge transfer include:

(i) **Borrowing/Lending of Concepts:** Concepts are the germinal grains of theories - structure becomes structuralism, system becomes systemism, capital becomes capitalism, modern becomes modernism and so on. Concepts have a notorious tendency to peregrinate from one discipline to another. Borrowed concepts often need some adaptation to the context of the new discipline, because a concept is not only a term, but it is also a notion or an idea. Most concepts have multiple origins and therefore also convey different meanings at different points of time.

(ii) **Borrowing/Lending of Methods:** Methods that originate in one discipline nowadays quickly find application in related as well as seemingly disparate disciplines. There are certain intermediary subject areas, e.g., psychology or economics for instance, which play a crucial role in the methodological enrichment of the recipient disciplines. Methods such as tabular demonstration, graphic presentation, measures of variability, ratios, sampling

distribution, factor analysis, etc., have been imported and some, after improvement, have been exported in refined forms. The introduction of mathematical and statistical methods across many disciplines has proved immensely valuable not only for their own contributions but also as a prelude to additional exchanges. However, indiscriminate borrowing of methods and tools has been responsible for disputes, particularly in the case of disciplines that give more emphasis on technique rather than substance.

(iii) **Borrowing/Lending of Theories:** Theories have an inherent tendency to effect cross-fertilization, a major contributor to the crossdisciplinarity that abounds today. Though a discipline as a whole cannot have a universal and monopolistic theory, the specialized domains within it need theoretical orientations. Within a domain, several theories may confront one another often resulting in the discreditation of some by their replacement with more viable theories.

(b) **Collaboration:** Collaboration as a means of information transfer has been attracting increasing attention among researchers on the phenomenon

of crossdisciplinarity. Collaboration across disciplinary boundaries is a more complex form of information/knowledge transfer.

Collaboration emerges in contemporary workplaces when members of different disciplines work together in practical applications. Knowledge emerging from such technical applications may differ from that found in traditional disciplinary literature. Though some simplification of theories, concepts and methods are usually required for collaborators from different disciplines to work together on a problem, yet, conflicting priorities can often complicate attempts to collaborate across disciplinary boundaries. Collaboration, almost by definition, requires compromise, but it may be superior to borrowing since members of the disciplines from which information is drawn also participate in its interpretation and use. Most of the existing crossdisciplinary subjects owe their origins to the collaborative efforts of the "mission-oriented" or "problem-focussed" research projects of the 1960s-70s, a trend still discernible even today.

From a wider perspective, Dogan further argued that the phenomenon of crossdisciplinary knowledge transfer occurs not only through the exchange of concepts, theories, methods and collaboration among disciplines and between subdisciplines, but that *"it is also evident in exchanges of information, substance, indicators, statistical data and in the daily praxis of empirical research."* As such, since crossdisciplinarity is not always

manifested explicitly, the degree of interaction or collaboration between or among disciplines is often difficult to discern and demarcate.

Pierce (1999) also recognized three modes of crossdisciplinary knowledge transfer, namely, i) borrowing, ii) collaboration, and iii) boundary-crossing. While agreeing to borrowing and collaboration as described by other writers, Pierce preferred the nomenclature "boundary-crossing" to describe the "lending" or "export" activities of researchers and practitioners. To him, boundary-crossing is a much more direct form of crossdisciplinary information transfer than either borrowing or collaboration. In effect, it implies not merely the publication of articles outside one's disciplinary affiliation, but that such articles find a receptive audience from the disciplines that publish them. In other words, such publications must receive citations from researchers in the disciplines in which they are published, and even from scholars in related disciplines. Authors publishing in other disciplinary literatures have greater control over the context in which information is presented, and are likely to be more accurate in representing the content and perspective of their own disciplines. Boundary-crossing, therefore, is potentially the most effective means of crossdisciplinary knowledge transfer since presentation and interpretation remain under the control of a member of the discipline from which the information originates.

Table-1 below depicts the various patterns of crossdisciplinarity and modes of formation of crossdisciplinary subjects suggested by different scholars:

Table-1: Patterns of Crossdisciplinarity and Modes of Formation of Crossdisciplinary Subjects

RANGANATHAN (1967)	NEELAMEGHAN (1974)	DAHLBERG (1994)	DOGAN (1997)	PIERCE (1999)
Loose Assemblage Kind-1	Juxtaposition of Studies	Interdisciplinarity	Borrow/Lending of Concepts	Borrowing
Dissection	Borrowing of Data	Multidisciplinarity	Borrow/Lending of Methods	Collaboration
Denudation	Borrowing of Tools	Transdisciplinarity	Borrow/Lending of Theories	Boundary-crossing
Fusion	Borrowing of Theories	Pluridisciplinarity	Collaboration	
Distillation	Convergence of Viewpoints	Syndisciplinarity		
Clustering				
Agglomeration				

1.2 EMERGENCE OF CROSSDISCIPLINARY SUBJECTS

Crossdisciplinary subjects emerge when the solidarity of existing disciplines begins to break down. In effect, crossdisciplinary subjects are "*products of the ontology of differentiation (analysis) and integration (synthesis)*" - the two powerful forces responsible for the tumultuous state of knowledge (Gopinath, 1984a). Reconfigurations within disciplines are effected by new approaches, societal changes, and creation of new knowledge as a result of pathbreaking research, new topics of current concern, or a combination of these. Knowledge structures, so long considered the standard frame of reference for our thoughts, our literary/academic output and research, have begun to split, fragment, and merge to spawn new and previously

unknown relationships "*within, among and between*" disciplines (Beghtol, 1995). Further, Ranganathan (1967) had aptly observed that the universe of knowledge is a "continuum" where "*no subject can be developed without its calling for some development in every other subject*". Today, no discipline or specialised domain can afford, nor attempt, to stand in isolation disregarding developments in other disciplines or speciality domains. New divisions demarcating the subjects into fields of specialization are increasingly overlapping and criss-crossing the increasingly indistinct boundaries. It is now generally acknowledged that crossdisciplinary investigations at the disciplinary boundaries are really fault lines or frontiers that conceal future scientific revolutions.

It may be reiterated that in the social sciences, influences cross over from one field to another, leading to the creation of new crossdisciplinary subjects. Interaction among the various social science disciplines is bringing about new fields which are increasingly obscuring traditional disciplinary boundaries. The maturity of such areas of knowledge is reflected in the degree of standardization of nomenclatures, i.e., terminological consensus, the lack of which has had perplexing consequences on the patterns of communication of knowledge across the disciplines. Inevitably, there are problems in defining what constitute the social sciences because all knowledge is interrelated and, more often than not, it is difficult to ascertain where the boundaries of one social science discipline end and another begins. Evolution, change, division into subfields, and formation of new specialised fields characterize the structure and development of the social sciences. Thus, dynamic interaction among the social

sciences and their integration with the humanities and the behavioural and natural sciences has become the order of the day.

However, in the social sciences, unlike the natural sciences, certain inherent problems have added to the already overwhelming dilemma associated with crossdisciplinarity, namely, the imprecision of social science vocabularies, the proliferation of specialized terminology, and the marked cultural and ideological contrasts in basic approaches to research (Rokkan, 1974).

1.3 CONSTRAINTS OF INFORMATION RETRIEVAL TOOLS

Viewed from the library and information perspective, problems - both conceptual and structural - arise when information retrieval (IR) tools are required to systematically and specifically represent crossdisciplinary subjects, their concepts and other elements. This problem presents the most complex and intriguing area of contemporary knowledge organization and information retrieval practice.

The most immediate and visible impact of crossdisciplinary subjects is felt by classification schemes. The rigidity of most existing classification schemes does not mesh well with the burgeoning fluidity of the academic environment and the multifaceted, interaction-intensive information world of the present. There is a clear need for classification schemes to respond in order to become increasingly flexible and hospitable to change. The continued

use of antiquated IR tools has, no doubt, proved highly problematic to the profession that applies them. While information systems are now larger, more complex and robust, it is regrettable that most classification schemes, in particular, have not developed in parallel. The only consolations are the stop-gap attempts to try to put into place a patchwork of modifications and additions to accommodate new needs. It is then not surprising to note that many scholars as well as practitioners have suggested radical adaptations or major changes in existing schemes to meet exigencies, while others take the opportunity to propagate their own improvised ideas and schemes. The tendency of most researchers to suggest alternative systems is indeed a matter of serious concern.

IR tools adopted by libraries and information centres, such as classification systems and subject headings, are basically designed to organize and represent, symbolically or descriptively, the concepts of disciplines or fields of knowledge for access and retrieval purposes in information systems. The major IR tools that have been adopted by the library and information world were originally predicated on the traditional academic disciplines. This structural principle is no longer adequate because crossdisciplinary knowledge creation, diffusion and utilization have overtaken traditional disciplinary perspectives and produced discourse communities whose documents cannot be readily accommodated in any disciplinary structure.

Thus, IR tools which primarily aim to organize and structure the universe of subjects are, therefore, constrained by the complexities of representing subject matter that is emotive in context, vague in definition and imprecise in terminology as is the case with the social sciences.

1.4 SIGNIFICANCE OF THE STUDY

It is fortunate that library and information practitioners are in strategic positions to bear witness to the complex problems posed by crossdisciplinarity that most scholars in other disciplines, in fact the actual practitioners, are reluctant to recognize early enough. The complex problems posed by crossdisciplinary subjects, particularly to the library and information science profession, require an objective and in-depth analysis of the phenomenon of crossdisciplinarity in its entirety. It is against this backdrop that the present study attempts an analysis of the components involved in the formation of crossdisciplinary subjects and a systematic evaluation of some information retrieval tools in terms of their capability to represent such crossdisciplinary subjects.

The present study is one of the first few efforts towards a conceptual analysis of, and an inevitable response to, the contemporary crossdisciplinary environment and its impact on IR tools. It is one of the first efforts to

conceptualize, evaluate and eventually suggest new techniques for the representation of crossdisciplinary subjects. The study also seeks to contribute to contemporary research on knowledge organization while considering the significance of subject representation in major IR tools. It is with the hope that the issues highlighted, the evaluation methodology presented, and the suggestions offered could provide further research with the much-needed conceptual framework and methodology for similar studies, besides highlighting the fundamental challenges ahead. The logical extension of this study is to explore other techniques for the representation and control of existing as well as new and emerging crossdisciplinary subjects in relevant knowledge fields.

Another significant aspect of the present study relates to the necessity of establishing valid criteria for evaluating the performance of IR tools. The study is an attempt to clarify practical problems that must be solved because knowledge of the specific factors determining the performance of IR tools is a prerequisite for any attempt to improve their performances. Such improvements, it is felt, can only be rendered possible through critical studies on the treatment of existing knowledge domains in IR tools, with particular reference to the representation of crossdisciplinary subjects as they emerge.

The present study has been greatly encouraged by the pioneering works and suggestions of several authorities in the field, such as Ranganathan (1944; 1967), Kyle (1960), Foskett (1971;1991), Neelameghan (1974), Vickery (1976), Gopinath (1984), Brittain (1984;1986;1989), and Dahlberg (1994; 1998), to name a few, on the need to undertake major studies to examine whether major IR tools have been able to incorporate the changes necessitated by the increasing fluidity of knowledge structures particularly in the social sciences.

The present study, therefore, has been undertaken with the expectation that a simple, yet powerful, methodology could be evolved to identify the existing as well as new subjects that are products of the contemporary crossdisciplinary academic environment. It was felt that such crossdisciplinary subjects identified, selected and analyzed could be compared with the provisions for them in the major IR tools. Such research is needed to test the efficacy of the IR tools and to determine how the representation of subjects and their concepts might vary depending on how the structuring of disciplines has been effected, and how they are affected by the contemporary crossdisciplinary environment.

1.5 OPERATIONAL DEFINITIONS

The following are the operational definitions of the concepts used in the present study:

(1) **Representation:** Representation is the principal basis on which information retrieval systems retrieve data, information and other knowledge entities. It involves a process whereby a subject proposition is represented *a priori* as a class number, data structure, subject heading, subject index term, or other surrogate to facilitate efficient organization, search and retrieval in information systems. Representation, in the present study, refers to subject representation by description based on analysis of the components of subjects and translating them into a definite syntactical order or some artificial language of ordinal numbers or symbols.

(2) **Crossdisciplinarity:** Crossdisciplinarity refers to the various modes of interaction and exchange of domain knowledge between or among distinct disciplines. In the present study, the term is used in its broadest sense to indicate all manifestations of interactions that cross disciplinary boundaries.

(3) **Crossdisciplinary Subjects:** Crossdisciplinary subjects are the manifest products of crossdisciplinarity between or among distinct disciplines. For the purpose of the present study, a crossdisciplinary subject is defined as

a subject expounding the juxtaposition, or formed by the synthesis of two or more, or convergence of several, distinct disciplines.

(4) **Information Retrieval Tools:** Information retrieval is the action of, or methods and procedures for, recovering specific information about, or from, a collection of stored data, documents, or their surrogates. Information retrieval is rendered possible through the aid of appropriate tools. In the present study, the term “information retrieval tools” (IR tools) is used to collectively refer to the universal subject indexing languages, namely, the Dewey Decimal Classification (21st Edition), the Colon Classification (7th Edition), and the Library of Congress Subject Headings, 25th Edition, 2002.

(5) **Knowledge Domain:** In the present study, a knowledge domain refers to a narrow and well-bounded speciality, field, discipline or subject matter.

(6) **Discipline:** A discipline is a formalized knowledge structure that provides for acquiring or advancing knowledge through the use of evidence and arguments, theories and methods according to rules fundamental to the area of knowledge in question. In the present study, the term discipline is understood in the traditional sense as one of exclusivity used to distinguish one formalized area of knowledge from another.

(7) **Subject:** In the present study, the term “subject” is used in the generic sense to refer to a division of the universe of subjects within which a particular academic or scientific activity is pursued, developed, and sustained.

(8) **Social Sciences:** The term “social sciences” is used to refer to those knowledge fields that study human beings as social beings or groups, or the behaviour of individuals or groups in their varieties of associations among themselves. In the present study, which acknowledges the pre-eminence of existing formal disciplinary structures, the social sciences involved in the study broadly include the following traditional areas: Anthropology, Communication Science, Criminology, Demography, Economics, Education, Ethics, Geography, History, Law, Linguistics, Management Science, Philosophy, Public Administration, Political Science, Psychology, Sociology, and Statistics.

(9) **Subject Descriptor:** A descriptor is an authorized entity identifier that can be used for retrieving other entities. A subject descriptor is usually an identifier selected from a pool of preferred terms, or controlled vocabulary, to represent a subject domain or concept for search and retrieval purposes. In the present study, a subject descriptor refers to an authorized subject term that represents documents or their surrogates in the SSA-CDROM database.

1.6 SUMMARY

The phenomenon of crossdisciplinarity has indeed pervaded most of the social science disciplines, and has consequently resulted in the emergence of crossdisciplinary subjects encompassing various issues, topics, problems, and techniques. While the patterns of crossdisciplinary interaction and exchange of domain knowledge remain essentially the same, the typologies of crossdisciplinarity suggested by scholars from both the social sciences and library and information science need refinement. In view of the multidimensional characteristics of crossdisciplinarity in the social sciences, the present study appropriately attempts to examine some significant aspects of the phenomenon with special emphasis on the emergence, structure and development of major crossdisciplinary subjects in the social sciences and their impact upon, and treatment in three major information retrieval tools.

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CHAPTER – 2

LITERATURE REVIEW

2.0 INTRODUCTION

Though the phenomenon of crossdisciplinarity leading to the emergence of crossdisciplinary subjects can be traced to the very beginnings of the main traditional academic disciplines themselves, interest in the emergence, structure and development of crossdisciplinary subjects and their impact on IR tools is a recent trend that started since the second half of the twentieth century. Studies on the phenomenon of crossdisciplinarity gained momentum towards the close of the twentieth century and continue to generate much debate among scholars in diverse fields.

The following review, therefore, attempts to describe the concerns expressed by social scientists, highlight major studies undertaken by library and information science researchers and practitioners, and review the suggestions for the improvement of the major IR tools.

2.1 LITERATURE REVIEW

There are some significant related studies that could be identified from both the social sciences literature and library and information science literature pertaining specifically to studies on the phenomenon of crossdisciplinarity and its inevitable impact on IR tools. Library and information science professionals, both as researchers and practitioners, have been quick to recognize the problems arising out of the fluidity

of contemporary knowledge structures, particularly in relation to the tools adopted for organizing and facilitating the retrieval of surrogates of knowledge available in various forms. There have been many studies undertaken on the various issues and problems arising out of the use of general classification schemes and subject heading lists, though the emphasis varies from one author to another.

Though there have been several studies on the systems of knowledge organization and vocabulary control devices that have gained acceptance in the library and information world, however, only a few studies specifically relating to the evaluation of information retrieval tools exist. Studies on how IR tools represent the various manifestations of interaction, collaboration and mutual dependency among the disciplines, particularly in the social sciences have been somewhat isolated.

During the 1960s and 1970s, considerable amount of research on information retrieval problems in specific disciplines were undertaken by the professional bodies in the social sciences, such as the American Psychological Association, and the American Economic Association. Soon, research projects like Investigation into Information Requirements of the Social Sciences INFROSS (1971), and Design of Information Systems in the Social Sciences DISISS (1980) covering many aspects of social science documentation were supported by funding bodies. Several individual academicians and practitioners have also written about the increasing fluidity of knowledge structures in the social sciences with emphasis on the capabilities of IR

tools in facilitating explicit and adequate access to social science knowledge. More recently, several studies have emerged which reflect the concerns of social scientists towards the crossdisciplinary academic environment and the changing knowledge structures.

A significant study by Foskett (1971) critically analyzed the problems relating to indexing and classification in the social sciences from the users' perspective. Foskett highlighted the structural weaknesses of major IR tools, such as the DDC, UDC, CC, LCSH, KWIC and PRECIS, through specific instances of their inability to represent new and emerging subjects in the social sciences.

Foskett advocated the technique of "Facet Analysis", first coined by Cordonnier and later applied by Ranganathan, for any systematic organization of the knowledge structures where almost all disciplines spawn new subjects of varying complexities. Foskett strongly felt that facet analysis provided a technique by which the subject matter of documents could be systematically analysed, ordered and represented in IR tools in a manner that satisfied the users' multifarious approaches to information and other surrogates of knowledge. Facet analysis, when applied to IR tools, provides for the systematic representation of even the most complex subjects, especially the crossdisciplinary subjects.

Foskett concluded that more intense research on, and revisions of, IR tools was required in the context of the increasing fluidity of existing knowledge structures. A more exhaustive treatment of the problem was given in his classic work *Classification and Indexing in the Social Sciences* (Foskett, 1974), which describes in detail the problems associated with information retrieval in the social sciences, and the increasing inability of existing information retrieval systems in meeting the challenge.

A related study by Chand (1978) emphasized the need for recognizing and providing for Phase Relations in classifications schemes, and also discussed and compared the provisions of CC and DDC in terms of their provisions for such relations. Though the study was based on the provisions for Phase Relations in CC (6th Edition) and DDC (18th Edition), the problems associated with the representation of complex subjects remain fundamental to subsequent editions of the classification schemes as well. While the concept and technique of Phase Relations had been recognized in CC as an essential feature, the terminology associated with Phase Relations had not been adopted by the DDC though some similar provisions exist.

The author concluded that the technique of Phase Relations forms a vital component of a universal classification scheme which attempts to incorporate new ideas, concepts, and subjects as they emerge. In this respect, further steps to integrate Phase Relations in the subsequent editions of DDC could greatly enhance its application.

Brittain (1979) traced the development of information services and the major research efforts to design information organization and retrieval tools geared to meet the needs of the social sciences. The author's critical examination of the knowledge structures, communication systems, and information services in science and technology vis-à-vis those of the social sciences has highlighted the fundamental differences in the daily praxis of these two major fields of knowledge. Brittain asserts that there are wide differences in the degree of consensus in respect of concepts, terminology, viewpoints, methods, and tools between the two fields. While scientists generally tend to exhibit a high degree of consensus in the daily praxis of empirical research, the reverse is the case in respect of social scientists who are overwhelmed by conflicting schools of thought, lack of research continuity, and difficulty in replication of empirical data to support research and theory building.

Brittain argued that the library and information profession, though armed with sophisticated information retrieval tools, had not been able to provide efficient and precise information retrieval and dissemination services to the social science community as much as it had been able to provide in the case of science and technology.

Brittain concluded that the lack of general consensus within the social sciences had placed severe constraints on the library and information profession's attempts to create standardized tools and 'tailor-made' services which could comprehensively

embrace the diverse, and often conflicting, information needs and communication patterns exhibited by academicians, researchers as well as practitioners in the social sciences. This situation had further aggravated the problems of organization and retrieval of documents belonging to the social sciences in libraries in particular. Traditional information retrieval tools adopted by libraries are increasingly confronted by the dilemma of organizing surrogates of disciplinary knowledge structures professing to belong to one area of knowledge – the social sciences.

Another significant study by Satija (1979) highlighted the need for classification schemes to provide for multi-phased subjects while laying emphasis to the provisions for representation of complex subjects in Colon Classification. The author acknowledged the role of intellectual cooperation among scholars for conducting interdisciplinary studies, and asserted that the juxtaposition of two subjects had become partly responsible for the exponential growth of knowledge. Satija reviewed briefly the techniques adopted by other classification schemes such as DDC, UDC, and LCC for the representation of complex subjects, and argued that the CC had been the only scheme to anticipate and provide for the representation of complex subjects formed by the interaction between two distinct or related subjects.

Satija further opined that there had never been any restriction for the application of Phase Relations only to two-phased subjects; but that it was possible to extend Phase Relations to express the interaction of three or more subjects giving rise

to three- or multi-phased complex subjects as may be warranted. Citing the example of the complex subject “Geopolitics”, the author affirmed that while synthesis was required in the 6th edition of CC to construct a class number for the subject, the 7th edition had enumerated it as a main class. Thus, a number for a three-phased subject like “Commerce and Geopolitics” could be admitted in the 7th edition of CC. This, however, had been possible not due to any extension in phase relations, but due to changes in the main classes. Ranganathan had obviously avoided any explicit provision for three or more phased subjects because the literary warrant of that time had not brought up many such classes. Satija thus suggested that a typical extension of phase relations to represent multi-phased complex subjects would be: General Relations between Physics, Chemistry and Mathematics = B&aC&aE. This way, by a simple extension, consistent class numbers can be constructed for subjects involving three or more phases. The first two phases of the n-phased subject could be considered and the rules for the construction of two-phased subjects applied accordingly.

Satija concluded by asserting that it was vindicated beyond doubt that the extension of the two-phased subject could be possible to any extent theoretically to provide consistent class numbers for complex subjects of any order. However, caution must be exercised to distinguish between a complex class and a main class derived by the Subject Device while constructing class numbers for complex subjects of higher order.

Though briefly presented, the above work had clarified that the challenges posed by multi-phased or multi-dimensional complex subjects at the notational plane could be dealt with by a simple and logical extension of the technique of Phase Relations.

A very significant work relating to the formulation of criteria for the evaluation and comparison of classification schemes was undertaken by Bury (1980) who deduced a set of twelve criteria from a wide range of sources, particularly from the works of Bliss, Ranganathan, Foskett, Shera, Sayers, and Mills. Though various authors had used different terms for the same principle, laid differing stress on them, and treated them in different ways, Bury argued that definite criteria for the evaluation and comparison of classification schemes did exist. The study demonstrated the possibility of formulating definite criteria through a comparative study of three classification schemes, namely, the Dewey Decimal Classification (DDC), Bliss's Bibliographic Classification (BC2), and the Library of Congress Classification (LCC). Five subject fields - Geology, Agriculture, Psychology, Education, and Music - were selected in order to study parts of each scheme in depth. Bury's approach is the reverse of the methods used by most studies which adopt the empirical approach involving the scrutiny of each scheme in terms of its features from which certain general criteria are worked out.

Bury started with the basic concepts about the act of classification itself and deduced certain criteria by which a classification scheme could be judged. These criteria form an analytical framework within which data about schemes could be collected and compared. She found that no individual scheme exhibited them all in completely satisfactory degree, which attested the fact that there is room for further discussion on, and improvement of, general classification schemes if libraries are to continue to arrange their documents in the most helpful order.

The above study drew certain conclusions as follows:

- (a) The first conclusion related to the feasibility of studying general classification schemes by comparative analysis through the application of definite criteria. The schemes selected exhibited enough similarities for comparison to be made, but not too similar that comparisons would be redundant. In fact, the compilers of each scheme had clearly intended them to be comparable and they had a clear understanding of the other schemes against which they had devised their schemes in competition.

- (b) The second conclusion concerned the relative importance and interdependence of the criteria. In the course of the study, it became increasingly clear that the

criteria were not all equally important, though no attempt was made to order them in terms of relative significance. Nevertheless, it was found that criteria relating to order within classes, facet analysis, flexibility and synthesis ranked the highest. The whole criterion on notation was found to be closely connected to each of the other criteria. Since the subject fields chosen for the study did not exhibit many problems in respect of terminology, it appeared that the criterion on terminology was not of great importance relative to the other criteria.

- (c) The third and central conclusion that could be drawn from the study was that while LCC provided more comprehensively at one point and DDC provided a simpler and slightly more flexible notation, BC2 was superior on many more criteria than the other two. The hypothesis that *“BC provides a more logical order, more comprehensive and detailed coverage, greater possibilities for change and expansion, shorter and simpler class marks, and is more predictable in use than the other two general schemes”* was proved correct.

A significant contribution of the above study was the identification, enumeration, and clarification of the fundamental criteria for the evaluation or comparison of general classification schemes in use today. These criteria included: Intellectual Basis, Order, Universality, Hospitality, Adaptability, Terminology, Relations, Synthesis, Notation, in terms of Hospitality, Simplicity, Brevity, Mnemonics, Expressiveness, Specificity, Synonyms, Flexibility, Correlation, Ease of Use, Revision, and Practical Use.

A related study by Adam (1982) critically analyzed the role of language in the communication of components of knowledge in the social sciences. Adam identified language as the source of communication problems among social scientists. The various ways in which social scientists used language, in both its natural and technical forms, along with the conflicting styles of usage, the dominance of particular languages over others, and the imprecision of meanings assigned to terms and concepts leading to the lack of terminological consensus even among those within the same discipline, had been largely responsible for the problems faced by information systems and services in the social sciences.

The above study reiterated the view that the greater share of responsibility for the weak knowledge structures in the social sciences could be attributed to the academicians, researchers and practitioners themselves. This situation had further

aggravated the problems of information retrieval in the social sciences, rendering impossible any attempt to systematically and precisely represent the knowledge structures and components of the social science disciplines in information retrieval tools.

Gopinath [et al.] (1983) studied the incidence of phase relations in the complex subjects associated with botany or zoology, psychology or economics, or sociology as a basic facet in the first phase. The study was undertaken through a sample set of documents embodying subjects having phase relations, that is, complex subjects. The selection of the sample was done on the basis of the study of the alphabetical subject part and the classified part of the library catalogue of the Indian Institute of Science, Bangalore. The documents on the shelves were also referred for clarification of the type of relations involved between subjects. The component phases involved in the complex subjects and the kinds of relations were identified. The dates of publications of the documents ranged from 1960s to 1980s. For the purpose of grouping, the complex subjects were arranged according to the basic subject of the first phase of the complex subjects. Data was generated and consolidated through categorization in the following manner:

The complex subjects were grouped by the association of the five basic subjects, namely, Botany, Zoology, Psychology, Economics, and Sociology. Within each group associated with one of the above basic subjects, the data was consolidated by the subjects involved in the second and later phase of complex subjects; and by the

type of phase relations involved in the complex subjects in each group.

The study indicated that General phase relation, Comparison phase relation, Influence phase relations, and Application (Tool) phase relation were predominant in all the subjects, with Economics showing the highest incidence of Intra-facet phase relation. A decennial break-up of the incidence of phase relations in all the basic subjects under consideration also indicated an increase in the interaction with other subjects. The study further indicated the existence of increasingly complex Inter-subject relations between the basic subjects belonging to both natural sciences and social sciences. It was also observed that Inter-subject phase relations had increase during the 1970s, although Economics showed a slight decline. Among the kinds of relations, General phase relation had the highest incidence, followed by Tool and Influence phase relations. Bias and Comparison phase relations were not significantly incident. The study of complex subjects indicated that the social sciences and the natural sciences have considerable interaction, though not intensive enough to form closer bonded relation such as cluster, fusion and distillation.

The above study provided empirical evidence of the incidence of interactions crossing disciplinary lines between the natural sciences and the social sciences. It must be pointed out, however, that the study had been conducted using data collected from a library where science collection predominates, although economics, management, and other social sciences also formed an important concern of the institution. A

balanced approach could have been obtained if a similar study had been conducted concurrently with sample documents drawn from social sciences libraries also. Another obvious flaw of the study was that the total holdings of the concerned library had not been shown, nor the exact sample size stated, thereby indicating a rather haphazard sampling procedure. Nevertheless, the study had demonstrated the possibility of empirically testing the phenomenon of crossdisciplinarity among the natural sciences and the social sciences. Similar studies could also be replicated in the case of other libraries having specialized collections in other disciplines.

A significant study by M.A. Gopinath (1984a) traced the historical development of multi- and interdisciplinary subjects to the “problem-focussed research” involving the convergence of many conceptual, ideological and practical paths towards solving the practical problems of humanity. The study gave a detailed study of multidisciplinary subjects with emphasis on their emergence, structures, development and provisions for their classification. Gopinath argued that the emergence of multidisciplinary subjects has been supported by a variety of sponsors such as governments, academic and research institutions, and organizations at the international, national, and local levels. While traditional disciplines are the result of evolved theoretical frameworks enunciated in the form of laws, canons and principles, both intensive and extensive research in all fields of human endeavour has accelerated the emergence and development of multidisciplinary subjects. Gopinath attributed the emergence of multidisciplinary subjects in the realms of pure and applied sciences to

the curiosity and creativity of individual researchers. The aftermath of the World War I, however, “brought into focus the need for interdisciplinary research as a necessity”. The exigencies of the World War II which further “demanded the interchange across disciplinary barriers served in a large measure, to hammer out a new methodology which had as its object, the operational responsiveness to the practical problems of winning a war.” Such interdisciplinary exchanges gave birth to “Operations Research” and later on to “Systems Analysis”.

Viewed from the point of view of unified knowledge, Gopinath asserted that *“interdisciplinary subjects are products of the ontology of differentiation (analysis) and integration (synthesis). Such an activity will use the language of theoretical construct and experimental techniques of different disciplines in problem solving.”* Gopinath further opined that the complexities of systems such as the oceans, the environment, brain and behaviour, energy, materials, computers, and space demanded multidisciplinary approaches, thereby eventually leading to the emergence of multidisciplinary subjects.

Gopinath also opined that several factors had been responsible for the promotion of multidisciplinary research and the inevitable development of multidisciplinary subjects, namely, a) encouragement, b) contact-node for research, c) contact-node for problem-recognition, d) action-oriented research, e) support facility, f) interdisciplinary associations, and g) impetus.

Gopinath further highlighted the impact of the emergence of multidisciplinary subjects on the basic structure of general classification systems such as DDC, CC and BSO, and provides an overview of their provisions for the accommodation of new multidisciplinary subjects through their revisions and adoption of specific devices. In conclusion, Gopinath suggested more research on the nature of multidisciplinary subjects in order to find ways for their appropriate representation in the general classification schemes.

Gopinath's study reviewed above had been particularly illuminating for the library professionals, as well as intellectually stimulating for the researchers interested in the structure and development of knowledge and the emergence of multidisciplinary subjects. The insightful discussion on the phenomenon of multidisciplinary subjects as an inevitable outcome of intellectual curiosity and creativity had been a commendable contribution, both in theory and practice, to the library and information profession. However, a critical evaluation of the specific devices and techniques adopted by the general classification schemes for the representation of crossdisciplinary subjects had not been incorporated in the study. Further, the author's description of all types of interactions between or among disciplines as "multidisciplinary" must be understood in the context of the period during which the phenomenon was sought to be explained. The phenomenon is now better known as crossdisciplinarity.

In another equally significant study, Gopinath (1984b) presented a case study of four relatively new multidisciplinary subjects, namely, General Systems Theory, Sociobiology, Solar Energy Studies, and International Relations illustrating their four different modes of formation, namely, Distillation, Fusion, Entity-Cluster, and Problem-Cluster respectively. The study discussed the scope and definitions, the historical development of the subject, input subjects contributing to the formation and development of multi- and interdisciplinary subjects, and the output subjects that were likely to have inputs from such subjects under consideration. A major contribution of this study was the presentation of the chronological landmarks associated with multidisciplinary subjects to illustrate the stages of their development towards an integrated discipline.

Gopinath's study highlighted the ramifications of multidisciplinary subjects in the contemporary knowledge environment. The study has thrown light on the need to undertake serious note of the manifestations of the fluidity of knowledge structures. Such developmental studies of subjects, that is, tracing the genesis, history and progress, inevitably lead to the recognition of subject structures at different stages of their growth, thereby helping in identifying and distinguishing the various modes of formation of subjects, and ultimately leading to better comprehension of the association among, within and between the constituents of the universe of subjects. Gopinath's study provided an insight into the nature of the bond among the constituents of crossdisciplinary subjects.

Another pertinent study concerning the problems of information retrieval in the social sciences was done by Brittain (1986) through an analysis of the rate of proliferation of social sciences literature in relation to the provisions of information retrieval tools. Though the focus of the study related to the role of social science information and documentation services in the development of social science research, the author's emphasis on the need for designing a new generation of information retrieval tools and services reflects the immediate concern expressed by academicians, researchers and practitioners in both the social sciences and library and information science. The study also highlighted the recent emergence of sophisticated information retrieval tools and the application of Artificial Intelligence-based technologies.

Brittain concluded that such new efforts would only be successful if the social science community resolved its internal differences and established a definite consensus at the level of theories, principles, concepts, tools, methods and their applications.

In a related study, Sethi (1986) traced the genesis of interdisciplinary studies, which emerged just before and during the Second World War. According to Sethi, the integration of disciplines had occurred through various modes, namely:

- (a) by subject;
- (b) by area;
- (c) by period;

- (d) by purpose; and
- (e) by point of view.

Sethi highlighted the problems encountered by libraries catering to interdisciplinary requirements of users engaged in interdisciplinary research and the immediate steps needed to be taken towards alleviating those problems. Sethi asserted that practically all operations and services of libraries were affected by the interdisciplinary environment within which institutions functioned. Though no detailed analysis of the problems of interdisciplinarity at the conceptual level had been given, Sethi's proposal for major changes in the practices and services of libraries has clearly highlighted the concerns of the library and information profession in relation to the complexities of contemporary scholarship and research.

The concern over the fissiparous state of knowledge in the social sciences had also been expressed by Gareau (1987). Gareau reviewed the progressive development of the universe of social sciences in the light of the expansion of disciplinary knowledge along with an increasing diversification of disciplinary perspectives across socio-cultural, political, and geographical boundaries. Gareau observed that much of what we know collectively as the "social sciences" comprised nothing more than a convenient nomenclature linking widely conflicting "sects" (*read disciplines*) and dissonant knowledge structures seeking to secure a common label amidst irreconcilable diversity. Gareau concluded with an argument questioning the

legitimacy of the social sciences' claim as one of the areas of knowledge under which a group of rather disorganized disciplines can be ordered.

An in-depth study by Husain (1989) had provided an insight into the underlying principles, techniques and provisions for the accommodation of new subjects in CC7. The measure of incidence of proliferation of subjects could be conjectured, according to the author, from the fact that the number of basic subjects in CC alone had increased from a mere two dozen in the 1st edition (1933) to 779 in the 7th edition (1987). The study centred on the problems related to the growing universe of subjects and their impact on classificatory structures. The study clarified the modes of formation of main subjects and non-main basic subjects, their appropriate placements, and the notational techniques required to provide infinite hospitality in the array of main classes. The detailed appraisals of the principles guiding the placement of new main subjects as well as non-main basic subjects effectively summarize their provisions in CC7. The critical examination of the notational techniques of Interpolation (use of Empty Digits) and Extrapolation (use of Emptying Digits and Empty-Emptying Digits) for the accommodation of new subjects under the existing arrays had thrown light on the ease with which CC7 could meet exigencies associated with the emergence of new subjects from time to time.

The author concluded that a theory-based classification scheme like CC7 could easily cope with the new developments in the universe of subjects by providing

appropriate inner mechanisms for the accommodation of new subjects, unlike non-theory-based schemes which have to struggle to keep track of the accelerated proliferation of the universe of subjects.

The above study bears significance to the present study for its critical examination of the relevant modes of formation of new subjects, which often include crossdisciplinary subjects, besides highlighting the various techniques for the accommodation of such subjects at the appropriate levels of notational hierarchy.

Dahlberg (1994) had advanced a proposition that knowledge fields or domains seem to interact if one considered the many observable forms of crossdisciplinarity in all areas of our contemporary scientific culture. The study traced the historical development and kinds of crossdisciplinarity with examples drawn heavily from the social sciences. Dahlberg argued that present-day IR tools, which are based on traditional disciplinary structures, are no longer adequate for the representation of crossdisciplinary subjects that abound today. The potential of the “Systematifier”, a generalized matrix with a sequence of facets characteristically listing the concepts genuine in a knowledge field, had been described and proposed as a new representation system. The “Systematifier” was designed for use in conjunction with the International Coding Classification (ICC), a non-discipline based faceted knowledge organization scheme based on general objects of being and the integrative level theory.

The “Systematifier” can be applied at the highest as well as the lowest levels of abstraction through the general concepts indicative of each level of proposition. It also provides for all the kinds of crossdisciplinary subjects and their concepts likely to be encountered. The “Systematifier”, in fact, represents a kind of “absolute syntax” which Ranganathan sought through his facet formulae applied to the Fundamental Categories - PMEST. Besides serving as a basis for ascertaining what existed in terms of domains, the ICC possessed an in-built heuristics for continuously taking care of the many forms of crossdisciplinarity by combining and enriching concepts from different knowledge fields according to cases in question by locating concepts at those positions determined by the “Systematifier”.

Dahlberg’s study had been significant for its definitive presentation of the phenomenon and typologies of crossdisciplinarity witnessed today. Incidentally, the ICC had been duly recognized and utilized in the three volumes of the International Classification and Indexing Bibliography (ICIB) and adopted by the bibliographical services of the journal ‘Knowledge Organization’ for organizing concepts in the field of knowledge organization.

A related study by Jyothirmayi and Humayoon Kabir (1996) critically examined the basic subjects provided in Colon Classification from the first edition to the seventh edition. The tabular depiction of the provisions of each edition of CC

indicated the increasingly exhaustive representation of new basic subjects which had emerged through different modes of formation. The study also included a critical review of the rules concerning the terminology used to describe the kinds of subjects recognized in CC7.

In conclusion, the authors observed that while the growth of basic subjects had been almost stagnant from CC1 to CC6, there had been a tremendous growth in the number of basic subjects in CC7 as a result of proper blending of research on the modes of formation of subjects as well as improvements in notational techniques. The authors, however, expressed concern that the total outcome of years of research had been tarnished to a great extent by the glaring, inadvertent errors and inconsistencies to be found in CC7.

Apart from the systematic exposition of the provisions for basic subjects in CC7, the interpretation of the specific modes of formation involved in the emergence of new basic subjects bears significance to the present study. The study served as a guideline for future research on revising and improving the provisions for basic subjects without forcing radical changes in the overall structure of CC7.

Another related study by Dogan (1997) had revealed that the contemporary social sciences are faced with the dilemma of fragmentation and hybridisation leading to the increasing fluidity of knowledge structures in the social sciences. Dogan

identified specialization as the case for fission within and among disciplines. Specialization had led to fragmentation of disciplines, with such specialities developing into “watertight compartments” within the discipline to which they belong. However, Dogan argued that such specialities invariably converged or innovatively recombined with specialities from other disciplines to create hybrid sub-disciplines.

Hybridisation, according to Dogan, “*implies an overlapping of segments of disciplines, a recombination of knowledge in new specialized fields*”. While fragmentation left gaps between the specialities in addition to those left by the division of the social sciences into formal disciplines, hybridisation sometimes bridged these gaps, and sometimes filled them completely (Dogan & Pahre, 1990). In the course of their development, some hybrids became institutionalised as sub-fields of formal disciplines, while others remained informal crossdisciplinary programmes dealing with topics rather than sub-fields. As hybrid specialities developed, they attracted researchers from other specialities that had also remained insulated within their respective disciplines. Such interaction became inevitable because “*path breaking ideas within any speciality usually come from cross-referencing ideas from other specialities or disciplines, rather than from research that is narrowly focused within the speciality*” (Turner, 1990). Dogan attributed the process of hybridisation as a manifestation of crossdisciplinarity involving the borrowing and lending of concepts, methods and theories at different levels of disciplinary structures.

Owing to such interaction among subfields, subdisciplines, and specialities of different disciplines, a large amount of literature dealing with specialized topics and themes crossing disciplinary boundaries have been generated. Such phenomena, Dogan argued, had further aggravated the problems of representing new and emerging crossdisciplinary subjects adequately and precisely in IR tools adopted by the library and information profession. Classification schemes, in particular, were increasingly constrained by such developments. In most cases, such documents dealing with crossdisciplinary subjects have been assigned class numbers arbitrarily due to the inability of the schemes to provide specific provisions.

Dogan concluded with a proposal that the various descriptions of the networks of crossdisciplinary influences, that have blurred the disciplinary boundaries and obliterated the old classification of the social sciences, should be replaced with the terms “multispeciality” or “hybridisation of scientific knowledge”, emphasizing on the instances of synthesis among disciplines.

Gopinath and Das (1997) also discussed the relationship between classification and knowledge representation in the context of contemporary knowledge explosion and specialization. They asserted that while classification schemes had been developed for the representation of subjects embodied in documents, the overwhelming rate of proliferation of published material on diverse and specialized subjects demanded representation at a variety of depth and breadth. They further argued that existing classification structures were no longer adequate for representing the vast corpus of

knowledge, and that more research was needed to advance classification theory and practice through the adoption of knowledge representation techniques such as hypertext language.

The study, however, failed to distinguish between subject representation (thought contents of documents) and knowledge representation (facts and heuristics) as the fundamental concerns of classification systems and expert systems respectively. Sophisticated knowledge representation techniques indeed hold great promise towards the refinement of classification theory and systems presently in existence, but more immediate attention must be paid towards enhancing existing systems in order to render them more useful for some time to come.

In a related study, Beghtol (1998) addressed the problems which the major classification systems faced, and reported some attempts to revise these systems to accommodate multidisciplinary works more appropriately. Beghtol also described some theoretical research perspectives that have attempted to reorient classification research towards the pluralistic needs of multidisciplinary knowledge creation and the perspectives of different discourse communities. Beghtol argued that the traditional characteristics of classification, namely, mutual exclusivity and joint exhaustivity, have failed to meet the needs of the contemporary knowledge environment. Hospitality, she argued, had emerged as the most needed and useful characteristics of classification systems in both theory and practice.

Beghtol attributed the complex problems faced by classification systems to their predication on the academic disciplines then existing when they were originally devised. Such a structural principle, Beghtol argued, was no longer adequate because multidisciplinary knowledge production had overtaken more traditional disciplinary perspectives and produced discourse communities of cooperation and interaction whose documents could not be readily accommodated within a particular disciplinary structure.

Beghtol concluded by suggesting that a paradigm shift in classification research was needed and could be developing. There was an urgent need to react quickly to multidisciplinary literary warrant and to build responsiveness to different discourse communities into the concept of consensus. Beghtol further emphasized that more basic research would be needed in order to evolve structural principles and creative design criteria for classification systems. Though attempt had not been made to analyze the phenomenon of crossdisciplinarity at the conceptual level, the study strongly advocated the need to breach the exclusivity of disciplinary structures and the boundedness of classificatory, domain-specific languages in order to facilitate crossdisciplinary dialogue through a generalized structure providing for a broader context of definitions and concepts.

Beghtol (1998b) opined that bibliographic classification systems need to respond to the fluidity of knowledge structures created by the phenomenon of

multidisciplinarity in most fields of knowledge. The response of general systems in use today to multidisciplinary works was outlined and some recent attempts to modify and/or revise general classification systems to accommodate multidisciplinary works more appropriately were discussed. Owing to the difficulties encountered by contemporary classification systems, Beghtol suggested three possible strategic responses or options: (i) using existing general systems with little change, (ii) adapting existing general systems, and (iii) creating new structures at the first level of subdivision. Beghtol further suggested a new semantic warrant for a general classification system, namely, viewpoint warrant, in order to endow such a system with infinite semantic, as well as notational, hospitality.

Beghtol concluded that, though both theoretical and practical work on the structural principle of viewpoint warrant remain to be taken up by scholars in the field, the need to pursue as many alternative structural principles as possible must be emphasised in order to create classification systems that can respond suitably to the new information age.

Chatterjee (2000) recently evaluated the capabilities of different documentary classification systems in tackling the problems posed by complex subjects through a comparison of their relevant provisions. Chatterjee observed that there were four different ways in which documents representing complex subjects have been treated in documentary classification, namely:

- (a) by placing such documents under broader subjects which cover the components;
- (b) by placing a document in one subject and ignoring the other;
- (c) by resorting to enumeration of complex subjects; and
- (d) by making provisions for synthesis, i.e., building class numbers through joining of component numbers with or without connecting symbols.

The critical examination of the provisions of classification systems, such as DDC, LCC, UDC and CC in terms of their accommodation of complex subjects has been highly illuminating. However, the author's singular emphasis on "Loose Assemblage" as the main mode of formation of complex subjects remains debatable particularly in the context of crossdisciplinary subjects, many of which owe their development to other equally significant modes of formation, namely, Fission, Fusion, Distillation, Clustering, and Agglomeration.

As regard to the literature pertaining to the Library of Congress Subject Headings, not many studies had dealt with the problems associated with the phenomenon of crossdisciplinarity in the social sciences. However, two significant and closely related studies by Studwell (1990a; 1993), reviewed the movement for change in the patterns and usage of LC Subject Headings and suggested improvements

to the headings in the social sciences. Among the issues addressed included confusion between disciplines and topics, confusion over the first element in a heading, insufficient number of headings, the problem of conditional subjects, controversial terminology, and insufficient 'See References'. Studwell concluded that, unless the LCSH incorporates necessary changes as recommended, the provisions for the social sciences would continue to pose immense problems both to the indexers and users alike.

Another critical examination by Studwell (1990b) also provided an insight into the fundamental principles and applications of the Library of Congress Subject Headings, by highlighting the strengths and weaknesses, with suggestions for improving several provisions in order to meet the changing terminological usage, forms of headings, and practical utility from the point of view of subject cataloguers and other users of systems which have adopted the Library of Congress Subject Headings.

A brief but relevant study by Wepsiec (1991) emphasised the need to incorporate more systematic hierarchical structures to the social science disciplines and subject matters in subject headings, particularly the Library of Congress Subject Headings, in order to render them more effective in meeting the complexities linked with end-user needs. The critical analysis of the policies adopted by the Library of Congress in the use of preferred terms in substitution to equally, if not more, current

and relevant headings is particularly significant. However, the study could cite only a few instances of the problems involved in representing crossdisciplinary subjects in the social sciences. Nevertheless, the study highlighted the importance of adopting definite structural principles based on the reality of social science knowledge.

2.2 SUMMARY

The above review of the existing literature reflects the enormity of the problems arising out of the phenomenon of crossdisciplinarity in the social sciences. In view of the complex nature of the phenomenon under investigation, the review of literature had to be confined to studies on the conceptual background of crossdisciplinarity in the social sciences, studies concerning problems faced by major IR tools, and the latest efforts to update and revise the IR tools. The literature review indicates that, except for a few stray efforts to test the performance of IR tools on the basis of definite parameters, no systematic study on the phenomenon of crossdisciplinary subjects in relation to IR tools has been able to propose definite criteria and methodologies with which to tackle the complex issues. Indeed, most of the researchers have succeeded in expressing their overwhelming sense of helplessness associated with the complexities of contemporary knowledge structures.

The literature review has revealed the structural weaknesses and terminological inconsistencies that have rendered IR tools increasingly inadequate for the representation of new and emerging crossdisciplinary subjects. This has been largely due to the emergence of a considerable number of crossdisciplinary subjects that cannot be readily accommodated under existing disciplinary structures, especially as provided in the classification schemes.

The review of the relevant literature has also revealed that, though some isolated studies had attempted to explore the phenomenon of crossdisciplinarity and the problems it posed on existing IR tools, only a few studies had attempted to address issues concerning the changing knowledge structures in the social sciences and the origins of crossdisciplinary subjects, their impact upon, and representation in, IR tools. Evidently, there has been a lack of specific studies on the phenomenon of crossdisciplinarity in its entirety, with particular reference to the social sciences, and the treatment of crossdisciplinary subjects in major IR tools. As such, the identification of the problem focused in the present study, was also inspired by other related studies, many of which are cited in the bibliography appended.

Though the phenomenon of crossdisciplinarity had been known to exist, and described variously by different authors, its impact on knowledge organization and retrieval systems has never been felt as strongly as in the

contemporary times. Renewed interests shown by scholars and practitioners in recent years attest to the fact that the phenomenon of crossdisciplinarity will continue to pose complex problems to all aspects of knowledge organisation, representation, and retrieval activities for quite some time.

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CHAPTER – 3

METHODOLOGY

3.0 INTRODUCTION

The present study has been an outcome of the review of available literature on various dimensions and problems related to the phenomenon of crossdisciplinarity, the emergence of crossdisciplinary subjects, and the problems associated with the representation of crossdisciplinary subjects in classification schemes and subject headings. The study is essentially an attempt to examine the complexities attributed to crossdisciplinarity among the social science disciplines, an effort towards the conceptual analysis of the crossdisciplinary subjects identifiable, and an examination of major IR tools in terms of their provisions for the representation of such subjects.

3.1 STATEMENT OF THE PROBLEM

A major aspect of the present study relates to the need for establishing valid criteria for the evaluation of IR tools in terms of their representation of crossdisciplinary subjects. The study attempts to clarify very real methodological problems that must be solved because knowledge of the specific factors determining the performance of IR tools is a prerequisite for any attempt to improve their performances. The study, therefore, seeks to clarify the various problems faced by IR tools in terms of their existing structural principles and methods of application, with special emphasis on

existing provisions for the representation of crossdisciplinary subjects in the social sciences.

The present study has been undertaken with a view to developing an appropriate methodology for identifying the existing crossdisciplinary subjects in the social sciences. It is felt that such crossdisciplinary subjects identified, selected and analyzed can be examined against the provisions for their representation in the major IR tools. The study is considered necessary in order to test the effectiveness of the provisions in the IR tools and to determine whether the representation of subjects varies depending on how the structuring of disciplines has been effected in the IR tools under consideration.

3.2 OBJECTIVES OF THE STUDY

The present study has been undertaken with the following specific objectives:

- a) To identify the major crossdisciplinary subjects in the social sciences;
- b) To attempt a conceptual analysis of the crossdisciplinary subjects identified;
- c) To evaluate three major information retrieval tools in terms of their provisions for the representation of crossdisciplinary subjects; and
- d) To suggest devices and techniques for more specific representation of crossdisciplinary subjects in IR tools.

With these objectives in view, the study attempts to critically analyze and clarify the complex issues relating to crossdisciplinarity in the social sciences, the consequent emergence of crossdisciplinary subjects, and their impact on the organization and representation in major IR tools. The study broadly addresses questions relating to whether, how and to what extent IR tools, principles and practices support and provide control of crossdisciplinary knowledge creation, analysis and retrieval in the social sciences.

3.3 HYPOTHESES

The following hypotheses have been considered for validation in the study:

1. There is no significant difference among information retrieval tools in terms of the modes of representation of crossdisciplinary subjects.
2. There is no significant relationship between the modes of formation of crossdisciplinary subjects and the modes of representation in information retrieval tools.

3.4 METHODOLOGICAL FRAMEWORK

In view of the complexity of the problem being addressed, and owing to the lack of any prescribed methodology for the conduct of similar studies as the present,

the need was felt to develop a suitable methodological framework appropriate to the context and scope of the present study.

The methodological framework adopted in the present study can be described as follows:

(1) **Definition of Crossdisciplinary Subject:** At the outset, an extensive preliminary survey of relevant literature provided needed insight into the phenomenon associated with crossdisciplinarity and the emergence of various typologies of crossdisciplinary subjects. The preliminary survey of the scant and scattered literature helped in the formulation of a working definition of a 'crossdisciplinary subject' as *a subject expounding the juxtaposition, or formed by the synthesis of two or more, or convergence of several, distinct disciplines.*

(2) **Identification and Selection of Crossdisciplinary Subjects:** The identification of the major crossdisciplinary subjects was subsequently undertaken on the basis of the working definition of a crossdisciplinary subject. Ranganathan's "modes of formation of subjects" and Dahlberg's "typologies" of crossdisciplinarity also provided ideas relating to essential considerations for the identification of crossdisciplinary subjects. A total of 150 crossdisciplinary subjects were identified and selected from the **Social Sciences Abstracts (SSA) on CD-ROM (2002-2003)**. The SSA-CDROM

was selected as the tool for the identification as well as the source for the selection of subject descriptors representing crossdisciplinary subjects in the social sciences as it is considered the most comprehensive bibliographical database covering the various social science disciplines. The identification of the subject descriptors involved a simple blanket search of the subject descriptor field of the SSA-CDROM. The SSA indexes and abstracts articles from English-language social science periodicals published in the United States and elsewhere. The SSA database is available in both CD-ROM (Wilson disc) and Online (Wilson web) versions on subscription, with monthly and weekly updates respectively. The SSA provides abstracts, ranging from 50 to 300 words, of articles published in 518 major periodicals. While the abstracting coverage began in January 1994, the indexing coverage started from 1983. The CD-ROM version can be installed on PCs using Windows 3.1/95/98/NT/XP environment with a minimum 4 MB of RAM. However, Windows 95 or later versions with 16 MB of RAM are recommended.

The SSA database provides several search options through Search, Search⁺, Biography Search⁺, Facts Search⁺, and Browse. The search and retrieval software integrated into the SSA database has been developed by SilverPlatter International, USA. Thesaurus search option, however, is not available in the SSA-CDROM.

The Browse Screen allows search for particular terms under specific fields and viewing of records that include those terms. Browse provides an alphabetical list of all of the searchable terms in the database. The Descriptor field lists the controlled vocabulary that describes the documents, and includes personal names, uniform titles, organization names, geographical names, topical terms, and names of subject domains. Descriptors can only be searched through the Subject Index in the Browse screen. The subject descriptors used in SSA have been manually assigned by professional indexers through a meticulous procedure involving consultations with specialists in the concerned fields, especially in the case of new and emerging domains that require specialist subject analysis. In most cases, the subject descriptors have been systematically derived through interpretation of the original materials to facilitate precise search and retrieval by end-users.

In view of the above considerations, subject descriptors were chosen as the most reliable and key elements for the purpose of identifying the crossdisciplinary subjects covered by the SSA database. The subject descriptors representing crossdisciplinary subjects formed the basic units of the study. Only the subject descriptors which represented knowledge domains, as distinguished from compound/complex concepts or topics, were considered. Subject descriptors were preferred over the titles or abstracts of documents in the SSA-CDROM due to their more precise representation of crossdisciplinary subjects. A descriptor bank was compiled which included

all the subject descriptors representing crossdisciplinary subjects identified and selected from the SSA-CDROM database. Synonymous subject descriptors were excluded in order to avoid duplication. The 150 crossdisciplinary subjects finally included in the study are listed in Annexure-1.

- (3) **Conceptual Analysis of Crossdisciplinary Subjects:** Consequent to the identification and selection of the subject descriptors representing different crossdisciplinary subjects in the social sciences, the conceptual analysis of each crossdisciplinary subject was undertaken. Conceptual analysis of the crossdisciplinary subjects was undertaken through consultation of several authoritative reference sources to clarify the origins, structure, development, scope and research concerns of the selected crossdisciplinary subjects. This stage of the study was necessary in order to determine what the crossdisciplinary subjects are about, their major areas of concern, research trends, and their theoretical and practical relevance to, and impact upon, contemporary issues and problems. The conceptual analysis of each crossdisciplinary subject helped ascertain its exact location within the realm of social sciences and, thus, provide guidance for its appropriate representation in each IR tool.

Various reference sources, such as subject dictionaries and encyclopaedias compiled by publishers of international repute, were consulted

for the purpose of deriving the conceptual analysis. These authoritative sources, in most cases, provided objective analyses and interpretations of contemporary crossdisciplinary subjects written by authorities in their respective specialisations. Since a detailed study of the origin, structure and development of each crossdisciplinary subject was well beyond the scope of the present study, a brief conceptual analysis of each crossdisciplinary subject was considered adequate for the purpose of the present study.

(4) Identification of Modes of Formation of Crossdisciplinary Subjects: The conceptual analysis of the crossdisciplinary subjects revealed the predominance of three distinct categories of crossdisciplinary subjects in the social sciences. It was observed that the crossdisciplinary subjects could be fitted into three broad groupings by virtue of their origins, structure and development. This inevitably led to the recognition of three broad categories of crossdisciplinary subjects on the basis of their modes of formation, namely, (i) juxtaposition, (ii) synthesis, and (iii) convergence, which did not precisely fit into existing typologies. The identification of the three categories of modes of formation of crossdisciplinary subjects provided a suitable framework on the basis of which the provisions for crossdisciplinary subjects in the IR tools could be critiqued upon. The three modes of formation so identified served as the basic criteria for the evaluation of the IR tools considered in the study.

(5) **Selection of Information Retrieval Tools:** In view of the complexities attributed to crossdisciplinary subjects, it was considered worthwhile to select three IR tools which represent different structural systems of subject indexing languages, namely, freely-faceted, almost-enumerative, and fully enumerative systems. The following IR tools were selected for evaluation in the study:

- (i) The Colon Classification, 7th edition (CC7), originally devised by S.R. Ranganathan in 1933, and revised under the editorship of M.A. Gopinath, published by Sarada Ranganathan Endowment for Library Science, Bangalore in 1987. The CC7 was selected for the study as it represents a freely-faceted analytico-synthetic classification scheme based on definite principles and postulates.
- (ii) The Dewey Decimal Classification and Relative Index, 21st edition, edited by Joan S. Mitchell, Julianne Beall, Winton E. Matthews, Jr., and Gregory R. New. Albany (NY): Forest Press, 1996. The DDC21 was published in two formats: in a four-volume 1207-page print format and on the CD-ROM format as *Dewey for Windows*. The print format used in the study includes Volume-1: Introduction and Tables, Volume-2: Schedules (000-599), Volume-3: Schedules (600-999), and Volume-4: Relative Index and Manual.

- (iii) Library of Congress Subject Headings, 25th edition (LCSH25). Washington, DC: Library of Congress, 2002. 4 volume, available both in print version and on CD-ROM as *CD-MARC Subjects* which contains subject headings created by cataloguers and used in cataloguing at the Library of Congress since 1898 till 2001.

The above three IR tools were specifically selected for evaluation as they represent three different fundamentally divergent structural principles for subject representation. CC7 is a classic example of a freely-faceted analytico-synthetic classification scheme with well-defined underlying theoretical and structural principles. DDC21 is a widely adopted almost-enumerative general classification scheme that provides for extensive enumeration while permitting the synthesis of class numbers as warranted by subject propositions. The LCSH25 is basically an enumerative list of subject headings representing major disciplines, specialised knowledge domains, concepts, events, geographical places and personalities, among others.

The DDC21 and CC7, apart from securing classified arrangement of books on shelves, are essentially subject indexing languages through which final indexes (alphabetical subject index or classified index) can be generated to provide subject approach to documents. Besides, both alphabetical subject index entries for a classified catalogue and subject headings for an

alphabetical catalogue can also be derived from the vocabularies of the classification schemes. Similarly, the LCSH25 is a subject indexing language designed to produce an index arranged in alphabetical order of subjects with cross-references to show the major relationships between subject headings. Though the three IR tools differ in their respective characteristics, planes of work, and modes of application, they have been selected for evaluation since they are basically standard subject indexing languages that facilitate indexing and systematic arrangement of documents while providing search and retrieval mechanisms in information systems.

- (6) **Evaluation of Information Retrieval Tools:** The next step involved a critical examination of the existing provisions in the IR tools for the representation of the crossdisciplinary subjects. This formed an important stage of the study undertaken with the aim of ascertaining to what extent, and in what manner, the treatment of crossdisciplinary subjects have been effected in the IR tools. The format adopted for examining the IR tools included the following elements: Subject; Category; Specific Provision; Alternative Provision(s); Mode of Representation; and Remarks.

The three IR tools were evaluated on the basis of their provisions for the representation of the crossdisciplinary subjects. The three modes of representation, which constitute the criteria on which the IR tools could be examined, include the following:

a) **Representation by Enumeration:** Representation by enumeration refers to the detailed and specific listing of both micro- and macro-subjects, including their subfields and elements, under appropriate divisions and levels of hierarchy. This type of representation is considered to be the most comprehensive and direct form of representation of subjects, though it adds considerably to the bulk of the IR tools. Fields of knowledge and their domains, concepts, theories, methods and tools generally find representation in IR tools on the basis of literary warrant as well as academic and terminological consensus. In the present study, representation by enumeration refers to the enumeration of specific provisions in the IR tools, either directly or in inverted forms as the case may be. The use of standardised terminology or preferred headings is also considered as enumeration provided the synonymous or unused headings are linked to the preferred headings or descriptions of subjects.

b) **Representation by Synthesis:** Representation by synthesis involves the combination or permutation of the constituent subjects or class numbers as warranted by the subject propositions in question. Representation by synthesis is a powerful feature incorporated in most bibliographic IR tools. Different IR tools employ different devices and techniques of synthesis for the representation of crossdisciplinary

subjects. In the present study, representation by synthesis refers to the application of appropriate devices and techniques through which the components of crossdisciplinary subjects can be combined and meaningfully represented in the IR tools.

- c) **Partial Representation:** Partial representation refers to the lack of specific or comprehensive provisions in the IR tools for the precise representation of crossdisciplinary subjects as given. While the enormity of providing for all subjects, particularly those formed by the juxtaposition of two or more disciplines in all their conceivable combinations or permutations, needs to be acknowledged, bias towards one of the component subjects has been an unavoidable feature of most IR tools. The lack of specific instructions or adequate scope notes, in many cases, necessitates the placing of the crossdisciplinary subjects a class number or subject heading that only partially represents a crossdisciplinary subject while ignoring other significant components. Thus, partial representation of crossdisciplinary subjects refers to the existence of provisions that are incomplete owing to the inherent inadequacies of the IR tools in question.

On the basis of the above criteria, each crossdisciplinary subject was picked from the descriptor bank, and the provisions available in each IR tool located and examined.

- (7) **Analysis and Interpretation:** An objective analysis and interpretation of the treatment of the crossdisciplinary subjects in each IR tool formed an essential aspect of this stage of the study. Interesting insights into the relative strengths and weaknesses of the IR tools could be derived, thereby rendering it possible to draw definite conclusions and offer appropriate suggestions for their improvement.
- (8) **Testing of Hypotheses:** The hypotheses formulated for the study were subjected to Chi-square tests to find out whether there existed some significant difference among the IR tools, and also to ascertain whether there indeed was any significant relationship between the modes of formation of crossdisciplinary subjects and the modes of representation provided for them in the IR tools.
- (9) **Findings and Suggestions:** On the basis of the findings of the study, several suggestions could be offered for improving the capabilities of the IR tools in terms of the need to represent established as well as new crossdisciplinary subjects emerging from the realm of the social sciences. Several significant aspects of the phenomenon of crossdisciplinarity encountered during the course of the study have also been identified and offered as potential areas for future research in the field of library and information science.

3.5 SUMMARY

The methodological framework adopted for the conduct of the present study embodies definite steps and techniques necessitated by the nature of the problems and dimensions of the phenomenon of crossdisciplinarity. The methodology adopted for the conduct of the present study has been developed keeping in view the complexity of the problem addressed. An appropriate, yet simple, methodological framework had to be conceived in order to deal with the complexities involved in the identification, analysis, and evaluation of the representation of crossdisciplinary subjects in three IR tools. While most evaluation studies on the performance of IR tools have considered the output or search stage to begin with, the present study focuses on the input or precoordination stage to determine whether or not provisions for subject headings or class numbers to represent documents embodying crossdisciplinary subjects exist. The formulation of definite criteria for the identification of crossdisciplinary subjects has strengthened the theoretical framework of the present study.

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CHAPTER – 4

CONCEPTUAL ANALYSIS OF CROSSDISCIPLINARY SUBJECTS

4.0 INTRODUCTION

Conceptual analysis is a prerequisite to the understanding of the genesis, development, and structure of knowledge domains as reflected in the contents of documentary sources. In the words of Hjørland (2002), “Critical studies of knowledge domains provide knowledge about the foundations of the domains and critical evaluations of their knowledge claims.” As such, the conceptual analysis of the crossdisciplinary subjects constitutes a vital component of the present study since it is fundamental to the comprehension of the correct position of the subjects in the universe of knowledge, besides being vital for establishing their correct representation and location in the IR tools under consideration. The conceptual analysis of the crossdisciplinary subjects is also a critical element for their accurate categorisation on the basis of their modes of formation. Categorisation, in the context of the present study, is used to refer to the process of grouping the crossdisciplinary subjects into generalised or broad categories comprising those subjects that share immediate similarity in terms of their modes of formation. Further, it is only through such a categorisation that the adequacy of the provisions in the IR tools can be systematically and more accurately evaluated and suggestions provided.

An attempt has, therefore, been made to present a conceptual analysis of the 150 crossdisciplinary subjects identified from the SSA-CDROM. The conceptual analysis is an attempt to determine what the crossdisciplinary subjects are about, their major areas of concern, research trends, and their theoretical and practical relevance to

contemporary issues and problems, and their impact upon existing knowledge structures.

4.1 CONCEPTUAL ANALYSIS

Following is the conceptual analysis of each crossdisciplinary subject considered in the study:

(1) ADDICTION STUDIES: Addiction Studies represents the convergence of the scholarly, experimental, and clinical research undertaken in fields as diverse as psychiatry, psychology, sociology, anthropology, medical science, law, economics, education, pathology, and criminology among others, on the causes, effects, treatment, and prevention of psycho-physiological abnormalities manifested in the form of addictions to alcohol, drugs, tobacco, solvents, sex (including pornography), work, television, among others. Overall, if the literature is any indication to go by, substance abuse remains the main focus of Addictions Studies.

The domain of Addiction Studies considers addiction as a human reaction to drugs and many other experiences as well, such as, love, marriage, home, medicine, psychiatry, school and religion. Addiction is an attachment to an object, person, or sensation that is so strong that the person diminishes appreciation of, and ability to attend to, other things in the environment or within the self to such a degree that he or she becomes dependent on that experience as the sole source of gratification. In view

of the multidimensional aspects of addiction, the different perspectives generated by several disciplines have attempted to address specific aspects of the problem, and there has been a good rapport among researchers and practitioners.

Addiction Studies encompasses an enormous body of research and academic discourse which has contributed new methods in the control of drug addiction, drug-related crimes, delinquency, and provided scientific techniques for conducting rehabilitation programmes and related public health matters and policies.

(2) AGRICULTURAL ECONOMICS: Agricultural Economics is a crossdisciplinary subject formed through the synthesis of agricultural science and economics. The first formal conceptualisation of agriculture within economic theory can be attributed to the Physiocrats who proposed models of economic flows between different sectors on the eve of industrialisation in France, when agriculture was considered to be the only productive sector. Thus, Agricultural Economics has its roots in classical political economy though two divergent systems of economic theorizing of agriculture emerged: the Marxian and the neoclassical. The Marxians focus special attention on the analysis of the role of agriculture in the transition from the feudal to the capitalist mode of production within a macroeconomic framework dealing with the structural position and functional role of agriculture in terms of intersectoral and national economic linkages. Neoclassical agricultural economics, on the other hand, focuses primarily on microeconomic issues dealing with the static efficiency of resource use in agricultural production. Contemporary Agricultural

Economics, as generally defined in the curricula of most universities, is identified more closely with the method and schema of neoclassical theory.

The central concern of Agricultural Economics is then reduced to one of profit maximization by an individual farmer operating with specified resources and technologies in an economic environment marked by perfect competition in all input and output markets. The optimal choice of products, and combinations of inputs to produce these, form the exclusive concerns of agricultural economics. There is no analysis of the structure of agrarian relations and organization or its transformation *vis-à-vis* the stimulus of economic growth.

Agricultural Economics has provided a framework within which a plethora of empirical studies have been undertaken in developing countries where dramatic agrarian changes have been witnessed in recent years. Both the neoclassical and the neo-Marxian schools, in spite of fundamental differences in method, are currently analysing the nature and implications of production relations mediated not only by economic but also by political factors. This recent emergence of overlapping areas of investigation has invigorated the subject. Besides, the revival or emergence of some institutional approaches to the analysis of agrarian questions has introduced an element of multidisciplinary into the arena of conventional agricultural economics. However, underlying this multifaceted diversity of Agricultural Economics are the latent roots of further disagreement and debate that will inevitably ensure that the field of agricultural economics flourishes.

(3) AGRICULTURAL GEOGRAPHY: Agricultural Geography is a crossdisciplinary subject formed through the synthesis of agricultural science and geography. Agricultural Geography is the study of spatial variations in agricultural activity. It was a leading subfield within economic geography until the 1950s, partly because it lent itself to prevailing geographical methods such as field mapping and regional delimitation, and partly because the then current belief in environmental determinism was not as inappropriate as in other fields of human geography. Today, Agricultural Geography has emerged as a distinct hybrid discipline focusing on issues such as spatial variations in farming practices, subsistence agriculture, land tenure systems, levels of agricultural technology, geography of food consumption, and industrialization of agriculture, among others.

(4) AGRICULTURAL PSYCHOLOGY: Agricultural Psychology is a crossdisciplinary subject formed through the synthesis agricultural science and psychology. In contrast to other social sciences that have developed specialized interest and/or application in agriculture, psychology has had relatively little interaction with agricultural or rural issues. Thus, there has not been any psychological counterpart to such social science specialities as rural sociology, farm marketing, agricultural economics, and rural geography. Nonetheless, psychological and agricultural issues have overlapped in several domains: (a) the investigation of farming tasks and skills, (b) analysis of expert agricultural judgement, (c) the evaluation of farm management decisions, and (d) some miscellaneous other areas.

Traditionally, farm workers were expected to have a wide variety of manual and mechanical skills, and psychologists were concerned with examining those skills. However, with the increased mechanization and corporatisation of farms and farm machinery, there has been a shift in the skills needed. Besides, given the complexity of the various tasks, there has been an increasing concern over accidents caused by human error. Thus, behavioural researchers have turned toward analysis of the cognitive skills needed in agricultural judgement and management.

Behavioural scientists have also provided analyses of the accuracy of expert judgements of crop ratings vis-à-vis crop yield. Studies have proved that, although there was a fairly high agreement among the crop judges, the ratings correlated only slightly with crop yields.

There has also been considerable amount of research on the decisions necessary to manage a farm, particularly those concerned with how the decisions should be made optimally, and how to modify decision situations to reflect the psychological limitations and abilities of farmers. Investigations have also been conducted to determine what factors farmers use in making various marketing decisions.

There has been interaction between psychology and agriculture in other areas also. For example, both psychological and agricultural researchers have made

important contributions to statistical design and analysis. While behavioural investigators have been instrumental in the development of individual-difference analyses, applied statisticians interested in agriculture developed much of what is now standard experimental design and analysis. Physiological and animal-learning psychologists have also conducted research relevant to agriculture. For instance, studies have been run using farm animals in experimental analyses of behaviour. In addition, psychologists have shown considerable interest in such naturalistic behaviour as imprinting in fowl.

In summary, although “agricultural psychology” as it exists today is yet to be formally recognized as a subfield of psychology, there has nevertheless been a wide variety of applications of behavioural research in agricultural settings.

(5) ANTHROPOGEOGRAPHY: A field of human geography closely associated with the work of the German geographer Friedrich Ratzel (1844-1904). It was inaugurated by his *Anthropogeographie*, published in two volumes in 1882 and 1891, which was distinguished by the attempt to conduct a nominally scientific study of the relations between society and nature through the elaboration of a system of concepts. Contemporary Anthropogeography deals with the spatial variations, as well as similarities, among different human communities, subcultures, and ethnic groups and tribes strictly from the geographical perspective. Anthropogeography is, therefore, a crossdisciplinary subject formed through the synthesis of anthropology and geography.

(6) ANTHROPOLOGICAL LINGUISTICS: Anthropological Linguistics is a branch of linguistics that studies the relationship between language and culture in a community, e.g., its traditions, beliefs, and family structure. Anthropological linguists study the ways in which relationships within the family are expressed in different cultures, and how people communicate with one another at certain social and cultural events, e.g., ceremonies, rituals, and meetings, and then relate this to the overall structure of the particular community.

Anthropological Linguistics is a crossdisciplinary subject formed through the synthesis of social anthropology and linguistics.

(7) ANTHROPOLOGICAL POLITICAL ECONOMY: Discourse on Anthropological Political Economy provides several overlapping genealogies, though the term 'political economy' became widely used in anthropology in the US during the Vietnam War (1965-73). Anthropological Political Economy entered the academic mainstream in the 1970s, at a time when two paradigms prevailed in the social sciences: (i) the development and underdevelopment paradigm that emerged to challenge modernization theory, and (ii) the modern world-system model of sociologist Immanuel Wallerstein. Anthropological political economy defined itself in contradistinction to both.

Anthropological Political Economy provides ethnographies of race in urban settings, educational discrimination, poverty, gender issues and the underprivileged. Anthropological political economists also tend to put forward alternative and even oppositional analyses to those offered by the other social science disciplines. For instance, they have questioned the validity of sociological paradigms and, indeed, the very way in which phenomena have been defined as problems within complex societies. The current challenge of Anthropological Political Economy is to interrogate its own intellectual equipment in order to consolidate its place as a radical social science discipline.

Anthropological Political Economy is a crossdisciplinary subject formed through the synthesis of anthropology and political economy.

(8) ANTHROPOLOGY AND EDUCATION: Anthropology and Education represents the juxtaposition of two distinct traditional disciplines. Anthropology and Education have, for over two decades, entered into a very broad and seemingly heterogeneous realm. A remarkable number of anthropologists have written on matters explicitly related to Education. The reason is evidently the growing concern with cultural transmission and the school. The realm of Anthropology and Education is conspicuously not a subfield today, though it may soon become one. Nevertheless, the realm consists of an array of research and intervention-research interests bearing on the nature of those social institutions involved in cultural transmission. Given the

emergent nature of the crossdisciplinary exchanges between Anthropology and Education, it remains to be seen how the two disciplines can form a subfield.

(9) ANTHROPOMETRY: Anthropometry, as a hybrid subfield of physical anthropology, represents the synthesis of anthropological research based on application of statistical measurements. Anthropometry traces its origins to the works of J.S. Elsholtz (1623-88), a German physician who designed the first anthropometer for measuring the human body. Anthropometry is not merely an ensemble of techniques and measurements, but it is a recognised field that provides a powerful method for description and analysis of body size, shape, form and proportions. It has been extensively used to quantify and analyse human growth and as such it has become an important specialisation not only in anthropology and human biology, but also of sports science, nutrition, medical sciences, aerospace engineering, operational designing, psychology and numerous other sciences.

(10) ARCHAEOLOGY AND HISTORY: The juxtaposition of Archaeology and History sharing certain commonalities reveals the enduring relationship between them. Archaeology and History have both long been closely related to each other in that they both attempt to study mankind's past. While archaeology attempts to draw substantive conclusions from physical evidence, history attempts to recreate mankind's past through various sources, much of which have been the cumulative result of the contributions of archaeology.

Archaeology and History represents a knowledge domain formed by the juxtaposition of two closely related disciplines concerned with the physical artefacts of human civilisation.

(11) ARCHAEOLOGY AND SOCIOLOGY: The juxtaposition of Archaeology and Sociology reflects an attempt to study society, particularly primitive society, through archaeological evidence. Archaeology has contributed immensely towards the better understanding of primitive societies through interpretations of physical evidence that reveal the socio-cultural situations existing at a particular area during a given period. Sociology, on the other hand, draws heavily from the data and interpretations provided by Archaeology in the attempt to study social situations and the evolution of human society from the most primitive stages of social evolution to the present human civilisation.

Archaeology and Sociology represents a crossdisciplinary subject formed by the juxtaposition of two related, though methodologically divergent, disciplines.

(12) ARCHAEOOMETRY: Archaeometry is a specialized subdiscipline within archaeology in which various scientific methods of chemical and physical analyses are applied to archaeologically derived materials. Archaeometry, therefore, centers on research whose aim is to explain and test archaeological questions about ancient things or phenomena related to human cultural activities. Archaeometry measures or

quantifies parameters using analytical techniques borrowed from earth science, chemical, biological, and other scientific disciplines.

The research concerns of Archaeometry include, for example, determining the ages of sites and artefacts, sourcing objects to the original localities of raw materials, identifying the components and processes involved in converting earth materials into metals and ceramics, and determining patterns of dietary exploitation. Many analytical techniques have been applied in these investigations and some common ones are: (i) age determination, (ii) identifying the sources of artefacts, (iii) metallurgy, (iv) ceramics, and (v) paleodiets. These applications of the various analytical techniques reveal how Archaeometry plays an important role in archaeology. Archaeometric methods are not used in isolation, but complement a range of other archaeological observations that build a more complete picture of the past. Archaeometry, therefore, provides a variety of tools that allow archaeologists to interpret human relics of the past.

Archaeometry is, thus, a crossdisciplinary subject formed through a fruitful synthesis of the appropriate mathematical techniques to archaeology.

(13) ARCHITECTURAL PSYCHOLOGY: Architectural Psychology is a field within the discipline of applied psychology which deals directly with the response of people to designed environments. The identification of a subfield within psychology to be called environmental psychology, and its own subfield, Architectural Psychology,

dates back to the latter half of the twentieth century only. The first architectural psychology programme, funded as a focus for investigation of the relationship between psychiatric disorder and physical environments, was established in the USA in the early 1960s at the University of Utah. By the 1970s and 1980s, courses in architectural psychology were included in the curriculum of many institutions and universities around the world.

The primary focus of Architectural Psychology has been on cognitive and affective responses to conditions that are, at least partly, under the control of building designers. Responses to attributes of enclosure (shapes, colours, sounds, temperature, lighting, degree of complexity, and so on), control of interaction with others, and ability to find one's way around buildings are three broad areas which have enticed researchers. Responses of specific groups to buildings commonly used by them - children and schools, university students and dormitories, patients and hospitals, workers and offices - have also established areas of study.

Evidently, Architectural Psychology is a crossdisciplinary subject formed by the synthesis of psychological principles, tools and techniques to the field of architecture.

(14) AREA STUDIES: Area Studies has been the site in the United States academy where an in-depth understanding of the languages and cultures of other societies has been nurtured. The pursuit of Area Studies aims at an understanding of the cultural

and social conditions in contiguous geographic regions. Area Studies originated from American frustration over the inadequacies of European-originated social sciences. Its institutional development since World War II has been the product of financial pressures in funding from the government and foundations, while its intellectual development has been the product of the changing views of language, discourse, and culture. By the 1990s, Area Studies was in a crisis: foundation funding had levelled off, enrolments were declining, and the end of the Cold War eliminated one of the motivations that had played so important a role in federal funding – the containment of Communism. In the new millennium, Area Studies finds itself at a familiar crossroads between funding pressures and new intellectual issues.

While Area Studies conceptually covers all the academic disciplines, they differ in their hospitality to the domain as an intellectual approach. History and language and literature, with their emphasis on substantive erudition, are the most fully represented in Area Studies, followed by political science and anthropology. Least hospitable to Area Studies are the ‘hard’ social sciences, those that emphasize strong methodology, quantitative methods, and abstract conceptualisation and theorising: economics, sociology, psychology, and a major portion of political science. The Ford Foundation (USA), the single most important source of private extra-university funding, in a programme begun in 1990, attempted to remedy these disparities by providing fellowships to allow scholars specialising in one of these disciplines.

Area Studies has been institutionalised in many countries through the establishment of (a) Area Studies departments, and (b) Area Studies centres, institutes, or programmes. Area Studies today includes all studies pertaining to specific geographic areas, such as, American Studies, Latin American Studies, European Studies (now renamed Eurostudies), Middle East Studies, Asian Studies, African Studies, Indology, Nipponology, East Asian Studies, among others.

Area Studies strictly represents a crossdisciplinary subject formed through the convergence of many disciplines to problems and issues from a spatial perspective.

(15) ART AND ANTHROPOLOGY: Art in one sense refers to visual representation, as opposed to dance or poetry. In another sense, it refers to principles of harmonious compositions and the ordered juxtaposition of images in any medium used to reveal design behind the disorder of sensory experience. Anthropologists, on the other hand, have long developed interest in art one of the many facets of culture. Many interpretations in anthropological research are based on artefacts in the form of paintings, sculptures, woodwork, and ceramic designs. For this reason, many anthropologists are also trained in the appreciation and interpretation of the creative and performing arts as part of their professional preparation. Besides, historians of the arts derive much of the interpretative sources from anthropological field studies.

Art and Anthropology typifies the juxtaposition of two related disciplines sharing many interests in common.

(16) ART AND RELIGION: Art and Religion have shared a common historical development since ancient times in primitive societies till the contemporary times. Art has generally reflected the socio-religious sentiments of peoples either individually or collectively, while Religion has been instrumental in the evolution of artistic representation styles. The Renaissance that swept Europe can be considered a turning point in the growth and development of Art along with the strong influence of Religion. Religious institutions, the world over, have had great influence on the development of Art in its various forms and media. The themes and perspectives depicted in major works of art are good measures of the psychological influence of Religion. The interrelationship between Art and Religion, as two components of culture, has inspired studies in several disciplines ranging from anthropology, history, sociology, to architecture, ethics, and philosophy.

(17) BIOARCHAEOLOGY: Bioarchaeology, a new domain formed by the synthesis between biological sciences and archaeology, is the study of human remains from archaeological settings, viewing these remains in relation to biocultural adaptations, life history, lifeway reconstruction, and population and demographic history. Bioarchaeology originated in the field of osteology, the anatomical study of bones and teeth. The reinterpretation of human remains is emblematic of the paradigmatic shift that took place in Bioarchaeology in the last thirty years of the twentieth century. For instance, ancient bones and teeth are no longer viewed as objects for classification

only. Rather, bioarchaeologists seek to understand ancient skeletons as though the populations they represent are alive today, subject to the myriad of environmental, cultural, and social influences that affect human biology.

Research results derived from the bioarchaeological study of ancient human remains are now viewed as integral to archaeology. Reflecting this increased role is the growing visibility of Bioarchaeology in the popular press and in the scientific literature. Past human biology provides an essential context for understanding present-day diseases, health, and life-style.

(18) BIOETHICS: Bioethics, both as an academic discipline and as a professional activity, is a relatively new multidisciplinary field that evolved from the domain of medical ethics. In addition to the biological and medical sciences, Bioethics draws from many established academic disciplines, such as philosophy, jurisprudence, psychology, sociology, and others, though debate about the proper relations between these disciplines contributing to bioethical analysis is continuing.

The main stimuli for the increase of research in Bioethics around the 1960s arose from the technical progress in medicine, societal changes in the western world, and a revitalized interest in the discipline of philosophical ethics. In combination, these developments formed the basis of the extraordinary rise of Bioethics in the second half of the twentieth century. Today, Bioethics has become institutionalised in academic departments, professional journals, and international associations.

Though medical ethics forms the core of Bioethics, the latter has a broader scope and is understood to encompass three major fields of research. First, there is the project of a rational justification of moral norms. It forms the methodological core of Bioethics, since it supplies the strategies of moral reasoning that are applied to the respective problems at issue. Second, there is what might be called clinical ethics concerned with moral problems that individual practitioners are confronted with in their daily practice. Finally, there is a group of problems that should be dealt with on the regulatory or policy level, such as the necessity to develop operationalisable juridical guidelines for awarding patents on biological materials, policies for the allocation of medical resources or the protection of the biodiversity.

Bioethics is a crossdisciplinary subject formed by the synthesis of ethics and the bio-medical sciences.

(19) BIOGEOGRAPHY: Biogeography refers to the study of biological resources limited to particular areas or the spatial distribution of species of living organisms, of both the animal and plant kingdoms. In other words, Biogeography is simply the geographical treatment of biological organisms. Biogeographers combine geographical and biological methods in order to discover, to present, and to explain the development of the spatial distribution patterns of organisms. Biogeography is divided into two common subdivisions - phytogeography and zoogeography - for studying the distribution of plants and animals respectively.

The field offers two main approaches, namely, historical biogeography that is concerned with the evolutionary processes that contributed to the actual distribution of plant and animal life, and ecological biogeography that is concerned with the ecological processes that contribute to the distribution of plant and animal life in the biosphere.

Biogeography is also concerned with general rules and models that provide a general framework of understanding patterns and processes. The most important areas of applied biogeographical research include almost all types of environmental degradation as a result of human impact on ecosystems and especially on vegetation. Biogeography is now a recognised hybrid field, though the struggle between the biological sciences and geography over claims of its disciplinary roots is likely to continue for some time.

Biogeography is a crossdisciplinary subject formed by the synthesis of geography and biology.

(20) BIOLOGICAL PSYCHIATRY: The long history of psychiatry reflects a constant conflict between philosophical idealism, with its insistence on the primacy of ideas, and materialism, with its emphasis on the biological substrate. Biological Psychiatry emerged during the 1940s as a counter movement against psychoanalysis, the dominant psychological approach in the US, to restore the medical, and especially

neurological, dimensions of psychiatry. The basic assumption of Biological Psychiatry was that the psychoses reflected actual derangements of brain functions, and should be studied and treated by neurological as well as psychological means.

Johannes Maargaard Nielsen, a Los Angeles neurologist, who founded a Society of Biological Psychiatry in 1946, initiated the movement. The American Society of Biological Psychiatry founded later tended to focus on physiological research and paid relatively little attention to the more general scientific study of behaviour. This trend perpetuated and reinforced the notion that Biological Psychiatry is limited to physiology. However, the subsequent development of Biological Psychiatry served to stimulate the use of scientific and experimental methods in psychiatric research, and has fostered a preference for systematic data collection and analysis over the use of anecdotal case histories and appeals to invalidated theories. Major contributions of Biological Psychiatry include insulin shock treatment, electroconvulsive therapy, discovery of new psychopharmacological agents, and more systematic psychotherapeutic methods. In recent years, all schools of psychotherapy, including psychoanalysis, have been made aware of the need to subject their methods and their claims to the same scientific rigour of Biological Psychiatry.

Biological Psychiatry is a crossdisciplinary subject formed by the synthesis of psychiatric principles and techniques to the study of behaviour among biological species, especially human beings.

(21) BIOPOLITICS: Biopolitics, which represents the synthesis of political science and the biosciences, is concerned with the biological basis of political behaviour of individuals as well as groups in certain settings. It emerged as a distinct field of political science since the 1970s, when interdisciplinary research began on the degree of influence exerted by biological dynamics and inheritance on the political behaviour of individuals, groups and communities. Biopolitics attempts to answer such intriguing questions as to why individuals behave in particular ways under certain political situations, besides seeking the reasons behind the instinctive drives in human beings for acquiring power and authority and material resources.

Biopolitics represents the synthesis of political science and biological sciences.

(22) BUSINESS AND MASS MEDIA: The relationship between the two distinct fields of Business and Mass Media can be described as one of mutual sponsorship, almost to a degree that can be considered as symbiotic, particularly in the contemporary world of digital communications technology. Business, to a very great extent, depends on advertising in different forms in various media, which Mass Media provides through the print media, cinema, telephone, radio, and television. Similarly, Mass Media thrives on the support from the business world. Arguably, the growth and development of the two spheres of activities run almost parallel to each other, and fluctuations in one lead to corresponding changes in strategies in the other.

Interest in Business and Mass Media has initiated serious discussions on the subject matter in several disciplines including sociology, anthropology, economics, public administration, law, computer science, telecommunication science, management, geography, and ethics. The subject matter of Business and Mass Media, thus, has generated a body of literature which justifies its recognition as a major field in academia.

Business and Mass Media represents a crossdisciplinary subject formed by juxtaposition.

(23) BUSINESS ANTHROPOLOGY: Anthropology, apart from dealing with societies and cultures, has opened out to business trends and livelihood activities within and among groups and subgroups as an effort towards the understanding of the modes of production, distribution and consumption of goods and services. Business Anthropology emerged as a new subfield of mainstream anthropology during the 1970s when interests in development, acculturation, and indigenous business practices received a boost through empirical field studies carried out in different areas. It is primarily concerned with the production, distribution, and consumption economics with a special focus on the business aspects of specific cultures, groups, and indigenous peoples. Researchers in Business Anthropology seek to find out the particular business or trade practices prevailing within specific cultural settings and explain how business activities of different groups affect, or are influenced by, the activities of others.

Business Anthropology characterizes the synthesis of business economics and management and anthropology.

(24) BUSINESS GEOGRAPHY: Within geography there has been a major resurgence in the question of relevance and a renewed interest in applying different methodologies to business problems. This resurgence has been driven to a great extent by the emergence of desktop geographical information systems (GIS) that have found application in areas as diverse as banking, insurance, real estate, retailing, manufacturing, health care, transport, and telecommunications, among others. Business Geography emerged as a new subfield of economic geography, and is concerned primarily with business trends, entrepreneurship, and market analysis. With the present globalisation trends, Business Geography is in a position to more accurately analyse present and future business and development trends at the local, regional, as well as international levels.

Business Geography symbolises the synthesis of business economics and management and geography.

(25) BUSINESS STUDIES: Business Studies is a generic title for several related aspects of research on enterprises and their environments, foremost among these being administration and management, accounting, finance and banking, international relations, marketing, and personnel and industrial relations. There is considerable disagreement, however, on the extent to which scholastic, managerial or professional

values should predominate in the framing of the curriculum and in research and teaching objectives. It is usual to trace modern ideas on Business Studies to formative developments in the United States, where the Wharton School of Finance and Commerce was the first of twenty schools of business administration and commerce to be founded between 1881 and 1910. Contemporary Business Studies draws from studies in varied disciplines such as economics, commerce, international relations, sociology, law, management, geography, and anthropology.

Business Studies represents the convergence of several disciplines that share a common interest in business activities.

(26) COGNITIVE SCIENCE: Cognitive Science is a multidisciplinary field, originally formed around shared interests in cognitive psychology and computer science, which has recently expanded to include related research in cognitive anthropology and cognitive linguistics. Cognitive scientists are interested in conceptual structures that mediate between stimuli received by the sense organs and behavioural responses. These knowledge structures, which are most often termed 'schemata', are the building blocks of cognition - the fundamental elements in all human information processing, e.g., perception and comprehension, recognition and recall, categorization and planning, and problem-solving and decision-making.

Cognitive Science draws on research in linguistics, psycholinguistics, cognitive psychology, and artificial intelligence. It deals with the scientific study of

thinking, reasoning, and the intellectual processes of the mind. It is concerned with how knowledge is represented in the mind, how language is understood, how images are understood, and with what the mental processes underlying inferencing, learning, problem-solving, and planning are related.

Cognitive Science represents a crossdisciplinary subject formed by the convergence of several disciplines.

(27) COMMUNITY STUDIES: Community Studies includes all theoretical as well as empirical investigations on specific communities. A community is generally defined as a social network of interacting individuals, usually concentrated within a defined territory. Interest in communities in anthropology, sociology, and social geography can be linked to the work of the Chicago School of mainstream geography, and in particular its evaluation of the social and behavioural consequences of urbanisation.

Community Studies declined in popularity throughout the social sciences, except social anthropology, from the 1960s onwards. However, the introduction of the concept of locality in the 1980s suggested a returning interest in such local social systems. Today, the field also includes those communities that exist beyond the bounds of territory, such as the gypsies, nomads, and other smaller indigenous groups. The current coverage of Community Studies includes multidisciplinary studies on

rural/urban communities, ethnic and linguistic groups, and indigenous peoples, among others.

Community Studies represents the convergence of several disciplines concerned with communities in general.

(28) COMPUTATIONAL PSYCHOLINGUISTICS: Computational Psycholinguistics, which emerged during the 1990s, is the branch of psycholinguistics that develops and uses computational models of language processing to evaluate existing models with respect to consistency and adequacy as well as to generate new hypotheses. The research methodology corresponds to the typical methodology in cognitive modelling. In fact, there is only one difference between cognitive modelling and computational psycholinguistics: while cognitive modelling deals with all aspects of human cognition, computational psycholinguistics is confined to architectures and mechanisms for human language processing.

Techniques used in computational psycholinguistics range from all kinds of symbolic processing mechanisms like graph unification, planning, or deductive reasoning to connectionist approaches. This situation suggests that one future direction in computational psycholinguistics could be the development of models combining symbolic with connectionist methods to describe the interplay of various tasks in language production or comprehension. Computational Psycholinguistics is a rapidly growing field with immense potential for contributing to the enrichment of research

efforts in artificial intelligence, knowledge-based systems, natural language processing, and speech recognition.

Computational Psycholinguistics is a new crossdisciplinary subject formed by the synthesis of computer science and psycholinguistics.

(29) CULTURAL ECOLOGY: Cultural Ecology, which draws from socio-anthropological and biological fields, is a hybrid field of Anthropology that studies the interaction of specific human cultures with their environments. Julian H. Steward, an American anthropologist, initiated the field in 1937 to distinguish it from biological, human, and social concepts of ecology. By definition, Cultural Ecology is the study of the process by which a society adapts to its environment. Its principal problem is to determine whether these adaptations institute social transformations or evolutionary changes. It analyses these adaptations, however, in conjunction with other processes of change. Its method requires examination of the interaction of societies with one another and with the natural environment.

Cultural Ecology has three fundamental concerns: (i) the analysis of the interrelationship of a culture's technology and its environment in terms of optimisation of natural resources; (ii) the analysis of the pattern of behaviour associated with a culture's technology; and (iii) the determinations of the relation between those behaviour patterns and the rest of the cultural system.

Cultural Ecology is now a recognised field with increasing input from other disciplines such as sociology, law, economics, environment studies, geography, and archaeology, among others. Cultural Ecology is a crossdisciplinary subject formed by the synthesis of the principles and techniques of ecology to the study of socio-cultural aspects of human existence.

(30) CULTURAL ECONOMICS: The hybrid subdiscipline of Cultural Economics emerged in the later part of 1960s following the concerns expressed by economists on the question of funding and sustenance of the multidimensional facets of cultural life. The field of Cultural Economics is now relatively well established, has an organisation (*Association of Cultural Economics International*) which publishes a quarterly journal (*Journal of Cultural Economics*) and organises a biennial conference, and has been able to generate teaching positions in a few economics departments in Europe and in the United States. Cultural Economics is located at the crossroads of several disciplines: art history, art philosophy, sociology, law, management, and economics. It is a crossdisciplinary subject formed by the synthesis of socio-anthropological studies on culture and economics.

(31) CULTURAL GEOGRAPHY: Traditionally, Cultural Geography was a subfield of human geography that focused on the patterns and interactions of human culture, both material and non-material, in relation to the natural environment. Today, Cultural Geography covers a wide range of studies with only tenuous links to a common tradition. Radical changes in the world order during the late 1980s, notably the

collapse of the Soviet imperial system in Eurasia, and the rise of religious fundamentalism, have given cultural geography a renewed contemporary relevance. The renewed interests in historical and contemporary environmental attitudes and conduct, the growing desire to find ways to represent multiple voices within geography, and the powerful restatement of national identities across the world all suggest that Cultural Geography will remain a diverse but vital part of the parent discipline of geography.

Cultural Geography represents the synthesis between sociological and anthropological studies of culture and geography.

(32) CULTURAL PSYCHOLOGY: Cultural Psychology emerged as a distinct discipline during the 1980s on the North American and European scene. A major aim of the discipline is to document variations in modes of, and ideals for, 'normal' psychological functioning across ethnic communities. The key assumption of Cultural Psychology is that there is a substantial portion of the psychological nature of human beings that is neither homogeneous nor fixed across time and space. Cultural Psychology seeks to document the variable cultural aspects of human psychological nature, and can be defined as the study of the distinctive mentalities of particular peoples.

In most of its research, the field has been pluralistic in its conception of 'normal' psychological functioning and interdisciplinary in its conception of how to

go about studying the origin, meaning, and social role of particular mental states on a worldwide scale. The field draws together anthropologists, psychologists, linguists, biologists, and philosophers in its study of the diverse modes of psychological functioning that have been produced and socially endorsed. One of the contributions of Cultural Psychology is to revive a conception of 'culture' that is both symbolic and behavioural. The tenet of psychic pluralism and the emphasis on goals, values, and pictures of the world as a source of psychological differences between cultural communities distinguishes between Cultural Psychology from other fields of study such as 'cross-cultural psychology' and 'national character studies with which it should not be confused. Given the increasingly international and interdisciplinary character of collaborative scholarship, Cultural Psychology today represents one of the most dynamic and fruitful crossdisciplinary subjects formed by the synthesis of several disciplines.

(33) CULTURAL STUDIES: Cultural Studies was formally introduced into the British university system in 1963 with the establishment of the Centre for Contemporary Cultural Studies (CCCS) at Birmingham, UK. Early work in Cultural Studies emphasized the need to move beyond the canonical definitions of textuality, in order to locate the culture of literacy in a wider social context. This initiative sought both to counter the elitism of 'high culture' and to widen its definition to be more inclusive. A combination of sociology and literary criticism, early Cultural Studies practitioners often described their work in terms of an 'anthropological turn',

referencing the anthropological definition of culture as a way of life in contrast to its more elitist literary rendering as aesthetics or appreciation.

In its later ethnographic expansion in the 1970s, work in Cultural Studies also sought to document culture as ordinary, popular, and ubiquitous, again invoking comparisons to anthropological models in contrast to literary ones. By the 1980s, Cultural Studies supported a wide range of research and teaching in which concerns related to gender, race and class remained prominent. The addition of polytechnics, where Cultural Studies was a popular and well-established field, to the British university system in the early 1990s provided a wider infrastructure for the field. Today, Cultural Studies, as a crossdisciplinary subject formed through the convergence of many disciplines, has gained influence and grown in recognition, through the establishment of journals, programmes and associations at the international level.

(34) DEMOGRAPHIC ANTHROPOLOGY: Demographic Anthropology is an interdisciplinary, policy-oriented field concerned with understanding and measuring population change with special focus on ethnographic perspectives. It emerged during the 1970s through the efforts of ethnographers and anthropologists trained in demography, who developed interest in quantifiable variables of population, especially those variables relevant to the study of groups in transition.

Contemporary Demographic Anthropology still has a humanistic slant that often militates against quantification and against teaching the scientific and economic assumptions underlying demography. Though the chasm between anthropology and demography sometimes strains interdisciplinary communication, the differences are diminishing, partly because of the support of funding agencies, such as the Andrew W. Mellon Foundation, which in 1993 started a postdoctoral training program in Demographic Anthropology, and the Ford Foundation which sponsors interdisciplinary conferences.

Demographic Anthropology represents the fruitful synthesis of demography and anthropology.

(35) DEVELOPMENT STUDIES: The concept of 'development' has its historical and intellectual roots in the period of major changes associated with the Industrial Revolution when industrial and social change in Europe became synonymous with social progress. Since then, development came to be identified with some kind of stage-by-stage movement towards more 'modern', technologically and economically 'advanced' forms of society such as the industrial nations.

By the mid-twentieth century, following the Second World War, the industrial nations, especially those with colonies or ex-colonies, were increasingly confronted with the economic and political problems of the poorer nations. This led to a greater awareness of the need to devise strategies aimed at alleviating the poverty and raising

the living standards of the populations of the more 'backward' countries. Development policies emphasized the importance of expanding production and modernizing the physical and social infrastructure. The interest in modernization was quickly transformed into a new field of study gradually calling itself Development Studies, an interdisciplinary grouping of subjects focusing upon the analysis and solution of problems of development, particularly those faced by the poorer, so-called developing countries. The disciplines brought together in this way included economics, geography, political science, public administration, sociology, and anthropology, and were sometimes joined by more technical subjects such as agronomy and irrigation or civil engineering. Despite their differences in scientific interest and specific policy recommendations, all the disciplines involved shared a general belief in the efficacy of Western technological, economic and managerial practice for solving development problems.

By the mid-1960s, a number of academic departments and special institutions were established which provided the main scientific arena within which relevant development issues could be debated and investigated from both theoretical and policy points of view. For example, the Institute of Development Studies at Sussex (UK) was founded in 1966, and the School of Development Studies at the University of East Anglia the next year. By the 1970s, the field became a rather untidy collection of competing theoretical paradigms and policy objectives ushered in by the radical and liberal criticisms of modernization. By the 1980s, Development Studies could no longer be monopolized by economic, technological and administrative types of

arguments, but had to take serious account of opposing ethical, political and cultural factors involved in development.

Development Studies remains torn between, on the one hand, relatively detached scientific analysis and, on the other hand, a commitment to engaging in the practical business of solving concrete problems. It also faces the problem of bringing together disciplines whose theoretical interests, methodologies, epistemologies, and scientific milieus are strikingly different. However, Development Studies will continue to play a vital role in providing an arena within which the analysis of societies at critical junctures of social transition remains an important area for enquiry, reflection and social action.

Development Studies represents the convergence of several related as well as distinct disciplines.

(36) ECOLOGICAL ANTHROPOLOGY: Ecological Anthropology is an emerging field of anthropology that focuses upon the complex relations between people and their environments. Human populations, socially organized and oriented by means of particular cultures, have ongoing contact with and impact upon the land, climate, plant and animal species, and other humans in their environments and these in turn have reciprocal impacts. Ecological Anthropology studies the ways in which a particular population purposively or unintentionally shapes its environment, and the ways in

which its relations with the environment shape its culture and its social, economic and political life.

Ecological Anthropology, which draws heavily from social and cultural anthropology, ecology, geography, and archaeology, became fully established as a distinct field in the 1960s when researchers were reinforced with increasing interest on the ecological dimensions of human societies, particularly the attempts to interpret the 'insider's ecology' to outsiders. Today, Ecological Anthropology has assumed relevance largely through its attempts to clarify issues relating to indigenous systems of ecological knowledge and practice.

Ecological Anthropology is a major crossdisciplinary subject that has been formed through the synthesis of anthropology and ecological principles and measurement techniques.

(37) ECOLOGICAL ECONOMICS: Ecological Economics is a recently developed field that sees the economy as a subsystem of a larger finite global ecosystem. Ecological Economists question the sustainability of the economy because of its environmental impact and its material and energy requirements, and also because of the growth of population. The main thrust is in developing physical indicators and indexes of sustainability. The book that came out of the first world conference of ecological economists in Washington DC in 1990 defined the field as "*the science and management of sustainability*". Ecological Economics draws heavily from

environmental and resource economics (i.e., microeconomics applied to environmental pollution and the depletion of natural resources), human ecology, ecological anthropology, agroecology, industrial ecology, and urban ecology.

In summary, Ecological Economics is a new crossdisciplinary field, formed by the synthesis of several disciplines concerned with the human and physical environment, which develops or introduces topics and methods such as: (a) new indicators and indices of sustainability of the economy; (b) the application of ecological notions of carrying capacity and resilience to human ecosystems; (c) risk assessment, uncertainty, complexity, and 'postnormal' science; (d) integrated environmental assessment; (e) ecological distribution conflicts; (f) international trade and the environment; (g) environmental causes and consequences of technological change; and (h) instruments of environmental policy.

(38) ECONOMETRICS: Econometrics is a branch of economics that applies statistical techniques for the empirical estimation of economic models. Econometrics began to establish itself as a distinct discipline in the late 1920s and early 1930s - the Econometric Society was founded in 1931 in the US with help from Alfred Cowles who was interested in forecasting stock market price movements - but it grew most rapidly in the years after the Second World War. This was because the political commitment to full employment using Keynesian policies prompted governments to monitor macroeconomic developments much more closely. The availability of time series data on aggregate economic variables, and interest in forecasting aggregate

demand encouraged econometric work on the relationships that comprise a simple Keynesian model of the economy. Two elements of such a model attracted particular attention: (i) the consumption function in which consumption (or savings) is linked to disposable income; and (ii) the investment function which expresses aggregate investment in terms of the growth of aggregate demand (or production), interest rates, and other variables. While there are a number of competing formulations of the consumption function, econometric work on this has always appeared to be much more successful than that dealing with the investment function. It was found to be very difficult to forecast aggregate investment reliably, and estimated relationships differ significantly between time periods so that even after more than thirty years of work there is no general agreement on the best specification for this relationship.

Interest in making forecasts of individual components of effective demand gradually evolved into the estimation of large macroeconomic models designed to forecast the overall macroeconomic behaviour of particular economies. By the late 1960s advances in data and computing power had allowed econometricians to compile and simulate large-scale macroeconometric models.

Another application of econometrics that has been developing since the 1950s combines the interest in forecasting with the scope provided by econometric models. This involved the estimation of single, or systems of, demand equations using either aggregate data on prices and consumption patterns or information collected in surveys of household expenditure. The availability of large cross-section surveys has prompted

the recent development of econometric techniques to deal with qualitative or limited dependent variables.

Econometrics, today, has developed to the extent that it dominates applied work in most branches of economics. Indeed, even economic historians use econometric analysis - often under the title 'cliometrics' - in discussing issues such as the impact of technological change on agriculture and industry. However, the major improvements in the volume and quality of economic statistics and in the availability of large-scale sample surveys that stimulated many econometric developments during the period 1950-80 are not likely to be repeated. Thus, future developments in econometrics will necessarily focus on methods of extracting more information from the data that is available. In practice, this will mean that applied economists and econometricians will have to devote more attention to the theoretical and statistical specification of their models in order to clarify their assumptions underpinning tests of particular hypotheses.

Econometrics is a major crossdisciplinary subject formed by the synthesis of economics and mathematical statistics.

(39) ECONOMIC ANTHROPOLOGY: The field of Economic Anthropology falls somewhere between economic history and economics proper. Like economic history, it is a descriptive discipline in which other economies and their transformations are carefully documented and competing theories of human behaviour elaborated and

intensely debated. A descriptive and analytic task for economic anthropology is to show how the several economic functions are fitted together within the social organization of a particular society.

Economic Anthropology employs many theories derived from neoclassical economics. In recent years, economic anthropologists have studied shifting conceptions of wealth, labour and gender, as well as the way non-monetary economies become organized when brought into contact with systems based on the use of cash and arranged according to different principles.

Economic Anthropology is a crossdisciplinary subject formed by the synthesis of economics and anthropology.

(40) ECONOMIC DEMOGRAPHY: Economic Demography, or population economics, is concerned with the examination of the economic causes and consequences of demographic change. Thomas Malthus's *An Essay on the Principle of Population*, published in 1798, was the first serious scholarly work that formulated clear relationships between economic and demographic variables. The Malthusian model provided a simple and appealing theory of the interaction between population growth and economic development that seemed to describe with considerable accuracy the conditions that were prevailing at that time. Over the years that followed, Malthus's pessimistic forecasts of mankind's future did not materialize, mainly because he did not anticipate the role and impact of technological change, which, for

example, drastically increased the efficiency of food production. However, over the past few decades, there has been a renewed interest in Malthus's propositions, due in large part to the somewhat frightening demographic and economic trends in some developing countries where the Malthusian trap may be re-emerging, particularly in the low-income countries of Africa and Asia.

For many years, Economic Demography was a fringe subject, and not really a part of economics, though it was seriously researched by a dedicated group of economists and by demographers with an interest in economics. However, with the publication of its own "handbook", it has joined the ranks of mainstream economics. Today, Economic Demography is a prominent crossdisciplinary subject that has been formed through the synthesis of economics and demography.

(41) ECONOMIC GEOGRAPHY: Economic Geography owes its origins to the colonial nineteenth century when the compilation of factual accounts of where useful commodities are produced and how they are traded, the distribution of economic activities, primarily the production of agricultural, mineral and industrial goods. Economic Geography studies the geography of economic activities. Economic Geography represents an intersection point between two fields - economics and geography - and deals with economic phenomena in a spatial context, examining the interrelationships of man and the environment as mediated by the economic processes of production, exchange, and consumption.

Economic Geography came of age in the 1950s and 1960s, but it was not until 1966 that neoclassical economic ideas were systematically applied to the explanation of geographical patterns of production and exchange. An important problem addressed has been the analysis of industrial locations and changes in the distribution of firms. Questions such as - what causes some regions to specialize in the manufacture of steel, vehicles, textiles, or electronic goods? - can be best answered by examining the manufacturing requirements such as raw materials, fuel, labour, research information, and the markets for the products as well as the transport needs.

At the international level, Economic Geographers have contributed major studies to the processes of agrarian change and industrialization, in the context of changing comparative advantage. A theme of considerable interest is the interrelationships of the world 'core' and the 'periphery', often called the North and South respectively. Debate focuses around questions such as: Does the core drain resources from the periphery? What has been the impact of the core on the nature and scale of development in the periphery? Economic Geographers approach questions such as these through aggregate data and also by means of national and intra-national case studies.

Economic Geography has emerged as a distinct discipline in its own right. There are two major areas of enquiry currently engaging economic geographers. Economic geographers are interested in the functioning of cities and city systems, especially the processes by which land uses change and cities grow or decline, both in

the developed and developing nations. Secondly, as the pressure on natural resources grows, so does the need for rational management of energy resources and recreational facilities, of minerals and agricultural land among others.

Economic Geography is a crossdisciplinary subject formed by the synthesis of two related disciplines – economics and geography.

(42) ECONOMIC HISTORY: Economic History is a hybrid discipline, concerned with recording and interpreting the economic events of the past. It should not be confused with the ‘history of economic thought’, which is the study of the intellectual history of economics as a discipline. Although the practice of compiling historical statistics goes back to the nineteenth century, if not earlier, Economic History refers to a self-conscious movement dating from the 1950s and 1960s, also known as the ‘new economic history’ or ‘cliometrics’, which set out to revolutionize the field by incorporating explicit economic analysis and quantitative methods into the study of past economic performance.

Economic History emerged as a reaction against the neoclassical paradigm and the laissez-faire programme with which it was associated. In subsequent decades, particularly following the post-cold-war developments, practitioners have extended and redirected the scope of Economic History to the needs of contemporary issues and developments by drawing upon diverse branches of economic theory to analyse the historical evolution of market and nonmarket institutions, technology, preferences, and

other elements commonly taken as exogenous by mainstream economics. Today, Economic History has reoriented itself increasingly in the direction of contemporary history, at the expense of medieval and early modern history along with a remarkable expansion of geographical orientation ushered by the globalisation of the world economy.

Economic History is a major crossdisciplinary subject formed by the synthesis of economics and history.

(43) ECONOMIC SOCIOLOGY: Economic Sociology, a hybrid field, is situated at the intersection between economics and sociology and is primarily concerned with the sociology of economic phenomena. Its intellectual origins can be traced back to the works of Karl Marx, Max Weber, and Emile Durkheim at the end of the 19th century. Between 1930 and 1970 interest in the field waned, but over the last two decades there has been a renaissance of both theoretical and empirical work in this area, centred especially around an intellectual movement known as the “new economic sociology”. Economic Sociology began to gain coherence and strength in the 1980s.

Economic Sociology acknowledges that people pursue economic goals alongside other objectives such as status, power, reputation, and moral obligations. In addition, it pays particular attention to the social contexts within which interactions are played out, and it recognizes that these contexts are themselves socially constructed and constrained. Thus Economic Sociology allows for a richer, contextualise, and

holistic examination of human economic interactions and organizational constructions. The *Handbook of Economic Sociology* (1994) edited by Smelser and Swedberg stands as a major testimony to the resurgence of interest in Economic Sociology and represents the most comprehensive overview of the historical development and current challenges facing the area.

Economic Sociology is a crossdisciplinary subject formed by the synthesis of economics and sociology.

(44) ECONOMICS AND EDUCATION: Economics and Education have shared a long history of interrelationship and exchange of concepts and theories. Economists are interested in the financial implications of education, or the economics of education, and have offered useful models, forecasts and theories for trials and implementation by educationists and educational researchers. Educational researchers have also offered interesting facts pertaining to the management of public education, increasing costs of education, and impact of particular economic policies on education. The two disciplines have enriched each other considerably, and the relationship is likely to develop further in the years to come.

Economics and Education represents a crossdisciplinary subject formed by the juxtaposition of two distinct but related social science disciplines.

(45) ECONOMICS AND ETHICS: Economics and Ethics share an interest in several specific, practical subjects. Several particular topics lie within the domains of interest of both welfare economists and moral philosophers. While economists have borrowed existing ethical theories, formalized and applied them to studies on economic phenomena, moral philosophers too have borrowed various formal tools from economics, such as: (i) utility theory converted from a theory of preferences to a formal theory of the structure of value; (ii) game theory which has led to some radical rethinking of the nature of rationality; (iii) bargaining theory, a branch of game theory, too has proved useful at the foundations of contractualism; and (iv) social choice theory which has undergone dramatic refinement in its application in ethics.

To summarize, Economics and Ethics have a close interaction and learnt a great deal from each other, thereby enriching both the disciplines. More cooperation and exchange of ideas, concepts, and tools between Economics and Ethics can be anticipated in the future. The subject matter of Economics and Education represents a crossdisciplinary subject formed by juxtaposition.

(46) EDUCATIONAL ANTHROPOLOGY: Educational Anthropology is the subfield of social anthropology concerned with the study of both formal and non-formal education. It is relatively new, having become an academic subfield in the 1970s. The conceptual origins of Educational Anthropology can be traced to culture-and-personality, the main area in anthropology where anthropologists systematically

studied childrearing practices, cultural transmission, or “primitive education” among the people they studied.

There appear to be two reasons for the emergence of Educational Anthropology as an academic subfield: one was the activities of the Council on Anthropology and Education and its publications; the other was the need to respond to theoretical, methodological, and policy claims of conventional educational researchers about culture and the experiences of non-mainstream children.

The principal methodology in Educational Anthropology is ethnography, or fieldwork, that allows researchers to establish good rapport, obtain otherwise difficult data, and collect data on actual behaviour or educational events in their natural settings. The theoretical concerns of the subfield include cultural transmission/acquisition, cultural continuities in schooling, culture and cognition, and language and education among others. However, the most active conceptual as well as substantive issue concerns minority education in specific sociocultural settings.

Educational Anthropology has grown rapidly since 1970 and had established its identity as an academic subfield of anthropology. Within the educational establishments the methodological, theoretical, and pedagogical contributions of Educational Anthropology are both evident and taken very seriously. Since education presents many opportunities for research and application, Educational Anthropology can look to the future with considerable optimism and expect to continue making

important theoretical and methodological contributions not only within the field itself but also to the broader realm of mainstream anthropology.

Education Anthropology is a crossdisciplinary subject that has emerged through the synthesis of education and anthropology.

(47) EDUCATIONAL PSYCHOLOGY: Educational Psychology covers two related, but distinguishable, fields. One is a branch of academic psychology that seeks to understand the processes of teaching and learning by focusing almost exclusively on specific contexts of teaching and learning, and specific types of knowledge that are acquired. The other is a profession - specifically which is concerned with the diagnosis and treatment of those handicaps and lacks that impede or impair a person's ability to learn.

Educational Psychology makes use of any or all of three main areas: (i) psychometrics, from which the specialist tests, diagnostic tools, and measuring instruments which are drawn; (ii) psychotherapy, which provides methods of treatment, particularly for emotional and neurotic problems, that are based on empathic conversation with the subject or the family concerned; and (iii) behaviourism or 'learning theory', which has generated the principles and techniques of behaviour modification.

Educational Psychology concerns with three main target groups: (i) the physically handicapped (those with serious impairments to vision, hearing or coordination); (ii) the mentally handicapped (those with learning or other predominantly intellectual problems that have some clearly identifiable and usually irremediable medical basis); and (iii) those whose problems are seen as primarily emotional or social. Educational psychologists attempt to alleviate the problems, particularly educational, faced by school-age children. Currently, attempts are being made to dispense with labels for different kinds of client, and to categorize instead the types of educational provision that they are deemed to require.

Today, Educational Psychology has become one of the major professions of psychologists. In Britain, practitioners are employed within the educational system to deal with psychological issues concerning children in school, and to assess and monitor the progress of children with special needs. They are usually based in Schools Psychological Services or Child Guidance Clinics. In some areas the work is largely taken up with assessing children who are having difficulties in school and making recommendations about which kind of educational setting they need. Other areas have been able to develop much more varied work ranging from therapy with individual children and their families, through curriculum development and teacher training, to consulting with the school on more effective management structures.

Educational Psychology represents the synthesis of education and the theories and methods of psychology.

(48) EDUCATIONAL SOCIOLOGY: Educational Sociology, also often referred to as the sociology of education by many scholars in the field, is an interdisciplinary field of sociology that directs attention to the social forces that affect all aspects of education in a given society, or across many societies. The term 'Educational Sociology' was first used by the philosopher John Dewey at the end of the nineteenth century, and university courses began to appear with that title in the United States in the early twentieth century and subsequently introduced in other universities in other parts of the world.

Since its beginning, Educational Sociology has been the site of major theoretical and methodological developments. It has produced a very large body of research knowledge about education in different societies and cultures. The social factors of interest to educational sociologists include those that are related to social structures, as well as social processes. Among the many other topics included in Educational Sociology are the family and its relationship to the socialization of the young, and its relationship to schooling, the relationship between teachers and students, the recruitment of teachers, and the teaching profession. Educational Sociology also covers macro-level studies of educational systems, the link between education and social and economic development, the relationship between technology

and education, and the factors related to the formation educational policy and planning.

By the late 1970s, Educational Sociology had moved into the mainstream of sociological debate, and by the 1980s and 1990s had acquired the status of a mainstream area in the discipline of sociology generally. The rapid development of Educational Sociology during the late twentieth century has resulted in considerable accumulated knowledge about educational systems and how they work in different cultural and organizational settings. The discipline has become increasingly relevant for policy making, as well as for theoretical development and methodological application. It has also become a discipline that is increasingly comparative, as knowledge about educational systems across national and cultural boundaries adds to knowledge of consistencies in educational processes, as well as the idiosyncratic properties of education in different structural and cultural settings. Educational Sociology will continue to attract the vigorous attention of sociologists and educational researchers who take a sociological perspective.

Educational Sociology is a major crossdisciplinary subject formed by the synthesis of education and sociology.

(49) ELECTORAL GEOGRAPHY: Electoral Geography is a new hybrid subfield of human geography concerned with the geographical aspects of the organisation, conduct and results of elections. Pioneering studies were published early in the

twentieth century, but the bulk of the literature emerged from the 1960s onwards, though few scholars identified themselves as electoral geographers.

Many aspects of elections are inherently spatial in their form, and five separate aspects of the subfield can be identified:

- (i) the *spatial organisation of elections*, especially the definition of constituencies;
- (ii) *spatial variations in voting patterns*, including the relationships between these and other characteristics of the population;
- (iii) the *influence of local factors on political attitudes* and voting decisions;
- (iv) *spatial patterns of representation* which result from the translation of votes into seats in a representative body; and
- (v) the *spatial variations in power and policy implementation* which reflect the patterns of representation.

Most of the work in Electoral Geography is concerned with identification of the relative importance of various cleavages and their variation among places.

Electoral Geography is a new crossdisciplinary subject that emerged through the synthesis of practical politics and geography.

(50) ENGINEERING PSYCHOLOGY: Engineering Psychology, also called Ergonomics, is a branch of psychology that is concerned with design, safety and comfort. In particular, it seeks to ensure that human capabilities, limitations, and

tendencies are considered in the design of things people use - from ordinary consumer products to sophisticated technologies - with the aim of maximizing performance and safety. The colloquial term 'user-friendliness' captures the essence of this goal, and in pursuing it, engineering psychologists draw upon and contribute to many domains of psychological knowledge.

Throughout its history, which dates back to the World War II era, Engineering Psychology has struggled to establish a clear identity as a recognised speciality, partly as a result of its interdisciplinary perspective and partly from the confusing array of labels with which it has been associated. For this reason, it has been suggested that the Engineering Psychology speciality is in transition though the philosophy that it represents has clearly established itself within psychology. In fact, the work of engineering psychologists played an important role in a comprehensive 'paradigm shift' that overtook psychology starting in the 1960s when the dominant psychological philosophy, behaviourism, was found unsuitable through studies on human information processing, cognitive and experimental psychology.

Engineering Psychology is fundamentally a crossdisciplinary subject that has been formed through the synthesis of engineering technology and psychology.

(51) ENVIRONMENTAL ARCHAEOLOGY: Environmental Archaeology is generally considered a 'field of studies' rather than a 'discipline' because of the underlying differences in perspective and the absence of a coherent theoretical,

methodological, or technical framework. However, its focus essentially covers the study of the past of our terrestrial milieu, its relationship to humans, and the latter's relationship to their environment.

Environmental Archaeology covers a broad range of specialised studies in archaeology that pertain to prehistoric human-environment interactions. These studies apply methods from the natural and life sciences to the study of past environments and the ways people exploited and changed them. Depending on the application or the discipline of origin, they are commonly divided into geoarchaeology, zooarchaeology, and bioarchaeology, all of which have their own specialised subfields. The essential unity of Environmental Archaeology is gradually being recognised through its steady efforts to surmount the 'nature-culture' and 'past-present' oppositions.

Environmental Archaeology can be regarded as a crossdisciplinary subject that originally emerged through the synthesis of environmental sciences and archaeology.

(52) ENVIRONMENTAL AUDITING: The origins of Environmental Auditing can be traced to the 1970^s, with the first formal environmental audits being required of US companies by the Securities and Exchange Commission in 1977. Since then, Environmental Auditing has developed into a field that provides a powerful tool for the assessment of industries, government departments, and organizations which are now increasingly compelled to acknowledge the need for environmental awareness and safeguards. Environmental Auditing requires a multidisciplinary approach, and so

audit teams could include personnel such as scientists, engineers, lawyers, and accountants. Thus, the field remains a contested domain in which various experts seek to establish links between what they currently do and what they might do in Environmental Auditing.

Environmental Auditing is generally regarded as an environmental management tool employed by organizations to facilitate improvements in their environmental performance. A single and universally accepted definition of Environmental Auditing does not exist and that the field is not clearly defined because of its evolving nature. Nevertheless, Environmental Auditing has common features in that it is a systematic, documented, periodic, and objective checking process of an organization's environmental performance against preset standards and objectives.

Environmental Auditing has been formed by the synthesis of environmental sciences and management auditing.

(53) ENVIRONMENTAL ECONOMICS: The economics of the natural environment has emerged as one of the most rapidly growing research fields in economics. The increased research interest in this field reflects the increasing public and political awareness of the significance of environmental quality in determining quality of life. Environmental Economics has its roots in early welfare economics and, in particular, in the theory of externality as expounded by Pigou and Coase. An

externality is said to exist when the actions of one agent affect (either positively or negatively) the well-being of another.

Environmental Economics concerns itself with the predominantly negative externalities associated with production, such as when a smoke-producing factory imposes air pollution upon people living nearby. Most of modern Environmental Economics can be seen as the development, refinement, and application of the seminal ideas of Pigou and Coase. The special issue of *Environmental and Resource Economics*, commissioned to mark the 'First World Congress of Environmental and Resource Economics' (1998) assesses the state-of-the-art of Environmental Economics, and provides some thoughts on the likely development of the area over the next decade.

Environmental Economics is a major contemporary crossdisciplinary subject that emerged from the synthesis of environmental sciences and economics.

(54) ENVIRONMENTAL MANAGEMENT: Environmental Management, as a truly crossdisciplinary domain, is essentially concerned with the conservation, development, and management of natural resources, and issues relating to pollution, risk assessment, environmental impacts and monitoring, and sustainable development, among many other concerns. In view of its multidisciplinary perspectives, Environmental Management involves social scientists, natural scientists, and engineers who deal with issues as varied as social ecology, public policy, resource economics,

ecodevelopment, biodiversity, urban sanitation, and pollution control, to mention a few. Considering the rapid rate of environmental degradation at the global level, Environmental Management is expected to assume a more significant place across more disciplines, thereby confirming its genuine crossdisciplinary nature.

Environmental Economics represents a dynamic crossdisciplinary subject that emerged from the synthesis of environmental sciences and economics.

(55) ENVIRONMENTAL PSYCHOLOGY: Environmental Psychology is that area of psychology that brings into conjunction and analyses the transactions and interrelationships of human experiences and action with pertinent aspects of the socio-physical surroundings. It is concerned with the ways the environment influences and channels individual behaviour. Environmental Psychology includes the study of such factors as *territoriality* and *personal space*, *ergonomic* design, and the physical attributes of surroundings. Though the field of Environmental Psychology emerged from the collaboration of perceptually oriented psychologists and design decision makers, it now overlaps considerably with many aspects of social psychology, especially the developments in situational theory.

The initial impetus for Environmental Psychology came from studies conducted in Europe on the practical problems produced by the devastation of World War II. The need to rebuild for unidentified individuals and large groups led to user requirement studies and surveys which tried to establish recurring patterns and

preferences to be considered in design. In the 1960s these studies extended to the evaluation of existing buildings and other physical infrastructure requirements. This examination gave rise to the consideration of various forms of systematic design, which clearly required as a basis some scientific underpinnings concerned with the ways in which the built environment influenced behaviour. In North America, the consideration of psychological implications of environmental design grew out of developing interests and the search for social relevance of university-based psychologists.

Measurement techniques in Environmental Psychology have concentrated on standardized questionnaire procedures on the one hand and detailed observations of action *in situ* on the other hand, both of which are now considered necessary for a full account of action and experience in relation to the physical environment. Most of the research in Environmental Psychology has explored the human correlates of design variables such as temperature, noise level and luminance, although increasingly considered are issues such as air pollution and other hazards and environmental risks. In general, two separate sets of psychological variables have been examined: (i) the effects upon task performance, and (ii) the relationship to comfort or satisfaction. These studies have been fruitful in establishing meaningful relationships and providing information for design decision makers.

Within the theoretical approaches underlying all the research in Environmental Psychology, two distinct trends have emerged. One set of researchers draws its

impetus from the formulations of the ecological psychologists and learning theorists. They assign a deterministic role to the environment, as one aspect of the general ecological system, which influences behaviour. The other trend has its roots in cognitive and phenomenological psychology and attempts to understand the ways in which people experience and understand their environments, relating these processes to the built form involved. Increasingly, however, these two approaches complement one another, and a variety of hybrid theories are emerging which will contribute both to the development of academic psychology and to real world decision making.

Environmental Psychology is a prominent crossdisciplinary subject that has been formed by the synthesis of specific principles of psychology and human ecology.

(56) ENVIRONMENTAL STUDIES: Environmental Studies represents the convergence of several related studies originating from different disciplines on the issues and problems associated with the environment, particularly the growing concern for environmental degradation, pollution, overpopulation, industrialisation, global warming and ozone depletion among others. Environmental Studies reflects the corpus of knowledge about the human and physical environment as projected in studies in diverse fields such as ecology, anthropology, economics, law, political science, education, public administration, sociology, geography, archaeology, geology, meteorology, biology, chemistry, engineering, and space sciences.

Thus, Environmental Studies represents the convergence of several distinct, as well as related, disciplines that focus on the natural environment.

(57) ETHNIC STUDIES: Ethnic Studies draws from a number of disciplines which, in academia, are not usually found together but brought together by a common focus -- ethnic groups. Segments of a population form ethnic groups by virtue of sharing the combination of i) common descent (real or supposed), ii) a socially relevant cultural or physical characteristic, and iii) a set of attitudes and behaviours.

Ethnic Studies represents the convergence of several disciplines ranging from anthropology, sociology, political science, demography, economics, law, education, to ethnobiology, archaeology, and geography. With the increasing ethnic consciousness and ethnic tensions at the global, national, and local levels, Ethnic Studies is poised to contribute much to our knowledge of specific ethnic relations, customs, laws, and histories.

(58) ETHNOARCHAEOLOGY: Ethnoarchaeology, a hybrid empirical field that emerged from the synthesis of archaeological ethnography and anthropological archaeology, is concerned with the study of variability in material culture and its relation to human behaviour and organisation among living peoples in order to strengthen archaeological inference. Contemporary Ethnoarchaeology is stimulated by several robust theories, including behavioural archaeology and the postmodernist inspired 'interpretive' anthropology. One area of great contribution by

Ethnoarchaeology lies in formation process research whereby basic data derived from artefacts collected by multiple projects have provided the basis for what has come to be called 'accumulation research'.

Ethnoarchaeological research provides the ideal approach to explore the degree of linkage. Identifying general principles that link variations in material culture to specific aspects of human behaviour and organisation have strengthened the power of archaeological interpretation. The new approach to Ethnoarchaeology, which combines with experimental archaeology, promises important contributions and new insights into artefact variability and site formation processes can be expected.

(59) ETHNOBIOLOGY: Ethnobiology started off as an appendage to classical taxonomy and systematic biology, essentially listing species collected from the wild and used by traditional societies. In other words, it is a field concerned with the ways traditional or indigenous peoples acquire, accumulate and transmit significant environmental knowledge through their everyday experiences with nature and natural resources.

One of the major concerns of ethnobiologists is to document and assess the value of traditional ecological knowledge, especially in regard to rapidly depleting biodiversity and other forms of ecosystem degradation. Recent ethnobiological research has begun to look at the dynamics of the relationships existing between individual species and populations, and between ecosystems and landscapes.

Ethnobiology has contributed immensely to the (re-) discovery of medicinal plants and animal species in the search for medicinal plants and animal extracts and their uses in alternative medical systems.

Ethnobiology has moved from an important descriptive stage of study to an even more important understanding of the linkages between ecological and social processes as they affect the biodiversity and ecosystem functioning. Ethnobiology is also becoming increasingly relevant in the area of sustainable development, with concerns for livelihood and development of traditional societies based on a value system that they understand, appreciate, and therefore engage.

Ethnobiology is a major crossdisciplinary subject that emerged from the synthesis of ethnology and biological sciences.

(60) ETHNOBOTANY: Ethnobotany represents an emergent field of knowledge, not a merely technical skill practiced worldwide by farmers, diviners, curers, shamans, and other specialists in the culture-bound uses of local plants. Ethnobotanists today constitute a heterogeneous group of scientists, many of whom are trying to find a common ground for discourse.

Ethnobotany itself, depending on definition, encompasses or overlaps with several other multidisciplinary specialities, including economic botany, ethnopharmacology, palaeoethnobotany, and ethnomycology. Among their extreme

diverse pursuits, ethnobotanists study the effects of past human activities on current vegetational forms and landscapes, investigate the myriad uses of specific plants to certain peoples and societies, delimit the similarities and differences between Western taxonomic botany and folk taxonomic botany of selected peoples, search for new drugs from plant compounds in nature, research folkways of naming and classifying plants, examine the distribution and utility of little-known food plants, and seek evidence for the evolution and antiquity of domesticated plants under artificial selection. While each of these research pursuits has shown its own notable success, yet none along or even all together can represent the potential scope of Ethnobotany as a field of inquiry.

The growing importance of Ethnobotany as a multidisciplinary field since the 1990s is also seen in the conduct of graduate programmes and international symposia. Recent developments suggest that Ethnobotany has come of age as a full-fledged field of inquiry, a development with immediate consequences for agriculture, medicine, education, and the environment.

Ethnobotany is an important crossdisciplinary subject that draws two distinct disciplines, namely, ethnology and botany.

(61) ETHNOPSYCHIATRY: From its origins in the late 18th century, clinical psychiatry recognized that mental illness might be influenced, sometimes even caused, by a society's mores, roles and sentiments. It was widely accepted that wide variations

existed in everyday psychological functioning that could be attributed to race, religion, gender and class. The result of further studies led to the emergence of Ethnopsychiatry as a new field with inputs drawn from ethnology, social and cultural anthropology, medical anthropology, epidemiology, social psychiatry, cultural psychiatry, cognitive anthropology, clinical psychiatry, sociology and other related fields. Georges Devereux popularized the term “Ethnopsychiatry”, coined by the Haitian psychiatrist Louis Mars in 1946 to refer to the local presentation of psychiatric illnesses, in the 1950s in his psychoanalytic study of the Mohave. Since then, Ethnopsychiatry is understood to refer to the medical study of illness in a particular community through the lens of its social and cultural setting, with emphasis on the systematic study of the psychiatric theories and practices of the group. In the last decade or so, Ethnopsychiatry has been profoundly influenced by critical theory, the feminist health movement and by the studies in the epistemology and politics of psychiatry initiated by Michel Foucault. The concerns of Ethnopsychiatry now also include anthropological critiques on cultural and epidemiological studies of ethnic groups or minority communities.

(62) ETHNOZOOLOGY: The field of Ethnozooology, as the name indicates, is a synthesis of the rather divergent disciplines of Ethnology and Zoology. Ethnozooology traces its origins to the 1960s when both intensive and extensive ethnological studies were undertaken by anthropologists, biologists, demographers, and sociologists. Ethnozooology basically deals with the traditional knowledge shared in common within ethnic groups about wildlife, domestication of animals, indigenous techniques of classification of animals, the significance of animals within cultures as objects of

worship or as items for food. Ethnozoologists attempt to discover the tradition-bound and mutually beneficial interrelationships which ethnic groups share with different species of the animal kingdom, and thereby study how cultural ecosystems relate to the biosphere.

Ethnozoology has attracted researchers from fields as diverse as anthropology, education, economics, sociology, law and public health on the one hand, and biopsychology, ecology, genetics, and zoogeography on the other. The field is now a recognised domain within the anthropological sciences, though zoologists also stake claim to its affiliation to their discipline.

(63) FORENSIC ANTHROPOLOGY: Forensic Anthropology is an applied field of biological anthropology in which techniques of human identification are applied to the medico-legal problems, mostly having to do with the identification of humans from skeletal remains or the detection of evidence of foul play. Identification is based on a number of techniques that typically include estimation of sex, age at death, stature, and “race”. Interest in Forensic Anthropology has been growing with the creation of the physical anthropology section of the American Academy of Forensic Sciences and the offering of advanced degrees in Forensic Anthropology at several universities.

(64) FORENSIC LINGUISTICS: Forensic Linguistics is a relatively recent hybrid field that emerged during the 1980s. Its precise sense, however, is still under

development, for it is used both broadly and narrowly: broadly, in the sense of the application of linguistics principles of analysis to language used in judicial proceedings; and narrowly, in the sense of the use of linguistic expertise by a linguist in a judicial proceeding, particularly expert testimony by a linguist at trial. Nevertheless, the field has grown rapidly and now has an official journal *Forensic Linguistics* begun in 1994 by the International Association of Forensic Linguists, an organisation that has met biannually since 1992.

Forensic linguists have testified in legal cases implicating a wide range of linguistic levels. Legal issues addressed include statutory and contract language ambiguity, comprehensibility of jury instructions, problems with “verbatim” transcripts, spoken language as evidence of intent, adequacy of warning labels on consumer products, verbal offences, trademark and copyright infringement, informed consent, and the regulation of advertising language, among others.

(65) FORENSIC PSYCHIATRY: Forensic Psychiatry, a product of the twentieth century synthesis of psychiatry and law, is a subspeciality of psychiatry in which scientific and clinical expertise is applied to legal issues in legal contexts embracing civil, criminal, correctional or legislative matters. It represents the overlap, interface, and interaction of psychiatry and the law in all its aspects reflecting a synthesis between the two disciplines in matters relating to criminal behaviour, civil litigation, family law, the diagnosis, care and treatment of psychiatric patients, legislation, and numerous other problems such as the management of violence in the study of sexual deviation. Though Forensic Psychiatry continues to be concerned primarily with

mentally disordered offenders, it now encompasses a wide range of offences and gives much more prominence to diagnosis, management and treatment in prison, hospital or the community using the skills of psychologists, nurses, social workers, and probation officers in addition to psychiatrists.

(66) FORENSIC PSYCHOLOGY: Forensic Psychology, which emerged from the synthesis of psychology and legal practice, is the branch of psychology concerned with the production and application of psychological knowledge and principles with the legal process. Its origins date back to the late nineteenth century when psychological expert testimony was officially allowed and implemented in the courtroom for the first time. Since then, Forensic Psychology has made great strides.

As both psychology and law essentially cover all aspects of human behaviour, it is understandable that forensic psychologists serve as experts on a variety of matters including defendants' competency to stand trial, criminal responsibility (also known as the insanity defence), eyewitness testimony, personal mental injury, appropriateness of sentences, criminal profiling, and decisions on child custody. To this end, forensic psychologists employ basic assessment methods such as the interview, in addition to psychological testing, forensic hypnosis, and polygraph testing. With such an approach supported by quality research, Forensic Psychology is destined to flourish in the future.

(67) FORENSIC SCIENCE: Forensic Science is a multidisciplinary domain concerned with the legal aspects of investigation, analysis, production and determination of evidence in the court of law. Forensic Science traces its origins in the nineteenth century legal practice of involving experts in various fields to interpret and provide expert testimonies in the courts of law. Forensic Science embraces several disciplines including anthropology, linguistics, psychiatry, medical science, biochemistry, ballistics, archaeology, computer science, economics, psychology, and law. The scope of Forensic Science has widened in recent years owing to its increasingly critical role, and now has an armament of specialists in diverse fields who are in a position to accurately determine cases with the help of hi-tech equipments, techniques and processes. Since the expert testimonies and evidences provided by forensic scientists are normally admissible for the determination of civil, criminal and correctional cases, Forensic Science surely has a bright prospect in the new millennium.

(68) GEOARCHAEOLOGY: Geoarchaeology, a new subdiscipline of archaeology established through the synthesis of geosciences and archaeology in the last quarter of the twentieth century, uses the techniques, methods, and concepts of the earth sciences to address archaeological problems. Geoarchaeology has provided a collection of sophisticated techniques for contributing substantive data critical to understanding prehistorical and historical human ecosystems.

There are at least seven major concerns of Geoarchaeology including: (i) site survey techniques that use geochemical, electromagnetic and other remote sensing procedures to locate sites or features within a known site; (ii) documentation of site-formation processes and the regional context of a site; (iii) using a wide array of approaches to differentiate cultural from natural sediments and features; (iv) the development and correlation of intra- and extrasite temporal contexts by relative and/or absolute dating; (v) integration of ancient landforms and biological information for the reconstruction of palaeolandscapes; (vi) reconstructing palaeoenvironments by the identification of pollen, wood charcoal, leaves and seeds; and (vii) the geochemical analysis of artefacts to document interaction between social groups.

Contemporary Geoarchaeology uses the techniques, methods, and concepts of the physical sciences as well, and is continually expanding the range of techniques and their applications to innovative questions. The successful melding of interdisciplinary research typical of geoarchaeological pursuits continues to have a bright future.

(69) GEOGRAPHY OF LAW: Geography of Law, as an emerging crossdisciplinary domain, relates either to the fact that law varies from one country to another, or from one group of countries to another, or to a chart of the various conceptions of law and different legal theories and practices. These two aspects overlap and complement each other. The importance of Geography of Law for research trends in legal science derives essentially from the fact that, apart from international law, law is always found to be related to a specific territory and a specific

state authority. Contemporary legal science accepts the territorial character of law through a generalization starting from the legal systems of the different countries and classification of these legal systems on the basis of social factors, which is very often further influenced by political and economic interests. Efforts are also being made by legal scholars to divide the world into several major 'legal families', though often adopting imprecise criteria for the delineation of such entities. A major problem relates to the precise territorial classification of law owing to its heterogeneous manifestations. Geography of Law, as a historical, socio-political and ideological factor, has a considerable influence on present trends in legal science throughout the world.

(70) GEOPOLITICS: Geopolitics emerged as a concept at the end of the 19th century to highlight the importance of territorial factors in shaping the political life of the state. The original interest in Geopolitics was provoked by a recognition that the condition of states and their citizens was changing rapidly in Europe towards the end of the 19th century. In the aftermath of the World War I, Karl Haushofer emerged as a key figure in the development of a German school of Geopolitics called *Geopolitik*, which stressed the significance for Germany of retaining key territories in Central and Eastern Europe. This school of thought, often linked with Nazism, may have influenced Adolf Hitler's policies of territorial conquests. Many writers have condemned Geopolitics more generally as an expansionist ideology and an insult to the respectable scientific discipline of geography.

such as *Reader's Digest* and *Life* in the midst of the Nazi hysteria. Many geographers in America and Europe abandoned the term in the 1950s and 1960s because they were concerned that they would be tainted with the stain of Nazism. It was only when Henry Kissinger began using the term "geopolitics" in the 1970s that it was possible to see a reversal of the exaggerated allegations about Geopolitics' links to Hitler's Germany. Geopolitics today is broadly pursuing several research agenda, ranging from the role of the media in reporting global politics, to the analysis of the contemporary politico-economic condition of the world from a spatial perspective.

(71) GLOBALISATION STUDIES: Globalisation has created an enormous multidisciplinary literature in both the scholarly and the popular domains, particularly since the 1990s. Despite continued and strong international interest in its various themes and topics, major problems of definition and confusion over ambiguous terminology as well as heroic myths remain to confront any attempts at objective inquiry. The main reason for such ambiguity obviously can be traced to the discipline-oriented perspectives within which the phenomenon of Globalisation finds discussion and research.

Today, however, several dimensions of Globalisation now exist which reflect the concerns of disciplines. These include: social globalisation, economic globalisation, political globalisation, and business globalisation, globalisation of technology, globalisation of terrorism, anthropology of globalisation, among others.

The nature, and effects, of Globalisation has emerged as a relevant issue in all spheres of life and inevitably led to the emergence of Globalisation Studies drawn from several disciplinary perspectives, thereby making it a truly relevant crossdisciplinary subject.

(72) HISTORICAL DEMOGRAPHY: Historical Demography emerged as a separate hybrid discipline during the 1950s when French scholars applied concepts and techniques of modern demography to historical material. Thus, Historical Demography is distinguished from other branches of history by its explicit use of concepts and tools derived from a social science discipline -- demography. Its goal is to establish historical facts by applying such conceptual frameworks to historical sources, and its methodological novelty lies in quantification. The research results of Historical Demography as such, have often questioned the conventional pictures of past populations, thereby throwing doubts about assumptions many theories rest upon.

Historical Demography, as it now stands, is both interdisciplinary and comparative and has raised new questions of its own, as it has evolved over time as well as cross-culturally.

(73) HISTORICAL GEOGRAPHY: Historical Geography, concerned primarily with the human geography of the past, emerged as soon as geography became institutionalised as a university discipline in the late nineteenth century. The origins of modern Historical Geography, as a distinct subdiscipline of geography, date from the

1920s and 1930s when an overwhelming number of introspective reviews, summaries and methodological articles were published.

From the 1930s to the 1960s, Historical Geography was seen as central to the subject of geography as a whole, but by the 1970s the subdiscipline became marginalized as historical approaches were eschewed by other geographers who considered descriptive empiricism inadequate for any attempt to explain the world through general theories of spatial organization. Since then, Historical Geographers began to look outside their discipline for inspiration and forged closer links particularly with economic and social history, political economy, political geography, cultural geography, and historical anthropology.

The most significant contribution of Historical Geography to the discipline as a whole is in the construction of an explicit social theory within geography. The outcome has been the emergence of time-space structures at the centre of social theory. For the first time, the discipline of geography, with an essential contribution from Historical Geography, is taking a lead in theory building for the social sciences as a whole.

(74) HISTORICAL LINGUISTICS: Historical Linguistics, as opposed to history of linguistics, is the study, reconstruction, theoretical explication and modelling of language change over time. It is the linguistic counterpart of cultural anthropology, cultural or social history, or evolutionary biology.

In the nineteenth century, linguistics was predominantly historical - it was the study of evolution and change, not of structure. Following the radical dichotomy of linguistics into synchronic and diachronic studies as mutually exclusive pursuits in the early twentieth century, there was a reversal of interest lasting upto the 1960s. As interest shifted from primary concern with data-processing to 'deeper' theoretical concerns, often with 'explanatory' pretensions, historical linguistics gradually became integrated as a subfield of general linguistics. Each succeeding school (or paradigm) developed a synthesis, in which techniques of synchronic description and analysis and explanatory claims were applied to historical data, and often validated by their diachronic success.

Current Historical Linguistics follows three main lines of enquiry: (i) 'Factual/Reconstructive' - the reconstruction of language on the basis of comparison of descendant forms in different languages, construction of 'chronicle' histories of languages or language families, and the construction of phonological and semantic histories of particular words or groups of words; (ii) 'Theoretical/Interpretative' - the reinterpretation of known histories of languages in terms of current research paradigms, and the use of historical data to make general theoretical points or validate particular models; and (iii) 'Sociolinguistic' - contemporary quantitative methods of studying linguistic variation in speech communities, especially the covariation of linguistic and social variables. More recently, sociolinguistic theory has been projected into history to form a new subdiscipline, 'sociohistorical linguistics', which

promises to be a major synthesis of Historical Linguistics and Sociolinguistics, and is perhaps the most important contemporary development in the field.

(75) HISTORICAL SOCIOLOGY: Historical Sociology traces its roots to the beginnings of sociology and history as institutionalised fields in the academia. However, the idea of a distinct enterprise called 'Historical Sociology' only formed as a radical synthesis of history and sociology during the twentieth century, as sociologists began to distinguish sharply between evidence derived from direct observation of the present and from indirect observation of the past. Historical sociologists sought to connect the two through serious investigation of other settings than the ones they lived in. During the twentieth century, Historical Sociology differentiated into four rather different pursuits -- social criticism, pattern identification, scope extension, and process analysis. Contemporary Historical Sociology has started focusing more on social issues through deeper historical interpretations of contemporary social settings.

(76) HISTORY AND ANTHROPOLOGY: Since the 1980s, History and Anthropology have developed a close relationship through mutual interest, overlapping methods, and reciprocal borrowing of methods and concepts. There are now significant areas of overlap between the two disciplines, even if certain basic orientations toward chronological narrative and contemporary fieldwork make them fundamentally distinct. While these recent developments suggest growing areas of mutual interest, shifts within both disciplines have also produced common ground.

Historians inspired by anthropologists have become increasingly interested in culture, drama, and ritual among others, while anthropologists increasingly interpret their observations from historical perspectives. Researchers engaged in areas involving both disciplines often refer to themselves as practitioners of “historical anthropology”, an appellation yet to gain institutional foothold in academia.

(77) HISTORY AND LITERATURE: History and Literature have many things in common, and one of them is the aesthetic form of narration. The many contemporary experiments notwithstanding, modern historiography and the modern novel still share the common feature of narration. Narration can be viewed as one of the primary tools of knowledge, and it determines the structure and aesthetic for in the presentation of a real or a fictional event. However, neither historical nor literary narration deals with a reproduction or duplication of events, but with a certain organisation of actual or imaginary occurrences or experiences.

(78) HISTORY AND POLITICS: History and Politics, as two dimensions of society, have several shared interests and points of convergence. Both have complemented each other through the borrowing, lending and refinement of concepts, theories and methods. History generally attempts to interpret the course of human civilisation through in-depth studies on the socio-political aspects of events, while political science traces the course of political events that shape the history of nations and groups. Political discourses, as a rule, are relegated to the realm of history in the

course of time. Thus, the relationship between History and Politics can be said to be of mutual interdependence and enrichment.

(79) INDUSTRIAL ECOLOGY: Industrial Ecology constitutes an emerging, multidisciplinary research field. The words ‘industry’ and ‘ecology’ were combined to the phrasing of “Industrial Ecology” in the late 1980s, when two notions gained a solid foothold in the minds and perspectives of those working for a sustainable development. Industrial Ecology finds its legitimisation in the question of what the environmental impact would be when, within a period of three or four decades, with a growing world population, each individual person lives at, ideally, a standard of living common in Western industrialised countries during the 1990s.

Industrial Ecology takes a systems view in studying material and energy flows and their transformation into products, by-products and waste through industrial and natural systems. While some scholars restrict Industrial Ecology to the study of biological, chemical, and physical processes, there are those who include the study of informational, legal and economic incentives, or even the study of inter- or intra-organisational structures, coordination, and consumption.

(80) INDUSTRIAL GEOGRAPHY: Industrial Geography is the study of the spatial arrangement or distribution of industrial activity. As a subfield of economic geography, it deals with manufacturing or secondary activity. Until the quantitative and model-building movement gathered strength in the latter part of the 1950s, the

study of Industrial Geography was largely confined to the verbal description of the distribution of individual manufacturing activities; there was little attempt to generalize from the case studies, no explicit theoretical framework, and hardly any economic analysis.

During the latter part of the 1950s when statistical methods began to be used on the measurement of industrial location patterns, and as human geography became more interested in theory and models, Industrial Geography was able to benefit from existing work in economics. Throughout most of the 1960s, the variable cost approach dominated theory in Industrial Geography. The 1970s saw two distinct but interconnected themes emerging in the more behaviourally oriented Industrial Geography: the location decision-making process and the role of industrial organization in the location decision. More recent developments have reflected the application of Marxian economics to industrial location problems, in place of the Neoclassical economics on which traditional location theory was based. Contemporary interests have shifted to the problems of planning industrial development, problems of economic decline, and dispersal of manufacturing firms from prosperous metropolitan centres towards the periphery.

As with other specialized subfields of economic and human geography, Industrial Geography finds its independent existence increasingly at variance with the tendency towards integration of subject matter providing a politico-economy perspective that seeks a holistic view of society.

(81) INDUSTRIAL JURISPRUDENCE: Industrial Jurisprudence is a hybrid field that emerged from the inevitable association between Industrial Economics and Law. Industrial Jurisprudence is concerned with several dimensions of industries and the process of industrialisation within which the legal, ethical and moral aspects of resource utilisation, industrial policies, production, planning, distribution, quality control, environmental considerations, location of industries, and employment conditions are examined. Industrial Jurisprudence emerged during the 1950s when the impact of industrialisation on other spheres of activities and living conditions became apparent. In a word, Industrial Jurisprudence covers all socio-legal matters pertaining to grants of licenses, terms of employment, labour relations, and wages, among others.

(82) INDUSTRIAL PSYCHOLOGY: Industrial Psychology, as a subfield of psychology, is concerned with the application of psychological principles and methods to industrial situations. Industrial psychologists may study the effects of environmental influences on people at work; of organizational influences, such as the effects of different management structures or styles; of social relationships within an industrial setting; or of sources of stress and industrial accidents.

(83) INDUSTRIAL SOCIOLOGY: Industrial Sociology, or the sociology of industry, as a subfield of sociology denotes the systematic study of the cultural and historical forces that foster the development of manufactories, and the diverse organisational structures, infrastructures, and market structures with which this

development is associated. Though Industrial Sociology has its intellectual headwaters in the Enlightenment in the 15th and 16th centuries, much of the empirical studies emerged during the post-World War II era well into the present millennium.

There were two crucially important contributions to the rapid development of Industrial Sociology: (i) the Hawthorne Experiments, conducted at the Chicago plant of the Western Electric Company between 1927 and 1932, which highlighted the importance of so-called 'informal' social relations at work for understanding workers' attitudes and behaviour, and showed the inadequacy of individualistic explanations which emphasized economic incentives or physical conditions of work as simple causative factors; and (ii) the works of Elton Mayo which stimulated much research, especially concerning the effects on work-place satisfaction and behaviour of leadership styles, participation, incentives and social relations in small work groups.

The current agenda of Industrial Sociology includes attempts to analyse the correlates of an consequences, for a society, (i) of the systems of distribution, stratification, administration, and education and (ii) of cultural, legal, political, and social institutions that evolve to accompany industrialisation. Most contemporary researchers in the field tend to specialise in studies of microscopic phenomena (like work settings), meso-phenomena (like industries, unions, and interest groups), and macro-phenomena (like national public policies, business cycles, and international trade relations).

(84) INTERNATIONAL STUDIES: International Studies, as a knowledge domain, emerged soon after the World War II when relations between nations the world over slowly recovered amidst the immediate need for peace and mutual cooperation. As such, all studies pertaining to the social, economic, political, commercial, and strategic and military dimensions of the relations between and among nations traditionally fall under International Studies. The field became institutionalised during the 1970s when several universities and research institutes established schools of International Studies, and has developed considerably owing to the strong support by funding agencies, both at the national and international levels. Contemporary issues such as globalisation, intellectual property rights, religious fundamentalism, terrorism, Greenpeace movement, the uni-polar world and the new world order are dealt with by scholars in the field.

(85) LABOUR STUDIES: Labour Studies is a loose appellation given to those studies on the various aspects of human labour from a wide range of disciplinary perspectives. Among the disciplines that particularly deal with labour may be included the following: economics, management, sociology, geography, anthropology, law, public administration, and psychology. Broadly, Labour Studies is concerned with issues relating to labour force, labour market, conditions of employment, problems of unemployment, wage, human resource development, labour and trade unions, labour management, labour contracts, and industrial disputes, industrial psychology, and labour migration, among others. Labour Studies has assumed a significant place in the

contemporary industrialised world wherein the human factor remains the highest concern in all spheres of endeavour.

(86) LAW AND ECONOMICS: The field of Law and Economics, or economic analysis of law, can be traced significantly to the works of Jeremy Bentham, but lay essentially dormant till the late 1960s. The field is now rapidly growing, although it is far from mature; one indication being the lack of empirical work. Under the economic approach to the analysis of law, two basic questions about legal rules are addressed: descriptive questions concerning the effects of legal rules on behaviour and outcomes; and evaluative questions concerning the social desirability of the effects of legal rules. In answering these questions, the method employed is that used in economic analysis namely, that individuals and firms are ordinarily presumed to be forward-looking and rational, and the framework of welfare economics is adopted to assess the social desirability of outcomes. Empirical work plays an essential role in assessing the predictive power of a given economic model with respect to the examined question, and to provide guidance as to how to amend the economic model to improve future analyses.

Empirical work at the crossroads of Law and Economics has served as a touchstone for multidisciplinary discourse on law because the social sciences share common statistical methods for evaluating empirical data, and because such work has suggested the utility of amending the neoclassical economic model to address issues studied in other disciplines including sociology, political science, criminology, and

psychology. The close relationship between Law and Economics has now led to the emergence of an area of study known as forensic economics, which is yet to find a foothold in academia.

(87) LAW AND ETHICS: Law and Ethics share several commonalities, the most important among them being rules, norms, values and customs. While Law is generally concerned with the enactment of rules for the regulation of public life, Ethics is more confined to moral and philosophical considerations relating to personal conduct and, often unwritten, codes of behaviour. In other words, Law and Ethics essentially deal with the mechanisms through which civilised behaviour is sought to be achieved within any given setting. Both Law and Ethics enrich each other through interpretation and imposition of appropriate codes, regulations, and practices.

(88) LAW AND GEOGRAPHY: The systematic study of the relationship between Law and Geography has a long, though uneven, history. Over the last century or so, scholars have defined both “law” and “space”, and the relationship between the two, in opposed ways, sequentially foregrounding space and then law. The last decade, however, has seen considerable interest in transcending the binary divide between law and space.

The juxtaposition of Law and Geography concerns the analysis of the manner in which law, as a set of processes, texts, and practices, is shaped by the geographic dimensions of social and political life, and the ways in which the geography of social

life is in turn structured by law. While suggestive, the critical literature is still in a state of formation. The theoretical basis for critical inquiry into Law and Geography is still somewhat undeveloped despite some attempts. However, this has encouraged the sort of truly interdisciplinary inquiry that is called for, such as the geographic relationships between law and other socially and politically powerful domains of knowledge.

(89) LAW AND SOCIOBIOLOGY: Though apparently disparate fields, Law and Sociobiology have had an interesting and fruitful relationship through a common fundamental interest -- behaviour. While Law deals with rules and regulations aimed at controlling behaviour, Sociobiology seeks to understand and predict the genetic bases and patterns of behaviour in human beings. The two disciplines have greatly benefited from the relationship, and some scholars have even suggested their merger into a new hybrid field as Legal Sociobiology through a synthesis of theories and concepts.

(90) LEGAL ANTHROPOLOGY: Legal Anthropology, a hybrid discipline drawn from law and anthropology, was first given clear recognition as a subfield of law in 1941, when law professor Karl Llewellyn constructed a genealogy for it and argued its relevance for the study and teaching of jurisprudence. Today, lawyers view Legal Anthropology as one of the booming fields of jurisprudential study. Legal anthropologists conceptualise law as part of a larger set of institutions of surveillance, normalization and control of members of a society.

The development of an action-oriented Legal Anthropology in the 1950s led to a focus on courtroom procedure and dispute settlement that had much in common with the American legal realists whose work was highly compatible with the work of the anthropologists. Both operated, at that time, within the narrowly defined paradigms of social science but more recent work within this paradigm has begun to shift towards historical analysis.

With new issues challenging the established competence of jurisprudence in the contemporary world of turmoil, Legal Anthropology now focuses on how difficult it is to 'get justice'. Working within the context of the legal profession's heightened consciousness of the apparent powerlessness of representative government to ensure peace and security, the future and role of Legal Anthropology both appear promising.

(91) LINGUISTIC DEMOGRAPHY: Linguistic Demography is a specialised subfield of Demography dealing with the size, distribution, and other characteristics of population on linguistic lines. The main focus of Linguistic Demography is the application of the language criteria in assessing the structure, and how such variables correlate with the overall composition, of a given population. Linguistic demographers are themselves, by profession, crossdisciplinary practitioners who may be either linguists trained in demography or vice versa. Field work is a major tool of the linguistic demographer, and the results of research in the field are usually authentic

indicators of the growth or decline of specific languages or language groups in particular settings at particular times.

(92) LINGUISTIC GEOGRAPHY: Linguistic Geography is concerned with the study of the distribution and social usage of language. The mapping of language areas or language groups, past or present, either as expressions of culture or culture contact or as part of political geography, has been a principal concern of linguistic geography. Linguistic Geography considers local differentiations within speech areas, and the changing geography of particular linguistic forms. Traditionally, Linguistic Geography has been geographical only in the sense that it has been concerned with the spatial distribution of linguistic phenomena. However, more recent concerns have examined the relationships between language, social practice and meaning. Today, Linguistic Geography has emerged as a well-developed field of enquiry.

(93) LOGIC AND LINGUISTICS: Although the founding fathers of modern logic showed some interest in the analysis of meaning in natural language, solid links between the two disciplines of Logic and Linguistics had not been established before the middle of the twentieth century. In the late 1950s, logical techniques were first applied to the analysis of grammars as theories of linguistic competence. These applications rapidly developed into the field of mathematical linguistics and later became a central part of theoretical computer science. The tightest connections between Logic and Linguistics, however, grew out of the rediscovery of logical analysis as a tool of natural language semantics, starting with the advent of the

Montague Grammar in the early 1970s. Since then, the relationship between Logic and Linguistics has grown to benefit both disciplines, although no immediate signs of synthesis of the two disciplines into a new distinct field can yet be discerned.

(94) MARITIME ANTHROPOLOGY: Maritime Anthropology, as a branch of Anthropology, is an interdisciplinary field concerned with the socio-cultural, commercial, and demographic aspects of communities that subsist on marine resources. The field initially started with field studies on fishing villages in Europe undertaken by cultural ethnologists in the 1930s. Since then, several other studies have been undertaken on different communities in other coastal areas of the world.

Maritime Anthropology at present includes studies on the human dimensions of coastal ecosystems, occupational mobility, effects of globalisation on the local economy of fishing villages, harbour communities, and demographic changes among others. The field has contributed useful inputs for administrators, industrialists, public health workers, as well as military strategists.

(95) MATHEMATICAL ECONOMICS: Mathematical Economics has developed from being a relatively small branch of economic theory in 1950 to become almost coextensive with mainstream economic theory. The reasons for the rapid expansion of Mathematical Economics after 1950 lie partly in the influx of ex-mathematicians to academic economics, and partly in the increasing concern in all

branches of economics with formal rigour and with the establishment of economics as a 'scientific' discipline.

Historically, among the first applications of mathematical analysis in economics were the use of the theory of simultaneous equations to discuss the problem of equilibrium in several interrelated markets and the use of calculus to analyse consumer behaviour. These applications remain at the heart of modern Mathematical Economics, though the mathematical techniques applied have changed totally.

At present, most of the effort of mathematical economists is devoted to modifying standard equilibrium and maximizing models by incorporating considerations of uncertainty and differential information in the hope that this approach will provide the basis for reconciling the more obvious disparities between observed economic behaviour and theoretical predictions.

(96) MATHEMATICAL GEOGRAPHY: Mathematical Geography is the product of the synthesis of geography and mathematical sciences. Mathematical Geography is a branch of mainstream geography that examines the spatial structure and patterns of activities, the spatial processes creating and changing these structures, and the spatial interaction among elements of these structures. Geographers have long been concerned with the spatial distribution of physical and human phenomena on the earth's surface, but the widespread application of mathematical and statistical methods to the understanding of these phenomena is a relatively recent development.

(97) MATHEMATICAL LINGUISTICS: Mathematical Linguistics is a branch of linguistics that makes use of statistical and mathematical methods to study the linguistic structure of written or spoken texts. This includes the study of the frequency of occurrence of linguistic items and the study of literary style. Mathematical Linguistics today finds relevance in computational linguistics and psycholinguistics, with possible applications in other related fields.

(98) MATHEMATICAL PSYCHOLOGY: As a hybrid of psychology and mathematics, Mathematical Psychology constitutes the uses of mathematics in extracting information from psychological data and in constructing formal models of behavioural and cognitive phenomena. Its evolution is traced from faltering beginnings in the early twentieth century to a flowering in the mid-1990s. Mathematical Psychology has contributed to other fields, such as, cognitive science, computational psycholinguistics, computer science, including artificial intelligence.

(99) MEDICAL ANTHROPOLOGY: Medical Anthropology, a hybrid subfield of anthropology associated with the bio-medical sciences, is generally understood to refer to the study of social and cultural dimensions of public health and medicine. Its founding figure was the anthropologist and doctor W.H.R. Rivers who argued that 'primitive medicine' could be studied as a social institution employing the same principles and methods that are used to study other social and cultural phenomena. 'Primitive medicine' was seen as a coherent body of practices underpinned by

particular ideas about the causation of disease that are, in turn, shaped by the general worldview of the members of that society.

Pioneering work in the 1930s and 1940s on comparative aspects of 'primitive' medicine and surgery led to the emergence of a subdiscipline that in the 1960s came to be known as "Medical Anthropology". During the 1960s and 1970s, Medical Anthropology, which was unavoidably concerned both implicitly and explicitly with the paradigm of modern Western medicine was characterized by powerful debates favouring the production of objective accounts of non-Western medical concepts and traditions among peoples who often lacked a medical domain of thought and practice that indigenously distinguished from that of religion or ritual.

The central concern of applied Medical Anthropology is ill-health and modes of dealing with it in a variety of settings from the clinic to the community. In contrast, more academically-oriented medical anthropology critically examines issues ranging from international health institutions and bureaucracies to the cultural construction of biomedical concepts and epidemiological categories. The latest and single most influential impetus in Medical Anthropology, however, has been the AIDS pandemic.

Medical Anthropology began to gain general respectability among academic anthropologists only in the early 1980s. In its broadest sense, Medical Anthropology deals with issues ranging from strictly applied work to topics of study that have long

been integral to mainstream anthropology, but this diversity means that, overall, the subdiscipline lacks the character of a truly coherent field.

(100) MEDICAL ECONOMICS: Medical Economics is a specialised interdisciplinary subfield of economics concerned with the study of the medical services or profession as an industry. The primary concern of Medical Economics lies in the economies of medical infrastructure, the levels of demand, supply, actual consumption, including short- and long-range forecasts in terms of possible fluctuations in the distribution of medical goods and services. Medical Economics attempts to provide systematic and quantitative analyses of public health expenditures, production of medical equipments and feasibility studies on establishment of medical institutes and research facilities in terms of actual needs and future projections. Medical Economics draws heavily from other related fields, such as, anthropology, sociology, law, geography, and demography which also have similar concerns within their respective disciplinary perspectives. Contemporary Medical Economics is likely to play a more proactive role in view of the increase in population the world over, and the growing concerns associated with the objective of eradicating or controlling the spread of diseases, such as AIDS, herpes, and hepatitis, that threaten the very fabric of modern society.

(101) MEDICAL GEOGRAPHY: Medical Geography was first recognized as a hybrid geographical discipline in 1952, when the Commission on Medical Geography of Health and Disease (US) first reported to the International Geographical Union.

Medical geography is concerned with the application of geographical perspectives and methods to the study of health, disease and health care. The study of geographical aspects of health-related problems has a long history, but has tended in the past to be viewed as part of disciplines such as epidemiology, medicine, demography, etc.

Medical Geography is now well established in many countries and incorporates two broad areas of study. The first, which has the longer tradition, concerns the spatial ecology of disease and geographical aspects of the health of populations. The second, which has developed more recently, emphasizes the geographical organization of health care. Medical Geography retains associations with *other disciplines outside geography concerned with health-related problems, reflecting the complexity of these problems and the need to examine them from a multidisciplinary perspective.*

(102) MEDICAL SOCIOLOGY: Medical Sociology is that branch of sociology concerned with the broad preserve of medicine in modern society. The subject has expanded so rapidly in the last three decades or so that it has become one of the largest specialized areas of sociology. While Medical Sociology has had general sociology as an intellectual parent, it has under the patronage of medicine enjoyed funding, appointments, an extended teaching role and ease of access for research that have arguably underpinned much of the expansion of the subject in recent years.

Medical Sociology emerged as a distinct area of study in the 1950s following the post-war interest in social epidemiology that sought to identify the role of social factors in the causation of disease. Early studies showed the influence of social structure, in particular of social class, in the aetiology of both psychiatric and organic disease, though identification of the relevant specific components of social structure proved more difficult.

During the 1970s, and increasingly during the 1980s, the health care system and health policy was subjected to a more critical theoretical approach through which patient experience could be depoliticised, alienated, controlled or constructed. Today, Medical Sociology continues to draw from both parental disciplines. Many medical sociologists are employed by medical institutions or on medically defined tasks. Over the last decade or so, a more critical sociology, namely the sociology of health and illness, has succeeded in widening the agenda of the broader Medical Sociology.

(103) MEDICINE AND PSYCHOLOGY: The two fields of Medicine and Psychology have shared a long history of mutually productive relationship largely because both deal with the realm of human psychophysiological functions. Along with the growth of human knowledge of Medicine, there has been a similar accumulation of knowledge about the functioning of the human mind under different situations. Both Medicine and Psychology have borrowed and shared several concepts, theories, models, and techniques from each other

(104) MILITARY GEOGRAPHY: Military Geography is the subfield of geography that deals with the impact of geography on military affairs. Its purpose is to provide understanding and appreciation of the significance of geographic concepts and realities to military plans and operations at the tactical and operational levels of war, and to military concerns at the strategic level. Thus, in using geographic methods and information, Military Geography concentrates on the influence of physical and cultural environments over political-military policies, plans, programmes, and combat/support operations of all types in local, regional, and global contexts.

While Military Geography is accepted by recognised scholars in the discipline as a viable subdivision of geography, its growth and contribution to scholarship has been marked by periods of intense activity and corresponding periods of benign neglect. Quite logically, the most vigorous activity has been during wartime or shortly thereafter, although some of the best studies have been only recently published. In view of the historic distrust between nations, and with it the possibility or reality of military action or intervention, the continued geographic study of military issues and conflict resolution would seem to have a place in scholarly research.

(105) MILITARY PSYCHIATRY: Military Psychiatry is a specialised branch of psychiatry that deals with the diagnosis and treatment of psychiatric disorders among military personnel. Military Psychiatry emerged as a distinct field geared to meet the particular environment within which military personnel operate. The field, which emerged soon after the World War II, has evolved its own unique methods designed to

address the individual cases as they arise during peace time or conflict. Military psychiatrists, as a rule, are experts in handling extreme cases of psychiatric disorders arising as a result of the devastating horrors of war, deprivation, guilt, substance abuse, shock and isolation. Military psychiatrists also often provide useful information relating to recruitment or dismissal of personnel in the form of psychiatric assessments and, verifications in the case of claims of insanity. With the growing sophistication of military establishments the world over, Military Psychiatry will continue to develop and refine the evaluation methods and test criteria as required.

(106) MILITARY PSYCHOLOGY: Military Psychology concerns the utilisation of psychological principles and methods for military applications. Military psychologists study processes and problems similar to those studied by other psychologists, but in military settings and/or with military populations. Military Psychology involves traditional psychological specialty areas such as personnel (selection, classification, placement), learning (training), experimental, human factors, social, clinical, and organizational psychology. Many countries have institutes of Military Psychology, such as the Military Psychological Service of Denmark, dedicated to military psychological research, instruction, and personnel selection and development.

(107) MILITARY SOCIOLOGY: Military Sociology is an interdisciplinary field mainly concerned with the armed forces as a special type of organization with specific social functions. These functions flow from the purpose of the organization, namely

security, and from the organizational means, force or violence. An empirically grounded and theoretically informed Military Sociology only became established, however, during the World War II. The Research Branch of the Information and Education Division of the US Armed Forces carried out pioneering studies during 1942-45. The discipline is most developed and differentiated in the US, though there are now institutions for research in Military Sociology in other countries.

The main areas of research in Military Sociology include: (i) internal organizational problems in daily military life, (ii) internal organizational problems in combat, (iii) relationships between the armed forces and the society, (iv) the military and politics, and (v) the armed forces in the international system. The interdisciplinary nature of the areas of interest has put Military Sociology in a special position because of widespread concern with its applied orientation, and with the 'conservative' views of its main client, the armed forces. It is seldom taught in university departments of sociology, and most research is concentrated in extra-university institutions, often within the armed forces. Nevertheless, the best studies in the field have profitably explored this very tension between academic and 'liberal' commitments and the applications of the research.

The key issues for contemporary research in Military Sociology relate to the most urgent problems of military organization, such as the consequences of current technological developments and of changes in the civilian view of the military in

industrialized countries, as well as the growing importance of military and paramilitary violence, especially in the developing countries.

(108) NEUROLINGUISTICS: Neurolinguistics is a hybrid field of linguistics concerned with the application of the methods and models of linguistics, particularly psycholinguistics, to the study of the neurological level of language production, reception, processing and acquisition as well as the disturbances of each of these. Neurolinguistics encompasses aspects of linguistics, psychology and the brain sciences and consequently interdisciplinary teams working in conjunction with medical facilities often carry out research in this area.

The problems most typically studied under this discipline have been primarily in two areas: language pathology and the underlying neural mechanisms of normal speech. In practice, Neurolinguistics normally limits itself to examining organically caused impairments of language competence or language acquisition, and especially to the linguistic implications of aphasic speech and language.

(109) PHILOSOPHY AND PSYCHOLOGY: Philosophy and Psychology share several areas of common concerns, and the last two decades have been a period of extraordinary levels of interaction between the two disciplines. The association of these two disciplines is traditional and, as to their contents, essential. Cognitive psychology, in particular, which focuses on higher mental processes like reasoning, decision-making, problem solving, language processing and higher-level visual

processing, has become a dominant paradigm among experimental psychologists. Largely as a result of this paradigm shift, the level of interaction between the disciplines of Philosophy and Psychology has increased dramatically.

One of the central goals of Philosophy is to provide explicit and systematic accounts of the theories and explanatory strategies in fields of knowledge. Another common goal is to construct philosophically illuminating analyses or explications of central theoretical concepts involved in the disciplines. Thus, many philosophers have seen cognitive psychology as fertile ground for the sort of careful descriptive work in what might be called the descriptive philosophy of cognitive psychology. On the other hand, perhaps the most impressive example of the way in which psychological research can contribute to the resolution of philosophical disputes is to be found in the venerable debate between empiricist and rationalist accounts of knowledge pertaining to the extent to which human knowledge in various domains is derived from experience, and the extent to which it is innate.

The juxtaposition of Philosophy and Psychology represents a powerful interaction between the two major disciplines concerned with the complex and multi-faceted dimensions of the human mind and bases of human knowledge.

(110) PHILOSOPHY AND RELIGION: Philosophy and Religion have a shared history of development and interaction between them, being the two oldest disciplines still in existence. Both have interests in the orientation of the human mind and

perceptions of the purpose of human existence. The two disciplines are rather intertwined and complement each other through shared concepts and ideals. Both Philosophy and Religion also have a shared language of discourse and interpretation. The philosopher of religion and the philosophical theologian is so far as they employ the spirit of free inquiry and philosophical method to matters pertaining to the question of God and related questions find their fields merging. Numbers of contemporary theologians are philosophers of religion, and philosophers of religion theologians.

(111) PHYSIOLOGICAL PSYCHOLOGY: Physiological Psychology is a hybrid subfield of psychology concerned with the study of the ways in which human behaviour and cognition are influenced or performed by processes that take place physically within the body. The term “physiological” is preferred to “biological” because such influences are usually exerted by whole systems of physical functioning operating together, such as is demonstrated in the fight or flight response, or the sensory information processing systems. Physiological Psychology is often seen as being inherently *reductionist* as it explains behaviour in terms of the actions of neurons and chemicals, but many physiological psychologists maintain an *interactionist* approach to the subject, in which physiological factors are seen as contributing to or influencing behaviour, but not necessarily determining it.

(112) PHYTOGEOGRAPHY: Phytogeography, which draws from both botany and geography, is the study of plant life limited to particular areas, or the spatial distribution of plant species. In other words, Phytogeography is simply the

geographical treatment of plant life and resources. Phytogeography today extends beyond the mere geographical description of plant life; it is increasingly concerned with the ecological factors that affect plant distribution, including issues such as ecosystem degradation, wasteland ecology, and shares the concerns of environmental management.

(113) POLEMOMOLOGY: Polemology is a relatively new crossdisciplinary field of the social sciences, concentrating on the scientific study of war and peace with the aim of preventing or even abolishing the use of military force in international relations. The French scientist Gaston Bouthoul was one of the first researchers to treat war as a scientific subject from a sociological viewpoint. He called this new field of research “Polemology”, the science of war, from the Greek *polemos* and *logos*. Though many earlier studies of war accepted military conflict as a normal and self-evident phenomenon in international relations, Polemology seeks to achieve peace through a scientific knowledge of the use of violence among nations. Different appellations have been used to designate the study of war and peace, such as, peace research, irenology, conflictology, conflict resolution, peace technology, crisis management, and so on. These new and varied appellations clearly reflect the divergent concepts of the aims, the field of research, and the methods to be applied in Polemology.

Polemology broadly covers the following fields of research:

- (i) Conflict Studies (causes and nature of international armed conflict);
- (ii) Strategic Studies (the role of force, deterrence or limited conflict in international relations);
- (iii) Defence Studies (the problems confronting an individual country); and
- (iv) Peace Studies (the avoidance, elimination, and control of force)

Given the scope and areas of concern, Polemology draws from almost all the social science disciplines, as well as from science and technology. As a new branch of the social sciences, Polemology is still struggling with divergent views on the content and the formal objectives of its research efforts, on research methods, and on the conceptualisation required for the establishment of a valid independent science. Disagreement also exists as to whether Polemology should be treated as a theoretical science (knowledge for the sake of knowledge) or as an applied science (knowledge in view of action, such as giving advice to the decision makers).

Most present polemological studies are products of uncoordinated contributions from different disciplines, for many polemologists do not hesitate to offer mainly subjective concrete solutions to solve existing conflicts in international relations without the support of a conceptual framework and a scientific methodology. However, given the contemporary international situation, there is much ground to be covered before Polemology becomes a credible science capable of advising decision

makers in order to avoid or to abolish the application of violence in society and in international relations.

(114) POLICY STUDIES: Policy Studies, strongly rooted in the social sciences, is concerned with understanding the decision processes of public and private institutions, and with assessing the significance of all knowledge for purposes of decision. Policy Studies was introduced after World War II to refer to the emergence of a common frame of reference among specialists in many disciplines, among which may be mentioned public administration, business administration, political science, economics, sociology, law, and more recently, the physical and natural sciences, and technology. Subsequent development of the Policy Studies has been marked by the refinement of conceptual tools, their application to a variety of policy problems, and by the establishment of policy sciences centres in universities, government agencies and the private sector. Policy scientists have, however, only recently begun to develop a distinctive professional identity and an understanding of the roles they may play in the evolution of human civilization.

Policy Studies reflects a convergence of several disciplines on a common outlook, despite their diversity of origins. One element of the common outlook is the contextuality of decisions and policies beyond the traditional academic division of labour. A contextual approach leads to an explicit conception of the decision process as a whole. A second element is a problem-orientation, which includes all the intellectual tasks logically entailed in the solution of any problem. A third element is

the synthesis of diverse methods of observation or analysis to all potentially important aspects of a problem at hand. Other disciplines that have contributed to the development of Policy Studies in recent years include anthropology, medicine, and psychiatry. One of the continuing tasks of Policy Studies in the contemporary times is to appraise its own impact on policy and society.

(115) POLITICAL ANTHROPOLOGY: Political Anthropology, as an offshoot of the anthropological study of power and politics in different cultures, is a hybrid field of anthropology concerned with the comparative study of the different solutions to the problem of coexistence without excessive conflict over power. From the 1930s until the 1950s, a time in which intensive fieldwork in 'primitive' or exotic cultures became the norm, Political Anthropology continued, almost exclusively, to examine political activities in the context of social and religious activities particularly in the disintegrating colonial empires. Today, Political Anthropology finds itself involved with issues at the global level that affect the political developments.

(116) POLITICAL ECOLOGY: Political Ecology had its origins in multidisciplinary efforts to integrate human and cultural ecology with political economy. The incorporation of ecology into political economy influenced political economists to take ecology more seriously, while political economy gave human and cultural ecologists a means to contextualise local level studies into broader political economic relations and into history.

Since the 1970s, Political Ecology has emerged as a multidisciplinary approach with which to analyse complex human-environmental interactions, especially those related to economic development and environmental degradation. In the 1990s, some political ecologists have drawn on cultural studies and discursive approaches for insights into the ways that identify politics and the meanings ascribed to specific landscapes shape environmental politics at various scales - from the local through the global. Today, Political Ecology is a dynamic and growing field that has become a forum for research, discussion, and debate among a diverse group of scholars concerned with the many ways in which power and politics affect and are affected by ecology and the biophysical environment.

(117) POLITICAL ECONOMY: Political Economy, known to have been the original name of economics or economic science, re-emerged after the World War II following the emergence of many new nations, substantial political and social changes, and widening gaps in economic development which questioned the validity of pure economic theory. Political Economy is the study of the relationship between the world of public power and decision making (politics) and the world of production and distribution (economics). This interdisciplinary field examines the role of government in the creation and distribution of goods. Political economists address a wide variety of issues such as public welfare programmes, public education, licensing of professions, public policy, at the local, national, regional, as well as international level.

The 'new' political economy has found application to international issues, that is, the relationship between economics and politics on a worldwide basis. Since the early 1980s, Political Economy has become both more diffuse and more pervasive. Decisions made by politicians in one region often profoundly affect the economy and well-being of citizens of another country. These issues have received more attention as the number of financial transactions occurring among nations increases. To illustrate, the passage of the North American Free Trade Agreement (NAFTA) in 1993 by the U.S. Congress to eliminate existing tariffs on the sale of manufactured goods among the United States, Canada, and Mexico had the strong support of several well-known political economists.

There is no single theory of Political Economy; rather there are multiple theories that attempt to describe the complex relationships between political and economic processes. Since a variety of assumptions and values underlie each theory of Political Economy, each theory is open to criticism. Thus, Political Economy is an on-going intellectual enterprise and all reasonable viewpoints must be heard.

(118) POLITICAL GEOGRAPHY: Political Geography, a subdiscipline of human geography, has attracted some of the most prominent geographers to its subject matter. Though considered to be the weakest of the three divisions of human geography, Political Geography predates both economic and social geography. In fact, before the emergence of modern geography as a generally accepted discipline, the term 'political

geography' was applied generally to 'human' aspects of geography, while physical geography was an adjunct of geology.

With the establishment of geography in universities, human aspects of geography were given new names, indicating the creation of subdisciplines. Political Geography was formally established as a subdiscipline by the publication in 1897 of Friedrich Ratzel's *Politische Geographie*.() The aftermath of the First World War, which brought geographers together to the task of redrawing the map of Europe, marked the heyday of traditional Political Geography both academically and in practice. Since then, Political Geography witnessed both periods of doldrums as well as momentous developments well into the 1970s. During the 1980s Political Geography witnessed a remarkable resurgence, reflected in the establishment of the journal *Political Geography Quarterly* in 1982. Political Geography also became increasingly concerned with social theory with a readiness to examine afresh such central concepts as state, society, nationalism, space, etc. The present challenge for Political Geography is to incorporate new politicisations of human geography through similarly resurgent specializations in other disciplines other than geography.

(119) POLITICAL PSYCHOLOGY: Political Psychology is a hybrid subfield of psychology concerned primarily with the application of methods and concepts in social, developmental and personality psychology to the explanation of political attitudes and behaviour. Broadly, research in this field covers the political consciousness and political action of the citizen, the characteristics and practice of

leadership, processes of decision-making and policy-making, and the management and resolution of conflict. The aims of researchers in this field are rapprochement between psychologists, political scientists and historians, and collaboration with practicing politicians and policy-makers in the application of psychological understanding to national and international politics. The focus of the field is applied, and the approaches within it eclectic.

Political Psychology grew particularly in the 1960s in response to the nuclear threat: social psychological approaches contributed to studies of conflict resolution, negotiation and bargaining behaviour, and the use of gaming and simulation in these contexts. A bulk of the research offers much material on decision-making and leadership drawn from small group dynamics research, and from psycho-biographical accounts and analyses of specific leaders.

(120) POLITICAL SOCIOLOGY: Political Sociology, as an interdisciplinary field, emerged after the World War II when the interaction between Political Science and Sociology became so common and indispensable. Political Sociology examines the links between politics and society, between social structures and political structures, and between social behaviour and political behaviour. It provides a theoretical and methodological bridge between sociology and political science. From a broader perspective, Political Sociology is concerned with the social basis of power in all institutional sectors of society and the study of political behaviour with a sociological framework. The major empirical problem of Political Sociology is the

description, analysis and sociological explanation of the peculiar social structure called the state and the various processes involved in its existence.

Since the 1980s, there has been a major shift in Political Sociology owing to the demise of the radical thrust in the social sciences. The studies in Political Sociology began to combine elements from studies of very different political shades. Some new problems areas include (i) master patterns of simultaneous social, cultural, and political change in society, (ii) dominant socio-political and emerging new cleavages, (iii) the formation of states and nations as well as breakdowns of social and political orders, (iv) prerequisites of and threats to democratic regimes, (v) problematic features of modern states such a bureaucratisation, centralisation, tendencies to corporatism, and (vi) the political consequences of globalisation such as the formation of continent-based political units and institutions.

(121) POPULATION GEOGRAPHY: Population Geography, also known as Geodemography, is concerned with studies of the ways in which spatial variations in the distribution, composition, migration and growth of population are related to the nature of places. A concern with spatial variation has been the geographer's distinctive contribution to population studies, and comparison is frequently made with demographers, who are much more interested in patterns of birth, death and marriage *per se*, neglecting the influence of migration and of spatial variations in general. Yet increasingly, and encouragingly, the boundaries between geography and other disciplines interested in population matters - economics, sociology, history,

psychology and biology as well as demography - are blurred. Thus, it is no longer accurate to think of population geographers as being concerned exclusively with distribution, since recent years have seen an interest in, for example, regional and national levels of fertility and mortality, detailed patterns of disease diffusion and advanced modelling of interregional population growth. There is also a growing interest in the application of social theory to Population Geography. Nevertheless, there is still more concern with migration and spatial variation than with other matters. Population geographers have also sought to make contributions to migration theory, although perhaps the most significant efforts have been devoted to relationships with distance and the recent development of population accounts. Within the wider discipline of geography, population study has always ranked prominently. Today, most university departments offer a separate course in Population Geography, while much research and teaching is also subsumed under urban, social or historical geography.

(122) POSTMODERN STUDIES: Postmodern Studies is an appellation for multidisciplinary inquiries, discourses, and social-cultural and philosophical concerns on both concepts of 'postmodernism' and 'postmodernity' derived originally from the Western philosophical perspectives on the contemporary human civilisation. There are two main tenets, mirroring the distinction between postmodernism and postmodernity: while the latter designates the social and cultural features of late capitalism, distinguishing them from earlier phases (modernity), the former designates a theoretical and methodological programme, as distinct from earlier (modernist) ones.

Prominent areas of Postmodern Studies have been work and organisation, political action, science and technology, commodification, consumption, gender, media, and popular culture, among many others. As such, a whole array of disciplines is engaged with the explication of the multi-faceted issues confronted in Postmodern Studies. The major disciplines, which are actively involved in Postmodern Studies, include philosophy, psychology, economics, political science, sociology, education, history, geography, anthropology, law, science and technology, management science, and information technology.

The changes in consumption patterns and market relationships brought about by the Internet, the rapid rise of popular electronic exchanges, the Internet's role in the globalisation process, are topics that await deeper exploration. It is to be expected that future Postmodern Studies will evolve in the direction of concrete field studies, with an emphasis on the cultural forms induced by computers and the Internet.

(123) PSYCHOBIOLOGY: Psychobiology, as a hybrid domain in psychology, is primarily concerned with the sources of the biological causes of individual functioning. The field usually has a slightly different emphasis to biopsychology but there is no universal agreed meaning for either label. However, in recent years, the field of Psychobiology has reemerged as a major area of research and teaching, with considerable contributions to other related fields in psychology.

(124) PSYCHOHISTORY: Psychohistory, in a strict etymological sense, is a field of history in which the empirical and theoretical discoveries of psychology are explicitly used to explain past events. Psychohistory emerged in America in the 1950s to designate historical writings utilizing psychology, for the most part depth psychology, as their primary frame of reference or mode of explanation. By current practice, however, Psychohistory entails the more specialized application of psychoanalytic theory to the interpretation of historical events and, especially, historical personalities. Psychohistory includes both psychobiographies of specific historical figures and the highly reductionist group psychoanalysis that treats whole cultures or collections of individuals. Since psychohistorians themselves may be either trained psychoanalysts or professional historians, Psychohistory may be classed as an interdisciplinary enterprise.

The practice of psychoanalysing historical people began with the father of psychoanalysis, Sigmund Freud, whose psychobiography of Leonardo da Vinci published in 1910 has become a classic of its kind. Practically since its inception, Psychohistory has come under severe attack both as history and as science. Nevertheless, Psychohistory has emerged as an applied, rather than a pure or basic, science dealing with studies that have only a historical, and not a logical, link with psychoanalytic theory.

(125) PSYCHOLINGUISTICS: Psycholinguistics, a subdiscipline of linguistics, is concerned with the theoretical, experimental and descriptive study of those

cognitive processes involved in the production and comprehension of language by adults, and in the acquisition of language by infants. It is the study of psychological aspects of language and the relationships between language and other psychological processes. Psycholinguistics deals with such questions as the interdependence of language and thought, language acquisition and the ways in which social experience and language acquisition interact, reading and pragmatics. Psycholinguistics is therefore a much broader field than linguistics that is concerned with the origins and form of language. Psycholinguistics is the study of (a) the mental processes that a person uses in producing and understanding language, and (b) how humans learn language. Psycholinguistics includes the study of speech perception, the role of memory, concepts and other processes in language use, and how social and psychological factors affect the use of language.

(126) PSYCHOLOGICAL ANTHROPOLOGY: Psychological Anthropology was initially an outgrowth of culture and personality studies - the new title for the subdiscipline having been proposed by Francis L.K. Hsu in his 1972 introduction to his edited collection *Psychological Anthropology*. The definition of Psychological Anthropology and its proper concern have been more closely associated with American anthropology than with anthropologists elsewhere in the world, who appear to be less inclined to define their interests in terms of a subdiscipline they consider as a parochial concern.

What distinguishes Psychological Anthropology as a crossdisciplinary domain is an explicit concern to reconcile psychology's focus on the individual with anthropology's focus on culture and society; but how precisely this objective is to be achieved is the subject of continuing debate. Psychological Anthropology is broadly concerned with culture and personality studies, socialization theories, psychoanalytic approaches, ethnosemantics, ethnopsychiatry and cognitive anthropology.

(127) PSYCHOLOGY AND ECONOMICS: Psychology as the science of human behaviour naturally also encompasses the study of economic behaviour. As disciplines, Psychology and Economics share more points of contact than generally thought. First, psychological theories and knowledge have been amply applied to explain problems genuinely studied in economics. Similarly, economic theory has also been applied to some fields located traditionally more within the realm of psychologists rather than economists. In most general terms, both disciplines meet in the area of decision-making. From this perspective, there is considerable overlap between the two disciplines of Psychology and Economics, though both disciplines use rather different approaches, rest on entirely different assumptions, and focus on different phenomena of interest.

Today, at the crossroads of Psychology and Economics, interesting research problems have emerged wherever the economic assumptions are violated. A fruitful synthesis is expected to reinforce the interrelationship between Psychology and Economics.

(128) PSYCHOLOGY AND RELIGION: Psychology and Religion share certain common areas of concern which have brought the two disciplines closer together since the 19th century. While Psychology is generally concerned with human thought, perception and cognition, Religion provides an essential component that serves to organise individual perceptions of the world and acts as a basis for action. The psychological study of Religion has provided descriptive accounts of devotional, mystical or other experiences reported as “religious”, studied the degree of correlation between various elements of religiosity, identified background or personality factors that shape these elements, and contributed to theological or philosophical reflections on human nature. Religion, on the other hand, provides a powerful motivating factor for human behaviour that is distinct and illustrative of whatever psychological principles apply to any affiliation, belief and worldview.

Psychologists define Religion not only in terms of behaviour, but as a more subjective and fundamental dimension or orientation of personality and human existence, as the way a person or group deals with such issues as trust and mistrust, commitment, evil, ideals and their frustration, with personal wholeness, fragmentation, and shortcomings and with death. Psychologists have contributed to the rapid growth of non-doctrinal, objective and analytic ‘religious studies’ particularly in secular universities, thereby further ensuring the groundwork for a long-term relationship between Psychology and Religion.

(129) PSYCHOMETRICS: Psychometrics is a subfield of psychology concerned with the measurement (usually through questionnaires or inventories) of psychological characteristics. Psychometric tests include intelligence tests, personality tests, creativity tests, and a whole range of tests used for personnel selection and vocational guidance. Psychometrics today draws from several disciplines, while at the same time enriches such disciplines in turn.

(130) PSYCHOPHYSICS: Psychophysics, as a specialised subfield of psychology, is the study of the relationship between the experience of physical stimuli and the physical stimuli themselves. For instance, the study of the relationship between perceived levels of sound, and levels of sound as measured by physical instruments. Psychophysics, therefore, deals with the whole range of psychological processes including sensory perception, neurophysiology and neuropsychology, and cognition.

(131) REGIONAL SCIENCE: Regional Science emerged as a hybrid discipline in the early 1950s. It employs formal neoclassical theory and rigorous statistical techniques to examine spatial issues in economics, geography and planning. The boundary between regional science and other related disciplinary concerns of location theory, regional economics and planning models are blurred, though increasingly interdependent.

Regional Science was the vision of the American economist Walter Isard who published several papers during the 1940s on alternative reconstruction based upon

location theory. Isard's works provided the twin foundations for Regional Science: (i) a combination of formal neoclassical theory and (ii) sophisticated techniques for manipulating empirical data confronting the real world. Isard established the first department of regional science in 1958 at the University of Pennsylvania, subsequently followed by one at Cornell University. Today, Regional Science typically exists as an inter- or multidisciplinary programme in universities around the world. Regional Science has also made valuable contributions to human geography by providing an intellectual space under which the early quantifiers and spatial theorists in human geography could work. In addition, Regional Science was one of the vehicles by which the ideas of social physics were brought to human geography. Against the backdrop of two decades of critique spanning the 1970s and 1980s, Regional Science has increasingly established its foundations, with more disciplines converging to contribute data, methods and theories to enrich the specialized field. Today, Regional Science is a major crossdisciplinary endeavour transcending several disciplines.

(132) SOCIAL ENGINEERING: Social Engineering, also often referred to as Social Technology, is a hybrid domain representing the synthesis of sociology and technology towards the goal of effecting social coordination and control. The field covers wide-ranging issues relating to regulating mechanisms applied to various aspects of society, ranging from birth-control policies, orientations of educational curricula and scientific development policies, use of technology in various spheres of human life and its impact thereon, to integration of scientific and technological

advances to social institutions and enhancement of their roles and functions in the contemporary world.

Social Engineering, though of recent origin, has emerged as a highly promising applied crossdisciplinary subject with great potential for establishing an increasingly pervasive role in the years to come.

(133) SOCIAL GEOGRAPHY: Social Geography is a subdiscipline of geography concerned with the study of social relations in space and the spatial structures that underpin those relations. The product of 1960s radical geography, Social Geography expanded dramatically in the 1970s until it was virtually synonymous with the whole field of human geography. The turbulent events of the 1960s saw the development of several new perspectives in Social Geography, stressing human welfare and social justice. As a result, Social Geography emerged as a thoroughly eclectic field by the 1970s, encompassing a wide range of ideas, theories and empirical research including several different approaches to knowledge and understanding. Then, with the 'cultural turn' throughout the human sciences during the 1980s, Social Geography emerged into a coherent intellectual project. Throughout this period, Social Geography retained its emphasis on mapping and interpreting the spatial incidence of social problems, including the geographies of crime, housing, education, drug and alcohol abuse.

Rather than simply mapping spatial patterns, however, social geographers are increasingly insistent on asserting the importance of space in the constitution of social

life and examining the spatial structures that underpin social relations as part of the more general reassertion of space in social theory. A closer association between social and cultural geography is also taking place, with studies of the iconography of landscape and of cultural politics. These trends suggest that, in future, social geographers will focus more on the politics of difference, examining the spatial constitution, symbolic expression and social significance of human diversity.

(134) SOCIAL PSYCHOLOGY: Social Psychology is the branch of psychology, which is particularly concerned with the nature and form of social interaction, and how people come to influence each other's behaviour. It also includes the study of social perception, including attitudes and attribution. The objects of social psychological studies include perceptions of people, choice of partners, the role of power in personal relations, and the psychology of small groups.

(135) SOCIOBIOLOGY: Sociobiology, as a hybrid field, is concerned with the application of the principles of evolutionary biology to the study of the social behaviour of organisms, including humans. The origins of Sociobiology can be traced back to the contributions of R.A. Fisher who became a founder of modern evolutionary theory when he synthesized Darwinian views on natural selection with new discoveries about genetics. Fisher demonstrated in his brilliant mathematical models that the fitness of a species is proportional to the level of genetic variation in its gene pool, giving natural selection more options on which to work in order to sustain a species. This concern with fitness as the key to understanding evolution was

to become the central theme of Sociobiology. Thus, Sociobiology is the field concerned with attempts to understand, and sometimes predict, the patterns of behaviour among social animals, and more specifically human beings. Sociobiology has as its central concern the study of the genetic bases of human social behaviour.

There are many weaknesses in the sociobiological approach, one of which is its retrospective approach to methodology, in which explanation takes three stages: (i) the identification of some kind of 'universal' in behaviour; (ii) the identification of a possible 'unit of natural selection' which could produce such behaviour; and (iii) the development of a plausible account of how that behaviour could have evolved. Other objections stem from the highly selective approach both to the 'universals' of behaviour – which usually emphasize only the more negative human traits – and those examples of animal behaviour taken as evidence, in which behavioural variations are largely ignored, and only those cases that support the argument are acknowledged. Sociobiology draws from the work of numerous scholars from such disciplines as sociology, anthropology, psychology, neurobiology, ethology, zoology, and primatology who incorporate the principles of evolutionary biology within the study of the social behaviours of humans and other organisms. Given the tremendous progress being made toward the precise specification of the contributions of genes to behaviour, it seems likely that Sociobiology will continue to gain prominence as a distinct discipline in the years to come.

(136) SOCIOLINGUISTICS: Sociolinguistics is the study of the relationships between language and its social context, and covers a very wide range of approaches and topics. At one end of this range Sociolinguistics merges into theoretical linguistics while at the other end it overlaps with sociology, social psychology, and even cognitive psychology. There is no generally accepted overarching theory of Sociolinguistics. What gives the various writings in the field some coherence and distinctiveness is their primary concern with language, particularly but not exclusively spoken language, as it is actually used. Language is seen as a variable and dynamic phenomenon, and sociolinguists reject the idealized and abstracted data that have often formed the basis of linguistic research. The notion that language is inherently a social phenomenon and fulfils important social functions has led some theoretical linguists to claim that there is no real distinction between linguistics and Sociolinguistics. Such views have found resonance in anthropology, where language study has a long tradition of being situated within culture.

(137) SOCIOLOGY AND PSYCHIATRY: Sociology and Psychiatry have a long-standing relationship that has never been free of tensions and can at least be characterized as ambivalent. Sociology and Psychiatry have a common topic: deviant behaviour. Sociology, as a scientific discipline which examines the rules by which society functions, has a genuine interest in phenomena which threaten these rules. For Psychiatry, in turn, a specific form of deviant behaviour, called mental illness, is its reason for existence. Thus, in this respect, the relationship between Sociology and Psychiatry could be regarded as a relationship of equal partners joining their

intellectual forces in analysing a topic of common interest, though they use different approaches. However, there is also a different type of relationship between these two disciplines, in so far as one of them, Psychiatry as a subspeciality of medicine, has become the subject matter of the other, Sociology.

Though both disciplines are extremely diverse within themselves, there has been a substantial overlap between the two disciplines in recent years. Since Psychiatry has obtained an important definitional power over the specific type of deviant behaviour called mental illness, and since it also has substantial influence on how such behaviour is dealt with, it is obvious that psychiatry itself has become a subject matter of Sociology. Sociology, on the other hand, has not only dealt with psychiatric concepts but also with the process of professionalisation of Psychiatry, which is linked closely to both conceptual issues and to the practice of Psychiatry.

(138) SOCIOLOGY OF ART: The Sociology of Art usually serves as convenient shorthand for 'sociology of the arts' or 'sociology of art and literature'. In fact, the sociology of the visual arts is probably far less developed than the sociology of literature, drama or even film.

The Sociology of Art is an extremely diverse body of work and the generic nature of its subject matter creates difficulties for analysis because there is no single, or even dominant, model of analysis or theory of the relationship between the arts and society. The foundations of Sociology of Art can be traced to different traditions. The

American Sociology of Art is often referred to as the 'production-of-culture' approach. It is included in the mainstream of sociological analysis and focuses on the study of the institutions and organizations of cultural production with emphasis on the social relations in which art is produced. The British tradition, though similar, places literature as a central focus with the performing arts taking second place. The Marxist tradition is a criticism of the 'production-of-culture' approach and emphasizes on the cultural product itself with particular attention to its content, symbolic nature, conventions of representation, and conditions of production.

The Sociology of Art, particularly in the United States and Britain, draws its strength, first, from the development of a methodology for the study of the institutions and practices of cultural production and, secondly, from the analysis of culture as part of a wider social and historical framework. The sociology of cultural production and the sociology of the text, as complementary analyses, provide a valuable corrective to the more traditional, uncritical approaches to the arts dominant in art history, literary criticism, and aesthetics.

Another area of great importance to the Sociology of Art is the study of reception -- of audiences and their responses. Developments in literary criticism have provided an approach to the constitution of meaning in the readers/viewers, their nature, constitution, and modes of perception.

The sociological approach to the arts has been able to demonstrate the contingent, and class-related, development and separation of 'high art' from 'popular culture'. Recognition of the interdisciplinary character of the Sociology of Art must also include mention of work by feminist critics and historians, who have noted and challenged the exclusion of women from both the production of art and the history of art, and also the dominance of patriarchal ideology in artistic representation. Feminist analysis has thrown light on the one-sided nature of the production of culture in terms of gender and the way in which women are represented in art and literature. Viewed from this perspective, the Sociology of Art will continue to generate contentious issues for quite some time and develop as a vibrant crossdisciplinary field drawing vital inputs from more disciplines.

(139) SOCIOLOGY OF KNOWLEDGE: The Sociology of Knowledge, although a recognized speciality since the late 1920s, is often regarded as a rather atypical and in some respects unique sociological field, which, to a greater degree than perhaps any other area of sociology, has interested scholars in other social and human sciences. The philosophers of the French and Scottish Enlightenment were among the first to recognize that a wide range of social, economic and political factors shape the genesis, structure and content of human consciousness. The prominent figures from whose works the Sociology of Knowledge is based include Emile Durkheim, M. Scheler, and Karl Mannheim among others. The central concern of the Sociology of Knowledge is the idea that what people take to be certain is an accident of the society in which they are born and brought up.

(140) SOCIOLOGY OF LANGUAGE: The Sociology of Language, as an interdisciplinary field of sociology, is concerned with the study of language varieties and their users within a social framework, for example, the study of language choice in bilingual or multilingual nations, language planning, language maintenance and language shift. The Sociology of Language is considered either as including the branch of linguistics called Sociolinguistics or as an extension of Sociolinguistics.

(141) SOCIOLOGY OF LAW: Sociology of Law, also known as Sociological Jurisprudence, is a distinctive form of sociology - the nexus of two disciplines within the social sciences. As such, it is essentially interdisciplinary by nature, and therefore of interest to both jurists and sociologists. Sociology of Law has developed as an empirical knowledge domain, with theoretical foundations aimed at describing and explaining the mutual relationships between law in its various forms, and social structures, social institutions, culture, ideologies, and values. Its objective is to unravel the various social and cultural influences that shape the law, whether law is produced by the legislator, the courts, or professionals of law and, conversely, to throw light on the action exerted by law in social life, social structures, and social change.

The origins of the Sociology of Law can be identified in the works of the founding fathers of sociology in the nineteenth century and the beginning of the twentieth century who recognised the central position occupied by law and the legal professionals in the structuring of social life. It was, however, since the 1970s that a

renewed interest in the Sociology of Law became evident and that it has been officially reintegrated into sociology. Modern Sociology of Law now extends in various directions though the insufficiency of any broad general theoretical framework to unite the various perspectives is often lamented.

(142) SOCIOLOGY OF RELIGION: The Sociology of Religion is a major subfield within the discipline of sociology that examines sacred ideologies and associated social practices from an objective and empirical perspective. In contrast with theology, which grapples with the claims of truth made by various religions, sociological analysis considers the social behaviour implications of religious activity, with particular emphasis on its effects on social integration and social change. Religion is viewed as a system of sacred beliefs and practices shared by a community of followers in a particular cultural context.

Modern sociologists of religion, operating almost entirely within the theoretical permutations established by classical sociological theory, have set about the task of systematizing the subfield by attempting to understand the organizational dynamics of religion, and religion's relationship with other human institutions. The worldwide resurgence of religious movements during the 1970s led to a renewed interest in the Sociology of Religion. Contemporary theorists have been forced to grapple with the reality that religion can both contribute to social harmony and stability as well as promote destabilization and change. The Sociology of Religion has

produced various seminal studies that have attempted to create a general paradigm for the subfield.

(143) SOCIOLOGY OF SCIENCE AND TECHNOLOGY: Robert K. Merton is usually cited as the founding father of the Sociology of Science and Technology for setting out his understanding of science and technology as a social institution with its own distinctive norms, practices, and applications, and of the social conditions that favoured or hindered the progress of science and technology. Science and Technology is an area that was long deemed “foreign” to social scientists, although in recent times small groups of social scientists have made major contributions to Science and Technology studies. Since the late 1960s, the sociology of science had developed into one of the most controversial subfields of sociology. Influenced by developments in the philosophy of science, sociologists argued that scientific knowledge was no longer to be presumed free from social shaping. To signal this shift in emphasis the term “sociology of scientific knowledge” was adopted by many sociologists working within the broader multidisciplinary, but strongly sociological, field of science and technology studies.

(144) SOCIOLOGY OF SPORT: Scientific interest in sport as a social phenomenon is rather recent, though sport is probably among the few cultural universals of mankind, and has emerged as one of the most important institutions in industrial societies. One of the earliest attempts to approach sport from a strictly sociological point of view was Heinz Risse’s *Soziologie des Sports* (1921), which tried

to identify the social functions of competitive sport both in antiquity and in modern industrial society. A remarkable growth of interest in the subject occurred after World War II, and especially since 1965.

The Sociology of Sport addresses a wide range of questions, determined partly by different sociological approaches, and partly by the specific problem areas. The phenomena of sport have been explained both from within, with reference to the internal structure of sport, and from without, with primary reference to social and cultural factors. There have also been attempts to interpret other social phenomena with reference primarily to sport. Studies range from such matters as socialization patterns and value contexts to the relevance of sport to international conflicts. Some major fields of interest are the study of sport activity with reference to sociocultural background, the analysis of intersystem conflict, the structure of sports groups, analysis of games and culture, and the relationship between sport and social class. Recent studies have also focussed on socialization and sport, social change and the relevance of sport to the position of minorities, among others.

(145) SUBALTERN STUDIES: Subaltern Studies is an Indian school of historiography whose inspiration lay in the Maoist movement of the 1970s, and whose primary concern has been the critique of the perceived elitist bias of Indian nationalist discourse in history writing. In other words, it represents a challenge to elitist historiography. The school was founded by Ranajit Guha, a Marxist intellectual from West Bengal influenced by the radicalism of the Chinese Cultural Revolution in the

late 1960s, to align himself with Indian Maoism, which characterised independent India as a semifeudal and semicolonial state.

Subaltern Studies began with an attempt to apply the approach known as “history from below” in the Indian context. The term subaltern was inspired by the Italian Marxist Antonio Gramsci, and is used to indicate powerlessness in a society wherein class differentiation, urbanisation, and industrialisation had proceeded very slowly. Initially overtly political in its stance, Subaltern Studies continues to remain popular among young Indian historians and scholars of modern India abroad as a radical alternative to an uncritical academic celebration of Independence. As a discursive field, Subaltern Studies has produced provocative research on the history of colonial India and, of late, into more recent developments. It has been a forum for fresh scholarship on a variety of themes, ranging from ‘low’ caste and ‘tribal’ peasant insurgency, middle-class ideologies of nationalism, prison life and disciplinary structures under colonialism, to the politics of liquor, the significance of myth, and interpretation of ‘bondage’. It has also contributed important theoretical reflections on questions of nationalism, colonial science, caste, gender, and identity.

Over the years, Subaltern Studies has raised the level of debate in Indian historiography - the corpus may be critiqued, but certainly not ignored. It has had an impact on the orientation of many scholars, within and outside the discipline of history, and beyond geographical frontiers. Whether it will retain its original radical

impetus by engaging boldly with questions posed by its own practice and the rapidly changing social and political environment remains to be seen.

(146) TERRORISM STUDIES: Terrorism, defined as the indiscriminate use of force to achieve political aims, has emerged as one of the major problems facing the world since the last quarter of the twentieth century. In most cases, it is a political tactic intended to produce intimidation through the use of threatened use of violence, and has become an increasingly common feature of political disputes at both the domestic and international levels. Though incidents of terrorism have been known to occur throughout history, a set of events that came together in the twentieth century created a new dimension to terrorism. The final wave of terrorism that has affected the world is associated with religious fundamentalism.

Terrorism, as a contemporary phenomenon, has generated interest as well as concern of scholars, administrators, managers, and the public alike. A huge corpus of literature now exists on terrorism, and the need is increasingly being felt to include studies on terrorism (or terrorism studies) as part of the research agenda in many universities and research institutes the world over. Terrorism Studies has also received a boost through generous funding by non-governmental organizations, defence departments, private firms, as well as national governments particularly in areas where the threats of terrorist activities are greater.

In view of the perplexing causes and catastrophic consequences associated with terrorism, present day terrorism has been studied from various disciplinary perspectives, thereby making the problem area a focus of multidisciplinary efforts. Several disciplines have contributed to the development of the field, of which political science, sociology, economics, law, psychology, history, ethics were among the first to recognise the need to consider the causes and effects of terrorism as a relevant issue deserving serious research. Following the non-conventional methods used by terrorists for achieving their presumed goals, the biological sciences, physical sciences, medical sciences, engineering sciences, and the human and environmental sciences immediately became involved with the scientific and technological aspects of terrorism. Different approaches to terrorism are closely associated with the way in which the phenomenon is conceptualised and structured within each discipline. Today, almost every discipline finds, in one way or the other, a critical role in the interpretation, analysis, and objective study of terrorism that has assumed global dimensions.

Terrorism Studies, which has assumed an increasingly global aspect, is now a rapidly growing point of convergence for many disciplines with sufficient justification for a distinct place in academia.

(147) TRIBAL STUDIES: Tribal Studies refers collectively to all studies on tribes from various disciplinary perspectives. The origins of the tribe lie in the earliest stages of human evolution. The term “tribe” forms a highly controversial subject matter with

a discriminatory content in usage. Sociologists and anthropologists have tried to define it as a concept for pre-state societies with a subsistence economy based on domestication of plants and animals. Nevertheless, the tribal structure provides a framework in which individuals have a clear concept of social identity.

The study of tribes has long been associated with anthropologists who have studied the various aspects of tribal societies the world over. However, scholars from several other disciplines, such as, sociology, political science, economics, education, geography, history, public administration, law, philosophy, and religion, now undertake other pertinent aspects of tribes and tribal societies. Tribal Studies, therefore, has assumed a significant place in academia particularly in areas where tribal societies coexist along with other non-tribal communities. For instance, in a country like India where tribals predominate in several states, scholarly studies on the tribals have been supported and sustained by government interest in the upliftment and amelioration of the tribals with mainstream Indian society.

Tribal Studies has emerged as an important crossdisciplinary subject comprehending all dimensions of tribes as critical components in the overall contemporary socio-cultural, economic, and political setting.

(148) URBAN STUDIES: Urban Studies covers the realm of scholarship and research on the multidimensional aspects of urbanisation and the growth of urban areas. Urbanisation is the complex process by which large numbers of people form,

settle in, work in, and live in cities. The growth of cities and urban agglomerations, and the consequent problems, has attracted the attention of scholars, researchers, administrators and planners from a diverse range of disciplines since the beginning of the industrial era. The major disciplines associated with the study of urbanisation and urban areas include economics, sociology, public administration, political science, law, anthropology, engineering, architecture, geography, history, criminology, and demography, which together have produced the bulk of the studies relating to urban issues.

Today, Urban Studies is an institutionalised domain where many disciplines converge to identify, investigate, analyse and provide solutions from their respective disciplinary perspectives.

(149) WOMEN'S STUDIES: Women's Studies as an identifiable area of teaching and research emerged in the late 1960s, although the intellectual antecedents go back further, most notably in the works of Simone de Beauvoir and Virginia Woolf. One of the earliest known courses on the status of women in the United States was offered by the Department of Sociology at the University of Arkansas in 1892. There were also some early twentieth-century examples of economics courses devoted to women's labour in an industrial society, such as the one offered at the University of Washington at Seattle in 1912 by Professor Theresa MacMahon.

The contemporary women's movement provided the impetus for the establishment and growth of women's studies across the disciplines. In 1969, feminists at Cornell University organized a conference on women which reflected the concerns of the movement and which led to a faculty seminar to examine the portrayal of women in the curriculum of the social and behavioural sciences. As a result of the seminar, an interdisciplinary course was established on 'The Evolution of Female Personality', followed in 1970 by a female studies programme that coordinated six courses from different departments of Cornell University. By the end of 1970, there were 110 courses on Women's Studies on various US campuses. Women's Studies programmes were established in other countries during the 1970s in Europe and, more recently, in Asia and Latin America. Women's Studies also spread to the developing world slowly at first and then more rapidly following the UN 'Conference for Women' in Copenhagen in 1980. At that time, as part of the Forum of Non-Governmental Organizations, a series of Women's Studies seminars and workshops was conducted under the joint sponsorship of The Feminist Press and the National Women's Studies Association of the US, The Simone de Beauvoir Institute of Canada, and SNDT Women's University of India.

An important factor in the growth of Women's Studies during the 1970s was the formation of women's caucuses or committees within professional associations to press for more recognition of women scholars and their concerns. Those at the forefront of the movement were in the fields of literature, history, sociology, and psychology. The National Women's Studies Association, USA, founded in 1977 was

instrumental for providing a mechanism for mutual support among Women's Studies constituencies and for the dissemination of knowledge about women's studies. It also served as a model for similar organizations in other countries or regions of the world.

Women's Studies scholarship was not at first accepted as a legitimate area of academic endeavour, and was largely ignored except by the feminists who were its adherents. With critical support offered by foundations and funding agencies, Women's Studies has continued to grow and flourish to the present day with no abatement in sight. Women's Studies received a boost when the Ford Foundation initiated a fellowship programme for research on women in 1972, giving it visibility and legitimacy. Since then, the growth of Women's Studies has been accompanied by a parallel expansion in the volume of books and journals for the dissemination of the new knowledge.

In the present stage of the evolution of Women's Studies, the issue is no longer its legitimacy and further growth, but rather its place in the curriculum. A variety of programmes in recent years have attempted to integrate the new knowledge into the so-called 'mainstream' curriculum, with the purpose of enlightening all students, men and women, and not only those taking Women's Studies courses. This is not simply a matter of adding new material to the existing curriculum; what is involved is the introduction of new perspectives that may challenge the assumptions and methods of the disciplines concerned. Women's Studies scholars have not only influenced the

content of the disciplines but also successfully reoriented the methodologies used in many major disciplines.

Women's Studies is a global movement. What constitutes Women's Studies varies from country to country, not only in numbers but also in relation to national characteristics such as the take-up of higher education. Women's Studies is now recognized throughout Asia and Central and Latin America. For example, from the first national conference on Women's Studies in India (Bombay, 1981), Women's Studies has been a catalyst for social change and India now has over 22 Women's Studies centres funded directly by the University Grants Commission. Today, Women's Studies is represented in all the disciplines as well as being a discipline in its own right. Women's Studies recognizes and legitimises women's knowledge and practice in all fields of endeavour worldwide.

Women's Studies represents a contemporary crossdisciplinary subject promoting the convergence of several disciplines, among which include sociology, anthropology, economics, law, political science, public administration, geography, history, literature, art, management science, and medical sciences.

(150) ZOOGEOGRAPHY: Zoogeography refers to the study of animal life (fauna) or zoological resources limited to particular areas, or the spatial distribution of animal species. In other words, zoogeography is simply the geographical treatment of animal organisms as they exist. Since the 1990s, researchers in the field of Zoogeography

have diversified their interests to include the ecological balance, interaction and interdependence between the animal and human species, including the impact of the growth of human settlements on the natural habitat of animal species. Contemporary Zoogeography has contributed considerably to knowledge about the delicate ecosystem within which organisms must coexist in a most beneficial manner to ensure the survival of all living species in the biosphere.

4.2 MODES OF FORMATION OF CROSSDISCIPLINARY SUBJECTS

The most significant outcome of the conceptual analysis has been the identification and comprehension of three broad manifestations of crossdisciplinary subjects, which do not precisely fit into existing typologies suggested by scholars in the field. The crossdisciplinary subjects considered in the study could be grouped under three broad categories on the basis of their modes of formation, namely (a) juxtaposition, (b) synthesis, and (c) convergence. Incidentally, the three patterns also correspond to the progressive stages in the development of crossdisciplinary subjects. Categorisation provided a suitable framework on the basis of which the treatment of the crossdisciplinary subjects could subsequently be examined against the existing provisions in the IR tools. The three broad categories of crossdisciplinary subjects were as follows:

(1) Category-1: Juxtaposition: The juxtaposition of two or more disciplines indicates the crossdisciplinary interaction whereby the disciplines engage

in collaboration or borrowing and lending of concepts, data, interpretations, theories, methods and tools. Such a pattern of crossdisciplinarity gives rise to crossdisciplinary subjects that expound the juxtaposition of components from two or more distinct disciplines in some relationship. For example, History and Sociology, Law and Ethics, Sociology of Science, etc.;

(2) **Category-2: Synthesis:** Synthesis occurs when two or more distinct disciplines merge to form a new crossdisciplinary subject within an existing disciplinary structure, or fuse together to create a hybrid domain that does not fit into any existing disciplinary structure. Broadly speaking, the subjects formed by the synthesis (fusion) of components from two or more distinct disciplines, or which emerge at the borderline, in between or at the overlap of pre-existing disciplines, fall under this category. For example, Economic Anthropology, Geopolitics, Psycholinguistics, Sociological Jurisprudence, etc.; and

(3) **Category-3: Convergence:** The third category includes crossdisciplinary subjects formed and sustained by the convergence of several distinct disciplines on a problem or subject matter under focus. For example, Addiction Studies, Development Studies, Policy Studies, Urban Studies, Women's Studies, etc.

The break-up of the 150 crossdisciplinary subjects on the basis of their modes of formation is given in Annexure-2.

4.3 SUMMARY

The conceptual analysis of the crossdisciplinary subjects included in the study forms an important stage of the present study, since knowledge about the subjects, their origins, structure, development, and research concerns is critical to the proper evaluation of the IR tools. A major outcome of the conceptual analysis relates to the identification of the modes of formation of the crossdisciplinary subjects considered in the study. The three modes of formation are in the nature of broad categories within the framework of which all crossdisciplinary subjects in all areas of knowledge can be accommodated.

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CHAPTER – 5

EVALUATION OF INFORMATION RETRIEVAL TOOLS

5.0 INTRODUCTION

Representation of the universe of knowledge in IR tools has been a major area of concern for scholars and practitioners in the field of library and information science. A major objective of the present study is, therefore, to systematically evaluate three major IR tools in terms of the provisions in them for the representation of the crossdisciplinary subjects identified, analysed, and categorised. The following IR tools were selected for evaluation in the study:

- (i) Ranganathan, S.R. *Colon Classification*. 7th edition/ revised and edited by M.A. Gopinath. Bangalore: Sarada Ranganathan Endowment for Library Science, 1987.
- (ii) Dewey, Melvil. *Dewey Decimal Classification and Relative Index*. 21st edition/ edited by Joan S. Mitchell, Julianne Beall, Winton E. Matthews, Jr., and Gregory R. New. Albany, New York: Forest Press, 1996.
- (iii) *Library of Congress Subject Headings*. 25th edition. Washington, DC: Library of Congress, 2002.

The three IR tools above were specifically selected for evaluation for the reason that they represent three different structures for subject representation. CC7 is a classic example of a freely-faceted analytico-synthetic classification scheme with well-defined underlying theoretical and structural principles. DDC21 is a widely adopted almost-enumerative general classification scheme that provides for extensive

enumeration while providing for the synthesis of class numbers as warranted by subject propositions. The LCSH25 is basically an enumerative list of subject headings representing major disciplines, knowledge domains, concepts, events, and personalities, among others. DDC21 and LCSH25, in particular, have emerged as the most widely adopted subject indexing tools among libraries today.

The DDC21 and CC7, apart from securing classified arrangement of books on shelves, are essentially subject indexing languages through which final indexes (alphabetical subject index or classified index) can be generated to provide subject approach to documents. Besides, both alphabetical subject index entries for a classified catalogue and subject headings for an alphabetical catalogue can also be derived from the vocabularies of the classification schemes. Similarly, the LCSH25 is a subject indexing language designed to produce an index arranged in alphabetical order of subjects with cross-references to show the major relationships between subject headings. Though the three IR tools differ in their respective characteristics, planes of work, and modes of application, they have been selected for evaluation since they are, basically, standard subject indexing languages that facilitate indexing, search and retrieval mechanisms in information systems.

5.1 CRITERIA FOR EVALUATION OF IR TOOLS

The three predetermined modes of representation, namely, (i) representation by enumeration, (ii) representation by synthesis, and (iii) partial representation, form the

basic criteria for the evaluation of the three IR tools in terms of their capacity to represent each crossdisciplinary subject considered in the study. The criteria have been formulated with the view to examine the treatment of crossdisciplinary subjects in each IR tools so that their relative strengths and weaknesses can be ascertained. Besides, the criteria provide a means for determining the manner in, and degree to, which the IR tools recognise and incorporate existing crossdisciplinary subjects emerging from the realm of the social sciences.

The three IR tools were examined in terms of their provisions for the representation of the crossdisciplinary subjects included in the study. Each crossdisciplinary subject was drawn from the descriptor bank, and the provisions available in each IR tool located and examined, and appropriate devices employed as required, following which the mode of representation adopted in each IR tool could be ascertained.

5.2 REPRESENTATION OF CROSSDISCIPLINARY SUBJECTS IN CC7

The Colon Classification, originally devised by S.R. Ranganathan and first published in 1933, was revised under the editorship of M.A. Gopinath and published in 1987 as the Colon Classification, 7th edition (Basic and Depth Version), generally referred to as CC7. The Colon Classification scheme has five parts:

- a) **Part-A: Introduction** which includes six chapters which describe the genesis and development of Colon Classification and the general theory of library classification;
- b) **Part-B: Guidance to the Beginner** has pedagogical value and it works as a guide to beginners in the use of CC7;
- c) **Part-C: General Rules** deals with call number, collection number, devices, focus and facet, planes of work, formation of zones and sectors, postulates for fundamental categories, and environment divisions;
- d) **Part-D: General Divisions and Common Isolates** which include description of Vedic systems of classification, schedule of environment divisions, provision of the checklist of components for facet analysis, schedule of basic subjects enumerating about 776 basic subjects, and enumeration of class numbers for 10 subject bundles; and
- e) **Part-E: Special Isolates** which includes the main schedules with facet formulae.

The representation of the 150 crossdisciplinary subjects included in the present study in CC7 is shown as follows:

No.1

Subject	ADDICTION STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	SY,13-p3 = Drug Addiction
Mode	Partial
Remarks	The provision is inadequate since Addiction Studies deals with other addictive agents, psychological deviances, and addiction to particular sensations.

No.2

Subject	AGRICULTURAL ECONOMICS
Category	Synthesis
Specific Provision	XX(J) = Agricultural Economics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.3

Subject	AGRICULTURAL GEOGRAPHY
Category	Synthesis
Specific Provision	U(J) = Agricultural Geography
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate

No.4

Subject	AGRICULTURAL PSYCHOLOGY
Category	Synthesis
Specific Provision	S(J) = Agricultural Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Provision by enumeration by (SD) under Psychology warranted.

No.5

Subject	ANTHROPOGEOGRAPHY
Category	Synthesis
Specific Provision	U5 = Anthropogeography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.6

Subject	ANTHROPOLOGICAL LINGUISTICS
Category	Synthesis
Specific Provision	P(Y,9D) = Anthropological Linguistics
Alternative Provision	
Mode	Synthesis
Remarks	Provision by enumeration as a subfield of Linguistics warranted.

No.7

Subject	ANTHROPOLOGICAL POLITICAL ECONOMY
Category	Synthesis
Specific Provision	X(Y,9D) = Anthropological Economics
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Schedule of Basic Subjects desirable.

No.8

Subject	ANTHROPOLOGY AND ARCHAEOLOGY
Category	Juxtaposition
Specific Provision	Y,9D&aV,1;92 = Anthropology and Archaeology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Schedule of Basic Subjects desirable.

No.9

Subject	ANTHROPOMETRY
Category	Synthesis
Specific Provision	Y,9D&eBT = Statistical Techniques in Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provisions for subfields of Anthropology by enumeration required.

No.10

Subject	ARCHAEOLOGY AND HISTORY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	V = History V,1;92 = Archaeology
Mode	Partial
Remarks	Separate provision required for Archaeology as a field distinct from History.

No.11

Subject	ARCHAEOLOGY AND SOCIOLOGY
Category	Juxtaposition
Specific Provision	V,1:92&aY = Archaeology and Sociology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.12

Subject	ARCHAEOOMETRY
Category	Synthesis
Specific Provision	V,1;92&eBT = Statistical Methods in Archaeology
Alternative Provision	
Mode	Synthesis
Remarks	Specific enumeration warranted.

No.13

Subject	ARCHITECTURAL PSYCHOLOGY
Category	Synthesis
Specific Provision	S(NA) = Architectural Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Psychology warranted.

No.14

Subject	AREA STUDIES
Category	Convergence
Specific Provision	0U = Area Study
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate, though use of plural form of heading is warranted.

No.15

Subject	ART AND ANTHROPOLOGY
Category	Juxtaposition
Specific Provision	M&aY,9D = Art and Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.16

Subject	ART AND RELIGION
Category	Juxtaposition
Specific Provision	M&aQ = Art and Religion
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.17

Subject	BIOARCHAEOLOGY
Category	Synthesis
Specific Provision	V,1;92:(G) = Bioarchaeology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.18

Subject	BIOETHICS
Category	Synthesis
Specific Provision	R4(G) = Bioethics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.19

Subject	BIOGEOGRAPHY
Category	Synthesis
Specific Provision	U3 = Biogeography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.20

Subject	BIOLOGICAL PSYCHIATRY
Category	Synthesis
Specific Provision	L,72;4:691(G) = Biological Psychiatry
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in Schedule of Basic Subjects warranted.

No.21

Subject	BIOPOLITICS
Category	Synthesis
Specific Provision	W(G) = Biopolitics
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in Schedule of Basic Subjects warranted.

No.22

Subject	BUSINESS AND MASS MEDIA
Category	Juxtaposition
Specific Provision	X44&a4,1 = Business and Mass Media
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.23

Subject	BUSINESS ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(X44) = Business Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of Anthropology and its subfields warranted.

No.24

Subject	BUSINESS GEOGRAPHY
Category	Synthesis
Specific Provision	U(X44) = Business Geography
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of Business Geography as a subfield of Economic Geography warranted.

No.25

Subject	BUSINESS STUDIES
Category	Convergence
Specific Provision	X44 = Business Economics
Alternative Provision	
Mode	Enumeration
Remarks	Enumeration in Schedule of Basic Subjects warranted.

No.26

Subject	COGNITIVE SCIENCE
Category	Convergence
Specific Provision	S;4 = Cognitive Psychology
Alternative Provision	
Mode	Enumeration
Remarks	Specific provision of Cognitive Science as a distinct field warranted.

No.27

Subject	COMMUNITY STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	Y = Sociology Y,9D = Ethnology/Anthropology
Mode	Partial
Remarks	Specific provision for Communities under Sociology warranted.

No.28

Subject	COMPUTATIONAL PSYCHOLINGUISTICS
Category	Synthesis
Specific Provision	PUS&e9S = Computer applications in Psycholinguistics
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of subfields of Psycholinguistics warranted.

No.29

Subject	CULTURAL ECOLOGY
Category	Synthesis
Specific Provision	Y(G,OZ;5) = Cultural Ecology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.30

Subject	CULTURAL ECONOMICS
Category	Synthesis
Specific Provision	X(Y) = Social (Cultural) Economics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.31

Subject	CULTURAL GEOGRAPHY
Category	Synthesis
Specific Provision	None
Alternative Provision	U55 = Human Geography
Mode	Partial
Remarks	Specific enumeration as a subfield under Human Geography warranted

No.32

Subject	CULTURAL PSYCHOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	SY = Social Psychology
Mode	Partial
Remarks	Specific enumeration warranted as, e.g., Social Psychology.

No.33

Subject	CULTURAL STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	Y,9D = Ethnology
Mode	Partial
Remarks	Specific enumeration of Culture as a sociological concept/process required.

No.34

Subject	DEMOGRAPHIC ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(YT) = Demographic Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.35

Subject	DEVELOPMENT STUDIES
Category	Convergence
Specific Provision	X27,OZ;7 = Economic Resources Development
Alternative Provision	
Mode	Enumeration
Remarks	Enumeration under Schedule of Basic Subjects warranted.

No.36

Subject	ECOLOGICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D&eG,OX;5 = Ecological principles in Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.37

Subject	ECOLOGICAL ECONOMICS
Category	Synthesis
Specific Provision	X&G,OZ;5 = Ecological principles applied in Economics
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Economics warranted.

No.38

Subject	ECONOMETRICS
Category	Synthesis
Specific Provision	XYT = Econometrics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.39

Subject	ECONOMIC ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(X) = Economic Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.40

Subject	ECONOMIC DEMOGRAPHY
Category	Synthesis
Specific Provision	YT(X) = Economic Demography
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate, though specific enumeration is warranted.

No.41

Subject	ECONOMIC GEOGRAPHY
Category	Synthesis
Specific Provision	U7 = Economic Geography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.42

Subject	ECONOMIC HISTORY
Category	Synthesis
Specific Provision	V(X) = Economic History
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of Economic History under Schedule of Basic Subjects warranted.

No.43

Subject	ECONOMIC SOCIOLOGY
Category	Synthesis
Specific Provision	Y(X) = Economic Sociology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of Economic Sociology under Schedule of Basic Subjects warranted.

No.44

Subject	ECONOMICS AND EDUCATION
Category	Juxtaposition
Specific Provision	X&aT = Economics and Education
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.45

Subject	ECONOMICS AND ETHICS
Category	Juxtaposition
Specific Provision	X&aR4= Economics and Ethics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.46

Subject	EDUCATIONAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(T) = Educational Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Schedule of Basic Subjects warranted, e.g., Educational Psychology.

No.47

Subject	EDUCATIONAL PSYCHOLOGY
Category	Synthesis
Specific Provision	TUS = Educational Psychology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.48

Subject	EDUCATIONAL SOCIOLOGY
Category	Synthesis
Specific Provision	TUV = Educational Sociology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.49

Subject	ELECTORAL GEOGRAPHY
Category	Synthesis
Specific Provision	U(W,OZ;3) = Electoral Geography
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of Electoral Geography as a subfield of Political Geography warranted.

No.50

Subject	ENGINEERING PSYCHOLOGY
Category	Synthesis
Specific Provision	SY,1-v3D = Engineering Psychology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.51

Subject	ENVIRONMENTAL ARCHAEOLOGY
Category	Synthesis
Specific Provision	V,1;92(X27)=Environmental Archaeology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration of subfields of Archaeology warranted.

No.52

Subject	ENVIRONMENTAL AUDITING
Category	Synthesis
Specific Provision	X27,1(8;J) = Natural Resource Audit
Alternative Provision	
Mode	Synthesis
Remarks	Use of current terminology warranted.

No.53

Subject	ENVIRONMENTAL ECONOMICS
Category	Synthesis
Specific Provision	X27,1 = Natural Resource Economics
Alternative Provision	
Mode	Enumeration
Remarks	Use of current terminology and specific enumeration warranted.

No.54

Subject	ENVIRONMENTAL MANAGEMENT
Category	Synthesis
Specific Provision	X27,1&e8 =Natural Resource Management
Alternative Provision	
Mode	Synthesis
Remarks	Use of current terminology warranted.

No.55

Subject	ENVIRONMENTAL PSYCHOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	SY = Social Psychology
Mode	Partial
Remarks	Provision interpreted to include Environmental Psychology as a subfield of Social Psychology.

No.56

Subject	ENVIRONMENTAL STUDIES
Category	Convergence
Specific Provision	AXB = Environmental Sciences
Alternative Provision	
Mode	Enumeration
Remarks	Specific provision warranted.

No.57

Subject	ETHNIC STUDIES
Category	Convergence
Specific Provision	Y,9D = Ethnology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate, though specific enumeration is warranted.

No.58

Subject	ETHNOARCHAEOLOGY
Category	Synthesis
Specific Provision	V,1;92(Y,9D) = Ethnoarchaeology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in the Schedule of Basic Subjects warranted.

No.59

Subject	ETHNOBIOLOGY
Category	Synthesis
Specific Provision	G(Y,9D) = Ethnobiology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in the Schedule of Basic Subjects warranted.

No.60

Subject	ETHNOBOTANY
Category	Synthesis
Specific Provision	I(Y,9D) = Ethnobotany
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in the Schedule of Basic Subjects warranted.

No.61

Subject	ETHNOPSYCHIATRY
Category	Synthesis
Specific Provision	L,72;4:691(Y,9D) = Ethnopsychiatry
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in the Schedule of Basic Subjects warranted.

No.62

Subject	ETHNOZOOLOGY
Category	Synthesis
Specific Provision	K(Y,9D) = Ethnozoology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration in the Schedule of Basic Subjects warranted.

No.63

Subject	FORENSIC ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(Z,OZ,8) = Forensic Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Anthropology warranted.

No.64

Subject	FORENSIC LINGUISTICS
Category	Synthesis
Specific Provision	P(Z,OZ,8) = Forensic Linguistics
Alternative Provision	
Mode	Synthesis
Remarks	Provision for Forensic Linguistics as a subfield of Linguistics warranted.

No.65

Subject	FORENSIC PSYCHIATRY
Category	Synthesis
Specific Provision	L,72;4:691(Z,OZ,8) = Forensic Psychiatry
Alternative Provision	
Mode	Synthesis
Remarks	Specific enumeration of subfields of Psychiatry warranted.

No.66

Subject	FORENSIC PSYCHOLOGY
Category	Synthesis
Specific Provision	S(Z,OZ,8) = Forensic Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.67

Subject	FORENSIC SCIENCE
Category	Convergence
Specific Provision	Z,OZ,8 = Court / Forensic Science
Alternative Provision	
Mode	Enumeration
Remarks	Enumeration under Schedule of Basic Subjects warranted.

No.68

Subject	GEOARCHAEOLOGY
Category	Synthesis
Specific Provision	V,1;92&eH = Geoarchaeology
Alternative Provision	
Mode	Synthesis
Remarks	Provision for Geoarchaeology as a hybrid subdiscipline of Archaeology required.

No.69

Subject	GEOGRAPHY OF LAW
Category	Synthesis
Specific Provision	U(Z) = Geography of Law/Legal Geography
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.70

Subject	GEOPOLITICS
Category	Synthesis
Specific Provision	WX = Geopolitics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.71

Subject	GLOBALISATION STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	XYA = International Economics (Theory)
Mode	Partial
Remarks	Provision for concept of Globalisation warranted.

No.72

Subject	HISTORICAL DEMOGRAPHY
Category	Synthesis
Specific Provision	YT(V) = Historical Demography
Alternative Provision	
Mode	Synthesis
Remarks	Provision required for Historical Demography as a subfield of Demography.

No.73

Subject	HISTORICAL GEOGRAPHY
Category	Synthesis
Specific Provision	U6,8 = Historical Geography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.74

Subject	HISTORICAL LINGUISTICS
Category	Synthesis
Specific Provision	P(V) = Historical Linguistics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.75

Subject	HISTORICAL SOCIOLOGY
Category	Synthesis
Specific Provision	Y(V) = Historical Sociology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Schedule of Basic Subjects warranted.

No.76

Subject	HISTORY AND ANTHROPOLOGY
Category	Juxtaposition
Specific Provision	V&aY,9D = History and Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.77

Subject	HISTORY AND LITERATURE
Category	Juxtaposition
Specific Provision	V&aO = History and Literature
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.78

Subject	HISTORY AND POLITICS
Category	Juxtaposition
Specific Provision	V*Z = History and Political Science
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.79

Subject	INDUSTRIAL ECOLOGY
Category	Synthesis
Specific Provision	X27,2A&eG,1;5 = Ecological principles applied to Industrial Resources
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.80

Subject	INDUSTRIAL GEOGRAPHY
Category	Synthesis
Specific Provision	U(XX) = Industrial Geography
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Economic Geography warranted.

No.81

Subject	INDUSTRIAL JURISPRUDENCE
Category	Synthesis
Specific Provision	Z,OZ,9A(XX) = Industrial Jurisprudence
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.82

Subject	INDUSTRIAL PSYCHOLOGY
Category	Synthesis
Specific Provision	S-9XX = Industrial Psychology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.83

Subject	INDUSTRIAL SOCIOLOGY
Category	Synthesis
Specific Provision	Y49(XX) = Industrial Sociology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.84

Subject	INTERNATIONAL STUDIES
Category	Convergence
Specific Provision	WAY = International Politics (International Relations)
Alternative Provision	
Mode	Enumeration
Remarks	Specific provision for International Studies under Schedule of Basic Subjects warranted.

No.85

Subject	LABOUR STUDIES
Category	Convergence
Specific Provision	X27,Y = Human Resource Economics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate, though specific enumeration is warranted..

No.86

Subject	LAW AND ECONOMICS
Category	Juxtaposition
Specific Provision	Z&aX = Law and Economics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.87

Subject	LAW AND ETHICS
Category	Juxtaposition
Specific Provision	Z&aR4 = Law and Ethics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.88

Subject	LAW AND GEOGRAPHY
Category	Juxtaposition
Specific Provision	Z&aU = Law and Geography
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.89

Subject	LAW AND SOCIOBIOLOGY
Category	Juxtaposition
Specific Provision	Z&aYUG = Law and Biosociology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.90

Subject	LEGAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(Z) = Legal Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.91

Subject	LINGUISTIC DEMOGRAPHY
Category	Synthesis
Specific Provision	YT(P) = Linguistic Demography
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Schedule of Basic Subjects warranted.

No.92

Subject	LINGUISTIC GEOGRAPHY
Category	Synthesis
Specific Provision	U(P) = Linguistic Geography
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Schedule of Basic Subjects warranted.

No.93

Subject	LOGIC AND LINGUISTICS
Category	Juxtaposition
Specific Provision	R1&aP = Logic and Linguistics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.94

Subject	MARITIME ANTHROPOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	Y,9D = Anthropology
Mode	Partial
Remarks	Enumeration as a subfield under Anthropology warranted

No.95

Subject	MATHEMATICAL ECONOMICS
Category	Synthesis
Specific Provision	X&eBT = Mathematical Economics
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Economics warranted.

No.96

Subject	MATHEMATICAL GEOGRAPHY
Category	Synthesis
Specific Provision	U1 = Mathematical Geography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.97

Subject	MATHEMATICAL LINGUISTICS
Category	Synthesis
Specific Provision	P&eBT = Mathematical Linguistics
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Linguistics warranted.

No.98

Subject	MATHEMATICAL PSYCHOLOGY
Category	Synthesis
Specific Provision	S&eBT = Mathematical Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield of Psychology warranted.

No.99

Subject	MEDICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(L) = Medical Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.100

Subject	MEDICAL ECONOMICS
Category	Synthesis
Specific Provision	X(L) = Medical Economics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.101

Subject	MEDICAL GEOGRAPHY
Category	Synthesis
Specific Provision	U(L) = Medical Geography
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.102

Subject	MEDICAL SOCIOLOGY
Category	Synthesis
Specific Provision	Y49(L) = Medical Sociology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.103

Subject	MEDICINE AND PSYCHOLOGY
Category	Juxtaposition
Specific Provision	L&aS = Medicine and Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.104

Subject	MILITARY GEOGRAPHY
Category	Synthesis
Specific Provision	U6,1 = Military Geography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.105

Subject	MILITARY PSYCHIATRY
Category	Synthesis
Specific Provision	L,72;4;691(V,8V) = Military Psychiatry
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.106

Subject	MILITARY PSYCHOLOGY
Category	Synthesis
Specific Provision	SYv3(V,8V) = Military Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.107

Subject	MILITARY SOCIOLOGY
Category	Synthesis
Specific Provision	Y49(MV) = Military Sociology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.108

Subject	NEUROLINGUISTICS
Category	Synthesis
Specific Provision	None
Alternative Provision	PUS = Psycholinguistics P = Linguistics
Mode	Partial
Remarks	Specific provision for Neurolinguistics warranted.

No.109

Subject	PHILOSOPHY AND PSYCHOLOGY
Category	Juxtaposition
Specific Provision	R&aS = Philosophy and Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.110

Subject	PHILOSOPHY AND RELIGION
Category	Juxtaposition
Specific Provision	R&aQ = Philosophy and Religion
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.111

Subject	PHYSIOLOGICAL PSYCHOLOGY
Category	Synthesis
Specific Provision	S-9G;3 = Physiological Psychology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.112

Subject	PHYTOGEOGRAPHY
Category	Synthesis
Specific Provision	U(I) = Phytogeography
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.113

Subject	POLEMOLOGY
Category	Convergence
Specific Provision	None
Alternative Provision	OX(W;18=L) = Peace Research
Mode	Partial
Remarks	Specific provision for Polemology as a distinct field of academia warranted.

No.114

Subject	POLICY STUDIES
Category	Convergence
Specific Provision	8V = Policy Sciences
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate, though use of current terminology is warranted.

No.115

Subject	POLITICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(W) = Political Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.116

Subject	POLITICAL ECOLOGY
Category	Synthesis
Specific Provision	W&eG,OZ;5 = Political Ecology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.117

Subject	POLITICAL ECONOMY
Category	Synthesis
Specific Provision	X(W) = Political Economics (Economy)
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.118

Subject	POLITICAL GEOGRAPHY
Category	Synthesis
Specific Provision	U6 = Political Geography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.119

Subject	POLITICAL PSYCHOLOGY
Category	Synthesis
Specific Provision	S-9W = Political Psychology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.120

Subject	POLITICAL SOCIOLOGY
Category	Synthesis
Specific Provision	WV = Political Sociology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.121

Subject	POPULATION GEOGRAPHY
Category	Synthesis
Specific Provision	U5,3 = Population Geography
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.122

Subject	POSTMODERN STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	R = Philosophy Y = Sociology
Mode	Partial
Remarks	Enumeration under schedule of basic subjects warranted.

No.123

Subject	PSYCHOBIOLOGY
Category	Synthesis
Specific Provision	SUG = Psychobiology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.124

Subject	PSYCHOHISTORY
Category	Synthesis
Specific Provision	V&eS = Psychohistory
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.125

Subject	PSYCHOLINGUISTICS
Category	Synthesis
Specific Provision	PUS = Psycholinguistics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.126

Subject	PSYCHOLOGICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	Y,9D(S) = Psychological Anthropology
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.127

Subject	PSYCHOLOGY AND ECONOMICS
Category	Juxtaposition
Specific Provision	S&aX = Psychology and Economics
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.128

Subject	PSYCHOLOGY AND RELIGION
Category	Juxtaposition
Specific Provision	S&aQ = Psychology and Religion
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.129

Subject	PSYCHOMETRICS
Category	Synthesis
Specific Provision	SPYT = Psychometrics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.130

Subject	PSYCHOPHYSICS
Category	Synthesis
Specific Provision	S,OZ;93 = Psychophysics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.131

Subject	REGIONAL SCIENCE
Category	Convergence
Specific Provision	None
Alternative Provision	0U = Area Study X = Economics
Mode	Partial
Remarks	Enumeration of Regional Science as a crossdisciplinary field warranted under Schedule of Basic Subjects.

No.132

Subject	SOCIAL ENGINEERING
Category	Synthesis
Specific Provision	None
Alternative Provision	Y = Sociology
Mode	Partial
Remarks	Specific provision under Social Engineering warranted.

No.133

Subject	SOCIAL GEOGRAPHY
Category	Synthesis
Specific Provision	None
Alternative Provision	U = Geography U5,5 = Human Geography
Mode	Partial
Remarks	Provision adequate.

No.134

Subject	SOCIAL PSYCHOLOGY
Category	Synthesis
Specific Provision	SY = Social Psychology
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.135

Subject	SOCIOBIOLOGY
Category	Synthesis
Specific Provision	YUG = Biosociology
Alternative Provision	
Mode	Enumeration
Remarks	Specific provision for Sociobiology warranted.

No.136

Subject	SOCIOLINGUISTICS
Category	Synthesis
Specific Provision	PUV = Sociolinguistics
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.137

Subject	SOCIOLOGY AND PSYCHIATRY
Category	Juxtaposition
Specific Provision	Y&aL,72;4:691=Sociology and Psychiatry
Alternative Provision	
Mode	Synthesis
Remarks	

No.138

Subject	SOCIOLOGY OF ART
Category	Synthesis
Specific Provision	Y(N) = Art Sociology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Sociology warranted.

No.139

Subject	SOCIOLOGY OF KNOWLEDGE
Category	Synthesis
Specific Provision	Y(0Y) = Sociology of Knowledge
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Sociology warranted.

No.140

Subject	SOCIOLOGY OF LANGUAGE
Category	Synthesis
Specific Provision	Y(P) = Sociology of Language
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Sociology warranted.

No.141

Subject	SOCIOLOGY OF LAW
Category	Synthesis
Specific Provision	Y(Z) = Sociology of Law
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Sociology warranted.

No.142

Subject	SOCIOLOGY OF RELIGION
Category	Synthesis
Specific Provision	Y(Q) = Sociology of Religion
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Sociology warranted.

No.143

Subject	SOCIOLOGY OF SCIENCE AND TECHNOLOGY
Category	Synthesis
Specific Provision	Y(A*Z) = Sociology of Science and Technology
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration as a subfield under Sociology warranted.

No.144

Subject	SOCIOLOGY OF SPORT
Category	Synthesis
Specific Provision	Y(L,1;57) = Sociology of Exercise and Recreation
Alternative Provision	
Mode	Synthesis
Remarks	Enumeration under Sociology warranted.

No.145

Subject	SUBALTERN STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	z44 = Indology V,44 = History of India
Mode	Partial
Remarks	Enumeration under Schedule of Basic Subjects warranted.

No.146

Subject	TERRORISM STUDIES
Category	Convergence
Specific Provision	V,1;4118 = Terrorism
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.147

Subject	TRIBAL STUDIES
Category	Convergence
Specific Provision	Y,9C = Tribes/Tribals
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.148

Subject	URBAN STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	Y,342 = Urban Sociology
Mode	Partial
Remarks	Specific provision required for Urban Studies in general.

No.149

Subject	WOMEN'S STUDIES
Category	Convergence
Specific Provision	Y,21 = Sociology of Women
Alternative Provision	
Mode	Enumeration
Remarks	Enumeration of Women's Studies under Schedule of Basic Subjects warranted.

No.150

Subject	ZOOGEOGRAPHY
Category	Synthesis
Specific Provision	U3,5 = Biogeography of Animals
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate

5.3 TREATMENT OF CROSSDISCIPLINARY SUBJECTS IN CC7

CC7 has been able to provide for the representation of crossdisciplinary subjects fairly adequately. The following observations can be made in respect of the treatment of the crossdisciplinary subjects in CC7:

- 1) The representation of almost all the crossdisciplinary subjects formed by juxtaposition has been secured through General Phase Relations device which permits the synthesis of components of the subject propositions expounding the relationship between two or more disciplines.

- 2) As regard to crossdisciplinary subjects formed by synthesis and by convergence, CC7 has been able to provide for their representation either by enumeration under the schedule of basic subjects in many cases, or by enumeration in the schedule of special isolates, or through the synthesis of the components from different parts of the schedules. However, the mere enumeration of several hybrid fields under the schedule of basic subjects without the support of special isolates indicates a serious defect of CC7. Besides, the lack of terminological currency in the case of many subjects, and the absence of relevant concepts in many of the schedules, render it difficult to secure appropriate synthesis as warranted by the crossdisciplinary subjects. Most of the crossdisciplinary subjects formed by convergence have not been enumerated as distinct basic subjects, thereby restricting their scope to the traditional disciplines within which they are to be accommodated. As such, the existing provisions have only been able to partially represent the crossdisciplinary subjects formed by convergence.
- 3) While the representation of many specialised hybrid knowledge domains as subfields of existing main disciplines can be considered acceptable, the accommodation of several crossdisciplinary subjects formed by convergence within the bounds of existing disciplines cannot be justified. However, a scrutiny of the existing schedules of CC7 for the behavioural and social sciences has revealed the feasibility of including new crossdisciplinary subjects at more appropriate placings. It is, therefore,

suggested that appropriate provisions for the accommodation of some crossdisciplinary subjects formed by convergence be enumerated in CC7 as follows:

Table-

EXTENSION OF SCHEDULE OF BASIC SUBJECTS IN COLON CLASSIFICATION	
S*Z	Behavioural and Social Sciences
S*ZX	Crossdisciplinary Subjects
S*ZXA	Addiction Studies
S*ZXD	Environmental Studies
S*ZXG	Polemology
S*Z XK	Policy Studies
S*ZXN	Postmodern Studies
S*ZXR	Terrorism Studies
S*ZXU	Globalisation Studies

It may further be emphasised that the above enumeration of the major crossdisciplinary subjects in the schedule of basic subjects must necessarily be supported by enumeration of their respective special isolates.

- 4) As regard to the terminology used in CC7, there is a lack of currency and literary warrant in the names of subjects used, for instance, YUG Biosociology instead of Sociobiology. More work is required towards the adoption of current terminology accepted by academic consensus for representing relevant subjects in CC7.
- 5) Further, in the case of certain subjects formed by the juxtaposition of sociology in some relation with other subject matter or discipline, for

example, Sociology of Knowledge, Sociology of Art, etc., sharpening of the focus is required at the level of the basic subject Y (Sociology) through Subject Device, since these subjects represent studies from the sociological perspective. The sociology schedule appears to have been largely ignored and no attempt seems to have been undertaken to include main concepts, objects and subject matters generally studied by the discipline. The absence of a facet formula for the sociology schedule also reflects the lack of serious effort during the revision of CC7.

- 6) Overall, an obvious weakness of CC7 is the lack of regular revisions in terms of provisions for new subjects that warrant inclusion in the schedules of special isolates, and not merely listed under the schedule of basic subjects. The enumeration of many crossdisciplinary subjects under the schedule of basic subjects indicates stop-gap measures to include new crossdisciplinary subjects in CC7. Detailed enumeration of crossdisciplinary subjects including their special isolates, as done in the case of SY (Social Psychology) and TUS (Educational Psychology) for instance, can ensure the dependability of CC7 considerably. There are inconsistencies in the treatment of crossdisciplinary subjects that are either specialised domains within existing disciplines or distinct fields requiring separate enumeration. The lack of serious efforts to involve specialists in the various fields for securing the systematic enumeration of concepts, specialised subfields of existing disciplines, and new crossdisciplinary

subjects is evident in CC7. Further, the enumeration of all major crossdisciplinary subjects under the schedules of special isolates would have enhanced the effectiveness of CC7. Regrettably, the absence of strong and sustained institutional support has also been responsible for the present unfortunate dilemma faced by CC7.

5.4 REPRESENTATION OF CROSSDISCIPLINARY SUBJECTS IN DDC21

The Dewey Decimal Classification (DDC) was conceived in 1873 by Melville Louis Kossuth Dewey (Dec.10, 1851- Dec.26, 1931), better known as Melvil Dewey, and first published in 1876 as a modest 42-page volume titled "*A Classification and Subject Index for Cataloging and Arranging the Books and Pamphlets in a Library*". The 21st edition of DDC (DDC21) was published in 1996 in two formats: in a four-volume print format and on the *Dewey for Windows* CD-ROM format. The print format, selected for the present study, includes Volume-1: Introduction and Tables, Volume-2: Schedules (000-599), Volume-3: Schedules (600-999), and Volume-4: Relative Index and Manual. *Dewey for Windows* includes an additional entry vocabulary of natural language index terms and index terms from other thesauri that cannot appear in the print index due to space constraints. The 22nd edition of DDC is expected to appear in the later part of 2003.

The DDC has emerged as the most widely used library classification system in the world. It is used in more than 135 countries, and has been translated into over 30 major languages. The DDC is developed, maintained, and applied in the Decimal Classification Division of the Library of Congress (LC), where annually over 110,000 DDC numbers are assigned to works catalogued by the LC.

In the DDC, basic classes are organized by disciplines or fields of study. The basic underlying principle is arrangement by discipline, and not by subject (also called topic in DDC). The consequence of this principle is that there is likely to be no single place for a given subject. A subject may appear in any discipline depending on the treatment of its aspects. The Relative Index assembles the disciplinary aspects of a subject in one place.

At the broadest level, the DDC divides the universe of knowledge into ten *Main Classes*, which are divided into ten *Divisions*, and each division further divided into ten *Sections*, for instance, 300 – Social Sciences, 320 – Political Science, and 327 – International Relations.

The evaluation of DDC21, in terms of the provisions for the representation of crossdisciplinary subjects, is presented as follows:

No.1

Subject	ADDICTION STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	616.86 = Substance abuse (Drug abuse) <i>Class here addiction, dependence, habituation, intoxication.</i> 362.29 = Substance abuse
Mode	Partial
Remarks	Provision for comprehensive representation of Addiction Studies warranted.

No.2

Subject	AGRICULTURAL ECONOMICS
Category	Synthesis
Specific Provision	338.1 = Agriculture
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.3

Subject	AGRICULTURAL GEOGRAPHY
Category	Synthesis
Specific Provision	338.109 = Agricultural geography
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.4

Subject	AGRICULTURAL PSYCHOLOGY
Category	Synthesis
Specific Provision	338.1019 = Agricultural Psychology
Alternative Provision	None
Mode	Enumeration
Remarks	Provision under Psychology warranted.

No.5

Subject	ANTHROPOGEOGRAPHY
Category	Synthesis
Specific Provision	304.2 = Human Ecology <i>Class here ecological anthropology, human geography</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Specific enumeration of Anthropogeography warranted.

No.6

Subject	ANTHROPOLOGICAL LINGUISTICS
Category	Synthesis
Specific Provision	None
Alternative Provision	306.44 = Language <i>Class here sociolinguistics.</i> 410 = Linguistics
Mode	Partial
Remarks	Extension of scope note under 306.44 to include Anthropological Linguistics warranted.

No.7

Subject	ANTHROPOLOGICAL POLITICAL ECONOMY
Category	Synthesis
Specific Provision	None
Alternative Provision	306.3 Economic institutions <i>Class here economic anthropology, ... of consumption.</i> 330 = Economics
Mode	Partial
Remarks	Specific provision for Anthropological Political Economy warranted.

No.8

Subject	ANTHROPOLOGY AND ARCHAEOLOGY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	301 = Anthropology 930.1 = Archaeology
Mode	Partial
Remarks	Enumeration warranted.

No.9

Subject	ANTHROPOMETRY
Category	Synthesis
Specific Provision	599.94 = Anthropometry
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.10

Subject	ARCHAEOLOGY AND HISTORY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	930.1 = Archaeology 900 = History
Mode	Partial
Remarks	Enumeration warranted.

No.11

Subject	ARCHAEOLOGY AND SOCIOLOGY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	930.1 = Archaeology 301 = Sociology
Mode	Partial
Remarks	Enumeration warranted.

No.12

Subject	ARCHAEOLOGY
Category	Synthesis
Specific Provision	930.1015195 = Archaeometry (<i>Application of statistical techniques in archaeology</i>)
Alternative Provision	
Mode	Synthesis
Remarks	Provision adequate.

No.13

Subject	ARCHITECTURAL PSYCHOLOGY
Category	Synthesis
Specific Provision	720.019 = Psychology principles of Architecture
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.14

Subject	AREA STUDIES
Category	Convergence
Specific Provision	940-990 = General History <i>Class here area studies ...</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision

No.15

Subject	ART AND ANTHROPOLOGY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	301 = Anthropology 700 = The Arts
Mode	Partial
Remarks	Enumeration warranted.

No.16

Subject	ART AND RELIGION
Category	Juxtaposition
Specific Provision	None
Alternative Provision	301 = Anthropology 700 = The Arts
Mode	Partial
Remarks	Enumeration warranted.

No.17

Subject	BIOARCHAEOLOGY
Category	Synthesis
Specific Provision	930.10157 = Biological principles applied in Archaeology (<i>Bioarchaeology</i>)
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.18

Subject	BIOETHICS
Category	Synthesis
Specific Provision	174.957 = Bioethics
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.19

Subject	BIOGEOGRAPHY
Category	Synthesis
Specific Provision	578.7 = Organisms characteristic of specific kinds of environment. <i>Class here biology of specific kinds of environments.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.20

Subject	BIOLOGICAL PSYCHIATRY
Category	Synthesis
Specific Provision	616.89 = Mental disorders <i>Class here ... psychiatry.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.21

Subject	BIOPOLITICS
Category	Synthesis
Specific Provision	320.0157 = Biopolitics
Alternative Provision	None
Mode	Synthesis
Remarks	Specific provision warranted under Political Science.

No.22

Subject	BUSINESS AND MASS MEDIA
Category	Juxtaposition
Specific Provision	None
Alternative Provision	650 = Business 302.23 = Mass Media
Mode	Partial
Remarks	Enumeration warranted.

No.23

Subject	BUSINESS ANTHROPOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	301 = Anthropology 650 = Business
Mode	Partial
Remarks	Enumeration warranted.

No.24

Subject	BUSINESS GEOGRAPHY
Category	Synthesis
Specific Provision	650.09 = Geographical Treatment of Business
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.25

Subject	BUSINESS STUDIES
Category	Convergence
Specific Provision	650 = Business
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.26

Subject	COGNITIVE SCIENCE
Category	Convergence
Specific Provision	153 = Cognitive Science
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.27

Subject	COMMUNITY STUDIES
Category	Convergence
Specific Provision	307 = Communities
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.28

Subject	COMPUTATIONAL PSYCHOLINGUISTICS
Category	Synthesis
Specific Provision	401.90285 = Computer applications in Psycholinguistics
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.29

Subject	CULTURAL ECOLOGY
Category	Synthesis
Specific Provision	304.2 = Human Ecology
Alternative Provision	None
Mode	Enumeration
Remarks	Extension of scope note under 304.2 Human ecology to include Cultural Ecology warranted.

No.30

Subject	CULTURAL ECONOMICS
Category	Synthesis
Specific Provision	306.3 = Economic Institutions
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.31

Subject	CULTURAL GEOGRAPHY
Category	Synthesis
Specific Provision	306.09 = Cultural Geography
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.32

Subject	CULTURAL PSYCHOLOGY
Category	Synthesis
Specific Provision	155.8 = Ethnopsychology and national psychology <i>Class here cross-cultural psychology</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.33

Subject	CULTURAL STUDIES
Category	Convergence
Specific Provision	306 = Culture
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.34

Subject	DEMOGRAPHIC ANTHROPOLOGY
Category	Synthesis
Specific Provision	304.6 = Demographic Anthropology <i>Class here demography, demographic anthropology...</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.35

Subject	DEVELOPMENT STUDIES
Category	Convergence
Specific Provision	338.9 = Economic Development and Growth
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.36

Subject	ECOLOGICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	304.2 = Ecological Anthropology
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.37

Subject	ECOLOGICAL ECONOMICS
Category	Synthesis
Specific Provision	333.7 = Natural resources and energy
Alternative Provision	None
Mode	Enumeration
Remarks	Extension of 333.7 to include Ecological Economics warranted.

No.38

Subject	ECONOMETRICS
Category	Synthesis
Specific Provision	330.015195 Statistical Mathematics <i>Class here econometrics</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.39

Subject	ECONOMIC ANTHROPOLOGY
Category	Synthesis
Specific Provision	306.3 = Economic Institutions <i>Class here economic anthropology;</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.40

Subject	ECONOMIC DEMOGRAPHY
Category	Synthesis
Specific Provision	304.6 = Population <i>Class here ... demography; comprehensive works on population.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Extension of scope note to include Economic Demography warranted.

No.41

Subject	ECONOMIC GEOGRAPHY
Category	Synthesis
Specific Provision	330.9 = Economic Geography
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.42

Subject	ECONOMIC HISTORY
Category	Synthesis
Specific Provision	330.09 = Economic history
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.43

Subject	ECONOMIC SOCIOLOGY
Category	Synthesis
Specific Provision	306.3 = Economic Institutions <i>Class here ... economic sociology;</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.44

Subject	ECONOMICS AND EDUCATION
Category	Juxtaposition
Specific Provision	None
Alternative Provision	330 = Economics 370 = Education
Mode	Partial
Remarks	Enumeration under either discipline warranted.

No.45

Subject	ECONOMICS AND ETHICS
Category	Juxtaposition
Specific Provision	None
Alternative Provision	330 = Economics 170 = Ethics
Mode	Partial
Remarks	Enumeration under either discipline warranted.

No.46

Subject	EDUCATIONAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	306.43 = Education <i>Class here educational anthropology</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.47

Subject	EDUCATIONAL PSYCHOLOGY
Category	Synthesis
Specific Provision	370.15 = Educational Psychology
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.48

Subject	EDUCATIONAL SOCIOLOGY
Category	Synthesis
Specific Provision	306.43 = Education (<i>Sociology of</i>) <i>Class here educational anthropology.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.49

Subject	ELECTORAL GEOGRAPHY
Category	Synthesis
Specific Provision	324.9 = Geographical Treatment of Elections
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.50

Subject	ENGINEERING PSYCHOLOGY
Category	Synthesis
Specific Provision	620.0019 = Psychological Principles of Engineering
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.51

Subject	ENVIRONMENTAL ARCHAEOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	930.1 = Archaeology 333.7 = Natural Resources and Energy
Mode	Partial
Remarks	Enumeration warranted.

No.52

Subject	ENVIRONMENTAL AUDITING
Category	Synthesis
Specific Provision	None
Alternative Provision	333.714 = Environmental Impact Studies
Mode	Partial
Remarks	Enumeration warranted.

No.53

Subject	ENVIRONMENTAL ECONOMICS
Category	Synthesis
Specific Provision	333.7 = Natural Resources and Energy <i>Class here...interdisciplinary works on the environment.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.54

Subject	ENVIRONMENTAL MANAGEMENT
Category	Synthesis
Specific Provision	333.7068 = Management of Natural Resources
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.55

Subject	ENVIRONMENTAL PSYCHOLOGY
Category	Synthesis
Specific Provision	155.9 = Environmental Psychology
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.56

Subject	ENVIRONMENTAL STUDIES
Category	Convergence
Specific Provision	372.357 = Nature Study <i>Class here environmental studies.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Enumeration under 300 or 333.7 warranted.

No.57

Subject	ETHNIC STUDIES
Category	Convergence
Specific Provision	305.8 = Racial, Ethnic, National Groups <i>Class here ...ethnology; ethnography;</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Enumeration of Ethnic Studies warranted.

No.58

Subject	ETHNOARCHAEOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	930.1 = Archaeology <i>Class here ... interdisciplinary works on archaeology</i> 599.97 = Human races <i>Class here physical ethnology</i>
Mode	Partial
Remarks	Enumeration warranted.

No.59

Subject	ETHNOBIOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	305.8 = Racial, ethnic, national groups <i>Class here ...ethnology, cultural ethnology...</i> 599.97 = Human races <i>Class here physical ethnology</i>
Mode	Partial
Remarks	Extension of scope note to include Ethnobiology warranted.

No.60

Subject	ETHNOBOTANY
Category	Synthesis
Specific Provision	None
Alternative Provision	305.8 = Racial, ethnic, national groups <i>Class here ...ethnology, cultural ethnology...</i> 599.97 = Human races <i>Class here physical ethnology</i>
Mode	Partial
Remarks	Extension of scope note to include Ethnobotany warranted.

No.61

Subject	ETHNOPSYCHIATRY
Category	Synthesis
Specific Provision	None
Alternative Provision	305.8 = Racial, Ethnic, National Groups <i>Class here ... ethnology.</i> 616.89 = Mental Disorders <i>Class here ... psychiatry.</i>
Mode	Partial
Remarks	Extension of scope note to include Ethnopsychiatry warranted.

No.62

Subject	ETHNOZOOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	305.8 = Racial, Ethnic, National Groups <i>Class here ... ethnology.</i> 590 = Animals (<i>Zoology</i>)
Mode	Partial
Remarks	Extension of scope note to include Ethnozoology warranted.

No.63

Subject	FORENSIC ANTHROPOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	301 = Anthropology 363.5 = Detection of Crime (Criminal Investigation) <i>Class here forensic science ...</i>
Mode	Partial
Remarks	Enumeration warranted.

No.64

Subject	FORENSIC LINGUISTICS
Category	Synthesis
Specific Provision	None
Alternative Provision	363.5 = Detection of Crime <i>Class here forensic science</i> 410 = Linguistics
Mode	Partial
Remarks	Enumeration warranted.

No.65

Subject	FORENSIC PSYCHIATRY
Category	Synthesis
Specific Provision	614.1 = Forensic Medicine (Medical Jurisprudence) <i>Including ... forensic dentistry, psychiatry</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.66

Subject	FORENSIC PSYCHOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	347.06019 = Evidence (<i>psychological aspects</i>) 150 = Psychology
Mode	Partial
Remarks	Enumeration warranted.

No.67

Subject	FORENSIC SCIENCE
Category	Convergence
Specific Provision	363.25 = Detection of crime (Criminal investigation) <i>Class here forensic science ...</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.68

Subject	GEOARCHAEOLOGY
Category	Synthesis
Specific Provision	930.101551 = Application of Geological principles in Archaeology
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.69

Subject	GEOGRAPHY OF LAW
Category	Synthesis
Specific Provision	340.09 = Geographical treatment of Law
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.70

Subject	GEOPOLITICS
Category	Synthesis
Specific Provision	320.12 = Territory <i>Class here Geopolitics</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.71

Subject	GLOBALISATION
Category	Convergence
Specific Provision	None
Alternative Provision	337 = International economics
Mode	Partial
Remarks	Enumeration warranted under main class 300 Social Sciences.

No.72

Subject	HISTORICAL DEMOGRAPHY
Category	Synthesis
Specific Provision	None
Alternative Provision	304.6 = Population <i>Class here comprehensive works on population</i>
Mode	Partial
Remarks	Enumeration of Historical Demography warranted.

No.73

Subject	HISTORICAL GEOGRAPHY
Category	Synthesis
Specific Provision	911 = Historical Geography
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.74

Subject	HISTORICAL LINGUISTICS
Category	Synthesis
Specific Provision	417.7 = Historical Linguistics
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.75

Subject	HISTORICAL SOCIOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	301 = Sociology 900 = History
Mode	Partial
Remarks	Enumeration under Sociology warranted.

No.76

Subject	HISTORY AND ANTHROPOLOGY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	301 = Anthropology 900 = History
Mode	Partial
Remark	Enumeration warranted.

No.77

Subject	HISTORY AND LITERATURE
Category	Juxtaposition
Specific Provision	None
Alternative Provision	900 = History 800 = Literature
Mode	Partial
Remarks	Enumeration warranted.

No.78

Subject	HISTORY AND POLITICS
Category	Juxtaposition
Specific Provision	None
Alternative Provision	900 = History 320 = Political Science (Politics and government)
Mode	Partial
Remarks	Enumeration warranted.

No.79

S79subject	INDUSTRIAL ECOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	338 = Production <i>Class here interdisciplinary works on industry</i>
Mode	Partial
Remarks	Extension of scope note to include Industrial Ecology warranted.

No.80

Subject	INDUSTRIAL GEOGRAPHY
Category	Synthesis
Specific Provision	338.09 = Geographical treatment of Production <i>(Industries)</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.81

Subject	INDUSTRIAL JURISPRUDENCE
Category	Synthesis
Specific Provision	343.07 = Regulation of Economic Activity <i>Class here comprehensive works on ...industry and trade.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Specific enumeration by extension of scope note warranted.

No.82

Subject	INDUSTRIAL PSYCHOLOGY
Category	Synthesis
Specific Provision	158.7 = Industrial Psychology
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.83

Subject	INDUSTRIAL SOCIOLOGY
Category	Synthesis
Specific Provision	306.36 = Systems of Labor <i>Class here industrial sociology, sociology of work.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.84

Subject	INTERNATIONAL STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	327 = International Relations 303.482 = Contact between Cultures 337 = International economics 341 = International Law 900 = Geography, history, and allied disciplines
Mode	Partial
Remarks	Enumeration warranted under 300 Social Sciences.

No.85

Subject	LABOUR STUDIES
Category	Convergence
Specific Provision	331 = Labor <i>Class here industrial relations, interdisciplinary works on labor.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.86

Subject	LAW AND ECONOMICS
Category	Juxtaposition
Specific Provision	None
Alternative Provision	330 = Economics 340 = Law
Mode	Partial
Remarks	Specific enumeration warranted. E.g., Law and Ethics

No.87

Subject	LAW AND ETHICS
Category	Juxtaposition
Specific Provision	340.112 = Law and Ethics
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.88

Subject	LAW AND GEOGRAPHY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	340 = Law 910 = Geography 349 = Law of specific jurisdictions, areas, socioeconomic regions
Mode	Partial
Remarks	Specific enumeration warranted. E.g., Law and Ethics

No.89

Subject	LAW AND SOCIOBIOLOGY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	304.5 = Genetic Factors <i>Class here sociobiology (biosociology)...</i> 340 = Law
Mode	Partial
Remarks	Specific enumeration warranted. E.g., Law and Ethics

No.90

Subject	LEGAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	306.25 = Judicial Institutions
Alternative Provision	None
Mode	Enumeration
Remarks	Provision of scope note under 306.25 for Legal Anthropology warranted.

No.91

Subject	LINGUISTIC DEMOGRAPHY
Category	Synthesis
Specific Provision	None
Alternative Provision	304.6 = Population <i>Class here ... demography; comprehensive works on population.</i> 410 = Linguistics
Mode	Partial
Remarks	Extension of scope note to include Linguistics Demography warranted.

No.92

Subject	LINGUISTIC GEOGRAPHY
Category	Synthesis
Specific Provision	410.9 = Geographical treatment of Linguistics
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.93

Subject	LOGIC AND LINGUISTICS
Category	Juxtaposition
Specific Provision	None
Alternative Provision	160 = Logic 410 = Linguistics
Mode	Partial
Remarks	Enumeration warranted under either discipline.

No.94

Subject	MARITIME ANTHROPOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	301 = Anthropology
Mode	Partial
Remarks	Enumeration under 301 warranted.

No.95

Subject	MATHEMATICAL ECONOMICS
Category	Synthesis
Specific Provision	330.1543 = Mathematical Economics
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.96

Subject	MATHEMATICAL GEOGRAPHY
Category	Synthesis
Specific Provision	526 = Mathematical Geography
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.97

Subject	MATHEMATICAL LINGUISTICS
Category	Synthesis
Specific Provision	410.151 = Mathematical Principles <i>Class here mathematical linguistics</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.98

Subject	MATHEMATICAL PSYCHOLOGY
Category	Synthesis
Specific Provision	150.151 = Mathematical psychology
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.99

Subject	MEDICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	306.461 = Medicine <i>Class here sociology of health, of illness.</i>
Alternative Provision	
Mode	Enumeration
Remarks	Enumeration warranted.

No.100

Subject	MEDICAL ECONOMICS
Category	Synthesis
Specific Provision	338.473621 = Economics of Medical Goods and Services
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.101

Subject	MEDICAL GEOGRAPHY
Category	Synthesis
Specific Provision	614.42 = Incidence <i>Class here health surveys, medical geography.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.102

Subject	MEDICAL SOCIOLOGY
Category	Synthesis
Specific Provision	306.461 = Medicine <i>Class here sociology of health, of illness</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.103

Subject	MEDICINE AND PSYCHOLOGY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	150 = Psychology 610 = Medical science (Medicine)
Mode	Partial
Remarks	Enumeration warranted under either discipline.

No.104

Subject	MILITARY GEOGRAPHY
Category	Synthesis
Specific Provision	355.47 = Military Geography
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.105

Subject	MILITARY PSYCHIATRY
Category	Synthesis
Specific Provision	None
Alternative Provision	355.0019 = Military Science - Psychological Principles 616.89 = Mental Disorders <i>Class here ... psychiatry.</i>
Mode	Partial
Remarks	Enumeration under Psychiatry warranted.

No.106

Subject	MILITARY PSYCHOLOGY
Category	Synthesis
Specific Provision	355.0019 = Military Science - Psychological Principles
Alternative Provision	None
Mode	Synthesis
Remarks	Enumeration under Psychology warranted.

No.107

Subject	MILITARY SOCIOLOGY
Category	Synthesis
Specific Provision	306.27 = Military Institutions <i>Class here military sociology.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.108

Subject	NEUROLINGUISTICS
Category	Synthesis
Specific Provision	612.78 = Voice and Speech <i>Including neurolinguistics.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.109

Subject	PHILOSOPHY AND PSYCHOLOGY
Category	Juxtaposition
Specific Provision	100 = Philosophy, Paranormal Phenomena, Psychology
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.110

Subject	PHILOSOPHY AND RELIGION
Category	Juxtaposition
Specific Provision	291.175 = Religion and Secular Disciplines
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.111

Subject	PHYSIOLOGICAL PSYCHOLOGY
Category	Synthesis
Specific Provision	612.8 = Nervous Functions Sensory Functions <i>Class here neurophysiology, psychophysiology.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.112

Subject	PHYTOGEOGRAPHY
Category	Synthesis
Specific Provision	581.9 = Treatment of Plants by Specific Continents, Countries, Localities.
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.113

Subject	POLEMOLOGY
Category	Convergence
Specific Provision	None
Alternative Provision	327.172 = Peace and International Order
Mode	Partial
Remarks	Enumeration under main class 300 warranted.

No.114

Subject	POLICY STUDIES
Category	Convergence
Specific Provision	320.6 = Policy Making <i>Class here ... policy studies, public policy.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.115

Subject	POLITICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	306.2 = Political Institutions <i>Class here political sociology ...</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Specific enumeration by extension of scope note for Political Anthropology warranted.

No.116

Subject	POLITICAL ECOLOGY
Category	Juxtaposition
Specific Provision	320.01577 = Political ecology
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.117

Subject	POLITICAL ECONOMY
Category	Synthesis
Specific Provision	None
Alternative Provision	320 = Political Science (Politics and Government) 330 = Economics
Mode	Partial
Remarks	Enumeration as a new subfield of 330 Economics warranted.

No.118

Subject	POLITICAL GEOGRAPHY
Category	Synthesis
Specific Provision	320.9 = Political Situation and Conditions <i>Class here historical and geographic treatment of politics and government.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.119

Subject	POLITICAL PSYCHOLOGY
Category	Synthesis
Specific Provision	320.019 = Psychological Principles <i>Including political decision making</i>
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.120

Subject	POLITICAL SOCIOLOGY
Category	Synthesis
Specific Provision	306.2 = Political Institutions <i>Class here political sociology;</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.121

Subject	POPULATION GEOGRAPHY
Category	Synthesis
Specific Provision	304.6 = Population <i>Class here ...population geography;</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.122

Subject	POSTMODERN STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	149.97 = Postmodernism 700.4113 = Postmodernism in Arts 809.9113 = Postmodernism in Literature
Mode	Partial
Remarks	Enumeration under 100 Philosophy warranted.

No.123

Subject	PSYCHOBIOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	612.8 = Nervous Functions Sensory Functions <i>Class here neurophysiology, psychophysiology</i> 150 = Psychology
Mode	Partial
Remarks	Enumeration warranted.

No.124

Subject	PSYCHOHISTORY
Category	Synthesis
Specific Provision	900.19 = History - Psychological Principles
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.125

Subject	PSYCHOLINGUISTICS
Category	Synthesis
Specific Provision	401.9 = Psychological Principles <i>Class here psycholinguistics</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.126

Subject	PSYCHOLOGICAL ANTHROPOLOGY
Category	Synthesis
Specific Provision	302 = Social interaction <i>Class here psychological principles of sociology...</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Enumeration of Psychological Anthropology warranted.

No.127

Subject	PSYCHOLOGY AND ECONOMICS
Category	Juxtaposition
Specific Provision	None
Alternative Provision	150 = Psychology 330 = Economics
Mode	Partial
Remarks	Enumeration warranted.

No.128

Subject	PSYCHOLOGY AND RELIGION
Category	Juxtaposition
Specific Provision	291.175 = Religions and Secular Disciplines <i>Including ... psychology;</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.129

Subject	PSYCHOMETRICS
Category	Synthesis
Specific Provision	150.15195 = Statistical Techniques in Psychology
Alternative Provision	None
Mode	Synthesis
Remarks	Provision adequate.

No.130

Subject	PSYCHOPHYSICS
Category	Synthesis
Specific Provision	
Alternative Provision	152 = Sensory perception, movement, emotions, physiological drives.
Mode	Partial
Remarks	Provision of scope note under 152 to include Psychophysics warranted.

No.131

Subject	REGIONAL SCIENCE
Category	Convergence
Specific Provision	None
Alternative Provision	338.9 = Economic Development and Growth 910 = Geography and Travel
Mode	Partial
Remarks	Enumeration under 300 Social Sciences warranted.

No.132

Subject	SOCIAL ENGINEERING
Category	Synthesis
Specific Provision	None
Alternative Provision	303.3 = Coordination and control
Mode	Partial
Remarks	Specific enumeration warranted under Sociology.

No.133

Subject	SOCIAL GEOGRAPHY
Category	Synthesis
Specific Provision	900 = Geography, history, and Auxiliary Disciplines <i>Class here social situations and conditions</i>
Alternative Provision	
Mode	Enumeration
Remarks	Provision adequate.

No.134

Subject	SOCIAL PSYCHOLOGY
Category	Synthesis
Specific Provision	302 = Social Interaction <i>Class here ...social psychology.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.135

Subject	SOCIOBIOLOGY
Category	Synthesis
Specific Provision	304.5 = Genetic Factors <i>Class here sociobiology(biosociology);</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.136

Subject	SOCIOLINGUISTICS
Category	Synthesis
Specific Provision	306.44 = Language <i>Class here sociolinguistics.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.137

Subject	SOCIOLOGY AND PSYCHIATRY
Category	Juxtaposition
Specific Provision	None
Alternative Provision	301 = Sociology 616.89 = Psychiatry
Mode	Partial
Remarks	Enumeration warranted under either discipline.

No.138

Subject	SOCIOLOGY OF ART
Category	Synthesis
Specific Provision	306.47 = Art
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.139

Subject	SOCIOLOGY OF KNOWLEDGE
Category	Synthesis
Specific Provision	306.42 = Sociology of Knowledge
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.140

Subject	SOCIOLOGY OF LANGUAGE
Category	Synthesis
Specific Provision	306.44 = Language
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.141

Subject	SOCIOLOGY OF LAW
Category	Synthesis
Specific Provision	306.25 = Judicial institutions
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.142

Subject	SOCIOLOGY OF RELIGION
Category	Synthesis
Specific Provision	306.6 = Religious Institutions <i>Class here sociology of religion.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.143

Subject	SOCIOLOGY OF SCIENCE AND TECHNOLOGY
Category	Synthesis
Specific Provision	None
Alternative Provision	306.45 = Science 306.46 = Technology
Mode	Partial
Remarks	Comprehensive enumeration under Sociology warranted.

No.144

Subject	SOCIOLOGY OF SPORT
Category	Synthesis
Specific Provision	306.483 = Sports
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.145

Subject	SUBALTERN STUDIES
Category	Convergence
Specific Provision	None
Alternative Provision	954 = South Asian History
Mode	Partial
Remarks	Enumeration warranted.

No.146

Subject	TERRORISM STUDIES
Category	Convergence
Specific Provision	303.625 = Terrorism
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.147

Subject	TRIBAL STUDIES
Category	Convergence
Specific Provision	307.772 = Tribal Communities
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.148

Subject	URBAN STUDIES
Category	Convergence
Specific Provision	307.76 = Urban Communities <i>Class here urban sociology, interdisciplinary works on cities.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.149

Subject	WOMEN'S STUDIES
Category	Convergence
Specific Provision	305.4071 = Study on Women <i>Class here interdisciplinary works on women, on females.</i>
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

No.150

Subject	ZOOGEOGRAPHY
Category	Synthesis
Specific Provision	590.9 = Geographical treatment of animal species
Alternative Provision	None
Mode	Enumeration
Remarks	Provision adequate.

5.5 TREATMENT OF CROSSDISCIPLINARY SUBJECTS IN DDC21

The DDC21 has remarkably adapted to the emerging needs imposed by the changing knowledge structures in all fields of knowledge, particularly in the social sciences. However, the treatment of crossdisciplinary subjects under existing provisions is yet to achieve a satisfactory level despite the structural problems imposed by the decimal notation. The following are some observations that can be made in respect of the treatment of crossdisciplinary subjects in DDC21:

- 1) The DDC21 has included many new crossdisciplinary subjects formed by juxtaposition through enumeration in the schedules. This indicates the efforts undertaken to incorporate new relationships between disciplines that have emerged in recent years. The lack of an appropriate relational device, such as the Phase Relations device in CC7 used for combining the subject components juxtaposed in some relationship, has resulted in the partial representation of several subjects. Instances of partial representation, strictly in the context of information retrieval practice, can at best be

considered as non-representation. The relatively high incidence of partial representation is also a strong indication that a more exhaustive enumeration of crossdisciplinary subjects needs to be undertaken.

- 2) In the case of many crossdisciplinary subjects formed by synthesis and by convergence, DDC21 has been able to provide for their appropriate representation either by enumeration or by synthesis. The extension of instructions under many of the existing provisions intended for the inclusion of other related subjects is, however, not a satisfactory approach from the point of view of information retrieval practice. Instances of partial representation also indicate certain structural weaknesses of DDC21 since many crossdisciplinary subjects have not been accorded the same recognition as they receive in academia.

- 3) Since several crossdisciplinary subjects formed by convergence have not been specified by enumeration in DDC21, such subjects can be more appropriately enumerated as direct subdivisions under the main class 300. To this effect, it is suggested that the main class 300 may be extended to include some of the major crossdisciplinary subjects formed by convergence, since they cannot be placed under individual disciplines. It is, therefore, proposed that the main class 300 Social Sciences be extended as follows:

300 SOCIAL SCIENCES	
300.01	Addiction Studies
300.03	Environmental Studies
300.04	Regional Science
300.05	Polemology
300.06	Policy Studies
300.07	Postmodern Studies
300.08	Terrorism Studies
300.09	Globalisation Studies

This suggestion is also in consonance with the explanation given in the *Manual of DDC21, Vol.4, p.1017* which explicitly states that the treatment of interdisciplinary works in the social sciences must be guided thus: “*Generally speaking, the 300 number is the interdisciplinary number for a phenomenon of social significance; it is used as the place of last resort for general works on a subject lacking disciplinary focus.*” Implementation of the above proposal will ensure the appropriate and more effective representation of the crossdisciplinary subjects whose focus cannot be restricted to any individual disciplinary boundary. This way, the problems encountered in respect of several crossdisciplinary subjects will also be resolved considerably, while avoiding any conflict with existing principles and practices.

5.6 REPRESENTATION OF CROSSDISCIPLINARY SUBJECTS IN LCSH25

The Library of Congress Subject Headings, 25th edition (LCSH25), published as a 5-volume set in 2002, contains headings established by the Library of Congress since 1898 upto November 2001. The headings included in the LCSH25 were obtained

by creating a tape consisting of all headings in verified status in the subject authority file at the Library of Congress in December 2001.

The LCSH25 contains approximately 19,200 personal name headings of which 18,000 represent family names, 4,500 corporate headings, 12 meeting or conference headings, 480 uniform titles, 197,000 topical subject headings, and 42,000 geographic subject headings. The LCSH25 incorporates thesaurus codes to indicate hierarchical relationships. There are 600 general USE references, 3,800 general *see also* references, 229,000 references from one usable heading to another, and 238,000 references from unused terms to used headings.

Five services that provide information about new and changed headings include:

- (i) a computer tape distribution service that supplies the subject headings in the MARC 21 authorities format on a weekly basis to supplement the master database file of subject authority records;
- (ii) the *L.C. Subject Headings Weekly Lists*, posted to the World Wide Web at <http://lcweb.loc.gov/catdir/cps/wls.html>, providing a timely source of information about new and changed subject headings, class numbers, references and scope notes;
- (iii) the quarterly LCSH25 in microfiche that provides the equivalent of a new edition of the list each quarter;

- (iv) the equivalent of a new edition of LCSH25 distributed four times a year with Library of Congress Classification on CD-ROM under the title *Classification Plus*; and
- (v) the *Cataloging Service Bulletin* that gives information on selected new, changed, and cancelled headings.

The LCSH25 is to be used in conjunction with the *Subject Cataloging Manual: Subject Headings* (5th edition, 1996) which contains the same instructions used by subject cataloguers at the Library of Congress in their daily work. The *Cataloging Service Bulletin* contains information on the most important topics that have been changed since the latest edition of the *Manual*. It also contains lists of subject headings of current interest, lists of headings that have recently been changed, and information on subject headings publications. In addition, the *Free-floating Subdivisions: An Alphabetical Index*, published annually, consists of all free-floating subdivisions that appear in the *Manual*. For each subdivision, a listing is provided of the free-floating lists in the *Manual* where it appears, identified by category. For subdivisions that have specific instruction sheets in the manual describing their usage, citations to these are provided. In addition, MARC subfield coding is provided. The list is to be used in conjunction with the *Manual*.

The relevant provisions in LCSH25 for the representation of each crossdisciplinary subject included in the study are presented as follows:

No.1
 Subject : **ADDICTION STUDIES**
 Category : Convergence
 Provision : Addicts (*May Subd Geog*)
 UF Addicted persons
 Addictive persons
 BT Sick
 NT Alcoholics
 Compulsive eaters
 Compulsive gamblers
 Internet addicts
 Medication abusers
 Narcotic addicts
 Recovering addicts
 Sex addicts
 Workaholics
 Mode : Partial
 Remarks : Specific enumeration of Addiction Studies warranted as, e.g.,
 Women's Studies.

No.2
 Subject : **AGRICULTURAL ECONOMICS**
 Category : Synthesis
 Provision : Agriculture – Economic aspects
 UF Agrarian question
 Agribusiness
Agricultural economics
 BT Land use, rural
 NT Agricultural development projects
 Agricultural industries
 Farm management
 Rent
 Mode : Enumeration
 Remarks : Enumeration of Agricultural Economics as a distinct
 domain warranted.

No.3
 Subject : **AGRICULTURAL GEOGRAPHY**
 Category : Synthesis
 Provision : Agricultural geography (*May Subd Geog*)
 [S439-S482 (Local)]
 [S494.5.G46 (General)]

UF Geography, Agricultural
 BT Economic geography
 Physical geography
 NT Agricultural systems
 Crop zones
 Crops--Geographical distribution
 Soil geography
 Mode : Enumeration
 Remarks : Provision adequate.

No.4
 Subject : **AGRICULTURAL PSYCHOLOGY**
 Category : Synthesis
 Provision : Agriculture – Psychological aspects
 Mode : Synthesis
 Remarks : No specific provision for Agricultural Psychology by enumeration. Psychological aspects derived by synthesis.

No.5
 Subject : **ANTHROPOGEOGRAPHY**
 Category : Synthesis
 Provision : Human geography (May Subd Geog)
 [GF]
 UF Anthro-geography [Former Heading]
 Anthropogeography
 Cultural geography
 Geographical distribution of humans
 Social geography
 BT Anthropology
 Geography
 RT Human ecology
 NT Applied human geography
 Human settlements
 Population geography
 Mode : Enumeration
 Remarks : Direct enumeration under Anthropogeography warranted.

No.6
 Subject : **ANTHROPOLOGICAL LINGUISTICS**
 Category : Synthesis
 Provision : Anthropological linguistics (May Subd Geog)

[P35-P35.5]

UF Anthropo-linguistics
Ethnolinguistics
Language and ethnicity
Linguistic anthropology
Linguistics and anthropology
BT Anthropology
Language and culture
Linguistics
NT Linguistic paleontology
Sapir-Whorf hypothesis

Mode : Enumeration
Remarks : Provision adequate.

No.7

Subject : **ANTHROPOLOGICAL POLITICAL ECONOMY**
Category : Synthesis
Provision : Anthropology (*May Subd Geog*)
Economics (*May Subd Geog*)
Mode : Partial
Remarks : Specific enumeration warranted.

No.8

Subject : **ANTHROPOLOGY AND ARCHAEOLOGY**
Category : Juxtaposition
Provision : Anthropology (*May Subd Geog*)
Archaeology (*May Subd Geog*)
Mode : Partial
Remarks : Specific enumeration warranted.

No.9

Subject : **ANTHROPOMETRY**
Category : Synthesis
Provision : Anthropometry (*May Subd Geog*)
[GN51-GN59 (Physical anthropology)]
[GV435 (Physical education and training)]
SA subdivision Anthropometry under classes of persons and ethnic groups; and subdivision Measurement under individual organs and regions of the body, e.g. Foot--Measurement; Heart--Measurement

UF Skeletal remains
BT Physical anthropology
RT Body size
NT Body weight
Cephalometry
Fingerprints
Footprints
Palmprints
Mode : Enumeration
Remarks : Provision adequate.

No.10
Subject : **ARCHAEOLOGY AND HISTORY**
Category : Juxtaposition
Provision : Archaeology and history
UF Historical archaeology
BT History
Mode : Enumeration
Remarks : Provision adequate.

No.11
Subject : **ARCHAEOLOGY AND SOCIOLOGY**
Category : Juxtaposition
Provision : Archaeology (*May Subd Geog*)
Sociology (*May Subd Geog*)
Mode : Partial
Remarks : Specific provision warranted.

No.12
Subject : **ARCHAEOOMETRY**
Category : Synthesis
Provision : Archaeometry
BT Archaeology – Methodology
Art - History
Mode : Enumeration
Remarks : Provision adequate.

No.13
Subject : **ARCHITECTURAL PSYCHOLOGY**
Category : Synthesis
Provision : Architecture – Psychological aspects
Mode : Synthesis
Remarks : Specific enumeration warranted.

No.14
Subject : **AREA STUDIES**
Category : Convergence
Provision : Area studies (May Subd Geog)
[D16.25]
Here are entered general works on area studies, and with local subdivision, works on area studies carried out in specific places. Works on area studies about a particular region, country, etc. are entered under the name of the region, country, etc. with the subdivision Study and teaching or Research. SA subdivision Research or Study and teaching under names of countries, cities, etc.
UF Area research
Foreign area studies
BT Education
Research
RT Geography--Study and teaching
Mode : Enumeration
Remarks : Provision adequate.

No.15
Subject : **ART AND ANTHROPOLOGY**
Category : Juxtaposition
Provision : Art and anthropology
UF Anthropology and art
BT Anthropology
Mode : Enumeration
Remarks : Provision adequate.

No.16
Subject : **ART AND RELIGION**
Category : Juxtaposition
Provision : Art and Religion (*May Subd Geog*)
UF Art – Religious aspects
Religion and art

BT Religion
NT Art and mythology
Idols and images
Reformation and art
Mode : Enumeration
Remarks : Provision adequate.

No.17
Subject : **BIOARCHAEOLOGY**
Category : Synthesis
Provision : Archaeology – Biological aspects
Mode : Synthesis
Remarks : Enumeration of Bioarchaeology warranted.

No.18
Subject : **BIOETHICS**
Category : Synthesis
Provision : Bioethics (*May Subd Geog*)
[QH332]
UF Biology – Moral and ethical aspects
Biomedical ethics
Life sciences – Moral and ethical aspects
Life sciences ethics
BT Science – Moral and ethical aspects
NT Biology – Social aspects
Medical ethics
Mode : Enumeration
Remarks : Provision adequate.

No.19
Subject : **BIOGEOGRAPHY**
Category : Juxtaposition
Provision : Biogeography (*May Subd Geog*)
UF Areography (Biology)
Geographical distribution of animals
and plants [former heading]
BT Biology
Geography
NT Biogeomorphology

Paleobiogeography
Phytogeography
Zoogeography

Mode : Enumeration
Remarks : Provision adequate.

No.20
Subject : **BIOLOGICAL PSYCHIATRY**
Category : Synthesis
Provision : Biological psychiatry (May Subd Geog)
[RC321-RC344]
Here are entered works dealing with that branch of psychiatry which emphasizes a multidisciplinary (physiological, neurological, pharmacological and genetic) approach to psychiatric disorders.
UF Biopsychiatry
Psychiatry, Biological
BT Psychiatry
RT Psychobiology
NT Biological adolescent psychiatry
Biological child psychiatry
Neuropsychiatry

Mode : Enumeration
Remarks : Provision adequate.

No.21
Subject : **BIOPOLITICS**
Category : Synthesis
Provision : Biopolitics (May Subd Geog)
UF Political behaviour
BT Human behaviour
Political science
Sociobiology

Mode : Enumeration
Remarks : Provision adequate.

No.22
Subject : **BUSINESS AND MASS MEDIA**
Category : Juxtaposition
Provision : Mass media and business (May Subd Geog)
BT Business

Mode : RT Public relations
Enumeration
Remarks : Provision adequate, though direct enumeration in given
order is warranted.

No.23
Subject : **BUSINESS ANTHROPOLOGY**
Category : Synthesis
Provision : Business anthropology (May Subd Geog)
[GN450.8]
UF Business--Anthropological aspects
Corporate anthropology
Industrial anthropology
Management anthropology
Private sector anthropology
Public sector anthropology
BT Anthropology
RT Corporate culture
Mode : Enumeration
Remarks : Provision adequate.

No.24
Subject : **BUSINESS GEOGRAPHY**
Category : Synthesis
Provision : Business – Geography
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.25
Subject : **BUSINESS STUDIES**
Category : Convergence
Provision : Business – Study and teaching
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.26
Subject : **COGNITIVE SCIENCE**
Category : Convergence
Provision : Cognitive science (May Subd Geog)
Here are entered works on the interdisciplinary study of
the mind and computers as information processing systems.
BT Science
RT Philosophy of mind
NT Artificial intelligence
Cognitive neuroscience
Cognitive psychology
Philosophy and cognitive science
Mode : Enumeration
Remarks : Provision adequate.

No.27
Subject : **COMMUNITY STUDIES**
Category : Convergence
Provision : Community – Study and teaching
Mode : Enumeration
Remarks : Specific enumeration warranted.

No.28
Subject : **COMPUTATIONAL PSYCHOLINGUISTICS**
Category : Synthesis
Provision : Computational linguistics
BT Applied linguistics
RT Multilingual computing
NT Machine translating
Network grammar
Mode : Partial
Remarks : Specific enumeration required.

No.29
Subject : **CULTURAL ECOLOGY**
Category : Synthesis
Provision : Culture – Environmental aspects
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.30
Subject : **CULTURAL ECONOMICS**
Category : Synthesis
Provision : Culture – Economic aspects
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.31
Subject : **CULTURAL GEOGRAPHY**
Category : Synthesis
Provision : Human geography (May Subd Geog)
UF Anthropo-geography [Former Heading]
Anthropogeography
Cultural geography
Geographical distribution of humans
Social geography
BT Anthropology
Geography
RT Human ecology
NT Applied human geography
Human settlements
Population geography
Mode : Enumeration
Remarks : Specific enumeration warranted for Cultural Geography as a new subfield of Human Geography.

No.32
Subject : **CULTURAL PSYCHOLOGY**
Category : Synthesis
Provision : Culture – Psychological aspects
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.33
Subject : **CULTURAL STUDIES**
Category : Convergence
Provision : Culture--Study and teaching (May Subd Geog)
UF **Cultural studies**
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.34
Subject : **DEMOGRAPHIC ANTHROPOLOGY**
Category : Synthesis
Provision : Demographic anthropology (May Subd Geog)
 [GN33.5]
 SA subdivision Population under names of specific ethnic
 groups, e.g. Indians of North America--Population
 BT Anthropology
 Demography
 NT Demographic archaeology
 Prehistoric peoples--Population
Mode : Enumeration
Remarks : Provision adequate.

No.35
Subject : **DEVELOPMENT STUDIES**
Category : Convergence
Provision : Development - Study and teaching (*May Subd Geog*)
Mode : Enumeration
Remarks : Direct enumeration of Development Studies warranted.

No.36
Subject : **ECOLOGICAL ANTHROPOLOGY**
Category : Synthesis
Provision : Anthropology – Environmental aspects
Mode : Synthesis
Remarks : Direct enumeration required.

No.37
Subject : **ECOLOGICAL ECONOMICS**
Category : Synthesis
Provision : Environmental economics (May Subd Geog)
 UF **Ecological economics**
 Economics--Environmental aspects
 Environmental quality--Economic aspects
 BT Economics
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.38
 Subject : **ECONOMETRICS**
 Category : Synthesis
 Provision : Econometrics
 [HB139]
 Here are entered works on the application of mathematics and statistics, usually with the aid of computers, to the empirical measurement of economic relations and verification of economic theory.
 RT Economics, Mathematical
 Statistics
 NT Distributed lags (Economics)
 Econometric models
 Economics--Statistical methods
 Instrumental variables (Statistics)

Mode : Enumeration
 Remarks : Provision adequate.

No.39
 Subject : **ECONOMIC ANTHROPOLOGY**
 Category : Synthesis
 Provision : Economic anthropology (May Subd Geog)
 [GN448-GN450.8]
 UF Commerce, Primitive [Former Heading]
 Economics, Primitive [Former Heading]
 BT Economics
 Ethnology
 NT Economics, Prehistoric
 Exchange
 Primitive property
 Subsistence economy

Mode : Enumeration
 Remarks : Provision adequate.

No.40
 Subject : **ECONOMIC DEMOGRAPHY**
 Category : Synthesis
 Provision : Demography – Economic aspects
 Mode : Synthesis
 Remarks : Direct enumeration warranted.

No.41
 Subject : **ECONOMIC GEOGRAPHY**
 Category : Synthesis
 Provision : Economic geography
 [HF1021-HF1027]
 Here are entered works on the branch of geography that deals with the relations of physical and economic conditions to the production and distribution of goods and services. Works on the economic geography of particular countries, cities, etc., are entered under the name of the place subdivided by Economic conditions.
 UF Geography, Economic [Former Heading]
 World economics
 BT Geography
 RT Commercial geography
 NT Agricultural geography
 Mortgage loans--Geographical distribution
 Mode : Enumeration
 Remarks : Provision adequate.

No.42
 Subject : **ECONOMIC HISTORY**
 Category : Synthesis
 Provision : Economic history
 Here are entered works on economic history. Works on the history of economics as a discipline are entered under Economics--History.
 SA subdivision Economic conditions under names of countries, cities, etc.
 UF Economic conditions
 History, Economic
 BT Economics
 NT Asiatic mode of production
 Economic indicators
 Industrial revolution
 Mode : Enumeration
 Remarks : Provision adequate.

No.43
Subject : **ECONOMIC SOCIOLOGY**
Category : Synthesis
Provision : Economics – Sociological aspects
UF Economic sociology
BT Economics
Sociology
Mode : Enumeration
Remarks : Specific enumeration warranted.

No.44
Subject : **ECONOMICS AND EDUCATION**
Category : Juxtaposition
Provision : Economics (May Subd Geog)
Education (May Subd Geog)
Mode : Partial
Remarks : Specific enumeration warranted.

No.45
Subject : **ECONOMICS AND ETHICS**
Category : Synthesis
Provision : Economics (*May Subd Geog*)
Ethics
Mode : Partial
Remarks : Specific enumeration warranted.

No.46
Subject : **EDUCATIONAL ANTHROPOLOGY**
Category : Synthesis
Provision : Educational anthropology (May Subd Geog)
UF Campus cultures
Culture and education
Education and anthropology
BT Anthropology
Culture
Education--Philosophy
NT Dropout behavior, Prediction of
Mode : Enumeration
Remarks : Provision adequate.

No.47
 Subject : **EDUCATIONAL PSYCHOLOGY**
 Category : Synthesis
 Provision : Educational psychology
 [LB1051-LB1091]
 Here are entered works on the nature and operation of the human learning process. Works on the application of psychology in the school setting are entered under School psychology.
 UF Education--Psychology
 Psychology, Educational
 BT Psychology
 RT Child psychology
 NT Achievement motivation
 Education and heredity
 Intelligence levels
 Learning, Psychology of
 Students--Psychology
 Mode : Enumeration
 Remarks : Provision adequate.

No.48
 Subject : **EDUCATIONAL SOCIOLOGY**
 Category : Synthesis
 Provision : Educational sociology (May Subd Geog)
 [LC189-LC214.53]
 SA subdivision Sociological aspects under types of educational institutions, e.g. Universities and colleges--Sociological aspects
 UF Education and sociology
 Social problems in education
 Society and education
 Sociology, Educational
 BT Sociology
 RT Education--Aims and objectives
 NT Classroom environment
 School environment
 Socially handicapped--Education
 Socially handicapped children--Education
 Technical education--Social aspects
 Mode : Enumeration
 Remarks : Provision adequate.

No.49
Subject : **ELECTORAL GEOGRAPHY**
Category : Synthesis
Provision : Elections – Geography
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.50
Subject : **ENGINEERING PSYCHOLOGY**
Category : Synthesis
Provision : Engineering – Psychological aspects
Mode : Synthesis
Remarks : Direct provision warranted.

No.51
Subject : **ENVIRONMENTAL ARCHAEOLOGY**
Category : Synthesis
Provision : Environmental archaeology (May Subd Geog)
[CC81]
UF Archaeology, Environmental
BT Archaeology--Methodology
Mode : Enumeration
Remarks : Provision adequate.

No.52
Subject : **ENVIRONMENTAL AUDITING**
Category : Synthesis
Provision : Environmental auditing (May Subd Geog)
[TD194.7]
UF Auditing, Environmental
Environmental accounting
Environmental compliance auditing
BT Environmental engineering
RT Environmental impact analysis
Environmental law
Environmental policy
Mode : Enumeration
Remarks : Provision adequate.

No.53
Subject : **ENVIRONMENTAL ECONOMICS**
Category : Synthesis
Provision : Environmental economics (May Subd Geog)
UF Ecological economics
Economics--Environmental aspects
Environmental quality--Economic aspects
BT Economics
Mode : Enumeration
Remarks : Provision adequate.

No. 54
Subject : **ENVIRONMENTAL MANAGEMENT**
Category : Synthesis
Provision : Environmental management (May Subd Geog)
[GE300-GE350]
Here are entered works on a multidisciplinary approach
to the environmentally sound use and management of natural
resources by applying principles from ecological engineering,
environmental engineering, planning, environmental economics,
and environmental law.
BT Environmental sciences
NT Ecological engineering
Ecosystem management
Mode : Enumeration
Remarks : Provision adequate.

No.55
Subject : **ENVIRONMENTAL PSYCHOLOGY**
Category : Synthesis
Provision : Environmental psychology (May Subd Geog)
[BF353-BF353.5]
UF Ecological psychology
Environmental quality--Psychological aspects
BT Psychology
NT Architecture--Psychological aspects
Idiodynamics
Mode : Enumeration
Remarks : Provision adequate.

No.56
Subject : **ENVIRONMENTAL STUDIES**
Category : Convergence
Provision : Human ecology--Study and teaching (May Subd Geog)
UF **Environmental studies**
NT Nature study
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.57
Subject : **ETHNIC STUDIES**
Category : Convergence
Provision : Ethnology--Study and teaching (May Subd Geog)
SA subdivision Study and teaching under ethnic groups
UF **Ethnic studies** [Former Heading]
NT Cross-cultural orientation
Mode : Enumeration
Remarks : Direct enumeration under former heading warranted.

No.58
Subject : **ETHNOARCHAEOLOGY**
Category : Synthesis
Provision : Ethnoarchaeology (May Subd Geog)
[CC79.E85]
UF Ethnology in archaeology [Former Heading]
BT Archaeology--Methodology
Ethnology--Methodology
Social archaeology
Mode : Enumeration
Remarks : Provision adequate.

No.59
Subject : **ETHNOBIOLOGY**
Category : Synthesis
Provision : Ethnobiology (May Subd Geog)
[GN476.7-GN476.78]
SA subdivision Ethnobiology under ethnic groups
BT Biology--Folklore
Biology, Economic
Ethnology

NT Ethnobotany
Ethnoentomology
Ethnozoology
Mode : Enumeration
Remarks : Provision adequate.

No.60
Subject : **ETHNOBOTANY**
Category : Synthesis
Provision : Ethnobotany (May Subd Geog)
SA subdivision Ethnobotany under ethnic groups
UF Indigenous peoples--Ethnobotany
BT Botany--Folklore
Ethnobiology
Plants--Folklore
Plants, Useful
RT Plants and civilization
NT Paleoethnobotany
Mode : Enumeration
Remarks : Provision adequate.

No.61
Subject : **ETHNOPSYCHIATRY**
Category : Synthesis
Provision : Cultural psychiatry (May Subd Geog)
[RC455.4.E8]
Here are entered works on the branch of psychiatry
concerned with the influence of culture on mental health.
Works on the branch of psychiatry concerned with the
comparison of mental health and disorders in different
cultures are entered under Psychiatry, Transcultural.
UF Culture and psychiatry
Ethnopsychiatry
Psychiatry, Cultural
Psychiatry and culture
BT Ethnopsychology
Social psychiatry
NT Psychiatry, Transcultural
Mode : Enumeration
Remarks : Direct enumeration under Ethnopsychiatry warranted as per
provision for Ethnobotany, etc.

No.62
Subject : **ETHNOZOOLOGY**
Category : Synthesis
Provision : Ethnozoology (May Subd Geog)
 [GN476.76-GN476.78]
 SA subdivision Ethnozoology under ethnic groups
 UF Indigenous peoples--Ethnozoology
 BT Animals--Folklore
 Ethnobiology
 Zoology, Economic
Mode : Enumeration
Remarks : Provision adequate.

No.63
Subject : **FORENSIC ANTHROPOLOGY**
Category : Synthesis
Provision : Forensic anthropology (May Subd Geog)
 [GN69.8]
 UF Anthropology, Forensic
 Medicolegal anthropology
 BT Forensic sciences
 Physical anthropology
 NT Forensic osteology
Mode : Enumeration
Remarks : Provision adequate.

No.64
Subject : **FORENSIC LINGUISTICS**
Category : Synthesis
Provision : Forensic linguistics (May Subd Geog)
 UF Linguistics--Jurisprudence
 Linguistics, Forensic
 BT Linguistics
Mode : Enumeration
Remarks : Provision adequate.

No.65
Subject : **FORENSIC PSYCHIATRY**
Category : Synthesis

Provision : Forensic psychiatry (May Subd Geog)
 [RA1151]
 Here are entered works on psychiatry as applied in courts of law. Works on the legal status of persons of unsound mind are entered under the heading Insanity--Jurisprudence.

UF Psychiatry, Forensic
 BT Criminal psychology
 Forensic neurology
 Insanity--Jurisprudence
 Medical jurisprudence
 Psychology, Forensic
 RT Insane, Criminal and dangerous
 NT Litigious paranoia
 Traumatic neuroses

Mode : Enumeration
 Remarks : Provision adequate.

No.66
 Subject : **FORENSIC PSYCHOLOGY**
 Category : Synthesis
 Provision : Psychology, Forensic (May Subd Geog)
 [RA1148]

UF **Forensic psychology**
 Juridical psychology
 Juristic psychology
 Legal psychology
 Psychology, Juridical
 Psychology, Juristic
 Psychology, Legal
 BT Forensic sciences
 Psychology, Applied
 NT Forensic neuropsychology
 Forensic psychiatry
 Mythomania
 Psychological autopsy

Mode : Enumeration
 Remarks : Direct enumeration as for Forensic Linguistics, Forensic Psychiatry warranted.

No.67
 Subject : **FORENSIC SCIENCE**
 Category : Convergence
 Provision : Forensic sciences (May Subd Geog)

Here are entered works on science as applied in courts of law or in criminal investigations.

UF Criminalistics
Forensic science
BT Science
RT Criminal investigation
NT Chemistry, Forensic
Forensic accounting
Forensic anthropology
Forensic economics

Mode : Enumeration
Remarks : Direct enumeration under singular heading form warranted.

No.68
Subject : **GEOARCHAEOLOGY**
Category : Synthesis
Provision : Archaeological geology (*May Subd Geog*)
[CC77.5]

UF Archaeogeology
Geoarchaeology
Geological archaeology
BT Geology

Mode : Enumeration
Remarks : Specific provision under Geoarchaeology warranted.

No.69
Subject : **GEOGRAPHY OF LAW**
Category : Synthesis
Provision : Law – Geography
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.70
Subject : **GEOPOLITICS**
Category : Synthesis
Provision : Geopolitics (May Subd Geog)
[JC319-JC323]
RT World politics
NT Buffer states

Mode : Enumeration
Remarks : Provision adequate.

No.71
Subject : **GLOBALISATION STUDIES**
Category : Convergence
Provision : Globalisation (*Not Subd Geog*)
[JZ1308-JZ1323]
Here are entered works on the complex of linkages and interconnections between countries and societies that make up the world system.
UF Internationalisation
BT International relations
Mode : Enumeration
Remarks : Provision adequate.

No.72
Subject : **HISTORICAL DEMOGRAPHY**
Category : Synthesis
Provision : Demography (May Subd Geog)
[HB848-HB3697]
SA subdivision Population under names of countries, cities, etc.
UF **Historical demography**
BT Social sciences
RT Population
Vital statistics
NT Demographic anthropology
Demographic transition
Linguistic demography
Population geography
Mode : Enumeration
Remarks : Specific provision under Historical Demography warranted.

No.73
Subject : **HISTORICAL GEOGRAPHY**
Category : Synthesis
Provision : Historical geography
[D-F (Individual regions and countries)]
[G141 (General)]
Here are entered works which take a historical approach to the geography of countries, regions, etc., at a

particular period in the past.
SA subdivision Historical geography under names of
countries, cities, etc.

UF Geography, Historical [Former Heading]

BT Geography

Mode : Enumeration

Remarks : Provision adequate.

No.74

Subject : **HISTORICAL LINGUISTICS**

Category : Synthesis

Provision : Historical linguistics (May Subd Geog)
[P140]

UF Diachronic linguistics

Dynamic linguistics

Evolutionary linguistics

Language and languages -- History [FormerHeading]

BT Language and history

Linguistics

NT Comparative linguistics

Historical lexicology

Language obsolescence

Linguistic change

Reconstruction (Linguistics)

Mode : Enumeration

Remarks : Provision adequate.

No.75

Subject : **HISTORICAL SOCIOLOGY**

Category : Synthesis

Provision : Historical sociology
[HM104]

UF Sociology, Historical

BT Anthropology

History

Social evolution

Sociology

NT Culture

Mode : Enumeration

Remarks : Provision adequate.

No.76
Subject : **HISTORY AND ANTHROPOLOGY**
Category : Juxtaposition
Provision : History
 Anthropology
Mode : Partial
Remarks : Specific provision warranted.

No.77
Subject : **HISTORY AND LITERATURE**
Category : Juxtaposition
Provision : Literature and history (*May Subd Geog*)
 UF **History and literature**
 History and poetry
 Poetry and history
 BT History
 NT Historical criticism (Literature)
Mode : Enumeration
Remarks : Provision adequate.

No.78
Subject : **HISTORY AND POLITICS**
Category : Juxtaposition
Provision : History
 Politics, Practical (*May Subd Geog*)
Mode : Partial
Remarks : Specific enumeration warranted.

No.79
Subject : **INDUSTRIAL ECOLOGY**
Category : Synthesis
Provision : Industrial ecology (*May Subd Geog*)
 [TS161]
 Here are entered works on optimizing the industrial
 materials cycle through design and production processes in
 order to minimize waste, pollution, and costs.
 BT Materials management
Mode : Enumeration
Remarks : Provision adequate.

No.80
Subject : **INDUSTRIAL GEOGRAPHY**
Category : Synthesis
Provision : Industries – Geography
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.81
Subject : **INDUSTRIAL JURISPRUDENCE**
Category : Synthesis
Provision : Industries – Legal aspects
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.82
Subject : **INDUSTRIAL PSYCHOLOGY**
Category : Synthesis
Provision : Psychology, Industrial (May Subd Geog)
[HF5548.7-HF5548.8]
UF Business psychology
Industrial psychology
Psychotechnics
BT Industrial engineering
Personnel management
Psychology, Applied
RT Industrial psychologists
NT Employee competitive behavior
Employee morale
Employee motivation
Industrial psychiatry
Mode : Enumeration
Remarks : Direct enumeration as for Industrial Sociology, etc., warranted.

No.83
Subject : **INDUSTRIAL SOCIOLOGY**
Category : Synthesis
Provision : Industrial sociology (May Subd Geog)
[HD6951-HD6957]
Here are entered works on social relations within
industry, as distinguished from labor-management relations.
Works on the impact of industry on culture and societal

changes are entered under Industries--Social aspects. Works on the social responsibilities of business, corporations, and industry are entered under Social responsibility of business.

BT Sociology

RT Industrial organization
Industries--Social aspects

NT Managing your boss
Office politics
Sex role in the work environment

Mode : Enumeration

Remarks : Provision adequate.

No.84

Subject : **INTERNATIONAL STUDIES**

Category : Convergence

Provision : Foreign study (May Subd Geog)

UF **International study**

BT Education

RT Students, Foreign

Mode : Partial

Remarks : Direct enumeration warranted.

No.85

Subject : **LABOUR STUDIES**

Category : Convergence

Provision : Labor – Study and teaching (*May Subd Geog*)

Mode : Enumeration

Remarks : Direct enumeration warranted.

No.86

Subject : **LAW AND ECONOMICS**

Category : Juxtaposition

Provision : Law and economics

[K487.E3]

Here are entered works on the discipline that studies law from the perspective of economic theory. Works on the economic aspects of the legal system are entered under Law--Economic aspects.

UF Economics and jurisprudence
Economics and law

Jurisprudence and economics

BT Economics

Jurisprudence

Mode : Enumeration
Remarks : Provision adequate.

No.87
Subject : **LAW AND ETHICS**
Category : Juxtaposition
Provision : Law and ethics
UF Ethics and law
Law and morals
Morals and law
BT Law – Philosophy
NT Abuse of rights
Mode : Enumeration
Remarks : Provision adequate.

No.88
Subject : **LAW AND GEOGRAPHY**
Category : Juxtaposition
Provision : Law and geography (*May Subd Geog*)
UF Geography and law
BT Geography
Mode : Enumeration
Remarks : Provision adequate.

No.89
Subject : **LAW AND SOCIOBIOLOGY**
Category : Juxtaposition
Provision : Law and sociobiology
BT Sociobiology
Mode : Enumeration
Remarks : Provision adequate.

No.90
Subject : **LEGAL ANTHROPOLOGY**
Category : Synthesis
Provision : Anthropology – Legal aspects
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.91
Subject : **LINGUISTIC DEMOGRAPHY**
Category : Synthesis
Provision : Linguistic demography
BT Demography
Sociolinguistics
Mode : Enumeration
Remarks : Provision adequate

No.92
Subject : **LINGUISTIC GEOGRAPHY**
Category : Synthesis
Provision : Linguistic geography
[P375-P381]
SA subdivisions Dialects and Maps under names of
languages; also subdivision Languages--Maps under
names of countries, regions, etc.
UF Dialect geography
Geography, Linguistic
Language and languages--Geography
Language geography
BT Areal linguistics
Dialectology
NT Language surveys
Mode : Enumeration
Remarks : Provision adequate.

No.93
Subject : **LOGIC AND LINGUISTICS**
Category : Juxtaposition
Provision : Language and logic
[BC57] [P39]
UF **Linguistics and logic**
Logic in language
BT Language and languages
NT Logical positivism
Predicate (Logic)
Mode : Enumeration
Remarks : Specific provision in given order warranted.

No.94
 Subject : **MARITIME ANTHROPOLOGY**
 Category : Synthesis
 Provision : Maritime anthropology (May Subd Geog)
 UF Marine anthropology
 Marine ethnology
 Maritime ethnology
 BT Anthropology
 Ethnology
 NT Fishing villages
 Mode : Enumeration
 Remarks : Provision adequate.

No.95
 Subject : **MATHEMATICAL ECONOMICS**
 Category : Synthesis
 Provision : Economics, Mathematical (May Subd Geog)
 [HB135]
 UF Economics--Mathematics
 Mathematical economics
 BT Economics--Methodology
 Mathematics
 RT Econometrics
 NT Economics--Mathematical models
 Input-output analysis
 Mode : Enumeration
 Remarks : Direct enumeration warranted,e.g., Mathematical geography.

No.96
 Subject : **MATHEMATICAL GEOGRAPHY**
 Category : Synthesis
 Provision : Mathematical geography
 [GA1-GA87]
 Here are entered works on the branch of physical
 geography that deals with attributes of the Earth, such as
 its size, shape, and movements, and with those relations to
 heavenly bodies which affect the features of the Earth.
 Works on the use of mathematics in geography are entered
 under Geography--Mathematics.
 UF Geography, Mathematical [Former Heading]
 BT Geography
 RT Astronomical geography
 Geodesy

Geographical positions
 NT Area measurement
 Cartography
 Cosmography
 Map projection
 Surveys
 Mode : Enumeration
 Remarks : Provision adequate.

No.97
 Subject : **MATHEMATICAL LINGUISTICS**
 Category : Synthesis
 Provision : Mathematical linguistics
 UF Algebraic linguistics
 Language and languages--Statistical methods
 Linguistics--Mathematical models
 Linguistics, Mathematical
 BT Applied linguistics
 Information theory
 Linguistics
 RT Computational linguistics
 NT Dependency grammar
 IPL (Computer program language)
 Linguistics--Graphic methods
 Linguistics--Statistical methods
 Semantics--Mathematical models
 Mode : Enumeration
 Remarks : Provision adequate.

No.98
 Subject : **MATHEMATICAL PSYCHOLOGY**
 Category : Synthesis
 Provision : Psychology – Mathematics
 Mode : Synthesis
 Remarks : Specific and direct provision warranted.

No.99
 Subject : **MEDICAL ANTHROPOLOGY**
 Category : Synthesis
 Provision : Medical anthropology (May Subd Geog)

[GN296-GN296.5]

BT Anthropology
 NT Health and race
 Traditional medicine

Mode : Enumeration
 Remarks : Provision adequate.

No.100

Subject : **MEDICAL ECONOMICS**
 Category : Synthesis
 Provision : Medical economics (May Subd Geog)
 [R728]
 [RA410-RA415]

Here are entered comprehensive works on the economic aspects of medical service from the point of view of both the practitioner and the public. Works on special aspects of medical economics are entered under specific headings, e.g. Medical care, Cost of.

UF Economics, Medical
 Health--Economic aspects
 Health economics
 Hygiene--Economic aspects
 Medical care--Economic aspects
 Medicine--Economic aspects

NT Fundholding (Medical economics)
 Group medical practice
 Health care rationing
 Medical care, Cost of
 Medically underserved areas

Mode : Enumeration
 Remarks : Provision adequate.

No.101

Subject : **MEDICAL GEOGRAPHY**
 Category : Synthesis
 Provision : Medical geography (May Subd Geog)
 [RA791-RA954]

Here are entered works on the geographical distribution of diseases, and on pathology in relation to conditions of geography and climate.
 Works on the occurrence of a particular disease in a locality are entered under the name of the disease

subdivided by the name of the place.

Works on the practice, history, or conditions of medicine in any particular locality are entered under

Medicine--[local subdivision], e.g. Medicine--Germany.

UF Diseases--Geographical distribution
Geographical distribution of diseases
Geographical pathology
Geography, Medical
Geomedicine
Medical topography
Pathology, Geographic
Topography, Medical

BT Geography

RT Medical climatology
World health

NT Environmentally induced diseases
Health service areas
Veterinary medical geography

Mode : Enumeration

Remarks : Provision adequate.

No.102

Subject : **MEDICAL SOCIOLOGY**

Category : Synthesis

Provision : Social medicine (May Subd Geog)
[RA418]

SA subdivisions Patients--Social conditions and Social aspects under individual diseases, e.g.

Cancer--Patients--Social conditions; Cancer--Social aspects; and subdivision Social aspects under medical topics, e.g. Heart--Transplantation--Social aspects

UF Medical care--Social aspects

Medical sociology

Medicine--Social aspects

Medicine, Social

BT Public health

Public welfare

Sociology

RT Medical ethics

NT Family--Health and hygiene

Medical cooperation

Medical sociologists

Social psychiatry

Transcultural medical care

Mode : Enumeration
Remarks : Provision adequate.

No.103
Subject : **MEDICINE AND PSYCHOLOGY**
Category : Juxtaposition
Provision : Medicine and psychology (May Subd Geog)
[R726.5-R726.8]
SA subdivision Psychological aspects under medical
subjects, e.g. Cancer--Psychological aspects;
Nursing--Psychological aspects
UF Behavioral medicine
Psychology and medicine
BT Psychology, Applied
NT Clinical health psychology
Geriatrics--Psychological aspects
Gynecology--Psychological aspects
Health behavior
Medicine, Psychosomatic
Placebo (Medicine)
Prescription writing--Psychological aspects
Mode : Enumeration
Remarks : Provision adequate.

No.104
Subject : **MILITARY GEOGRAPHY**
Category : Synthesis
Provision : Military geography (May Subd Geog)
[UA985-UA997]
SA subdivision Strategic aspects under names of regions,
countries, cities, etc.
UF Geography, Military
Terrain study (Military science) [Former Heading]
BT Geography
Military art and science
NT Africa--Strategic aspects
East Asia--Strategic aspects
Indian Ocean--Strategic aspects
North Atlantic Region--Strategic aspects
Persian Gulf Region--Strategic aspects
Mode : Enumeration
Remarks : Provision adequate.

No.105
Subject : **MILITARY PSYCHIATRY**
Category : Synthesis
Provision : Military psychiatry (May Subd Geog)
 [UH629-UH629.5]
 UF Psychiatry, Military [Former Heading]
 BT Medicine, Military
 Psychiatry
 RT War neuroses

Mode : Enumeration
Remarks : Provision adequate.

No.106
Subject : **MILITARY PSYCHOLOGY**
Category : Synthesis
Provision : Psychology, Military
 [U22.3]
 UF **Military psychology**
 BT Psychology, Applied
 Sociology, Military
 RT Morale
 NT Aeronautics, Military--Psychology
 Combat--Psychological aspects
 Deterrence (Strategy)
 Prisoners of war--Psychology
 Psychology, Naval

Mode : Enumeration
Remarks : Direct enumeration warranted as, e.g., Military Psychiatry.

No.107
Subject : **MILITARY SOCIOLOGY**
Category : Synthesis
Provision : Sociology, Military (May Subd Geog)
 UF **Military sociology**
 BT Armed Forces
 Armies
 Peace
 War
 RT War and society
 NT Civil-military relations

Militarism
Military policy
Psychology, Military
Mode : Enumeration
Remarks : Direct enumeration warranted as, e.g., Military Geography.

No.108
Subject : **NEUROLINGUISTICS**
Category : Synthesis
Provision : Neurolinguistics (May Subd Geog)
[QP399]
UF Neuro-linguistics
BT Biolinguistics
Higher nervous activity
Language and languages--Physiological aspects
Linguistics
Neuropsychology
RT Psycholinguistics
Mode : Enumeration
Remarks : Provision adequate.

No.109
Subject : **PHILOSOPHY AND PSYCHOLOGY**
Category : Juxtaposition
Provision : Psychology and philosophy
UF **Philosophy and psychology**
BT Philosophy
Mode : Enumeration
Remarks : Provision adequate.

No.110
Subject : **PHILOSOPHY AND RELIGION**
Category : Juxtaposition
Provision : Philosophy and religion
Here are entered works on the reciprocal relationship and influence between philosophy and religion. Works on the philosophy of religion are entered under Religion--Philosophy.
UF Christianity and philosophy
Religion and philosophy

BT Religion
NT Buddhism and philosophy
Catholic Church and philosophy
Islam and philosophy
Philosophical theology
Mode : Enumeration
Remarks : Provision adequate.

No.111
Subject : **PHYSIOLOGICAL PSYCHOLOGY**
Category : Synthesis
Provision : Psychophysiology (May Subd Geog)
[QP360]
Here are entered works on the relationship between
psychological and physiological processes.
SA subdivision Psychophysiology under individual parts
of the body, e.g. Heart--Psychophysiology
UF Behavioral physiology
Physiological psychology
Physiopsychology
Psychology, Physiological [Former Heading]
Somatopsychics
BT Physiology
Psychobiology
RT Mind and body
NT Habituation (Neuropsychology)
Movement, Psychology of
Neuropsychology
Psychophysics
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.112
Subject : **PHYTOGEOGRAPHY**
Category : Synthesis
Provision : Phytogeography (May Subd Geog)
[QK101-QK474.5]
SA subdivision Geographical distribution under particular
plants, e.g. Corn--Geographical distribution;
Fungi--Geographical distribution
UF Botanical geography
Botany--Geographical distribution

Geobotany
 Geographical distribution of plants
 Plant distribution
 Plant geography
 Plants--Geographical distribution
 BT Biogeography
 RT Disjunct plants
 NT Corn--Geographical distribution
 Crops--Geographical distribution
 Fungi--Geographical distribution
 Plant introduction
 Plants--Migration
 Vegetation boundaries
 Vegetation surveys
 Mode : Enumeration
 Remarks : Provision adequate.

No.113
 Subject : **POLEMOLOGY**
 Category : Convergence
 Provision : Peace--Research (May Subd Geog)
 UF Peace science
 Mode : Partial
 Remarks : Direct enumeration warranted.

No.114
 Subject : **POLICY STUDIES**
 Category : Convergence
 Provision : Policy sciences
 [H97]
 SA subdivision Government policy under subjects; and
 headings of the type [topic] and state and [topic]
 policy, e.g. Science and state; Economic policy
 UF Policy-making
 Public policy management
 NT Decision-making
 Political planning
 Mode : Enumeration
 Remarks : Direct enumeration warranted.

No.115
 Subject : **POLITICAL ANTHROPOLOGY**
 Category : Synthesis
 Provision : Political anthropology (May Subd Geog)
 [GN492-GN495.2]
 Here are entered works on political anthropology as a branch of learning. This heading may be divided geographically for works on this branch of learning in a specific place. Works on the political life of particular ethnic groups are entered under the name of the group subdivided by Politics and government.
 SA subdivision Politics and government under names of countries, cities, etc. and under ethnic groups
 UF Anthropology, Political
 Government, Primitive [Former Heading]
 BT Ethnology
 Political science
 NT Chiefdoms
 Political customs and rites
 Mode : Enumeration
 Remarks : Provision adequate.

No.116
 Subject : **POLITICAL ECOLOGY**
 Category : Synthesis
 Provision : Political ecology (*May Subd Geog*)
 [JA75.8]
 BT Social ecology
 RT Green movement
 Mode : Enumeration
 Remarks : Provision adequate.

No.117
 Subject : **POLITICAL ECONOMY**
 Category : Synthesis
 Provision : Economics (May Subd Geog)
 [HB1-HB130]
 Here are entered works on economics as a branch of learning. This heading may be divided geographically for works on this branch of learning in a specific place. Works on the economic conditions of particular countries, regions, cities, etc., are entered under the name of the place subdivided by Economic conditions.

SA subdivision Economic aspects under topical headings, e.g. Agriculture--Economic aspects; and subdivision Economic conditions under names of countries, cities, etc., and under classes of persons and ethnic groups, including occupational groups

UF Economic theory
Political economy
BT Social sciences
RT Economic man
NT Business
Commerce
Development economics
Economic development
Industries

Mode : Enumeration
Remarks : Direct enumeration warranted.

No.118
Subject : **POLITICAL GEOGRAPHY**
Category : Synthesis
Provision : Political geography
[JC319-JC323]

Here are entered works on the branch of geography that deals with human governments, the boundaries and subdivisions of political units and the situations of cities. Works which take a historical approach to the geography of countries, regions, etc., at a particular period in the past are entered under Historical geography.

UF Geography, Political [Former Heading]
BT Human geography

Mode : Enumeration
Remarks : Provision adequate.

No.119
Subject : **POLITICAL PSYCHOLOGY**
Category : Synthesis
Provision : Political psychology

UF Mass political behavior
Political behavior
Politics, Practical--Psychological aspects
Psychology, Political
BT Political science

Psychology
 Social psychology
 NT International relations--Psychological aspects
 Political alienation
 Political socialization
 Propaganda
 Public opinion
 Mode : Enumeration
 Remarks : Provision adequate.

No.120
 Subject : **POLITICAL SOCIOLOGY**
 Category : Synthesis
 Provision : Political sociology
 UF Mass political behavior
 Political behavior
 Political science--Sociological aspects
 BT Political science
 Sociology
 NT Political socialization
 Mode : Enumeration
 Remarks : Provision adequate.

No.121
 Subject : **POPULATION GEOGRAPHY**
 Category : Synthesis
 Provision : Population geography (May Subd Geog)
 [HB1951-HB2160]
 UF Geography of population
 Population, Geography of
 BT Demography
 Human geography
 NT Emigration and immigration
 Migration, Internal
 Population density
 Residential mobility
 Mode : Enumeration
 Remarks : Provision adequate.

No.122
 Subject : **POSTMODERN STUDIES**
 Category : Convergence
 Provision : Postmodernism – Study and teaching (*May Subd Geog*)
 UF Post-modernism
 Postmodernism (Philosophy)
 BT Arts – Modern, 20th century
 Avant-garde (Aesthetics)
 Modernism (Art)
 Philosophy, Modern – 20th century
 NT Architecture, Postmodern
 Mode : Enumeration
 Remarks : Provision does not include Postmodernity.

No.123
 Subject : **PSYCHOBIOLOGY**
 Category : Synthesis
 Provision : Psychobiology (May Subd Geog)
 UF Biological psychology
 Biopsychology
 BT Biology
 Human behavior
 Psychology
 RT Biological psychiatry
 NT Developmental psychobiology
 Psychophysiology
 Mode : Enumeration
 Remarks : Provision adequate.

No.124
 Subject : **PSYCHOHISTORY**
 Category : Synthesis
 Provision : Psychohistory
 [D16.16 (History)]
 UF Psychoanalysis in historiography
 BT Child psychology
 Historiography
 History--Psychological aspects
 Psychoanalysis
 RT Historiometry
 Mode : Enumeration
 Remarks : Provision adequate.

No.125
 Subject : **PSYCHOLINGUISTICS**
 Category : Synthesis
 Provision : Psycholinguistics (May Subd Geog)
 [P37]
 SA subdivision Psychological aspects under names of
 languages, e.g. English language--Psychological aspects
 UF Language, Psychology of
 Language and languages--Psychological aspects
 Language and languages--Psychology
 Psychology of language
 BT **Biolinguistics**
 Language and languages
 Linguistics
 Psychology
 RT **Neurolinguistics**
 Thought and thinking
 NT **Cognitive grammar**
 Communicative competence
 Generative grammar
 Language acquisition
 Mode : Enumeration
 Remarks : Provision adequate.

No.126
 Subject : **PSYCHOLOGICAL ANTHROPOLOGY**
 Category : Synthesis
 Provision : Ethnopsychology (May Subd Geog)
 [GN270-GN279]
 SA subdivision Psychology under names of racial
 or ethnic groups, e.g. Afro-Americans--Psychology
 UF Ethnic groups--Psychology
 Ethnic psychology
 Indigenous peoples--Psychology
 Psychological anthropology
 Psychology, Ethnic
 BT **Psychology**
 RT **National characteristics**
 NT **Cognition and culture**
 Cultural psychiatry
 Cultural relativism
 Culture conflict

Ethnocentrism
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.127
Subject : **PSYCHOLOGY AND ECONOMICS**
Category : Juxtaposition
Provision : Economics (*May Subd Geog*)
Psychology (*May Subd Geog*)
RT Economics – Psychological principles
Mode : Partial
Remarks : Specific enumeration warranted.

No.128
Subject : **PSYCHOLOGY AND RELIGION**
Category : Juxtaposition
Provision : Psychology and religion (May Subd Geog)
[BF51]
UF Religion and psychology
BT Religion
NT Psychiatry and religion
Psychology, Religious
Mode : Enumeration
Remarks : Provision adequate.

No.129
Subject : **PSYCHOMETRICS**
Category : Synthesis
Provision : Psychometrics
[BF39-BF39.2]
UF Psychological measurement
Psychology--Measurement
Psychology--Scaling
Psychology--Statistics
Psychometry
BT Psychological tests
Psychology--Methodology
Scaling (Social sciences)
NT Decision-making--Mathematical models

Educational tests and measurements
Multidimensional scaling
Psychology--Mathematical models

Mode : Enumeration
Remarks : Provision adequate.

No.130

Subject : **PSYCHOPHYSICS**
Category : Synthesis
Provision : Psychophysics (*May Subd Geog*)
[BF237]
BT Physics
Psychophysiology
NT Weber-Fechner law

Mode : Enumeration
Remarks : Provision adequate.

No.131

Subject : **REGIONAL SCIENCE**
Category : Convergence
Provision : Regional economics (*May Subd Geog*)
[HT388]
BT Economics
Regional planning
Regionalism
RT Space in economics
NT Regional economic disparities

Mode : Partial
Remarks : Direct enumeration warranted.

No.132

Subject : **SOCIAL ENGINEERING**
Category : Synthesis
Provision : Social engineering (*May Subd Geog*)
UF Engineering, Social
BT Social control

Mode : Enumeration
Remarks : Provision adequate.

No.133
 Subject : **SOCIAL GEOGRAPHY**
 Category : Synthesis
 Provision : Human geography (May Subd Geog)
 [GF]
 UF Anthropo-geography [Former Heading]
 Anthropogeography
 Cultural geography
 Geographical distribution of humans
 Social geography
 BT Anthropology
 Geography
 RT Human ecology
 NT Applied human geography
 Political geography
 Population geography

Mode : Enumeration
 Remarks : Provision adequate, though enumeration under Social
 Geography is desirable.

No.134
 Subject : **SOCIAL PSYCHOLOGY**
 Category : Synthesis
 Provision : Social psychology (May Subd Geog)
 [HM251-HM291]
 UF Mass psychology
 Psychology, Social
 BT Human ecology
 Psychology
 Social groups
 Sociology
 NT Collective behavior
 Community psychology
 Political psychology
 Population psychology
 Social psychiatry

Mode : Enumeration
 Remarks : Provision adequate.

No.135
 Subject : **SOCIOBIOLOGY**
 Category : Synthesis
 Provision : Sociobiology (May Subd Geog)
 [GN365.9 (Anthropology)]
 BT Genetic psychology
 Human biology--Social aspects
 Human evolution
 Psychology, Comparative
 Social evolution
 NT Biopolitics
 Law and sociobiology
 Sexism in sociobiology
 Socioendocrinology
 Mode : Enumeration
 Remarks : Provision adequate.

No.136
 Subject : **SOCIOLINGUISTICS**
 Category : Synthesis
 Provision : Sociolinguistics (May Subd Geog)
 [P40]
 SA subdivision Social aspects under names of languages,
 e.g. English language--Social aspects
 UF Language and languages--Social aspects
 Language and languages--Sociological aspects
 Language and society
 Society and language
 Sociology of language
 BT Language and culture
 Language and languages
 Linguistics
 Sociology
 NT Linguistic demography
 Linguistic minorities
 Literature and society
 Racism in language
 Sapir-Whorf hypothesis
 Mode : Enumeration
 Remarks : Provision adequate.

No.137
Subject : **SOCIOLOGY AND PSYCHIATRY**
Category : Juxtaposition
Provision : Sociology (*May Subd Geog*)
 Psychiatry (*May Subd Geog*)
 RT Psychiatry – Social aspects
Mode : Partial
Remarks : Specific enumeration warranted.

No.138
Subject : **SOCIOLOGY OF ART**
Category : Synthesis
Provision : Art – Social aspects
Mode : Synthesis
Remarks : Direct enumeration warranted.

No.139
Subject : **SOCIOLOGY OF KNOWLEDGE**
Category : Synthesis
Provision : Knowledge, Sociology of
 [BD175]
 UF Knowledge, Theory of (Sociology)
 Sociology of knowledge
 BT Communication
 Knowledge, Theory of
 Public opinion
 Sociology
 RT Social epistemology
Mode : Enumeration
Remarks : Direct enumeration warranted.

No.140
Subject : **SOCIOLOGY OF LANGUAGE**
Category : Synthesis
Provision : Sociolinguistics (*May Subd Geog*)
 [P40]
 SA subdivision Social aspects under names of languages,
 e.g. English language--Social aspects
 UF Language and languages--Social aspects
 Language and languages--Sociological aspects
 Language and society
 Society and language

Sociology of language
 BT Language and culture
 Language and languages
 Linguistics
 Sociology
 NT Linguistic demography
 Linguistic minorities
 Literature and society
 Racism in language
 Sapir-Whorf hypothesis

Mode : Enumeration
 Remarks : Provision adequate.

No.141
 Subject : **SOCIOLOGY OF LAW**
 Category : Synthesis
 Provision : Sociological jurisprudence

UF Law--Sociology
 Law and society
 Society and law
Sociology of law
 BT Jurisprudence
 Sociology
 NT Critical legal studies

Mode : Enumeration
 Remarks : Provision adequate, though direct enumeration is desirable.

No.142
 Subject : **SOCIOLOGY OF RELIGION**
 Category : Synthesis
 Provision : Religion and sociology (May Subd Geog)
 [BL60]

Here are entered works on religious sociology in general. Works on the sociology of Christian denominations and general Christian social theory are entered under Sociology, Christian. Works on the efforts of the church to deal with social problems are entered under Church and social problems.
 UF Religion and society
 Society and religion
 Sociology and religion

Sociology of religion

BT Sociology
NT Religion and social status
Sociology, Biblical
Sociology, Christian
Sociology, Shinto

Mode : Enumeration
Remarks : Direct enumeration warranted.

No.143

Subject : **SOCIOLOGY OF SCIENCE AND TECHNOLOGY**

Category : Synthesis

Provision : Science--Social aspects (May Subd Geog)
[Q175.5]

UF Science and society
Sociology of science

NT Science indicators

Technology – Social aspects (May Subd Geog)

UF Technology and society
Sociology of technology

Mode : Partial
Remarks : Comprehensive provision warranted.

No.144

Subject : **SOCIOLOGY OF SPORT**

Category : Synthesis

Provision : Sports--Sociological aspects
Here are entered works on sociological theories applied
to sports.

UF **Sociology of sports**

BT Sociology

Mode : Enumeration
Remarks : Direct enumeration warranted.

No.145

Subject : **SUBALTERN STUDIES**

Category : Convergence

Provision : South Asia – Historiography

Mode : Partial

Remarks : Direct enumeration under Subaltern Studies warranted.

No.146
 Subject : **TERRORISM STUDIES**
 Category : Convergence
 Provision : Terrorism – Study and teaching (May Subd Geog)
 UF Acts of terrorism
 Attacks, Terrorist
 Terror attacks
 Terrorist attacks
 BT Direct action
 Insurgency
 Subversive activities
 RT Political violence
 Terror
 NT Bioterrorism
 Chemical terrorism
 Cyberterrorism
 Nuclear terrorism
 State-sponsored terrorism
 Mode : Enumeration
 Remarks : Direct enumeration under Terrorism Studies warranted.

No.147
 Subject : **TRIBAL STUDIES**
 Category : Convergence
 Provision : Tribes – Study and teaching
 UF Tribes and tribal system
 BT Family
 RT Clans
 NT Detribalisation
 Lost tribes of Israel
 Tribal government
 Twelve tribes of Israel
 Mode : Enumeration
 Remarks : Direct enumeration warranted as, e.g., Women’s Studies.

No.148
Subject : **URBAN STUDIES**
Category : Convergence
Provision : Cities and towns--Study and teaching (May Subd Geog)
UF **Urban studies**
Mode : Enumeration
Remarks : Direct enumeration under Urban Studies warranted.

No.149
Subject : **WOMEN'S STUDIES**
Category : Convergence
Provision : Women's studies (May Subd Geog)
UF Female studies
Feminist studies
Women--Study and teaching [Former Heading]
Women studies
BT Education--Curricula
Mode : Enumeration
Remarks : Provision adequate.

No.150
Subject : **ZOOGEOGRAPHY**
Category : Synthesis
Provision : Zoogeography (May Subd Geog)
[QL101-QL345]
SA subdivision Geographical distribution
under individual animals, e.g. Fishes--Geographical
distribution.
UF Animals, Geographical distribution of
Geographical distribution of animals
Zoology--Geographical distribution
BT Biogeography
NT Animal introduction
Cattle--Geographical distribution
Mode : Enumeration
Remarks : Provision adequate.

5.7 TREATMENT OF CROSSDISCIPLINARY SUBJECTS IN LCSH25

The LCSH25, true to its claims as the most exhaustively enumerated list of subject headings, has been able to adequately represent most of the crossdisciplinary subjects by enumeration. However, the following observations can be made in respect of the treatment of crossdisciplinary subjects in LCSH25:

- 1) LCSH25 has been able to represent a bulk of the crossdisciplinary subjects by enumeration, either in the form of direct or inverted headings. However, the inconsistencies in the use of inverted phrase headings to represent crossdisciplinary subjects appears to be illogical since knowledge domains are better known by, and usually searched under, their names as given. It has been observed that, in the case of some crossdisciplinary subjects, such as Forensic Psychology or Military Psychology, the inverted headings Psychology, Forensic or Psychology, Military respectively have been preferred for securing their collocation in alphabetical indexes. However, since it is a stated policy of the Library of Congress to revert inverted headings to the extent practicable, the problems associated with such inverted headings are likely to be resolved soon.

- 2) Another important observation relates to the substitution of headings representing several well-recognised crossdisciplinary subjects by the

use of preferred headings. Obviously, considerations for literary warrant have been compromised for the sake of ensuring vocabulary control. There is certainly no justification for the substitution of established crossdisciplinary subjects formed by convergence, such as Environmental Studies and Urban Studies, with “Human Ecology – Study and Teaching”, and “Cities and Towns – Study and Teaching”. Such inconsistencies become more evident when other crossdisciplinary subjects such as Area Studies and Women’s Studies have been represented by direct enumeration under their given names. Such inconsistencies indicate the disregard for current terminology as reflected in the literature of the respective knowledge domains.

- 3) An equally important observation relates to the treatment of crossdisciplinary subjects formed by juxtaposition. While many of these subjects have been enumerated in LCSH25, the lack of an appropriate technique for synthesis of the component disciplines has rendered impossible the representation of several such subjects. In this regard, it is suggested that a technique using a tagged relational device, such as AND, between two component topics, objects or disciplines, may be adopted for representing various interrelationships and, thereby, minimise the need for the enumeration of possible combinations of related as well as distinct disciplines and topics in the LCSH.

Overall, it can be stated that in spite of certain inherent shortcomings, the extent to which LCSH25 provides for the representation of the crossdisciplinary subjects has been remarkable.

5.8 SUMMARY

The above evaluation has brought to light the peculiarities associated with each individual IR tool in terms of their treatment of the crossdisciplinary subjects in the social sciences. The necessity of incorporating suitable structural changes, adoption of specific devices for synthesis, and use of headings consistent with current terminology cannot be overemphasised. Sustained efforts need to be undertaken by those responsible for revising and updating the IR tools in question, if the fundamental objective of securing the representation of all fields of knowledge is to be achieved.

CHAPTER – 6

ANALYSIS AND INTERPRETATION

6.0 ANALYSIS AND INTERPRETATION

On the basis of the analysis of the matrix (Annexure-3) depicting the modes of representation of the three categories of crossdisciplinary subjects in the three IR tools, the following analyses and corresponding interpretations could be derived.

6.1 BREAK-UP OF CROSSDISCIPLINARY SUBJECTS

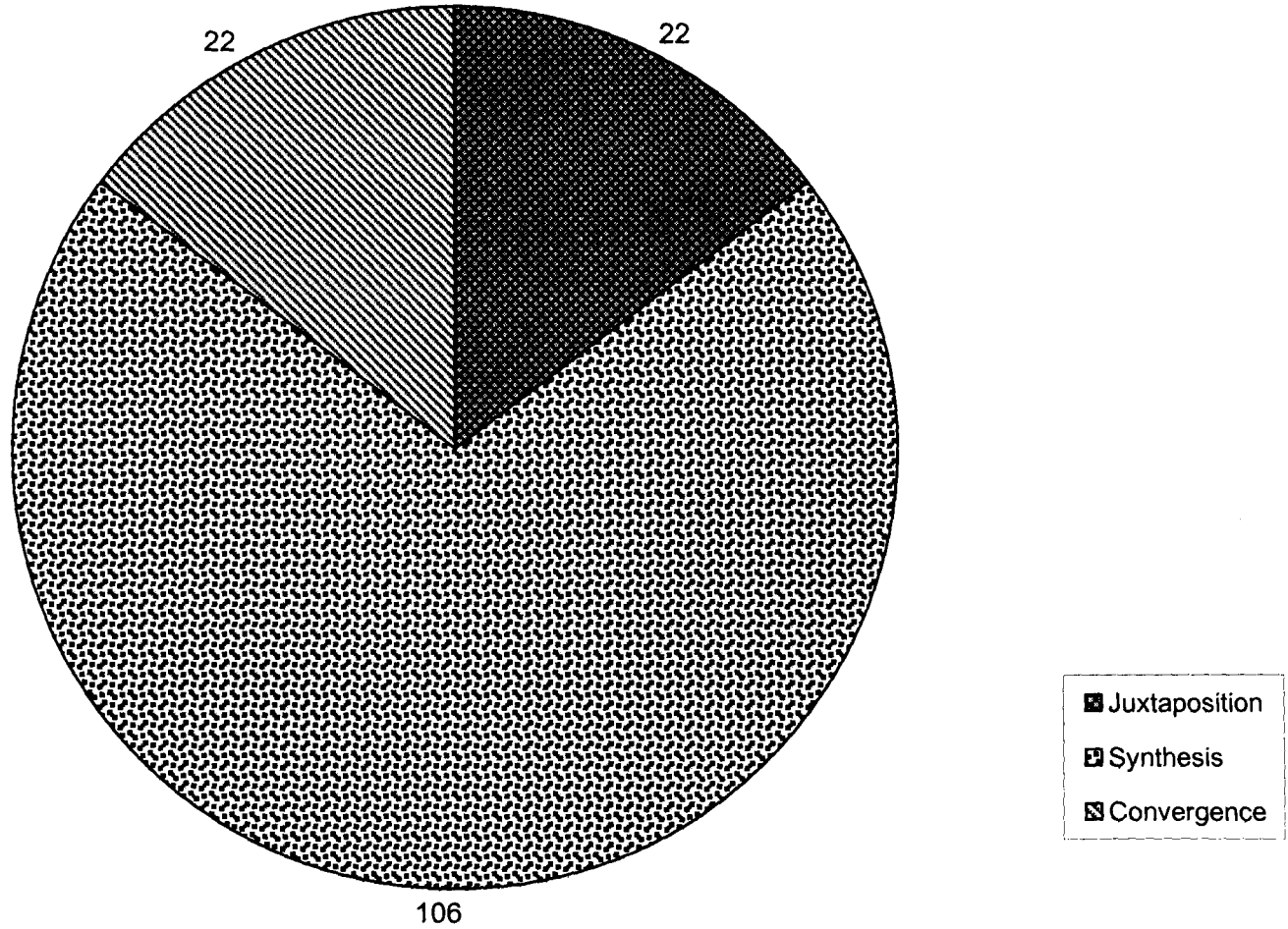
The identification of the modes of formation of the 150 crossdisciplinary subjects included in the study could be secured through the conceptual analysis of each subject in terms of its origins, structure and development. The modes of formation of the crossdisciplinary subjects formed the basis of the categorisation as follows:

Table-2: Break-Up of Subjects by Category

CATEGORY	NUMBER	PERCENTAGE
1. Juxtaposition	22	15
2. Synthesis	106	70
3. Convergence	22	15
TOTAL	150	100

Table-2 indicates that the crossdisciplinary subjects formed by juxtaposition add up to 22 corresponding to 15% of the total number of crossdisciplinary subjects considered in the study. This reveals that several crossdisciplinary subjects, for some reasons, continue to remain at the initial stage of formation. One reason that can be

Fig. 1: Break-up of Subjects by Category



attributed to this situation is the lack of serious attempts on the part of researchers to synthesize these subjects as new and distinct hybrid fields.

Table-2 also shows that the crossdisciplinary subjects formed by synthesis comprise a significant proportion totalling 106 corresponding to 70% of the total number of crossdisciplinary subjects considered in the study. This confirms the predominance of synthesis as a major mode of formation of crossdisciplinary subjects in the social sciences.

Table-2 further indicates that the crossdisciplinary subjects formed by convergence constitute a relatively low proportion with a total of 22 corresponding to 15% of the total number of crossdisciplinary subjects considered in the study. This is a strong indication that, while problems and issues confronted in the social sciences are numerous, not many have succeeded in attracting the collective efforts of several disciplines thus leading to their recognition and institutionalisation as distinct knowledge domains.

A definite trend that can be discerned from Table-2 is that crossdisciplinary subjects formed by synthesis constitute a high proportion of crossdisciplinary subjects in the social sciences, while the crossdisciplinary subject formed by synthesis and by convergence form a relatively low proportion in the social sciences.

6.2 INCIDENCE OF MODES OF REPRESENTATION

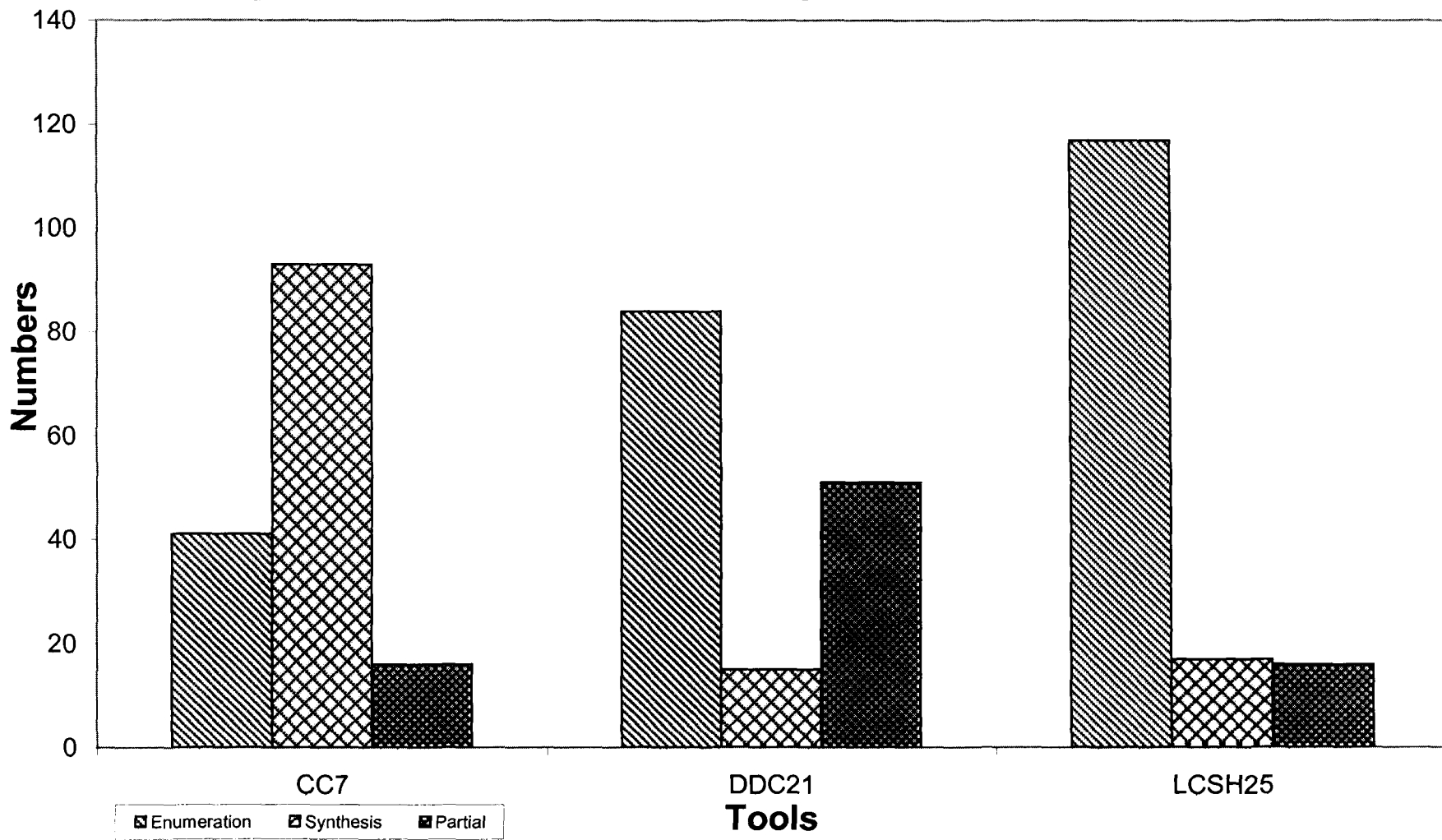
Table-3 indicates the number and percentage of subjects against each mode of representation applicable for the representation of the crossdisciplinary subjects in the three IR tools:

Table-3: Incidence of Modes of Representation in IR Tools

Mode of Representation	CC7		DDC21		LCSH25	
	No.	%	No.	%	No.	%
Enumeration	41	27.33	84	56.00	117	78.00
Synthesis	93	62.00	15	10.00	17	11.33
Partial	16	10.66	51	34.00	16	10.66
TOTAL	150	100	150	100	150	100

Table-3 indicates that CC7, which is basically an analytico-synthetic classification scheme, provides for the representation of 93 crossdisciplinary subjects by synthesis, which is 62% of the total number of subjects considered in the study. Three techniques for synthesis, namely, general inter-subject phase relation, tool phase relation, and subject device were employed for securing adequate representation. The number of subjects represented by enumeration, which total 41, is also significantly high at 27.33% mainly due to the enumeration of several crossdisciplinary subjects in CC7 under the schedule of basic subjects. Attention is drawn to the incidence of partial representation in the case of 16 crossdisciplinary subjects (10.66%), which indicates that CC7 has not been able to comprehensively represent a number of crossdisciplinary subjects due to the lack of direct enumeration and enumeration of components of the subjects to permit their representation by synthesis. Such

Fig. 2: Incidence of Modes of Representation in IR Tools

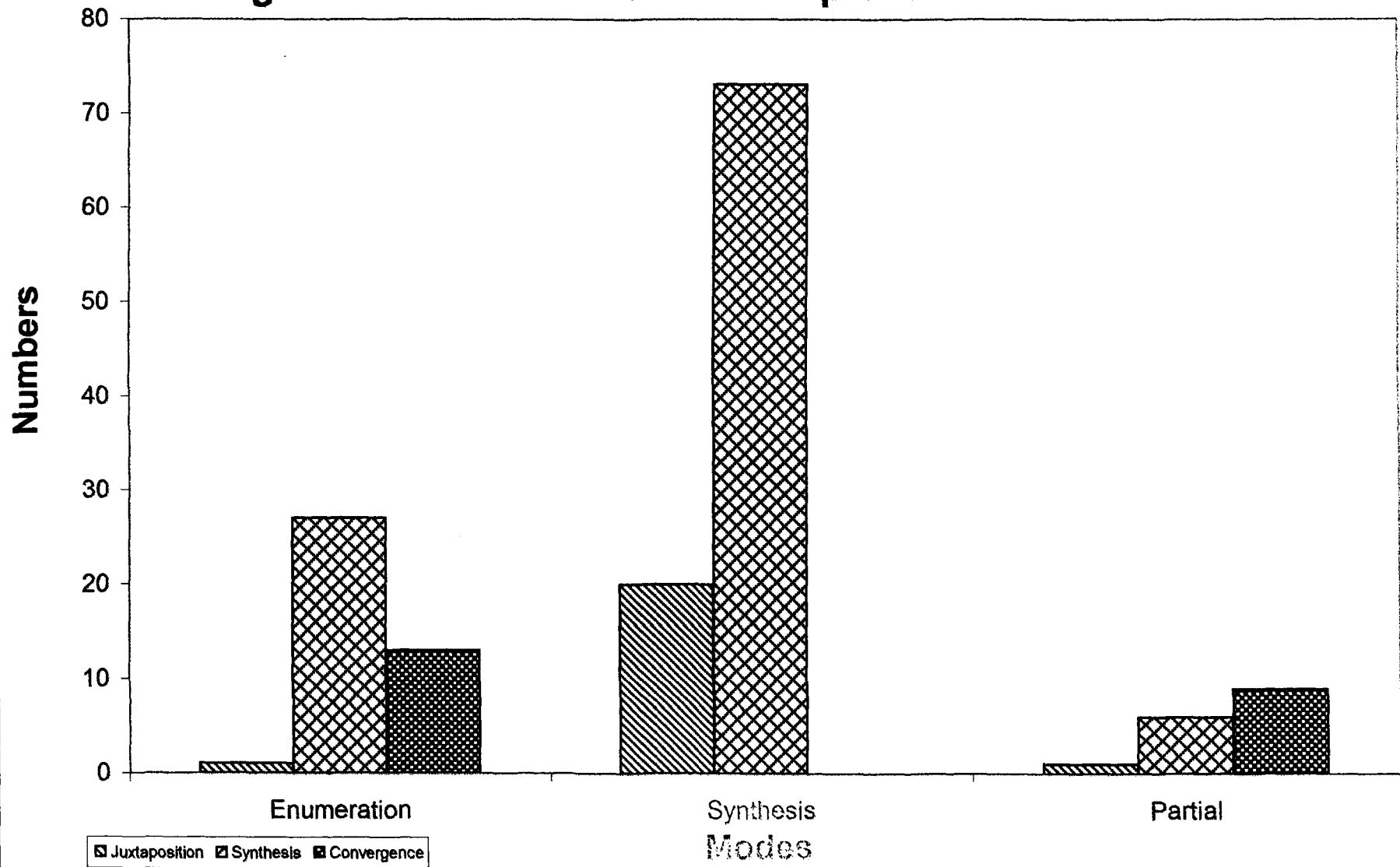


crossdisciplinary subjects could only be represented under either component subject. However, the study has demonstrated that the strength of CC7 lies in its capacity for synthesis as the preferred mode of representation of subjects.

Table-3 further indicates that DDC21 remains essentially an enumerative classification scheme by providing adequate representation by enumeration for 84 crossdisciplinary subjects, corresponding to 56% of the total. The incidence of representation by synthesis in the case of 15 crossdisciplinary subjects, corresponding to 10% of the total, confirms DDC21's basically enumerative structure. The incidence of partial representation in the case of as many as 51 crossdisciplinary subjects (34%), however, indicates certain inherent structural weaknesses of DDC21. A major shortcoming relates to the lack of specific devices for the representation of subjects juxtaposing two or more disciplines in some relationships.

Of the three IR tools considered in the study, LCSH25 has accommodated a significantly high number of the subjects, 117 out of 150, corresponding to 78% by enumeration. This demonstrates the strength of LCSH25 as an essentially enumerative IR tool. LCSH25 also provided representation for 17 crossdisciplinary subjects, corresponding to 11.33%, by synthesis. Further, the table also reveals that LCSH could provide for the partial representation of 16 subjects, corresponding to 10.66%, under either one of the component subjects or under broader disciplines where applicable.

Fig. 3: Incidence of Modes of Representation in CC7



6.3 MODES OF REPRESENTATION OF CROSSDISCIPLINARY SUBJECTS:

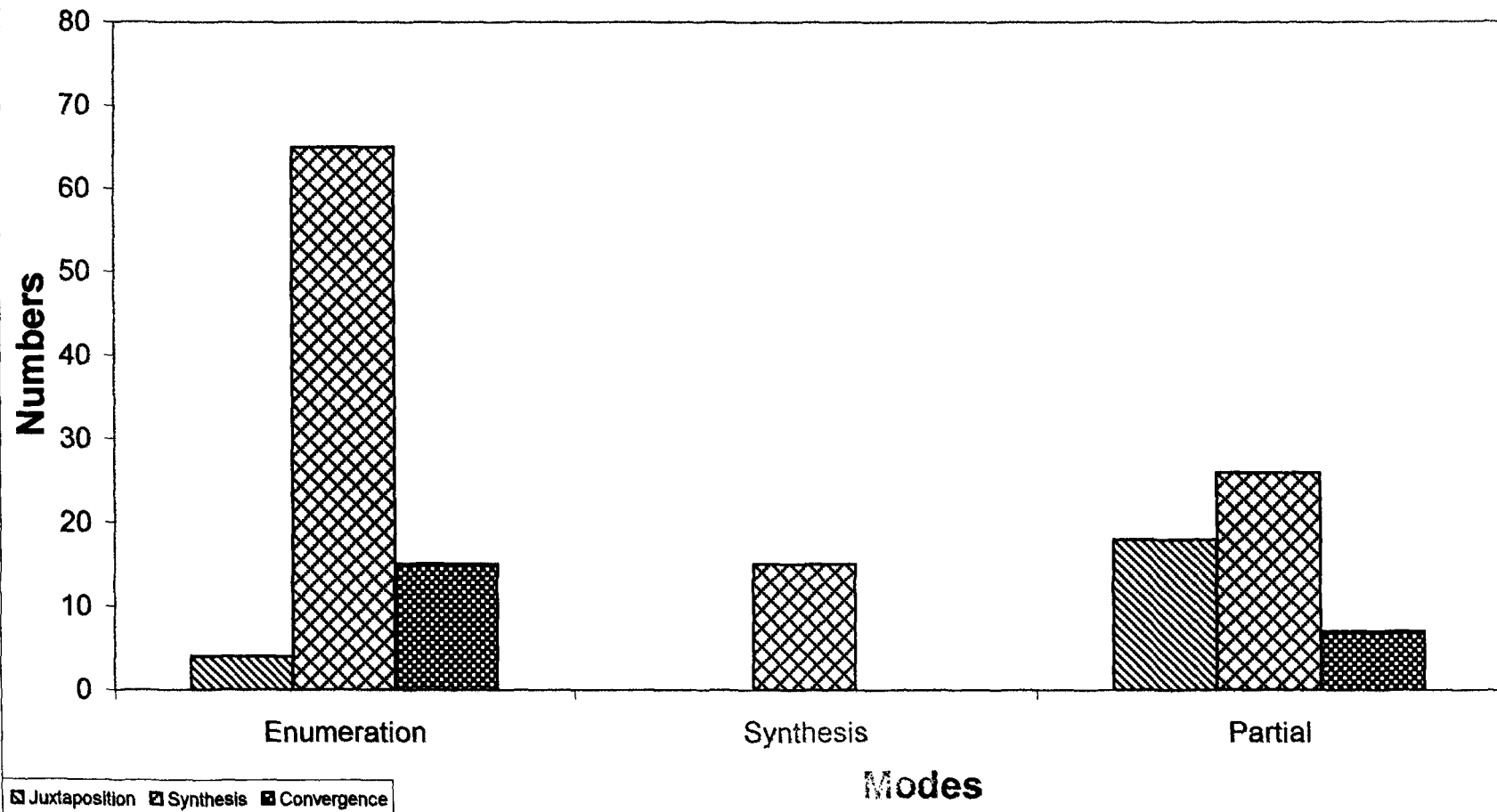
The following tables, derived from the examination of the provisions for the representation of crossdisciplinary subjects in the three IR tools, show the incidence of the three modes of representation applicable in the case of each category of crossdisciplinary subjects in CC7, DDC21 and LCSH25 respectively:

Table-4: Incidence of Modes of Representation in CC7

Modes of Formation	Modes of Representation			TOTAL
	Enumeration	Synthesis	Partial	
Juxtaposition	1	20	1	22
Synthesis	27	73	6	106
Convergence	13	0	9	22
TOTAL	41	93	16	150

Table-4 indicates the incidence of the modes of representation involved in the representation of subjects under each category. CC7 could represent 93 crossdisciplinary subjects by synthesis, followed by 41 by enumeration and 16 by partial representation in order of decreasing incidence. Representation by synthesis was found to be the highest in the case of crossdisciplinary subjects formed by synthesis at 73, followed by subjects formed by juxtaposition of which 20 could be represented by synthesis. There was no incidence of representation by synthesis in the case of crossdisciplinary subjects formed by convergence. The number of crossdisciplinary subjects represented by enumeration was highest in the case of crossdisciplinary subjects formed by synthesis at 27, followed by subjects formed by

Fig. 4: Incidence of Modes of Representation in DDC21



convergence at 13, and 1 in the case of crossdisciplinary subjects formed by juxtaposition. The incidence of representation by enumeration was reasonably high due to the enumeration of many fused basic subjects and agglomerate subjects under the schedule of basic subjects in CC7. The incidence of partial representation was highest in the case of crossdisciplinary subjects formed by convergence at 9, followed by subject formed by synthesis at 6, and 1 in the case of crossdisciplinary subjects formed by juxtaposition.

Table-5: Incidence of Modes of Representation in DDC21

Modes of Formation	Modes of Representation			TOTAL
	Enumeration	Synthesis	Partial	
Juxtaposition	4	0	18	22
Synthesis	65	15	26	106
Convergence	15	0	7	22
TOTAL	84	15	51	150

Table-5 above shows a significantly high incidence of representation by enumeration for 84 crossdisciplinary subjects of which 65 are subjects formed by synthesis, followed by subjects formed by convergence at 15, and 4 in the case of crossdisciplinary subjects formed by juxtaposition. Partial representation in the case of as many as 51 subjects assumes significance, and reflects the lack of enumeration of or provisions for synthesis for crossdisciplinary subjects formed by synthesis in particular which showed an incidence of 26. Representation by synthesis had a relatively low incidence at 15 only in the case of crossdisciplinary subjects formed by synthesis, and there were no incidents of representation by synthesis in the case of the

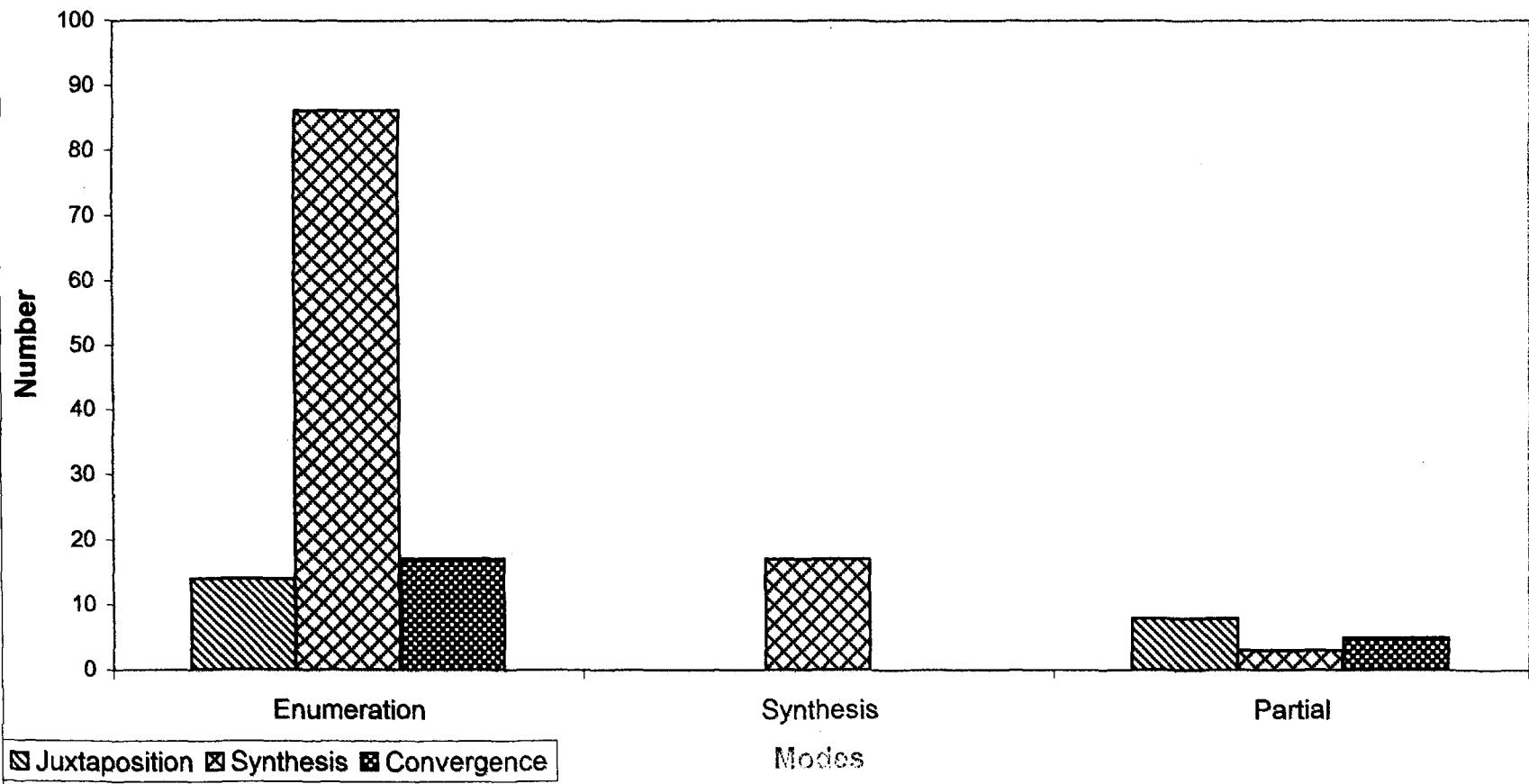
subjects formed by juxtaposition and by convergence. This attests to the strength of DDC21 as an essentially enumerative scheme with very limited synthetic devices.

Table-6: Incidence of Modes of Representation in LCSH25

Modes of Formation	Modes of Representation			TOTAL
	Enumeration	Synthesis	Partial	
Juxtaposition	14	0	8	22
Synthesis	86	17	3	106
Convergence	17	0	5	22
TOTAL	117	17	16	150

Table-6 reinforces the strength of LCSH as an enumerative list of subject headings capable of representing many of the crossdisciplinary subjects considered in the study. As many as 117 subjects found representation by enumeration, of which a significantly high incidence of 86 relates to crossdisciplinary subjects formed by synthesis, followed by subjects formed by convergence at 17, and 14 in the case of crossdisciplinary subjects formed by juxtaposition. Representation by synthesis was observed only in the case of subjects formed by synthesis at an incidence of 17, and there was no incidence of representation by synthesis in the case of subjects formed by juxtaposition and by convergence. Partial representation was inevitable in the case of 16 subjects, of which 8 were subjects formed by juxtaposition, while 3 and 5 were crossdisciplinary subjects formed by synthesis and by convergence respectively.

Fig. 5: Incidence of Modes of Representation in LCSH25



6.4 RELATIONSHIP BETWEEN CATEGORIES AND MODES:

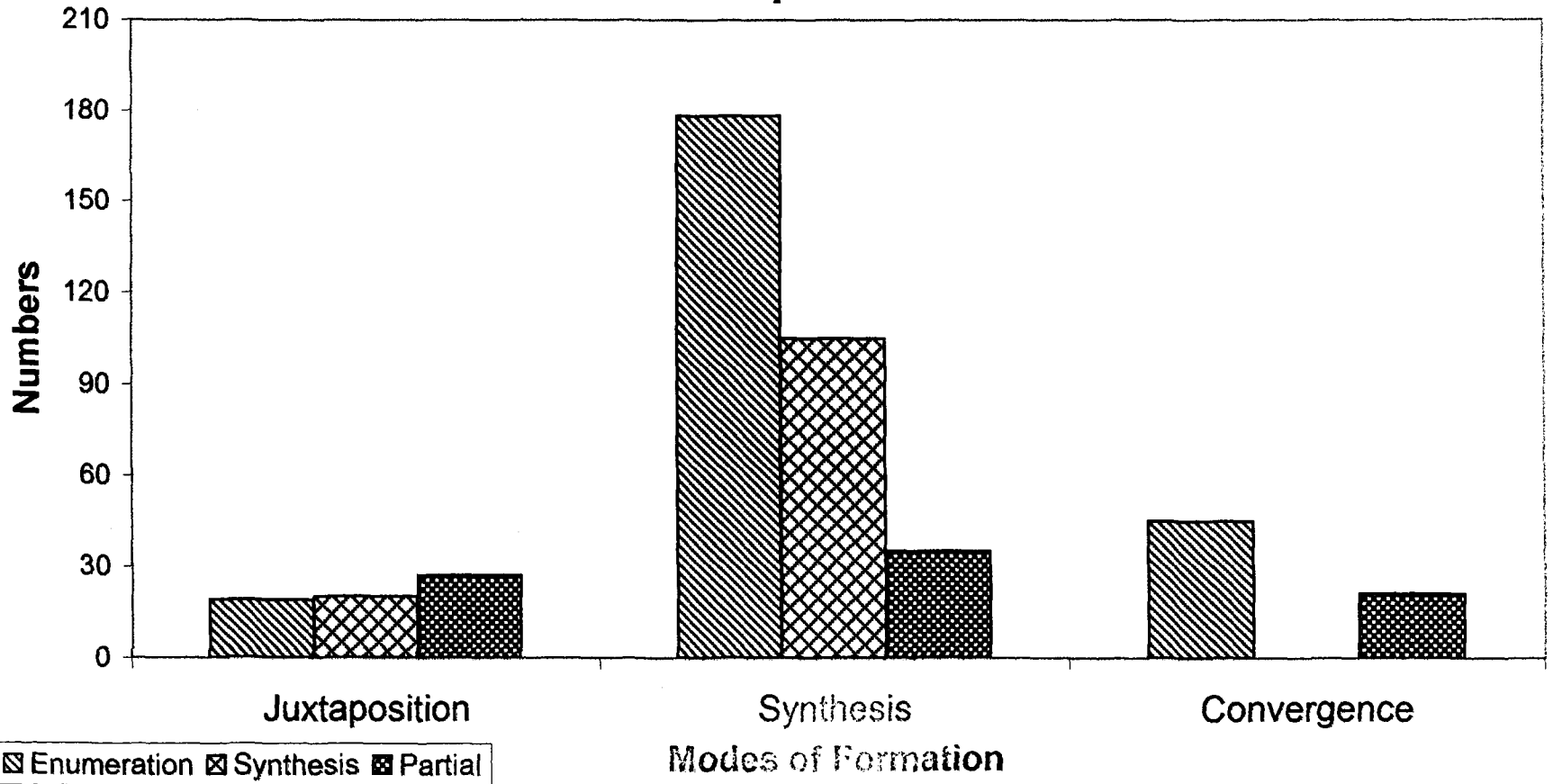
Table-7 depicts the relationship between the three modes of representation of crossdisciplinary subjects and their modes of representation. The overall incidence of representation by enumeration is the highest at 242, followed by representation by synthesis at 125, with partial representation at the lowest incidence of 83.

Table-7: Relationship between Modes of Formation and Representation

Modes of Formation	Modes of Representation in IR Tools			TOTAL
	Enumeration	Synthesis	Partial	
1. Juxtaposition	19	20	27	66
2. Synthesis	178	105	35	318
3. Convergence	45	0	21	66
TOTAL	242	125	83	450

Table-7 shows the aggregate of the incidence of each mode of representation in the three IR tools combined. The table indicates overall that representation by enumeration is the dominant mode of representation. The incidence of representation by enumeration was highest in respect of crossdisciplinary subjects formed by synthesis at an aggregate of 178, followed by subjects formed by convergence at 45 and 19 in the case of crossdisciplinary subjects formed by juxtaposition. Table-7 also shows the highest incidence of representation by synthesis in the case of crossdisciplinary subjects formed by synthesis totalled 105, followed by subjects formed by juxtaposition at 20, and absence of representation by synthesis in the case of crossdisciplinary subjects formed by convergence. It can be stated that the

Fig. 6: Relationship Between Modes of Formation and Modes of Representation



crossdisciplinary subjects formed by convergence did not warrant representation by synthesis, since these subjects have been either specifically enumerated or only partially represented in the IR tools.

As indicated in Table-7, the incidence of partial representation is relatively high for all three categories of subjects. Partial representation was highest in the case of crossdisciplinary subjects formed by synthesis at an aggregate of 35, which indicates the inability of the IR tools to adequately represent crossdisciplinary subjects formed by synthesis. The incidence of partial representation was also relatively high in respect of the crossdisciplinary subjects formed by juxtaposition at an aggregate of 27, indicating that the IR tools have not provided adequately for the specific enumeration, or rendered appropriate devices for combining the components, of crossdisciplinary subjects formed by juxtaposition. The incidence of partial representation in the case of crossdisciplinary subjects formed by convergence was slightly lower at 21, indicating the strength of the IR tools in representing most of the crossdisciplinary subjects either by enumeration or synthesis.

A definite conclusion that can be drawn from Table-7 above relates to the fact that representation by enumeration remains a powerful mode of representation, followed by representation by synthesis and partial representation in decreasing order of incidence at 242, 125 and 83 respectively.

Overall, two definite conclusions can be drawn from the above observations of the modes of representation of the three categories of crossdisciplinary subjects in the three IR tools. First, in respect of the modes of representation, there is a significant increase in the number of subjects represented by enumeration, from 41 to 84 to 117 in CC7, DDC21 and LCSH respectively. This indicates the varying degrees to which the IR tools represent crossdisciplinary subjects by enumeration, thereby strengthening the existing structural principles inherent in the three IR tools. However, in terms of the incidence of representation by synthesis, at 93, 15, 17, there appears to be considerable degree of difference either in the application or lack of devices for synthesis in CC7, DDC21 and LCSH25 respectively. As for partial representation, there is not much variation in its incidence in respect of all three IR tools. However, the incidence of partial representation in CC7 and LCSH25 are both low at 16 each, while DDC21 showed the highest incidence of partial representation at 51. If the incidence of partial representation is considered to be non-representation, it can then be said that DDC21 has shown the poorest performance in comparison to CC7 and LCSH25, mainly owing to the inadequate enumeration of the crossdisciplinary subjects and the lack of appropriate devices for securing their representation by synthesis.

Secondly, overall, the incidence of the modes of representation in the three IR tools overall reveals varying degrees of deviation. LCSH shows the highest deviation (SD = 58.02), followed by CC7 at (SD = 39.28), and DDC21 at (SD = 34.51). This indicates that, overall, the three IR tools show moderate deviation in terms of the

incidence of the three modes of representation applicable to the crossdisciplinary subjects considered in the study.

6.5 TESTING OF HYPOTHESES

The data generated by the study, in the strict sense, are not amenable to rigorous statistical tests and analysis. However, Chi-square tests were applied to the available data since it was considered worthwhile to ascertain the degree of association or difference between the distinct variables, namely, (i) the modes of representation vis-à-vis the three IR tools, and (ii) the modes of formation of crossdisciplinary subjects vis-à-vis the modes of representation.

- (1) **HYPOTHESIS-1: There is no significant difference among the information retrieval tools in their modes of representation of crossdisciplinary subjects.** The analysis of the modes of representation provided by the three IR tools, shown in Table- 3, clearly indicates that each IR tool could provide for the representation of all three categories of crossdisciplinary subjects through appropriate use of specific modes of representation, though the instances of each mode varied from one IR tool to the other.

Table-8: Difference among IR Tools

Modes of Representation	CC7	DDC21	LCSH25	TOTAL
Enumeration	41	84	117	242
Synthesis	93	15	17	125
Partial	16	51	16	83
TOTAL	150	150	150	450

In order to ascertain whether there exists any significant difference among the three IR tools in terms of the modes of representation of crossdisciplinary subjects, χ^2 test was applied on the data presented in the above table. The computed value of χ^2 being 160.43 with 2 degrees of freedom at 1% level of significance, it can be said that there is a significant difference among the IR tools in terms of the incidence of the modes of representation.

On the basis of the above result, it can be stated that the formulation of Hypothesis-1 stands rejected, given the significantly high degree of difference among the three IR tools in terms of the incidence of the three modes of representation.

(2) HYPOTHESIS-2: There is no significant relationship between the modes of formation of crossdisciplinary subjects and modes of their representation in information retrieval tools.

Table-9: Relationship among Modes of Formation

Modes of Formation	Modes of Representation in IR Tools			Total
	Enumeration	Synthesis	Partial	
Juxtaposition	19	20	27	66
Synthesis	178	105	35	318
Convergence	45	0	21	66
TOTAL	242	125	83	450

The data presented in the above Table-9 indicates the incidence of each mode of representation aggregated from the three IR tools against each category of mode of formation of the crossdisciplinary subjects. In order to ascertain whether any significant relationship exists between the modes of formation and the modes of representation, χ^2 test has been applied on the data. The computed value of χ^2 at 66.12 with 2 degrees of freedom at 5% level of significance indicates that there is a highly significant degree of relationship between the modes of formation and modes of representation of crossdisciplinary subjects in the three IR tools. Therefore, the formulation of Hypothesis-2 stands rejected.

6.6 SUMMARY

To sum up, the analysis of the data generated from the study has revealed the significant variations among the three IR tools in terms of the incidence of the modes of representation of crossdisciplinary subjects considered in the study. Evidently, such difference can be attributed to the divergent theoretical and structural principles adopted by the IR tools in question.

CHAPTER – 7

FINDINGS AND SUGGESTIONS

7.0 SUMMARY OF FINDINGS

The major findings of the study may be summarised as follows:

- (1) The study has revealed that the phenomenon of crossdisciplinarity has pervaded most of the disciplines and their subfields in the social sciences. Crossdisciplinarity has stimulated the proliferation of hybrid speciality domains and increasing tendencies towards convergence on problem-focused scholarship in the social sciences. The major disciplines that have actively initiated and sustained crossdisciplinarity include anthropology, economics, education, geography, history, linguistics, political science, psychology, and sociology, which together have contributed to the bulk of crossdisciplinary subjects included in the study. Nevertheless, it has been observed that other disciplines, increasingly drawn by the forces of crossdisciplinarity, also have immense potential to contribute towards the formation of new crossdisciplinary subjects.

- (2) The conceptual analysis has revealed the emergence and development of the crossdisciplinary subjects through different modes of formation. Broadly speaking, the origins of many of the institutionalised crossdisciplinary subjects can be traced to

the first quarter of the twentieth century, following renewed crossdisciplinary efforts after the Second World War. In respect of the three modes of formation, it can be stated that synthesis, or hybridisation, has been the most powerful unifying force leading to the emergence and proliferation of crossdisciplinary subjects in the social sciences.

- (3) Inter-Subject General and Tool Phase Relations and Subject Device were valuable devices for the representation of crossdisciplinary subjects in CC7. The study revealed that the three devices could provide precise representation by synthesis for a significantly high number of crossdisciplinary subjects. There did not arise any instance of application of the other four kinds of phase relations for the representation of crossdisciplinary subjects included in the study.
- (4) The 'Schedule of Basic Subjects' provided in chapter DE of CC7 has considerably increased its capacity to represent crossdisciplinary subjects formed by juxtaposition and by convergence through enumeration. Evidently, the rigorous work undertaken at DRTC, Bangalore, during the entire period of revision of CC7 has borne significant results. However, much remains to be done toward the comprehensive enumeration of

crossdisciplinary subjects and their respective isolates in the schedule of special isolates of CC7.

(5) The DDC21, though structurally a discipline-based classification scheme, showed a high incidence of representation by enumeration for the crossdisciplinary subjects, was however found to have many class numbers used to represent several crossdisciplinary subjects, evidently due to the *limitations imposed by the notational system*. Further, the provisions for the representation of a sizeable number of crossdisciplinary subjects formed by juxtaposition and by synthesis were found to be inadequate, resulting in their partial representation.

(6) The LCSH could secure the representation by enumeration for a significantly high number of subjects owing to its enumerative structure. The instances of representation by synthesis were necessitated due to the use of free-floating subdivisions located elsewhere in the list. The incidence of partial representation was unavoidable in the case of some crossdisciplinary subjects formed by convergence for which specific provisions were not available.

- (7) A significant finding of the study relates to the inconsistencies in the terminology used to represent the crossdisciplinary subjects in all the three tools. It was observed that there were marked variations in the nomenclatures adopted and preferred, particularly for the crossdisciplinary subjects formed by synthesis. There is evident inconsistency in the vocabulary adopted by the IR tools, in contrast to the current and standardised subject descriptors used in the SSA-CDROM.

7.1 SUGGESTIONS

In view of the findings of the present study, which have generated new dimensions to the existing constraints faced by IR tools in representing crossdisciplinary subjects, the following suggestions are put forward:

- (1) The first and foremost suggestion concerns with the evident shortcomings of the IR tools in terms of their provisions for crossdisciplinary subjects. New crossdisciplinary subjects that have attained recognition as distinct knowledge domains must invariably find appropriate provisions in the IR tools by enumeration. Since a new knowledge domain has its own isolates (concepts, theories, methods, tools, etc.), there is a strong justification for providing its own facet structure that

must be enumerated and elaborated as warranted. The efforts of CC7 and DDC21 towards the enumeration of many new crossdisciplinary subjects have been commendable, though more efforts in this direction will considerably strengthen the two classification schemes. The suggestions offered at 5.3 and 5.5 of Chapter-5 deserve serious consideration for the improvement of CC7 and DDC21 respectively. As regard to LCSH25, the Cataloging Services Division of the Library of Congress needs to ensure that appropriate enumeration of manifestations of existing crossdisciplinary is secured to the extent possible.

- (2) There is an urgent need to undertake a comprehensive revision of CC7, based upon a detailed conceptual analysis of all relevant existing subjects preferably presented by leading experts in their respective fields. Such contemporary crossdisciplinary subjects must find enumeration within the schedules of special isolates, and not merely listed in the schedules of basic subjects as presently done in CC7.

- (3) While the present study has been one of the first few efforts towards the conceptualisation of crossdisciplinary subjects in the social sciences vis-à-vis their representation in major IR tools, further research is required to examine the phenomenon of crossdisciplinarity in other fields, such as the behavioural sciences, physical sciences, biological sciences, and the humanities, or even at the level of individual disciplines. The simple methodology adopted in the present study can be applied in such studies.

7.2 LIMITATIONS OF THE STUDY

The present study has been conducted under certain constraints and unavoidable limitations that necessitated certain modifications in the methodology. These limitations, though not overwhelming, have inevitably influenced the outcome of the study to some degree. The major limitations of the study include the following:

- (a) **Lack of alternative abstracting/indexing databases:** While it would have been desirable to consider several bibliographical sources to obtain a more exhaustive list of crossdisciplinary subjects, the study had to be conducted using only one bibliographical data source, namely, the SSA-CDROM. In spite of its limitations in terms of bibliographical coverage, the

uptodateness of the SSA-CDROM and its ready availability in the NEHU central library were evidently the decisive considerations for its use in the study.

(b) **Selection of Subject Descriptors:** One of the most difficult tasks was selecting the subject descriptors/headings available in the bibliographical sources. Major barriers included:

- (i) an overwhelming number of subject descriptors used in the SSA-CDROM;
- (ii) confusing overlaps and redundancy;
- (iii) misleading and inappropriate subject descriptors/headings;
- (iv) difficulties in determining the scope of subject descriptors/headings used in the indexing and abstracting services; and
- (v) the absence of an in-built thesaurus in the SSA.

(c) **Non-availability of the *Subject Cataloging Manual: Subject Headings*:** The non-availability of the *Manual* which is to be used in conjunction with the LCSH25, imposed certain limitations in terms of precise and correct application of subject headings for the crossdisciplinary subjects considered in the

study. The study had to be conducted using the print version of the LCSH25 without the help of auxiliary aids and online support services.

7.3 CONTRIBUTIONS OF THE PRESENT STUDY

The phenomenon of crossdisciplinarity has drawn the attention of library and information researchers for some decades now. However, the literature review revealed that most of the studies undertaken earlier lacked sound conceptual framework that could provide a systematic examination of the IR tools in question. As one of the first studies to address the complexities associated with crossdisciplinarity and their consequent impact on IR tools, the present study could make certain valid contributions as follows:

- 1. Modes of Formation:** While several scholars in the field of library and information science, as well as from the social sciences, have proposed different patterns of interaction among disciplines leading to the emergence of various typologies of crossdisciplinary subjects, the present study could recognize the various manifestations of crossdisciplinary subjects under three definite modes of formation, namely, (i) juxtaposition, (ii) synthesis, and (iii) convergence. These modes of formation recognised in the present study are the outcome of

generalisation at the highest level of abstraction and can, therefore, be applied in similar studies concerned with the phenomenon of crossdisciplinarity in other areas of knowledge.

2. **Criteria for Evaluation of IR Tools:** While several earlier studies on the performance of IR tools have generally emphasized on experimental techniques aimed at evaluating the performance of major IR tools at the output or search stage against definite parameters such as recall and precision, the present study was undertaken with a new set of criteria for the evaluation of the IR tools at the input or precoordination stage. This method involves a simple evaluation of the IR tools in terms of the provisions available for the representation of the crossdisciplinary subjects considered in the study. The three modes of representation, namely, (i) enumeration, (ii) synthesis, and (iii) partial representation, constitute the basic criteria by which the IR tools can be evaluated for the representation of knowledge fields, their subjects, subfields, specialised domains, concepts and other elements. IR tools can be evaluated against such criteria that seek to determine to what extent they provide representation of subjects through a particularly preferred mode of representation. So far, enumeration or synthesis have been the major criteria for determining the extent to which IR tools represent subjects. The recognition of the three fundamental modes of representation has provided a perspective

through which the performance of the IR can be evaluated in substantive terms. The evident variations in the modes of representation of crossdisciplinary subjects have helped in identifying the strengths and weaknesses of each IR tool, and on the basis of which definite conclusions can be drawn about their overall performance and effectiveness in meeting the exigencies brought about by the increasing fluidity of knowledge structures and the resulting emergence of crossdisciplinary subjects.

3. **Methodological Framework:** The methodology adopted for the conduct of the present study was framed specifically for the purpose of addressing the complexities associated with the phenomenon of crossdisciplinarity with particular emphasis on their impact upon, and representation in, IR tools. The methodological framework comprises of (i) the definition of a crossdisciplinary subject; (ii) the identification and selection of crossdisciplinary from an authoritative bibliographical database; (iii) the conceptual analysis of the crossdisciplinary subjects; (iv) the recognition of three major modes of formation of crossdisciplinary subjects; (v) the selection of three major IR tools representing three different structural systems; (vi) the evaluation of the IR tools using a format designed for the purpose; (vii) testing of the hypotheses formulated for the purpose of the study; and (viii) the presentation of definite conclusions and suggestions for further

research. The simple methodology adopted in the present study can be applied in similar studies on other areas of knowledge where the phenomenon of crossdisciplinarity abounds.

7.4 CONCLUSION

In final conclusion to the present study, it may be stated a relevant dimension of the phenomenon of crossdisciplinarity in relation to contemporary IR tools has been addressed. It is hoped that the present study will generate renewed interest and further research on the complexities associated with the increasingly perplexing phenomenon of crossdisciplinarity in other areas of knowledge. Indeed, the fact that IR theory, practice and research will need to be more responsive to the burgeoning phenomenon of crossdisciplinarity cannot be overemphasised. In this respect, it must be reiterated that more basic research is needed on the conceptual and structural principles guiding IR tools in order to equip the library and information profession to meet the rapidly changing knowledge structures. Research on the impact of crossdisciplinarity and the inevitable emergence of crossdisciplinary subjects on contemporary library and information theory and practice presents a challenging problem area that is likely to remain so for quite some time.

ANNEXURE-1
LIST OF CROSSDISCIPLINARY SUBJECTS

SL. NO.	SUBJECT
1	ADDICTION STUDIES
2	AGRICULTURAL ECONOMICS
3	AGRICULTURAL GEOGRAPHY
4	AGRICULTURAL PSYCHOLOGY
5	ANTHROPOGEOGRAPHY
6	ANTHROPOLOGICAL LINGUISTICS
7	ANTHROPOLOGICAL POLITICAL ECONOMY
8	ANTHROPOLOGY AND ARCHAEOLOGY
9	ANTHROPOMETRY
10	ARCHAEOLOGY AND HISTORY
11	ARCHAEOLOGY AND SOCIOLOGY
12	ARCHAEOOMETRY
13	ARCHITECTURAL PSYCHOLOGY
14	AREA STUDIES
15	ART AND ANTHROPOLOGY
16	ART AND RELIGION
17	BIOARCHAEOLOGY
18	BIOETHICS
19	BIOGEOGRAPHY
20	BIOLOGICAL PSYCHIATRY
21	BIOPOLITICS
22	BUSINESS AND MASS MEDIA
23	BUSINESS ANTHROPOLOGY
24	BUSINESS GEOGRAPHY
25	BUSINESS STUDIES
26	COGNITIVE SCIENCE
27	COMMUNITY STUDIES
28	COMPUTATIONAL PSYCHOLINGUISTICS
29	CULTURAL ECOLOGY
30	CULTURAL ECONOMICS
31	CULTURAL GEOGRAPHY
32	CULTURAL PSYCHOLOGY
33	CULTURAL STUDIES
34	DEMOGRAPHIC ANTHROPOLOGY
35	DEVELOPMENT STUDIES
36	ECOLOGICAL ANTHROPOLOGY
37	ECOLOGICAL ECONOMICS
38	ECONOMETRICS
39	ECONOMIC ANTHROPOLOGY
40	ECONOMIC DEMOGRAPHY
41	ECONOMIC GEOGRAPHY
42	ECONOMIC HISTORY
43	ECONOMIC SOCIOLOGY
44	ECONOMICS AND EDUCATION
45	ECONOMICS AND ETHICS
46	EDUCATIONAL ANTHROPOLOGY
47	EDUCATIONAL PSYCHOLOGY
48	EDUCATIONAL SOCIOLOGY
49	ELECTORAL GEOGRAPHY
50	ENGINEERING PSYCHOLOGY

51	ENVIRONMENTAL ARCHAEOLOGY
52	ENVIRONMENTAL AUDITING
53	ENVIRONMENTAL ECONOMICS
54	ENVIRONMENTAL MANAGEMENT
55	ENVIRONMENTAL PSYCHOLOGY
56	ENVIRONMENTAL STUDIES
57	ETHNIC STUDIES
58	ETHNOARCHAEOLOGY
59	ETHNOBIOLOGY
60	ETHNOBOTANY
61	ETHNOPSYCHIATRY
62	ETHNOZOOLOGY
63	FORENSIC ANTHROPOLOGY
64	FORENSIC LINGUISTICS
65	FORENSIC PSYCHIATRY
66	FORENSIC PSYCHOLOGY
67	FORENSIC SCIENCE
68	GEOARCHAEOLOGY
69	GEOGRAPHY OF LAW
70	GEOPOLITICS
71	GLOBALIZATION
72	HISTORICAL DEMOGRAPHY
73	HISTORICAL GEOGRAPHY
74	HISTORICAL LINGUISTICS
75	HISTORICAL SOCIOLOGY
76	HISTORY AND ANTHROPOLOGY
77	HISTORY AND LITERATURE
78	HISTORY AND POLITICS
79	INDUSTRIAL ECOLOGY
80	INDUSTRIAL GEOGRAPHY
81	INDUSTRIAL JURISPRUDENCE
82	INDUSTRIAL PSYCHOLOGY
83	INDUSTRIAL SOCIOLOGY
84	INTERNATIONAL STUDIES
85	LABOUR STUDIES
86	LAW AND ECONOMICS
87	LAW AND ETHICS
88	LAW AND GEOGRAPHY
89	LAW AND SOCIOBIOLOGY
90	LEGAL ANTHROPOLOGY
91	LINGUISTIC DEMOGRAPHY
92	LINGUISTIC GEOGRAPHY
93	LOGIC AND LINGUISTICS
94	MARITIME ANTHROPOLOGY
95	MATHEMATICAL ECONOMICS
96	MATHEMATICAL GEOGRAPHY
97	MATHEMATICAL LINGUISTICS
98	MATHEMATICAL PSYCHOLOGY
99	MEDICAL ANTHROPOLOGY
100	MEDICAL ECONOMICS

101	MEDICAL GEOGRAPHY
102	MEDICAL SOCIOLOGY
103	MEDICINE AND PSYCHOLOGY
104	MILITARY GEOGRAPHY
105	MILITARY PSYCHIATRY
106	MILITARY PSYCHOLOGY
107	MILITARY SOCIOLOGY
108	NEUROLINGUISTICS
109	PHILOSOPHY AND PSYCHOLOGY
110	PHILOSOPHY AND RELIGION
111	PHYSIOLOGICAL PSYCHOLOGY
112	PHYTOGEOGRAPHY
113	POLEMOLOGY
114	POLICY STUDIES
115	POLITICAL ANTHROPOLOGY
116	POLITICAL ECOLOGY
117	POLITICAL ECONOMY
118	POLITICAL GEOGRAPHY
119	POLITICAL PSYCHOLOGY
120	POLITICAL SOCIOLOGY
121	POPULATION GEOGRAPHY
122	POSTMODERN STUDIES
123	PSYCHOBIOLOGY
124	PSYCHOHISTORY
125	PSYCHOLINGUISTICS
126	PSYCHOLOGICAL ANTHROPOLOGY
127	PSYCHOLOGY AND ECONOMICS
128	PSYCHOLOGY AND RELIGION
129	PSYCHOMETRICS
130	PSYCHOPHYSICS
131	REGIONAL SCIENCE
132	SOCIAL ENGINEERING
133	SOCIAL GEOGRAPHY
134	SOCIAL PSYCHOLOGY
135	SOCIOBIOLOGY
136	SOCIOLINGUISTICS
137	SOCIOLOGY AND PSYCHIATRY
138	SOCIOLOGY OF ART
139	SOCIOLOGY OF KNOWLEDGE
140	SOCIOLOGY OF LANGUAGE
141	SOCIOLOGY OF LAW
142	SOCIOLOGY OF RELIGION
143	SOCIOLOGY OF SCIENCE AND TECHNOLOGY
144	SOCIOLOGY OF SPORT
145	SUBALTERN STUDIES
146	TERRORISM STUDIES
147	TRIBAL STUDIES
148	URBAN STUDIES
149	WOMEN'S STUDIES
150	ZOOGEOGRAPHY

ANNEXURE-2

BREAK-UP OF CROSSDISCIPLINARY SUBJECTS BY MODES OF FORMATION

Sl. No.	JUXTAPOSITION	Sl. No.	SYNTHESIS	Sl. No.	CONVERGENCE
1	ANTHROPOLOGY AND ARCHAEOLOGY	1	AGRICULTURAL ECONOMICS	1	ADDICTION STUDIES
2	ARCHAEOLOGY AND HISTORY	2	AGRICULTURAL GEOGRAPHY	2	AREA STUDIES
3	ARCHAEOLOGY AND SOCIOLOGY	3	AGRICULTURAL PSYCHOLOGY	3	BUSINESS STUDIES
4	ART AND ANTHROPOLOGY	4	ANTHROPOGEOGRAPHY	4	COGNITIVE SCIENCE
5	ART AND RELIGION	5	ANTHROPOLOGICAL LINGUISTICS	5	COMMUNITY STUDIES
6	BUSINESS AND MASS MEDIA	6	ANTHROPOLOGICAL POLITICAL ECONOMY	6	CULTURAL STUDIES
7	ECONOMICS AND EDUCATION	7	ANTHROPOMETRY	7	DEVELOPMENT STUDIES
8	ECONOMICS AND ETHICS	8	ARCHAEOOMETRY	8	ENVIRONMENTAL STUDIES
9	HISTORY AND ANTHROPOLOGY	9	ARCHITECTURAL PSYCHOLOGY	9	ETHNIC STUDIES
10	HISTORY AND LITERATURE	10	BIOARCHAEOLOGY	10	FORENSIC SCIENCE
11	HISTORY AND POLITICS	11	BIOETHICS	11	GLOBALISATION
12	LAW AND ECONOMICS	12	BIOGEOGRAPHY	12	INTERNATIONAL STUDIES
13	LAW AND ETHICS	13	BIOLOGICAL PSYCHIATRY	13	LABOUR STUDIES
14	LAW AND GEOGRAPHY	14	BIOPOLITICS	14	POLEMOLOGY
15	LAW AND SOCIOBIOLOGY	15	BUSINESS ANTHROPOLOGY	15	POLICY STUDIES
16	LOGIC AND LINGUISTICS	16	BUSINESS GEOGRAPHY	16	POSTMODERN STUDIES
17	MEDICINE AND PSYCHOLOGY	17	COMPUTATIONAL PSYCHOLINGUISTICS	17	REGIONAL SCIENCE
18	PHILOSOPHY AND PSYCHOLOGY	18	CULTURAL ECOLOGY	18	SUBALTERN STUDIES
19	PHILOSOPHY AND RELIGION	19	CULTURAL ECONOMICS	19	TERRORISM STUDIES
20	PSYCHOLOGY AND ECONOMICS	20	CULTURAL GEOGRAPHY	20	TRIBAL STUDIES
21	PSYCHOLOGY AND RELIGION	21	CULTURAL PSYCHOLOGY	21	URBAN STUDIES
22	SOCIOLOGY AND PSYCHIATRY	22	DEMOGRAPHIC ANTHROPOLOGY	22	WOMEN'S STUDIES
		23	ECOLOGICAL ANTHROPOLOGY		
		24	ECOLOGICAL ECONOMICS		
		25	ECONOMETRICS		
		26	ECONOMIC ANTHROPOLOGY		
		27	ECONOMIC DEMOGRAPHY		

28	ECONOMIC GEOGRAPHY
29	ECONOMIC HISTORY
30	ECONOMIC SOCIOLOGY
31	EDUCATIONAL ANTHROPOLOGY
32	EDUCATIONAL PSYCHOLOGY
33	EDUCATIONAL SOCIOLOGY
34	ELECTORAL GEOGRAPHY
35	ENGINEERING PSYCHOLOGY
36	ENVIRONMENTAL ARCHAEOLOGY
37	ENVIRONMENTAL AUDITING
38	ENVIRONMENTAL ECONOMICS
39	ENVIRONMENTAL MANAGEMENT
40	ENVIRONMENTAL PSYCHOLOGY
41	ETHNOARCHAEOLOGY
42	ETHNOBIOLOGY
43	ETHNOBOTANY
44	ETHNOPSYCHIATRY
45	ETHNOZOOLOGY
46	FORENSIC ANTHROPOLOGY
47	FORENSIC LINGUISTICS
48	FORENSIC PSYCHIATRY
49	FORENSIC PSYCHOLOGY
50	GEOARCHAEOLOGY
51	GEOGRAPHY OF LAW
52	GEPOLITICS
53	HISTORICAL DEMOGRAPHY
54	HISTORICAL GEOGRAPHY
55	HISTORICAL LINGUISTICS
56	HISTORICAL SOCIOLOGY
57	INDUSTRIAL ECOLOGY
58	INDUSTRIAL GEOGRAPHY
59	INDUSTRIAL JURISPRUDENCE
60	INDUSTRIAL PSYCHOLOGY

61 INDUSTRIAL SOCIOLOGY
62 LEGAL ANTHROPOLOGY
63 LINGUISTIC DEMOGRAPHY
64 LINGUISTIC GEOGRAPHY
65 MARITIME ANTHROPOLOGY
66 MATHEMATICAL ECONOMICS
67 MATHEMATICAL GEOGRAPHY
68 MATHEMATICAL LINGUISTICS
69 MATHEMATICAL PSYCHOLOGY
70 MEDICAL ANTHROPOLOGY
71 MEDICAL ECONOMICS
72 MEDICAL GEOGRAPHY
73 MEDICAL SOCIOLOGY
74 MILITARY GEOGRAPHY
75 MILITARY PSYCHIATRY
76 MILITARY PSYCHOLOGY
77 MILITARY SOCIOLOGY
78 NEUROLINGUISTICS
79 PHYSIOLOGICAL PSYCHOLOGY
80 PHYTOGEOGRAPHY
81 POLITICAL ANTHROPOLOGY
82 POLITICAL ECOLOGY
83 POLITICAL ECONOMY
84 POLITICAL GEOGRAPHY
85 POLITICAL PSYCHOLOGY
86 POLITICAL SOCIOLOGY
87 POPULATION GEOGRAPHY
88 PSYCHOBIOLOGY
89 PSYCHOHISTORY
90 PSYCHOLINGUISTICS
91 PSYCHOLOGICAL ANTHROPOLOGY
92 PSYCHOMETRICS
93 PSYCHOPHYSICS

94	SOCIAL ENGINEERING
95	SOCIAL GEOGRAPHY
96	SOCIAL PSYCHOLOGY
97	SOCIOBIOLOGY
98	SOCIOLINGUISTICS
99	SOCIOLOGY OF ART
100	SOCIOLOGY OF KNOWLEDGE
101	SOCIOLOGY OF LANGUAGE
102	SOCIOLOGY OF LAW
103	SOCIOLOGY OF RELIGION
104	SOCIOLOGY OF SCIENCE AND TECHNOLOGY
105	SOCIOLOGY OF SPORTS
106	ZOOGEOGRAPHY

ANNEXURE-3
MODES OF REPRESENTATION IN IR TOOLS

Sl. No.	CATEGORY	SUBJECT	CC7	DDC21	LCSH25
1	Convergence	ADDICTION STUDIES	Partial	Partial	Partial
2	Synthesis	AGRICULTURAL ECONOMICS	Synthesis	Enumeration	Enumeration
3	Synthesis	AGRICULTURAL GEOGRAPHY	Synthesis	Enumeration	Enumeration
4	Synthesis	AGRICULTURAL PSYCHOLOGY	Synthesis	Enumeration	Synthesis
5	Synthesis	ANTHROPOGEOGRAPHY	Enumeration	Enumeration	Enumeration
6	Synthesis	ANTHROPOLOGICAL LINGUISTICS	Synthesis	Partial	Enumeration
7	Synthesis	ANTHROPOLOGICAL POLITICAL ECONOMY	Synthesis	Partial	Partial
8	Juxtaposition	ANTHROPOLOGY AND ARCHAEOLOGY	Synthesis	Partial	Partial
9	Synthesis	ANTHROPOMETRY	Synthesis	Enumeration	Enumeration
10	Juxtaposition	ARCHAEOLOGY AND HISTORY	Partial	Partial	Enumeration
11	Juxtaposition	ARCHAEOLOGY AND SOCIOLOGY	Synthesis	Partial	Partial
12	Synthesis	ARCHAOMETRY	Synthesis	Synthesis	Enumeration
13	Synthesis	ARCHITECTURAL PSYCHOLOGY	Synthesis	Enumeration	Synthesis
14	Convergence	AREA STUDIES	Enumeration	Enumeration	Enumeration
15	Juxtaposition	ART AND ANTHROPOLOGY	Synthesis	Partial	Enumeration
16	Juxtaposition	ART AND RELIGION	Synthesis	Partial	Enumeration
17	Synthesis	BIOARCHAEOLOGY	Synthesis	Synthesis	Synthesis
18	Synthesis	BIOETHICS	Synthesis	Enumeration	Enumeration
19	Synthesis	BIOGEOGRAPHY	Enumeration	Enumeration	Enumeration
20	Synthesis	BIOLOGICAL PSYCHIATRY	Synthesis	Enumeration	Enumeration
21	Synthesis	BIOPOLITICS	Synthesis	Synthesis	Enumeration
22	Juxtaposition	BUSINESS AND MASS MEDIA	Synthesis	Partial	Enumeration
23	Synthesis	BUSINESS ANTHROPOLOGY	Synthesis	Partial	Enumeration
24	Synthesis	BUSINESS GEOGRAPHY	Synthesis	Enumeration	Synthesis
25	Convergence	BUSINESS STUDIES	Enumeration	Enumeration	Enumeration
26	Convergence	COGNITIVE SCIENCE	Enumeration	Enumeration	Enumeration
27	Convergence	COMMUNITY STUDIES	Partial	Enumeration	Enumeration
28	Synthesis	COMPUTATIONAL PSYCHOLINGUISTICS	Synthesis	Synthesis	Partial
29	Synthesis	CULTURAL ECOLOGY	Synthesis	Enumeration	Synthesis
30	Synthesis	CULTURAL ECONOMICS	Synthesis	Enumeration	Synthesis
31	Synthesis	CULTURAL GEOGRAPHY	Partial	Synthesis	Enumeration
32	Synthesis	CULTURAL PSYCHOLOGY	Synthesis	Enumeration	Synthesis
33	Convergence	CULTURAL STUDIES	Partial	Enumeration	Enumeration
34	Synthesis	DEMOGRAPHIC ANTHROPOLOGY	Synthesis	Enumeration	Enumeration
35	Convergence	DEVELOPMENT STUDIES	Enumeration	Enumeration	Enumeration
36	Synthesis	ECOLOGICAL ANTHROPOLOGY	Synthesis	Enumeration	Synthesis
37	Synthesis	ECOLOGICAL ECONOMICS	Synthesis	Enumeration	Enumeration
38	Synthesis	ECONOMETRICS	Enumeration	Enumeration	Enumeration
39	Synthesis	ECONOMIC ANTHROPOLOGY	Synthesis	Enumeration	Enumeration
40	Synthesis	ECONOMIC DEMOGRAPHY	Synthesis	Enumeration	Synthesis
41	Synthesis	ECONOMIC GEOGRAPHY	Enumeration	Enumeration	Enumeration
42	Synthesis	ECONOMIC HISTORY	Synthesis	Enumeration	Enumeration
43	Synthesis	ECONOMIC SOCIOLOGY	Synthesis	Enumeration	Enumeration
44	Juxtaposition	ECONOMICS AND EDUCATION	Synthesis	Partial	Partial
45	Juxtaposition	ECONOMICS AND ETHICS	Synthesis	Partial	Partial
46	Synthesis	EDUCATIONAL ANTHROPOLOGY	Synthesis	Enumeration	Enumeration
47	Synthesis	EDUCATIONAL PSYCHOLOGY	Enumeration	Enumeration	Enumeration
48	Synthesis	EDUCATIONAL SOCIOLOGY	Enumeration	Enumeration	Enumeration
49	Synthesis	ELECTORAL GEOGRAPHY	Synthesis	Enumeration	Synthesis
50	Synthesis	ENGINEERING PSYCHOLOGY	Enumeration	Synthesis	Synthesis

SI. No.	CATEGORY	SUBJECT	CC7	DDC21	LCSH25
51	Synthesis	ENVIRONMENTAL ARCHAEOLOGY	Synthesis	Partial	Enumeration
52	Synthesis	ENVIRONMENTAL AUDITING	Synthesis	Partial	Enumeration
53	Synthesis	ENVIRONMENTAL ECONOMICS	Enumeration	Enumeration	Enumeration
54	Synthesis	ENVIRONMENTAL MANAGEMENT	Synthesis	Synthesis	Enumeration
55	Synthesis	ENVIRONMENTAL PSYCHOLOGY	Partial	Enumeration	Enumeration
56	Convergence	ENVIRONMENTAL STUDIES	Enumeration	Enumeration	Enumeration
57	Convergence	ETHNIC STUDIES	Enumeration	Enumeration	Enumeration
58	Synthesis	ETHNOARCHAEOLOGY	Synthesis	Partial	Enumeration
59	Synthesis	ETHNOBIOLOGY	Synthesis	Partial	Enumeration
60	Synthesis	ETHNOBOTANY	Synthesis	Partial	Enumeration
61	Synthesis	ETHNOPSYCHIATRY	Synthesis	Partial	Enumeration
62	Synthesis	ETHNOZOOLOGY	Synthesis	Partial	Enumeration
63	Synthesis	FORENSIC ANTHROPOLOGY	Synthesis	Partial	Enumeration
64	Synthesis	FORENSIC LINGUISTICS	Synthesis	Partial	Enumeration
65	Synthesis	FORENSIC PSYCHIATRY	Synthesis	Enumeration	Enumeration
66	Synthesis	FORENSIC PSYCHOLOGY	Synthesis	Partial	Enumeration
67	Convergence	FORENSIC SCIENCE	Enumeration	Enumeration	Enumeration
68	Synthesis	GEOARCHAEOLOGY	Synthesis	Synthesis	Enumeration
69	Synthesis	GEOGRAPHY OF LAW	Synthesis	Synthesis	Synthesis
70	Synthesis	GEOPOLITICS	Enumeration	Enumeration	Enumeration
71	Convergence	GLOBALIZATION	Partial	Partial	Enumeration
72	Synthesis	HISTORICAL DEMOGRAPHY	Synthesis	Partial	Enumeration
73	Synthesis	HISTORICAL GEOGRAPHY	Enumeration	Enumeration	Enumeration
74	Synthesis	HISTORICAL LINGUISTICS	Synthesis	Enumeration	Enumeration
75	Synthesis	HISTORICAL SOCIOLOGY	Synthesis	Partial	Enumeration
76	Juxtaposition	HISTORY AND ANTHROPOLOGY	Synthesis	Partial	Partial
77	Juxtaposition	HISTORY AND LITERATURE	Synthesis	Partial	Enumeration
78	Juxtaposition	HISTORY AND POLITICS	Enumeration	Partial	Partial
79	Synthesis	INDUSTRIAL ECOLOGY	Synthesis	Partial	Enumeration
80	Synthesis	INDUSTRIAL GEOGRAPHY	Synthesis	Enumeration	Synthesis
81	Synthesis	INDUSTRIAL JURISPRUDENCE	Synthesis	Enumeration	Synthesis
82	Synthesis	INDUSTRIAL PSYCHOLOGY	Enumeration	Enumeration	Enumeration
83	Synthesis	INDUSTRIAL SOCIOLOGY	Synthesis	Enumeration	Enumeration
84	Convergence	INTERNATIONAL STUDIES	Enumeration	Partial	Partial
85	Convergence	LABOUR STUDIES	Enumeration	Enumeration	Enumeration
86	Juxtaposition	LAW AND ECONOMICS	Synthesis	Partial	Enumeration
87	Juxtaposition	LAW AND ETHICS	Synthesis	Enumeration	Enumeration
88	Juxtaposition	LAW AND GEOGRAPHY	Synthesis	Partial	Enumeration
89	Juxtaposition	LAW AND SOCIOBIOLOGY	Synthesis	Partial	Enumeration
90	Synthesis	LEGAL ANTHROPOLOGY	Synthesis	Enumeration	Synthesis
91	Synthesis	LINGUISTIC DEMOGRAPHY	Synthesis	Partial	Enumeration
92	Synthesis	LINGUISTIC GEOGRAPHY	Synthesis	Enumeration	Enumeration
93	Juxtaposition	LOGIC AND LINGUISTICS	Synthesis	Partial	Enumeration
94	Synthesis	MARITIME ANTHROPOLOGY	Partial	Partial	Enumeration
95	Synthesis	MATHEMATICAL ECONOMICS	Synthesis	Enumeration	Enumeration
96	Synthesis	MATHEMATICAL GEOGRAPHY	Enumeration	Enumeration	Enumeration
97	Synthesis	MATHEMATICAL LINGUISTICS	Synthesis	Enumeration	Enumeration
98	Synthesis	MATHEMATICAL PSYCHOLOGY	Synthesis	Synthesis	Synthesis
99	Synthesis	MEDICAL ANTHROPOLOGY	Synthesis	Partial	Enumeration
100	Synthesis	MEDICAL ECONOMICS	Synthesis	Enumeration	Enumeration

Sl. No.	CATEGORY	SUBJECT	CC7	DDC21	LCSH25
101	Synthesis	MEDICAL GEOGRAPHY	Synthesis	Enumeration	Enumeration
102	Synthesis	MEDICAL SOCIOLOGY	Enumeration	Enumeration	Enumeration
103	Juxtaposition	MEDICINE AND PSYCHOLOGY	Synthesis	Partial	Enumeration
104	Synthesis	MILITARY GEOGRAPHY	Enumeration	Enumeration	Enumeration
105	Synthesis	MILITARY PSYCHIATRY	Synthesis	Partial	Enumeration
106	Synthesis	MILITARY PSYCHOLOGY	Synthesis	Synthesis	Enumeration
107	Synthesis	MILITARY SOCIOLOGY	Enumeration	Enumeration	Enumeration
108	Synthesis	NEUROLINGUISTICS	Partial	Enumeration	Enumeration
109	Juxtaposition	PHILOSOPHY AND PSYCHOLOGY	Synthesis	Enumeration	Enumeration
110	Juxtaposition	PHILOSOPHY AND RELIGION	Synthesis	Enumeration	Enumeration
111	Synthesis	PHYSIOLOGICAL PSYCHOLOGY	Synthesis	Enumeration	Enumeration
112	Synthesis	PHYTOGEOGRAPHY	Synthesis	Enumeration	Enumeration
113	Convergence	POLEMOLOGY	Partial	Partial	Partial
114	Convergence	POLICY STUDIES	Enumeration	Enumeration	Enumeration
115	Synthesis	POLITICAL ANTHROPOLOGY	Synthesis	Enumeration	Enumeration
116	Synthesis	POLITICAL ECOLOGY	Synthesis	Synthesis	Enumeration
117	Synthesis	POLITICAL ECONOMY	Synthesis	Partial	Enumeration
118	Synthesis	POLITICAL GEOGRAPHY	Enumeration	Enumeration	Enumeration
119	Synthesis	POLITICAL PSYCHOLOGY	Enumeration	Synthesis	Enumeration
120	Synthesis	POLITICAL SOCIOLOGY	Enumeration	Enumeration	Enumeration
121	Synthesis	POPULATION GEOGRAPHY	Enumeration	Enumeration	Enumeration
122	Convergence	POSTMODERN STUDIES	Partial	Partial	Enumeration
123	Synthesis	PSYCHOBIOLOGY	Enumeration	Partial	Enumeration
124	Synthesis	PSYCHOHISTORY	Synthesis	Synthesis	Enumeration
125	Synthesis	PSYCHOLINGUISTICS	Enumeration	Enumeration	Enumeration
126	Synthesis	PSYCHOLOGICAL ANTHROPOLOGY	Synthesis	Enumeration	Enumeration
127	Juxtaposition	PSYCHOLOGY AND ECONOMICS	Synthesis	Partial	Partial
128	Juxtaposition	PSYCHOLOGY AND RELIGION	Synthesis	Enumeration	Enumeration
129	Synthesis	PSYCHOMETRICS	Enumeration	Synthesis	Enumeration
130	Synthesis	PSYCHOPHYSICS	Enumeration	Partial	Enumeration
131	Convergence	REGIONAL SCIENCE	Partial	Partial	Partial
132	Synthesis	SOCIAL ENGINEERING	Partial	Partial	Enumeration
133	Synthesis	SOCIAL GEOGRAPHY	Partial	Partial	Enumeration
134	Synthesis	SOCIAL PSYCHOLOGY	Enumeration	Enumeration	Enumeration
135	Synthesis	SOCIOBIOLOGY	Enumeration	Enumeration	Enumeration
136	Synthesis	SOCIOLINGUISTICS	Enumeration	Enumeration	Enumeration
137	Juxtaposition	SOCIOLOGY AND PSYCHIATRY	Synthesis	Partial	Partial
138	Synthesis	SOCIOLOGY OF ART	Synthesis	Enumeration	Synthesis
139	Synthesis	SOCIOLOGY OF KNOWLEDGE	Synthesis	Enumeration	Enumeration
140	Synthesis	SOCIOLOGY OF LANGUAGE	Synthesis	Enumeration	Enumeration
141	Synthesis	SOCIOLOGY OF LAW	Synthesis	Enumeration	Enumeration
142	Synthesis	SOCIOLOGY OF RELIGION	Synthesis	Enumeration	Enumeration
143	Synthesis	SOCIOLOGY OF SCIENCE AND TECHNOLOGY	Synthesis	Partial	Partial
144	Synthesis	SOCIOLOGY OF SPORT	Synthesis	Enumeration	Enumeration
145	Convergence	SUBALTERN STUDIES	Partial	Partial	Partial
146	Convergence	TERRORISM STUDIES	Enumeration	Enumeration	Enumeration
147	Convergence	TRIBAL STUDIES	Enumeration	Enumeration	Enumeration
148	Convergence	URBAN STUDIES	Partial	Enumeration	Enumeration
149	Convergence	WOMEN'S STUDIES	Enumeration	Enumeration	Enumeration
150	Synthesis	ZOOGEOGRAPHY	Enumeration	Enumeration	Enumeration

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