Indic Cultures and Concepts:
Implications for Knowledge Organization

Abstract

This paper deals with the impact of culture, especially indigenous cultures, on conceptualization and semantic relationships. Representation of concepts in the performing arts, mythology, humanities, and cognate domains viewed through different cultural perspectives in knowledge organization and knowledge organization tools (KOTs) is examined.

Introduction

We live in a culturally diverse world. Cultural differences among communities have come to the fore in recent years thanks to developments in information and communication technologies (ICT) leading to increased interaction among peoples of different cultures. Depending on the context, “Culture” may signify: (1) a particular society at a particular time and place, e.g. Vedic culture, Dravidian culture, Mayan culture; or (2) the knowledge and values shared by a society/community, e.g. modern Bengali society; or (3) the tastes, styles in art and manners that are favoured by a community or social group, e.g. Elizabethan poetry, French Renaissance art; and (4) the attitudes and behaviour that are characteristic of a particular social group or organization, e.g. Jain monks, Parsis of India, South-Pacific Islanders, etc. Culture and the environment in which a culture evolves have always been major factors influencing knowledge and concept formation, development of language and terminology and formation of links between concepts among the members of a cultural group. In other words, the nature of concepts, the terminology used to represent concepts, the range and kinds of interrelationships between concepts are all functions of the culture and social life of the community. The culture and social life in turn are impacted and determined by a variety of factors including the geographical terrain in which the culture evolves, the dominant flora and fauna in the terrain, the interactions between the members of the cultural group and other cultural groups, the predominant occupations of the members of the cultural group, etc. A cultural frame could be seen as a perspective bound by certain traditions that would relate to a particular culture. For example, the picture of someone wearing a particular dress may state something about the cultural and time frame. If required, the term “culture” may be used to mean a country, community, linguistic or ethnic group. It is precisely this that makes us speak of Indic culture, Islamic culture, Tamil culture, etc. This manner of understanding culture is possibly a consequence of the marked characteristics and traits of our societies – regions, linguistic groups, religious groups, etc. All these have major implications for the development of tools for knowledge organization (KOTs) for culture-specific domains as concepts, their names (terms), semantic inter-relationships between them and organization in meaningful ways are basic to both knowledge formation and the development of KOTs such as classification schemes, thesauri, taxonomies, ontologies, etc. KOTs need to accommodate and display such different cultural viewpoints and relationships among concepts. A concept is a mental representation that stands collectively for all meaningful statements that can be made about an entity. All the meaningful statements that can be made about the flower lotus constitute the concept of lotus. It should be obvious that the concept of lotus as viewed from the
perspective of a particular linguistic and cultural group will not be the same as seen from
the perspective of another group. For example, certain South Pacific islanders are reported
to be knowledgeable about some twenty-five different varieties of a single fish species,
including attributes such as when and where they will be seen in the sea, which ones are
edible or usable for medicinal purposes, etc. Such an elaborate categorization of one type of
fish may not be found in textbooks on fish. However, such an extensive categorization is
important to the daily livelihood of the community concerned. Similarly, a flower named
"kuRinci" appears to have some significance in the life and culture of Tamils belonging to
the Dravidian culture and civilization. There are several different aspects to the flower –
cultural, religious, scientific, literary, mythological, etc and literature exists on all these
different aspects of the flower. The term is also used in Tamil to denote a number of related
concepts. For example, the term has also been used by early Tamils to denote the kind of
terrain similar to those in which the flower grew in abundance. Over a period of time
cultural aspects such as music, poetry, etc also appear to have been denoted by the same
term. Thus the Tamil term kuRinci meant several related things and its connotation has
therefore to be understood depending on the context in which it is used.

Objectives of the Paper
The need for and importance of effective and adequate representation of culture-specific
concepts in knowledge organization tools and facilitating navigation among related
concepts cannot be overemphasized. Information retrieval systems have traditionally used
thesauri and similar KOTS for representing concepts as also for displaying semantic relations
between concepts. Most such KOTS have limitations in terms of both:

- The adequacy of coverage of concepts encountered in discourses; Most KOTS evolve
and develop in a certain environment. While there may be a considerable degree of
agreement on the nature, naming and connotation of concepts in the sciences and
engineering, this is not so in the social sciences and even less so in the humanities and
culture-specific domains. For example, a thesaurus for the domain of Education or
Sociology developed for an information system in the U.S. or Western Europe may
not be adequate in many respects when it comes to indexing literature on the domain
originating from say, India or China; i.e. there could be several concepts and
conceptual relations unique to the domains of Education or Sociology as perceived in
the Indian or Chinese contexts for which there may be no corresponding or equivalent
concepts in the western cultures;

- The thesauri that have been in use in retrieval systems group all semantic relations
into a limited number of categories. The three most widely used categories of relations
in thesauri are Equivalence, Hierarchical and Non-Hierarchical Associative Relations.
While there is a certain degree of agreement on what constitutes a Hierarchical
relation, a wide range of relations obtaining between concepts are treated as Non-
Hierarchical Associative Relations (Lateral Relations). In practice this makes
navigation between semantically related concepts difficult as the end user is unable to
differentiate between different kinds of Lateral Relations. The availability of more
powerful tools for building information systems and supporting navigation (e.g.
Ontologies) has made it worthwhile to explore the feasibility of categorizing lateral
relations into a limited number of categories and representing these.

In recent years a few projects related to developing KOTS required to support design of
multilingual databases, digital collections and related user interfaces in culture-specific
domains have been initiated. This paper is largely a result of the experiences gained while
working on these projects. The objective of this paper is to examine the impact of culture,
especially ancient traditions and indigenous cultures, on conceptualization and semantic
relationships. Two closely related issues that have implications for knowledge organization will be examined in this paper:

- The nature of concepts encountered in culture-specific domains; the impact of culture on concepts formation will be specifically examined. This will be done using a few examples representative of the nature of problems encountered.
- The nature and kinds of semantic relations encountered between concepts and their representation: More specifically the kinds and range of non-hierarchical associative relations between concepts in culture-specific domains will be examined.

Concepts and Conceptual Relations in Indic Cultures

Several major civilizations and religions have had their origins in India. Because of this India has a rich philosophical heritage right from the Vedic-Upanishadic period to the scholastic period; and many schools and sub-schools of philosophical thought have emerged. „Hinduism” connotes a way of life rather than a religion. The more orthodox followers may prefer to use the term „sanatana dharma” meaning the „ancient and eternal religion” instead of Hinduism. Looked at from this angle, all religions of Indian origin – Jainism, Buddhism, Sikhism are different facets of Hinduism. However, in practice, the term is applied specifically to the religion based on the Vedas and the Vedic philosophy. The basic scriptures, the sources that provide the overall framework for the interpretation of knowledge/concepts and philosophical thoughts of Hinduism, are the Vedas. As against this Vedic culture, the civilization of the ancient speakers of the proto-Dravidian languages is broadly referred to as Dravidian civilization. The history of this is obscure and there is more than one theory about their origin. One theory is that even before the arrival of the Aryans in the Indian subcontinent, the speakers of the proto-Dravidian languages (comprising Proto-North Dravidian, Proto-Central Dravidian, and Proto-South Dravidian) had settled in most parts of the subcontinent. The foreign invaders forced the Dravidians, the original inhabitants of India to the southern parts. In this paper we examine the nature of Indic culture-specific concepts and their interrelations with emphasis on the Dravidian culture and civilization. The Dravidian culture is distinct from the Vedic culture even though because of extensive and continuous interactions between the two over thousands of years, a composite culture has evolved. However, in handling literature on arts, architecture, Music, philosophy and many other culture-specific domains, it is imperative to handle and accommodate concepts and conceptual relations that are unique to the Dravidian culture. In the following paragraphs, we illustrate, with a few examples, the nature of concepts and conceptual relations in Dravidian culture-specific areas and also examine briefly the problems and issues related to developing KOTS for design of information systems in such domains. Most regions of the southern states of India are home to the Dravidian culture. The region has unique art forms such as dance and music, folk forms, architecture, festivals, rituals, fauna and even calendars distinct from those of the rest of the country. These art forms have also spread to some parts of Southeast Asia and many of the elements of Dravidian culture can be found, for example, in the art forms and architecture of Cambodia and Indonesia.

The Carnatic Music System

The classical music system that is prevalent in most parts of South India is known as Carnatic music. As early as between 200 BCE and 1200 CE, long before systematization of this form of music into a discipline, systems of music and dance are said to have been developed, e.g. by the Tamils. There are references to this in many works of the sangam period. For example, there are references to a highly evolved form of music among the Tamils in such works as tolkappiyam (a Tamil grammar work of the Sangam period). The
classification of the terrain (land) into five categories viz., mullai (pastoral), marutham (arable land), kurinji (hilly areas), paalai (waste land), and neytal (coastal) became the basis for classification of ragas (melodies). They developed pann (ragas) of their own and the pans were categorized based on the appropriate time of the day for singing the raga:
- pakalpanns (day time melodies)
- iravupanns (night-time melodies)
- potupanns (melodies that could be sung any time of the day / night)

The present prevalent form of Carnatic music has as its basis, the system of ragas (melodic scales) and talas (rhythmic cycles). It is highly structured and there are seven rhythmic cycles and 72 fundamental (Melakarta) ragas. All the other ragas originate from these. A characteristic feature of this form of music is the highly devotional element of most of the compositions that are generally sung / played during a concert. An idea of the web of lateral relations between a music composition and entities associated with it can be obtained from the following table which associates the navagraha compositions of Muthuswami Dikshitar – one of the trinities of carnatic music.

**Table 4: Entities associated with a music composition**

<table>
<thead>
<tr>
<th>Graha / Planet</th>
<th>Symbol</th>
<th>Deities</th>
<th>Foods offerings</th>
<th>Element</th>
<th>Colour</th>
<th>Gemstone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun</td>
<td>Surya</td>
<td>Rudra / Agni</td>
<td>Wheat / Sugar</td>
<td>Fire</td>
<td>White</td>
<td>Ruby</td>
</tr>
<tr>
<td>Moon</td>
<td>Chandra</td>
<td>Gautri</td>
<td>Rice</td>
<td>Water</td>
<td>White</td>
<td>Pearl</td>
</tr>
<tr>
<td>Mars</td>
<td>Angaraka</td>
<td>Ksetrapati / Prthvi</td>
<td>Peas</td>
<td>Fire</td>
<td>Red</td>
<td>Coral</td>
</tr>
<tr>
<td>Mercury</td>
<td>Bđha</td>
<td>Narayana / Vishnu</td>
<td>Green lentil</td>
<td>Earth</td>
<td>Yellow</td>
<td>Emerald</td>
</tr>
<tr>
<td>Jupiter</td>
<td>Brhaspati</td>
<td>Brahma / Indra</td>
<td>Peanuts, rice, curd</td>
<td>---</td>
<td>Yellow</td>
<td>Yellow sapphire</td>
</tr>
<tr>
<td>Venus</td>
<td>Sukra</td>
<td>Marvat / Indrani</td>
<td>Small beans, ghee</td>
<td>water</td>
<td>White</td>
<td>Diamond</td>
</tr>
<tr>
<td>Saturn</td>
<td>Sani</td>
<td>Prajaapati</td>
<td>Sesame seeds &amp; oil</td>
<td>space</td>
<td>Blue</td>
<td>Blue sapphire</td>
</tr>
<tr>
<td>Dragon’s Head</td>
<td>Raahu</td>
<td>Sarpaprajapa / Godhaaravati</td>
<td>Black lentil</td>
<td>---</td>
<td>Smoke</td>
<td>Hessonite / Garnet</td>
</tr>
<tr>
<td>Dragon’s Tail</td>
<td>Ketu</td>
<td>Brahma / Citra Gupta</td>
<td>Horse grain, Lemon rice</td>
<td>---</td>
<td>Smoke</td>
<td>Cat’s eye</td>
</tr>
</tbody>
</table>

Musical instruments are also associated with deities; e.g. veena is associated with goddess saraswati, flute with lord Krishna, and so on. There is also literature on the suitable kind of wood for making certain musical instruments; certain kinds of melodies are associated with certain rituals. All these suggest extensive interconnection between music and folklore, religion, philosophy, mysticism, other performing art forms, sociology, festivals, customs, etc.

**Flora and Tamil Culture**

A bell shaped flower, kurinji, grows in the Kodaikanal and Nilgiris hills of South India. The flower is of interest to botanists as it blossoms only once in twelve years unlike the other common flowers. An examination of the literature on the flower suggests that there are several different aspects to it – cultural, religious, scientific, literary, and mythological; literature on all these different aspects exists. The term is also used in Tamil to denote a number of related concepts and the semantics of the term changes depending on the context in which it is used. For example, the term kurinji has also been used by early Tamils to denote the kind of terrain similar to those in which the flowers grew in abundance. The early cultures appear to have emerged in environments that were conducive for living and the areas were identified by the flora that grew in abundance in those regions. Over a period
of time other cultural aspects such as music and poetry also appear to have been denoted by the same term. An idea of the web of relations between the term and other concepts can be obtained from the table below.

Table 2: Homographs in Tamil

<table>
<thead>
<tr>
<th>Term</th>
<th>Flower</th>
<th>Terrain</th>
<th>Music</th>
<th>Poem</th>
<th>Poetic convention</th>
<th>Deity</th>
</tr>
</thead>
<tbody>
<tr>
<td>kuRinji</td>
<td>kuRinji</td>
<td>Hilly Terrain</td>
<td>Music associated with hilly terrains</td>
<td>kuRinci-p-paaTTu</td>
<td>Clandestine union of lovers associated with hill tract</td>
<td>kuRinji</td>
</tr>
<tr>
<td>mullai</td>
<td>jasmine</td>
<td>Forest tract</td>
<td>Melody type associated with forest</td>
<td>Mullai-p-paaTTu</td>
<td>Patient endurance of lady during separation from lover, associated with forest land</td>
<td>Andavar</td>
</tr>
<tr>
<td>marutam</td>
<td>Flowering mrdurah</td>
<td>Agricultura l tract</td>
<td>Morning melody special to agricultural land</td>
<td></td>
<td>Love action associated with agricultural land</td>
<td></td>
</tr>
<tr>
<td>neytaL</td>
<td>Water lily variety</td>
<td>Coastaltract</td>
<td>Sorrow of lovers due to separation associated with coastal areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>paalai</td>
<td>Ape Flower</td>
<td>Desert tract</td>
<td>Group of 7 classes of melodies</td>
<td>Temporary separation of lovers associated with desert tract</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Issues in and Implication for KOTS

The foregoing examples and illustrations, while certainly not exhaustive of the nature of concepts and conceptual relations in Indic culture-specific domains, bring out an important aspect, viz., the unity of ideas cutting across domains. Indic cultures and art forms reveal a “unity, a correspondence of concepts”. For example, taala refers to measurement of “rhythm in music, cadence in dance, height in sculpture and area in architecture” (Srinivasan, 2002). Similarly, ragas are associated with deities, music, color, gender, mood, and so on. This can be seen across genres of performing arts such as music and dance, across art and architecture. Srinivasan has also brought out the relation between Indian philosophical thought and temple architecture (as seen in Angkor Wat temple in Cambodia). We have also seen the extensive relation between flora and naming of terrains, music, etc. In other words many of these concepts exhibit a trans-disciplinary character. This characteristic could be related to Ranganathan’s proposition of seminal mnemonics implemented in his Colon Classification. Ranganathan’s proposals such as systems and specials also seem to be aimed at accommodating different schools of thought; for example, the idea could be applied when handling different systems of calendars that are extensively used.
An aspect of the nature of these domains that requires attention is the extensive web of relations obtaining between concepts cutting across domains. Reference has already been made to hierarchical relations that are widely recognized and provided for in KOTS. Hierarchical relations as recognized by KOTS are, to a very large extent, based on class membership (class inclusion / generic relation). This in turn is based on the ability to categorize a concept as a member of a group of concepts which share certain common attributes. In other words, the categorization of a concept into a class depends on defining “necessary and sufficient” conditions that every member of that class must satisfy. While this is reasonably straightforward in the domains of science and engineering, in culture-specific domains it is not easy to define such conditions for class membership. As such we end up treating most conceptual relations in these domains as lateral relations. This again leads to imprecision and to inability in precisely expressing the nature of relation between two concepts. An effort, therefore, to categorize lateral relations (non-hierarchical associative relations) into a limited number of categories has been attempted (Neelameghan and Raghavan, 2006). Categorizing lateral relations by itself does not help improve retrieval unless we find mechanisms for implementing these in information systems. A study is being done to explore if these relations could be built into an ontology which in turn could be used in a search interface. For example, the web of relations between the concept kurinji and other concepts is graphically represented in the following Figures:

**Fig. 1: Web of Relations**
Fig. 2: Web of Relations

Such a facility should help better navigation among related concepts in a search process. Secondly, it was realized that a complete display of all related concepts is indeed very difficult in these domains given very extensive web of relations obtaining in reality cutting across domains and disciplines. An additional approach that was experimented with was to link the KOT to other lexical tools.

References