Prof. Ranganathan's Choice of Words and Language: Some Reflections

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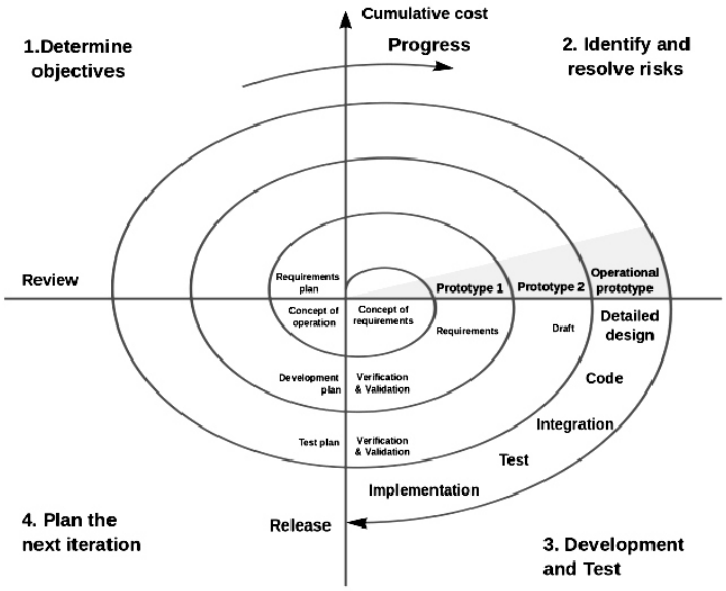
Abstract:
Gives an overview of Prof Ranganathan's vivid language in his professional writings. As he was a pioneer in LIS writing, he had to borrow, adopt, adapt and coin words or technical terms from other disciplines. This is illustrated with one particular expression, i.e. 'Spiral Model'. Many similar terms are enumerated here. His choice of words for communication in LIS was based on his wide reading and certain principles. The present paper proposes compilation of a concordance of Prof. Ranganathan.

Prof. Ranganathan had an impeccable, flawless and purposive choice of words or technical terms in his writing. He has borrowed, adapted, adopted terms from many disciplines. Many of the terms used by him have stood the test of time. He had even foreseen some of new usages of familiar words. Here is an instance to illustrate the point.

Those who are studying or working in the area of software testing know that there are various software development approaches. These are defined, designed and used during software development process. These approaches are also referred as "Software Development Process Models" (SDPM). Some of the SDPMs are Waterfall Model, Incremental Model, V-Model, Iterative Model, RAD Model, Agile Model, Spiral Model, Prototype Model etc.).The reader of this paper need not know what these are and how these are used. Enough if the reader notices that there is a concept named, 'Spiral Model'.

Excuse me for slipping into a first person narration. I have just fringe interest SDPM, but the concept or the expression "Spiral Model" caught my attention. I was somehow fascinated by the term 'Spiral Model', and wanted to know a little more about that. Naturally, I turned to Wikipedia for a quick reference. When

I saw the corresponding webpage, there was a figure of Spiral Model (Fig. 1.). It reminded me of Prof. Ranganathan's 'Spiral of Scientific Method' (Fig.2.). This does not need any explanation, as it is too well-known to LIS professionals.



(Fig. 1.) Spiral Model

As I had used the concept of 'Spiral of Scientific Method' many times for teaching purpose, I was curious about the method/model. The accompanying write-up in the wiki read, "**This model was first described by Barry Boehm in his 1986 paper 'A Spiral Model of Software Development and Enhancement'".**

But, I knew Prof. Ranganathan's Spiral of Scientific Methods was published much earlier in 1956-57. Therefore, objectively speaking, Prof. Ranganathan should have priority claim on 'Spiral Model'. However, it requires further and in-depth research to say it confirmatively; but my present interest was not priority claim for Prof. Ranganathan. My present interest was to understand 'Spiral Model' so that I can have some insight to know why Prof. Ranganathan

may have selected this particular model to illustrate the concept of scientific methods. I was sure, there may be some references to the use or application of spiral model in some other subjects, or may be, use of spiral model is reflected in mathematics or philosophy. Prof Ranganathan may have known about spiral through his knowledge of mathematics and philosophy. This could be possible. Therefore, I turned to *The Stanford Encyclopedia of Philosophy* as the next step (*https://plato.stanford.edu/*).



(Fig. 2) Ranganathan's Spiral of Scientific Method

After reading through a few entries in the encyclopedia, I was drawn towards an entry about Archimedes, the Third Century BC *Greek mathematician, philosopher and* thinker and his less known ideas about Spiral or call it spiral model. It was noticed that Archimedes wrote a book titled *On Spirals.*

"Archimedes famously describes the generation of the spiral in Definition 1 of his *Spirals…."*

(Source: https://plato.stanford.edu/entries/descartes-mathematics/)

Archimedes defined Spiral as "a plane curve generated by a point moving away from or toward a fixed point at a constant rate while the radius vector from the fixed point rotates at a constant rate." (https://www.merriam-ebster.com/dictionary/Archimedean%20spiral)

In other words, in *On spirals,* Archimedes gives; fundamental properties of spiral connecting the length of the radius vector with the angles through which it has revolved. He gives results on tangents to the spiral as well as finding the area of portions of the spiral.

Well, it can be conclusively stated that the idea of spiral model is as old as 3rd Century B.C. Prof. Ranganathan being a mathematician knew the concept of Spiral Model offhand. Properties of spiral perfectly suited in describing scientific research process.

Today the **spiral model** is considered as a risk-driven process model generator for software projects. Based on the unique risk patterns of a given project, the spiral model guides a team to adopt elements of one or more process models, such as incremental, waterfall, or evolutionary prototyping.
The **spiral model** has four **phases**: Planning, Risk Analysis, Engineering and Evaluation.

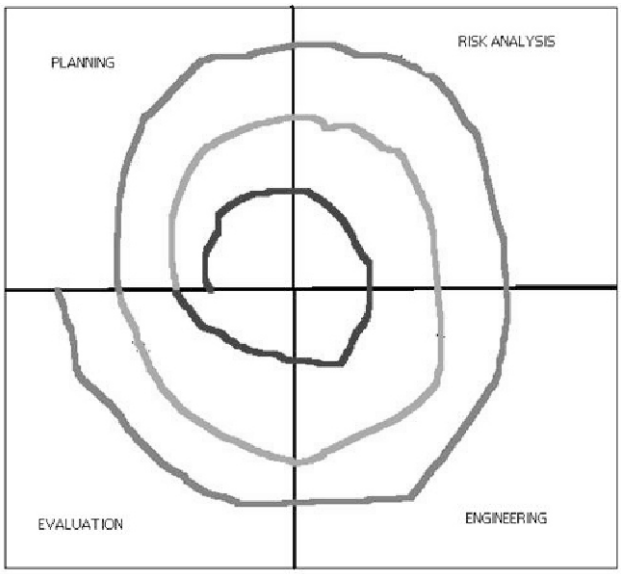
software project repeatedly passes through these **phases** in iterations (called Spirals in this **model**). The baseline **spiral,** starting in the planning phase, requirements are gathered and risk is assessed.

In short, the characteristics of spiral model is to be **evolutionary, progressive and iterative.**

Incidentally, I came across a concept called 'Win-Win Spiral Model'. It is a combination of win-win situation known in the context of negotiation coupled with the progressive, evolutionary and iterative movement.

Besides experiencing the thrill of a literary detective for some time, I learned one more obvious law of nature in this process. This was triggered by a section titled, **Win-Win Spiral Model**. (P.35) (Source: Barry Boehm. Spiral Development: Experience, Principles, and Refinements Spiral Development

Workshop. February 9, 2000. Carnegie Mellon University and Software Engineering Institute. http://www.sei.cmu.edu/reports/00sr008.pdf).



(Fig. 3) Win-Win Spiral Model

The take-home message of Boehhm's paper is that no win-win situation is a permanent arrangement. We may balance it at one instance, but soon it may become imbalanced. It is a dynamic situation, and it follows spiral model. The spiral and win-win equation has to be continuously balanced and re-balanced as the situation changes.

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On looking back, one notices how perfectly the spiral model describes the characteristics of scientific methods. Prof. Ranganathan's choice of words was flawless. Even to say that the term 'Spiral' on verbal plane perfectly represents the concept of 'Scientific Methods' on idea plane, he would say that the term

'Spiral' coextensively describes the concept 'scientific methods'. He was ahead of his time. It is clearly seen that he had used an expression (eg. Spiral Model) that would be used much later in time.

Prof Ranganathan has borrowed many technical terms from mathematics, philosophy, astronomy, physical, biological and social sciences etc. and used them in his prolific writings. Given here are some examples: Umbra, Penumbra, Wall-Picture, Cow-Calf, Osmosis, Symbiosis Arrays, Chains, Organism, Mapping, Matrix, Relativity, Energy, Phase, Sector, Segment etc. Many such terms have been borrowed, coined and adapted by Prof. Ranganathan to make his writing more vivid.

Therefore, I propose to this Meeting to initiate and compile an online Concordance of Prof Ranganathan. There is a base document titled *Ranganathan Dictionary: Indian Terminology on Library and Information Science* by V. Venkatappaiah, P S G Kumar. B.R. Publishing Corporation, 1994. ISBN 10: 8170187672 / 9788170187677. However, a concordance has wider use, and it is different from dictionary in concept. I think it is worth compiling a concordance of Prof Ranganathan. This would be a treasure and serves both LIS and non-LIS scholars.

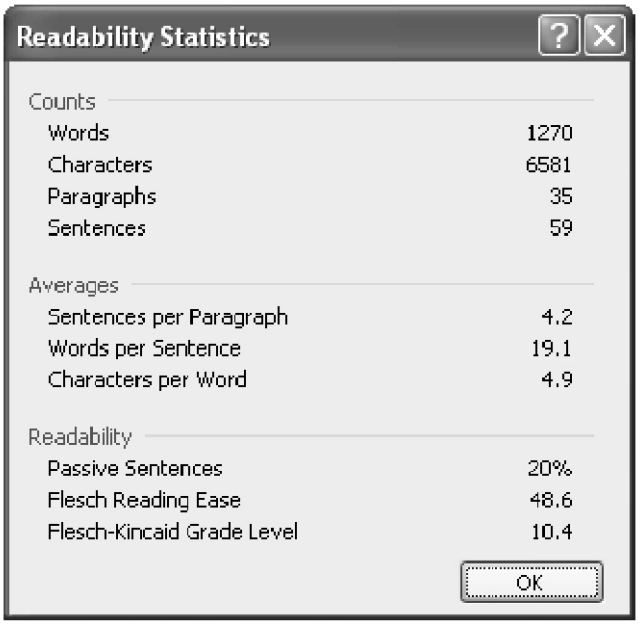
Choice of terms is one of the core factor in assessing language of a document and/or it's author. The other factor that governs a document or author is a 'Readability Test'. Readability Test reflects on the ease of language used.

In other words, readability measure is computed based on the parameters or variables such as:

-Average number of Sentences per Paragraphs
-Average number of Words per Sentences
-Average number of Characters per word and
-Proportion of Passive Sentences

It was necessary to subject Prof Ranganathan's writings to the readability test available as a feature in MS-Word. It is a difficult proposal to cover over 60 books and hundreds of other writings by Prof. Ranganathan as a part of this test. One must note that it was required to make an estimate about the features of Ranganathan's language / writings and not an exact measure.

Therefore, some three sample pages of Ranganathan's 1957 writing from *Annals of Library Science,* March 1957 were selected for readability test. This paper was selected as a sample because, it was written at the middle of his professional career spanning from 1924 to 1972.



(Fig. 4; Readability Statistics)

An average number of Sentences per Paragraph was 4.2. This means the text is very easy to read. It can not get simpler.

An average number of Words per Sentence was 19.1 which was slightly on the higher side. The sentences are longer than expected making it difficult to read. This should have been around eight to ten words per sentence.

An average number of Characters per word was 4.9. This would mean that the words are short and simple. It is a common man's language, but sometimes one has to use more technical vocabulary or jargons. In such cases the characters per word may increase, and around 20% of the text is less readable owing to Passive Sentences. Readability increases when passive sentences are converted to active ones. Only the minimum necessary passive sentences

should be retained. (Sometimes passive sentences are required, as the active counter parts appears awkward.)Consolidating all these, the Readability of Prof Ranganathan on two different scales was computed and it is given as follows.

Flesch Reading Ease 48.6
Flesch-Kincaid Grade Level 10.4

This means 48.6 % of the text is readable. It requires only 10.4 years of schooling to understand the text, so simple it is. In short, Prof Ranganathan wrote in a simple language. There were hardly any compound and complex sentences and his choice of terms was highly meticulous. His rich vocabulary was carefully drawn from different disciplines to match the tone of the concept being covered. It is amazing to see how Prof. Ranganathan expressed complex, innovative ideas in such simple language!