META-KNOWLEDGE AS WAY TO HANDLE THE INFORMATION EXPLOSION – AN INFORMATION SCIENCE APPROACH

Mirea-Gheorghe Berechet, PhD. Student[65]

Abstract:

In the Information Science field of interest, the optimization of providing the most appropriate documentation to the reader has become an almost insurmountable problem. If in the case in which the involved reader has completed a questionnaire aimed at (generally) indicate the sphere of knowledge interest, it is still possible to provide him with too much information that cannot be useful assimilated. Paper proposes a new approach in the matter, namely to provide the reader not with knowledge, but with meta-knowledge. To this end, the concept of meta-knowledge, as well as the way in which particular requests of information could be connected with that concept and, consequently, the way in which the appropriate documentation should be provided are examined and detailed discussed. Finally, some institutional proposals are done in order to make feasible such a meta-knowledge providing to the Libraries users.

Keywords: *Information Science, knowledge, information, meta-knowledge, optimization.*

JEL classification: *A20, I20, Z00.*

Today's human society has reached the stage where almost all information is available almost instantly to almost everyone. The information is no longer a rarity but, on the contrary, threatens, through the increasing volume, to become overwhelming. Thus, sociologists' predictions for the next five years predict a tenfold increase in the amount of information, an increase due to the technological boom of the last four decades and, in particular, the Internet.

Every day, users of the infodocumentary structures, such as libraries, manage and retrieve information from the huge amount available in them, a process that, very often, proves to be difficult and time-consuming. Most of the time, they feel disoriented and do not know where they are, where they will go and what they will do.

All this huge flow of information produces side effects such as missing really important information. The feeling of being overwhelmed by an enormous amount of information is by no means a new one, but it is, in fact, a fundamental problem of the human condition. The company has faced this in the past, after inventions such as newspaper, the radio and television, which produced, in those times, increases in the flow of information. Their manipulation does not create difficulties for current high technology but creates problems for the human subject in terms of their processing to be transformed into knowledge. The human being has limited power to process information, studies estimating that, for a specialized field, reading all publications on the web exceeds the biological time available to a human being. (Iancu, Şt., 2017).

Information document structures, such as libraries, for example, are at the forefront of this struggle, having to adapt to the new requirements the whole set of services provided to users. A first effect of the information avalanche materializes in the requirement of users to be provided with information liable to quickly turn into knowledge in their fields of interest (general or scientific). Recent research has focused on building better tools to help users manage information retrieval.

Knowledge is that information which, once received as such, finds in the pre-existing cognitive "deposit" of the receiving subject an informational (and knowledge) base that allows its structural integration.

[65]*SCOSAAR, Bucharest, Romania, +40727963640, bmirel2002@yahoo.com*

To this end, it is necessary to equip the infodocumentary structures with appropriate software to filter the information that can be transformed into knowledge, starting from the robot portrait of the user's initial cognitive background. The purpose of the program is to deliver to him, as far as possible, only that information which is useful to him.

The design of the robot portrait will start once the library card is obtained by filling in a grid form with predefined answers, a form that should include the following elements:

1. Professional specialization

2. Expertise

3. Interest in reading

The information obtained in this way will be introduced in the program which has the role of comparing, through specialized algorithms, the robot portrait of the cognitive background corresponding to that user, with the information after which the classification and indexing of publications in the library catalogue. If the user's areas of interest match the theme of some papers, they are delivered.

Even in this way, it is still possible to provide the reader with too much information that cannot be usefully assimilated. Hence, there is the need for the delivery of meta-knowledge and not just knowledge.

The concept of meta-cognition, as a process by which knowledge is obtained, is a relatively recent one, which emphasizes the role of the subject in the conscious realization of the cognitive process by self-knowledge of one's cognition, being used to refer to a diversity of epistemological processes. Developed by John Flavell (1976) and then interpreted and applied to the theory and practice of education, he defined it as composed of "knowledge that takes as its object or regulates any aspect of any cognitive effort."

Meta-cognition has been described as "the ability of individuals to regulate their cognitive activity to promote more effective understanding." It is a deliberate, planned, goal-oriented mental process that uses higher-level thinking skills applied to thoughts and experiences (Hacker et al. 1998). The thought process is related to how the cognitive subject relates to reality through his mental representations. Moore (1982) defines it as "the knowledge of the individual about various aspects of his thinking" and has also been described as "the ability of individuals to regulate their cognitive activity to promote more effective understanding."

Meta-knowledge is a reflection on one's cognitive activity that often leads to anticipations regarding the development of these reflections. Meta-cognition is the process by which the cognitive subject obtains them by monitoring their cognitive processes, constituting, in fact, feedback that he actively uses in achieving his cognitive goals.

In 1981, Flavell proposed the cognitive monitoring model illustrated in the figure below:

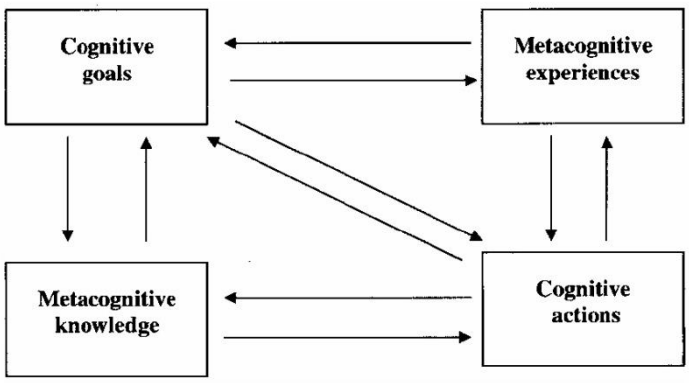

Figure1. Flavell's model of cognitive monitoring (source: Flavell, 1981)

Meta-knowledge appears during the information search process, its correct application leading most easily to good results. At a more advanced stage, knowledge is gained about the quality of information and about how such information is obtained.

In the case of info-documentary structures, in the process of finding information, it was found that it is unlikely that all searches will provide solutions to a particular problem. Many interactions are likely to produce not solutions, but knowledge of the location of potential solutions, either in the form of specific information or by defining broader areas of information. What is transferred from the source to the receiver - the cognitive subject - in this process is the knowledge about knowledge. Such interactions can take two forms. First, they can serve to guide the cognitive subject to relevant information, and second, they can guide him away from irrelevant information.

In the process of designing a heuristic information retrieval strategy to develop meta-cognition, approaches to:

- defining concepts, terms, notions;
- description of some aspects;
- interpretation of partial results;
- finding equivalents;
- explanation of concepts, terms, notions, phenomena;
- comparing the results to establish similarities and differences;
- formulation of ideas, judgments, personal opinions, direct and indirect evaluations;
- formulating arguments for or against (Rusu, Dj., 2018).

We can exemplify, in the case of info-documentary structures, as follows:

1. Instead of providing knowledge in a given field, knowledge is provided in a field with an immediately higher degree of generality.

   We can consider the case of a cognitive subject who requests information in the economic field. By providing him with information in the social field, we will thus provide him with knowledge about the genus, concerning the knowledge about the species. Delivering to the cognitive subject meta-knowledge - that is, knowledge about the genus - it is given not only knowledge about the target species, but also knowledge about other species that are part of that genus (in this case, for example, about sociology or anthropology);

2. Instead of providing specific knowledge about a topic (eg about the economic system), knowledge of systems, in general, is provided (in this case, knowledge of systems theory is provided). In other words, here, in relation with the knowledge of a particular case, knowledge is provided about the general case. Thus, giving meta-knowledge - that is, knowledge about the general case - gives not only knowledge about the subject, but also knowledge about any particular case that would become of subsequent interest;

3. Instead of providing knowledge about a specific case[66], for example, about the institutional response to the COVID-19 pandemic in Romania, knowledge is provided about the response to non-economic external shocks. It is also a type of meta-knowledge because, by making available to the subject meta-knowledge – i.e. knowledge about the abstract case - it gives not only knowledge about the case (dated temporally and spatially), but also knowledge about the case that has no dating, i.e. about the abstract case.

Meta-cognition plays an important role in the acquisition of knowledge, majorly influencing this process by forcing the cognitive subject to select, evaluate, review and even abandon cognitive tasks, goals and strategies. They are very helpful in interpreting the meaning and implications of various strategies for finding information that can be transformed into knowledge.

[66] Nota bene: We must not confuse the particular case with the concrete case, the particular case can be an abstract but particular case, just as the particular case can be a concrete but general case.

Conclusions

Humanity is facing a major, accelerated transition from the industrial age to the age of knowledge, characterized by a society in which the creation, dissemination and use of information and knowledge have become the most important factor of production. In such a society, the intellectual capital materialized in knowledge is the most powerful producer of wealth, surpassing in importance the land, labor and financial capital.

The transition from the agricultural to the industrial era lasted about 150 years, a process in which agriculture did not disappear, but had the effect of the emergence of an industrial approach to agriculture, so that 5% of the population is employed in this branch of the economy, instead of 65%. Similarly, in the future, we will still have industry, but we will understand and manage it from a new perspective: the knowledge perspective. Mankind is at the beginning of a transition of probably a few decades to a knowledge-based economy, in which we will discover that the goods we need every day can be produced by less than 10% of our population. We also find that we need to become more responsible for the planet's natural resources so that we do not pass on to future generations the problems we create.

Bibliography

Flavell, J. H. (1981) Cognitive Monitoring. In W. P. Dickson (Ed.), *Children's Oral Communication* (pp. 35-60). New York: Academic Press.

Hacker, D. J., Dunloky, J., & Graesser, A. C. (Eds.) (1998), *Metacognition in educational theory and practice* (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum Associates.

Iancu, Ştefan (coord.) (2017), *Academicianul Mihai Drăgănescu*. Bucureşti: AGIR.

Moore, T. (1982). *Understanding Language*. London: Macmillan.

Rusu Djulieta. *Metacogniţia în instruirea academică in Competitivitatea şi Inovarea în Economia Cunoaşterii*, Vol.2., 2018, Chişinău, Republica Moldova, pp. 139-150.