Chapter 1: Introduction

1.1 Organization of Knowledge:

Organization of knowledge is a fundamental process in libraries. Knowledge is recorded on different media to yield documents of various formats. Printed book is the predominant format available in modern libraries. For a long period, librarians have engaged themselves to arrange books on the shelves in a helpful manner. Melvil Dewey (1851-1931) devised Decimal Classification system for the purpose which is the most popular system in the world. Universal Decimal Classification system came during the period 1895-1905.

Dr. S.R. Ranganathan (9th August 1892 – 27th September 1972) was not satisfied with the existing schemes of library classification. He, however, viewed the problems differently. He adopted a different methodology, though unknowingly, which was latterly identified as faceted classification or analytico-synthetic method to design his Colon Classification Scheme.
Organization of knowledge in libraries has two aspects. One is to design a notational system, that is, a classification scheme for the arrangement of printed books and other materials on the shelves in a suitable order. The other aspect is to supplement that notational system through alphabetical subject terms or subject catalogue. There are many subject heading lists. Among them, Library of Congress Subject Headings (LCSH) list and Sears List of Subject Headings (SLSH) are most popular in libraries. So knowledge may be represented either in notational language or in semi-natural language. Subject heading lists, thesauri, indexing languages – all are examples of second kind.

Absolute Syntax is the unique idea of Dr. S. R. Ranganathan. He made many significant contributions in the field of library science. Unfortunately, he had not enough time to research on Absolute Syntax. The concept of Absolute Syntax was proposed on 11 June 1966 at the Symposium on Relational Factors in Classification, organized by the University of Maryland, College Park, Md., USA and he died on 27th September 1972. After his death no significant contribution on Absolute Syntax came out except the article of Prof. A. Neelameghan (1927-1914) entitled “Absolute Syntax and Structure of an Indexing and Switching Language” published in 1975.
1.1.1 Absolute Syntax:

According to Ranganathan (1967), ‘Absolute Syntax’ is meant the sequence in which the facet ideas of a subject arrange themselves in the minds of the majority of persons. Linguistic Syntax is the Syntax of Words — that is, the sequence in which the words stand arranged in a sentence or in the name of a subject in a natural language. The Linguistic Syntax may vary with the language; often it does.

Ranganathan (1967) demonstrates the idea with the following examples:

Consider the Subject:

“The Heart of the Frog”.

This is Step 0. the full title in Step 1 will be

“The Heart of the Frog (as studied in) Zoology”.

In Step 2, only the kernel terms are retained,

“Heart. Frog. Zoology”.

This sequence is according to the Linguistic Syntax of the English language.

According to the Linguistic Syntax of the Tamil language, the kernel terms will stand arranged in Step 2 as follows:

“Zoology. Frog. Heart”.

The kernel terms will stand arranged as:

“Zoology. Frog. Heart”.

This represents the Syntax of Facets.

It happens that the Linguistic Syntax of the English language differs from the Syntax of Facets; while the Linguistic Syntax of the Tamil language agrees with the Syntax of Facets.
There may be languages in which the Linguistic Syntax may give respectively

“Zoology. Heart. Frog
Frog. Heart. Zoology
Frog. Zoology. Heart
Heart. Zoology. Frog” — respectively.

The number of variations of Linguistic Syntax from the Syntax of Facets will increase with the number of the kernel terms in the name of the subject — which is the same as the number of the facets in it.

Third International Study Conference on Classification Research was held in Bombay during 6th to 11th January in 1975. The famous paper “Absolute Syntax and Structure of an Indexing and Switching Language” by Neelameghan appeared in the conference proceedings. Neelameghan (1979) also held the view of Ranganathan that:

The generalized facet structure (model) of subject representation obtained on the basis of the general theory of classification and guiding principles for helpful sequence, formulated thereof (Ranganathan and the Bangalore School) is found to be helpful and acceptable to a large number of users of information systems…(p.165).

For the theoretical framework of his paper, Neelamegan cited authors from various disciplines. The paper contains thirty references belonging to the following broad subjects:

- Communication
- Education
- Future of civilization
- Library classification
- Linguistics
- Pattern recognition
- Philosophy
1.1.2 Relevance of Facet and Faceted Classification:

Ellis (1999) argued that facet analysis as a post-lexical approach to classification using words from the subject field as the concept terms in the classification derived represents an excellent approach to searching and organising the results of WWW searches using either search engines or search directories. The underlying philosophy of facet analysis is better suited to the disparate nature of WWW resources and searchers than the assumptions of contemporary IR research.

Facet analysis can assist the developer or searcher to retrieval to overcome some of the problems in indexing or searching the WWW in a reasonably effective and efficient way.

Ranganathan’s ideas should continue to be relevant for IR practice.

Fox (2005) recognized that with the rapid proliferation of digital repositories and digital archives comes the need for appropriate and flexible classification schemes that can be implemented in conjunction with current technology such as object-oriented programming techniques. S. R. Ranganathan was a forerunner in the area of classification systems, and developed a classification system, which was very suited to the need at hand.
1.1.3 Cognitive Science and Information Retrieval:

Cognitive science is an interdisciplinary field with contributions from various fields, including, psychology, neuroscience, and linguistics, and many areas of computer science (e.g., artificial intelligence, robotics, vision, learning, speech, neural networks), philosophy (e.g., mind, language, knowledge, science, logic), biology (e.g., ethology, behavioral ecology, sociobiology, behaviour genetics, evolutionary theory), medicine (e.g., psychiatry, neurology, human genetics, Imaging), anthropology (e.g., primatology, cognitive ethnology, archeology, paleontology), as well as any other portions of the physical, social and mathematical sciences that are pertinent to the study of cognition.

Cognitive science tends to view the world outside the mind much as other sciences do. Thus it too has an objective, observer-independent existence. The field is usually seen as compatible with the physical sciences, and uses the scientific method as well as simulation or modeling, often comparing the output of models with aspects of human behavior. Still, there is much disagreement about the exact relationship between cognitive science and other fields, and the interdisciplinary nature of cognitive science is largely both unrealized and circumscribed.

Recent studies illustrate that straightforward application of cognitive science can lead to new insights and innovation in information retrieval (IR) field. The importance of the cognitive view in information retrieval are now largely recognized and witnessed.

1.2 Statement of the problems:

Classification, indexing and on the whole information retrieval are essentially a cognitive process. There is no denying fact that absolute syntax would have some deep relationship with
cognitive science. There is also a growing trend to view IR problems from cognitive point of view.

Ranganathan conjectured about absolute syntax in 1966 and proposed for a team research to study the problem. Except the work of Prof. A. Neelameghan in 1975, no significant work has been done in this area so far. But it seems that there is still immense potentiality of absolute syntax in the emerging digital environment of information retrieval. Knowledge representation is today's major area of research in different fields viz., computer science, artificial intelligence, cognitive science. The standard assumption in artificial intelligence and cognitive science in general is that knowledge should be represented in some language independent code. In classification also thought contents are analyzed and sequenced in a language independent form in the idea plane. In this context, it is assumed that studying absolute syntax from the angle of cognitive science may give deeper insight into the problem of knowledge representation for the purpose of information retrieval. In the last 40 years, cognitive science has reached a new peak in theory and practice. Newer and newer theories, models and experiments have emerged to explain the central domain of the human mind. Studying absolute syntax in the light of these new developments in cognitive science may be helpful for future research and/or design of information retrieval systems.

1.3 Research Questions:

i. Do majority of people think in the same way?

ii. Is there any deep structure of syntax of thought?

iii. Is there any proof of Absolute Syntax at the neuro-cognitive level?

iv. Has culture any role on thought process?
v. Can academic disciplines be considered as culture?

vi. Do all people categorize the world in the same way?

vii. Have illiterate people the same worldview compared with that of literate people?

1.4 Hypotheses:

**Hypothesis 1:** Culture plays a significant role in human thinking process.

**Hypothesis 2:** Cultural relativism determines people’s information behavior.

1.5 Methodology:

Ranganathan properly recognized that search for Absolute Syntax would be done by a team of researchers. It is difficult for individual researcher to design any experimental setup. However, the present researcher follows an indirect method. Reading (2011) recognizes that knowledge and understanding advance both through exploring the details of how entities function and by linking these back together to explain why they do. This research follows this latter tradition and is, as a consequence, based on research in the library than in the laboratory.

It identifies the relevant findings in different sub-disciplines within cognitive science. For the purpose, abstracting services, review journals, online databases, monographs, and primary core journals have been consulted. Works of representative authorities on the relevant topics have been studied. This research follows conceptual analysis method. To do that, core concepts have been identified first and then their relevance are linked with Absolute Syntax and studied critically.
The main concepts are: Linguistic universals, Linguistic relativity, Language of Thought (LOT) hypothesis, Computational Theory of Mind (CTM), Modularity of mind, Cultural relativity, Two Culture theory, Worldviews theory and quantum cognition.

This thesis is mainly based on the theories and principles of Noam Chomsky, Jerry Fodor, Steven Pinker, B.L. Whorf, C. P. Snow and Roger Penrose.

1.6 Objectives of the Study:

i. To study the recent developments in cognitive science which are relevant to absolute syntax.

ii. To examine critically the theories / principles / models / experiments etc. established in the field of cognitive science which may validate the idea of absolute syntax.

iii. To examine also the contradictory views of the researchers in cognitive science which may not support fully or partially the idea of absolute syntax.

iv. To frame a theoretical background for absolute syntax based on the theories / principles / models / experiments established in the field of cognitive science, if possible.

v. To provide a ground for future researchers to study / design information retrieval systems from cognitive point of view.

1.7 Organization of Thesis:

The thesis is divided into 7 chapters: an introduction, five individual chapters and a final chapter with conclusions, limitations of study and suggestions for further research.
Chapter 2, How Human Mind Thinks presents bistable perception. Experiments with Necker cube, Face /Vase diagram and Rabbit / Duck illusion are discussed. Then Steven Pinker’s concept on ‘How the mind works’ is discussed. Debate between Pinker and Jerry Fodor are described. Roger Penrose’s criticism on Computational Theory of Mind (CTM) has also been described.

Chapter 3, Linguistic Universals and Linguistic Relativity deals with these topics. It discusses Greenberg’s approach to linguistic universals, Chomsky’s Transformative grammar and Deep Structures and Surface Structures. Lakoff’s criticism on Chomsky is also included. Fodor’s Language of Thought hypothesis (LOT) is briefly discussed.

Then, Linguistic Relativity has been described. Edward Sapir and Benjamin Lee Whorf’s contributions are discussed.

Chapter 4, Culture and Academic Disciplines recognizes academic disciplines as social phenomena. So, attributes of cultures are also manifested among them. It also discusses cultural relativity.

Chapter 5, Worldviews describes different kinds of worldviews.

Chapter 6, Quantum Cognition starts with brief description of Quantum theory. Then it considers uncertainty problems of Information Retrieval Systems. Bistable perception is seen in the light of quantum complementarity. Also discusses about brain dynamics and quantum mind.

The last chapter concludes on whole discussion and findings.

Then the thesis is accompanied by necessary references.