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UNITY OF KNOWLEDGE AND LIBRARY SCIENCE

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[States the concept of unity of knowledge with the help of systems analysis. Discusses the role of library science in fostering unity of knowledge and also to understand the structural, developmental and behavioural patterns of various subjects and the universe of knowledge as a whole.]

0 Introduction

There was a time when the man of knowledge was generalist rather than a specialist. His epistemological creed was most clearly stated by Plato who believed that "till all the studies reach the point of inter-communication and connection with one another and come to be considered in their mutual affinities, the pursuit of them can have a value."

1 Specialised fragmentation of knowledge

The man of knowledge today is a specialist. The words of John Herman Randall(1) are noteworthy in this connection, which reads "As reflected in the microcosm of the modern university, the world of knowledge has today become radically plural. It is a world of many different knowledges, pursued in varied ways to diverse ends. These many inquiries are normally carried on with little thought for their relations to each other. The student of John Donne's poetry, the student of the structure of the atom-each gives little enough attention to what the others are doing, and none at all to any total picture of anything. Each has his own goals, his own language for talking about what he is doing and what he has discovered. Each seems happiest when left to his devices, glad indeed if he can

keep the others treading on his toes. They have all little understanding of each other's pursuits. And lacking understanding and the very possibility of communication, neither they nor, it would seem, anyone else is in a position to appraise the respective importance of what each is doing."

Every branch of knowledge today has become so extensive that one cannot expect to master even one of its numerous sub-branches fully. Moreover, the demand is for persons who have specialised intensively in some particular narrow field. This has led to the specialisation in fragments of knowledge.

2 Composite nature of man :

But man is composite. He is a creature with the urge to know. This urge in man leads to the development of philosophy, the sciences and the social sciences. He is also a creature with a sense of value, of quality in things, which finds expression in religion, in imaginative literature, in music, and in arts.

3 Role of knowledge and man :

Further each kind of knowledge plays a role of its own in making man a composite creature. The different sciences provide us an understanding of the natural environment. This understanding enables us to get control of the environment in which we live and consequently the life is made comfortable. In addition to it, the sciences contribute to an understanding and appreciation of the scientific method and outlook. Moreover, sciences give us a sense of the immensity of the universe and a true sense of perspective

Social sciences provide us an understanding of man's social environment and his relationship with other men and groups. They throw light on man and his behaviour-individually and collectively and contribute to an appreciation of the meaning and relationships of different forces playing on life.

Humanities provide us a sense of beauty, ideas and values. The world in which we live is not merely a world of material things, but also of ideas, values and beauty.

Besides, a person has to play many roles while living in this world. These roles require knowledge, insight, efficiency, values and ideas which different studies provide.

4 Unity of knowledge

This brief reflection on the respective importance of each branch of knowledge suggests that they all form part of universe of knowledge in which each has a role of its own to play. This leads us to the concept of the unity of knowledge.

The concept of the unity of knowledge is not so simple as it appears on the surface. There have been various attempts in the second half of this century to understand this problem. The outstanding one, was the conference organised by Columbia University in 1954 with the explicit aim to explore the following propositions: "The unity of knowledge: problem or chimera? to what extent or in what manner can knowledge be said to be unified? what are the instruments, the skills or the insights by which man can discover harmony amid the diversity which seems to surround him? Has science the answer, or philosophy, or any product of the reasoning power of man, or does one approach it more surely through the intuitive reachings of religion or the creative arts? To which of the disciplines or to what kind of co-operative enterprise among the disciplines must we look for unity."(2)

5 System analysis approach

The author feels that the problem of the unity of knowledge can be understood better by system analysis approach. If knowledge represents a unity, it has the unity of system. To understand this hypothesis, let us try to see what a system is?

51 DEFINITION

System may be defined as :

- "(1) Something consisting of a set (finite or infinite) of entities,
- (2) Among which a set of relations is specified, so that
- (3) Deductions are possible from some relations to others or from the relations among the entities to the behaviour or the history of the system"(3).

52 CHARACTERISTICS

From the above definition, the following characteristics of a system can be derived :

521 STRUCTURE

System possesses structure as Anatol Rapoport says "The most fundamental feature which distinguishes a system from other aggregates or from an arbitrarily circumscribed portion of world is the possibility of describing it in purely structural terms."(3) It leads to the question what structure implies? *Oxford English dictionary* has defined the term 'structure' in the following ways :

- 1 Mutual relation of the constituents, parts or elements of a whole, as determining its peculiar nature or character.
- 2 The co-existence in a whole of distinct parts having a definite manner of arrangement.
- 3 An organised body or combination of mutually connected and dependent parts or elements.

G G Granger views structure as "a set of any elements between which, or between certain sub-sets of which, relations are defined."(4)

Michael Lane is also of the view that "structure consists in elements, and in law like relations between these elements."(5)

From these definitions, we can generalise that structure refers to relations among the components of a system. To quote Rapoport again 'structure refers not to specific components or physical features but rather to relations, which may be relations among parameters as well as relations among parts.'(6) The idea of structure helps an observer in making coherent sense of what he sees.

522 DEVELOPMENT PATTERN

The second characteristic of system is that its development represents a pattern. Exponential and logistic patterns have been recognised in the development of various systems.

With the lapse of time, when certain changes occur in the components of a system, the development of the system correspondingly changes in the direction of increasing division into sub-system and further division of sub-system into sub-systems. This leads to an array of sub-systems.

Systems generally proceed at a number of different levels. Mr Kenneth Boulding(7) has recognised the following levels of systems arranged in the sequence of increasing complexity :—

- | | |
|------------------------------|---------------------------|
| 1 Static systems ; | 6 Animal systems ; |
| 2 Dynamic systems ; | 7 Human systems ; |
| 3 Thermostat systems ; | 8 Social systems ; and |
| 4 Open systems , | 9 Transcendental systems. |
| 5 Genetic-societal systems ; | |

523 COHERENT BEHAVIOUR

The third characteristic of system is its coherent behaviour. It behaves as a whole or coherently. Its components are related to each other in such a manner that a change in a particular component causes change in all other components and in the total system. Therefore, it is said that system represents the concept of unity.

53 ORGANISMIC APPROACH

Ralph W Gerard (8) has explained these attributes of a system in context of living systems in the following manner. According to him there is a hierarchy of living systems from cell to society in which the larger ones frequently include the smaller ones as components or sub-systems. Each system represents three aspects: structural, behavioural and evolving. Structure implies a description of the inter-relations among the components of a system; the arrangement of its parts and the potential influence which they may have upon each other.

Behaviour refers to the short term reversible changes of state of a living system, its immediate responses to environmental stimuli; the functions performed by its homostatic devices in maintaining certain steady states as well as the behaviour patterns.

Evolving refers to the long term irreversible changes i.e the development pattern.

Gerard's method of system analysis is known as organismic approach to system construction. Analysis of this sort, no doubt, yields knowledge that can be organised into systematic descriptions and predictions, yet mathematical approach is preferred to it.

54 MATHEMATICAL APPROACH

Mathematical approach is based upon homologies. It demands a much more precise specification of entities and relations. In this approach, system is specified as a particular mathematical model and

is seen isomorphic to all systems specified in terms of models of the same type. Chemistry provides examples of mathematical models, where all systems are represented by differential equations.

These two approaches do not stand far apart from each other. They are rather complementary as has been observed in the study of systems in social and biological sciences.

55 UNIFYING PRINCIPLE

To conclude discussion about system, we can say that system represents a unifying principle. System is actually embodied in the interrelations and helps in the emergence of knowledge of the whole from knowledge of the parts. It views the whole as a unity. "System analysis, therefore, can be characterised as a unified method of conceptualisation for the integration of diverse content areas."(9)

6 Knowledge as a system

In the foregoing discussions, we have observed that knowledge represents unity and the concept of unity is embodied in the concept of system. Therefore, let us now try to see if knowledge qualifies as a system.

Knowledge qualifies as system because :

61 STRUCTURE

It possesses structure. Its components are ideas or subjects, which maintain mutual relations among themselves. They co-exist in a whole having a definite manner of arrangement. Patterns of relations are discernible and specifiable among the entities of knowledge. All this provides it an appearance of unity having mutually connected parts or elements.

62 DEVELOPMENT PATTERN

Its development characterises a pattern. It has been observed by the experts that knowledge develops generally through four stages: authority centred, speculative, empirical and positivistic. Just as a system in its growth gets divided into sub-systems, knowledge also gets fissioned into divisions and sub-divisions in its development.

63 COHERENCY

Coherence or wholeness exists in the knowledge. It is composite

in nature. Its components are so related to each other that a change in a particular component causes change in all other components and in the universe of knowledge as a whole. Innumerable ideas are being created every minute. But the degree of impact of a new idea is not of the same order in all cases. It is the seminal ideas which make a powerful, deep and extensive impact and even change the structural and developmental pattern of the universe of knowledge.

Development of knowledge is full of many such instances as Darwin's Theory of evolution, when propounded, gave a new meaning to the structural relations in biological sciences. It also influenced considerably the social sciences, especially sociology, anthropology, psychology etc. Similar was the case with Karl Marx's contributions. With the publication of his ideas, the whole gamut of social sciences underwent a metamorphosis. Humanities felt affected in their content and interpretation. Biological sciences also could not remain away from the arena of its influence.

Another example can be cited of Rutherford's seminal contributions in the field of atomic and nuclear physics. These seminal ideas not only gave a new direction to the development of physics, but also influenced structural analysis in chemistry and biology. Further, series of spectacular advances in engineering and technology, made possible by these seminal ideas have given rise to a new set of social and human problems.

By the above mentioned examples, it may be clear that a seminal idea creates turbulence in the structural and developmental pattern of the universe of knowledge. This is due to coherent nature of knowledge. Had the entities of the knowledge not been related in coherent manner, the phenomena of turbulence would have never occurred?

7 Library science and unity of knowledge

Library science has an unique role in fostering unity of knowledge. Bliss was the first library scientist to have realised this, though not so explicitly as Dr Ranganathan. A library scientist proceeds with the belief that knowledge is coherent and represents a system. He finds unity in the structure, mode of development and coherent behaviour of knowledge.

71 STRUCTURE

Structure of knowledge consists of isolate ideas or subjects. There exists a set of relations among them. Library scientist discovers and concentrates on these structural relations. For this purpose, he takes into account the whole complex of multiple interdependencies between parts and components of the universe of knowledge. This, in turn, helps him in discerning and understanding patterns of relationship. He does all this with the belief that unity is embodied in the inter-relations and an adequate understanding of these relationships contributes to the emergence of knowledge of the whole from knowledge of the parts.

711 MODES OF FORMATION

Dr Ranganathan's contributions in this respect are fundamental in nature. He has specified the following set of relations among the entities of the universe of knowledge.

- | | |
|--------------|--------------------|
| 1 Fission | 5 Lamination |
| 2 Dissection | 6 Loose assemblage |
| 3 Denudation | 7 Distillation. |
| 4 Fusion | |

He has named the above set of relations as 'modes of formation of the universe of knowledge.' He is of the opinion that "the very mode of formation leaves its impression on the structure of a subject. Apart from that, we can also examine the structure of the universe of knowledge as a whole."(10)

712 SYNTAX OF SUBJECTS

Lamination mode of formation has been further investigated by Dr Ranganathan with regard to the syntax among the constituents of subjects. In this connection, his fundamental contribution is Generalised facet structure(11). Generalised facet structure is a model by which the components of a subject and their interrelations can be represented in a helpful syntax approximating the absolute syntax of ideas.

72 DEVELOPMENT PATTERN

Knowledge represents unity in its developmental pattern. Subjects in their development proceed through certain stages. A library

scientist concentrates on the modes of development of various subjects. This, in turn, helps him in discerning and discovering growth-pattern characteristic of the universe of knowledge as a whole.

Dr Ranganathan's contribution in this sphere is his *Spiral of Scientific Method*.⁽¹²⁾ According to him, the development of various subjects corresponds to the stages in the *Spiral of Scientific Method*. A stage in the *Spiral* represents certain methodological and ideological attributes i.e. kind of work involved and the kinds of ideas produced. Recognition of such a growth pattern enables library scientists to observe the affinity and interaction between different subjects at various levels of their growth.

73 COHERENT BEHAVIOUR

The final test for the Unity of knowledge is its coherent behaviour. Coherency is judged by the degree of effect that a new seminal idea makes upon the structural and developmental pattern of other subjects and the universe of knowledge as a whole. A library scientist studies this phenomenon from the point of view of impact of ideas.

Universe of knowledge is dynamic. It is giving birth to a cascade of new ideas incessantly. These new ideas do not create the same degree of impact in all cases. Dr Ranganathan has, therefore, recognised the following three categories of ideas according to their decreasing degree of impact.

- 1 Seminal ideas;
- 2 Near seminal ideas;
- 3 Pedestrian ideas.

It is the seminal ideas which create a turbulence in the structural and developmental pattern of the universe of knowledge. This is why Dr Ranganathan has enumerated 'turbulently dynamic' as one of the attributes of the universe of knowledge. There has not been any study worth mention in this field under library science. This field waits for the extensive and intensive investigations by the library scientists.

8 Conclusions

The aim of library service is essentially retrieval and dissemination of recorded knowledge. To meet this demand, library science in

its growth has developed various retrieval systems both conventional and non-conventional. Experience has shown that the efficiency of a retrieval system depends upon the analysis and structuring of subjects at the input and search stage. This, in turn, demands an understanding of the structural, developmental and behavioural patterns of various subjects and the universe of knowledge as a whole. Therefore, continuous research activity is essential in these three parameters of the universe of knowledge. Then only library science can play an effective role not only in fostering unity of knowledge but also in achieving its aims and ends.

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