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Subjective Dimensions of the Treatment of Information: Analysis of the Underlying Implications for Information Retrieval

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Abstract

The informational boom has contributed to change the scenario and the behavior in relation to how information is treated, especially from the beginning of the 21st century. Gradually the concern regarding the offer of means for the user to retrieve information that meets demands efficiently and specifically imposes itself to the purpose of prioritizing only the dissemination of information. One of the key aspects for the information retrieval process to occur adequately is the treatment of information. This process comprehends, among various tasks, indexing. This activity presents the challenge of attributing terms that represent the analyzed object faithfully. The quality of indexing is conditioned by how qualified the indexer is, and his or her impartiality in the process. However, it is inevitable that some elements of subjective judgment affect this activity. This article presents the partial results of a study carried out in university libraries, with the objective of identifying how individual perspectives permeate the treatment of information. To meet this objective – to verify the influence of the subjectivity in the indexing process – the study had the Clinical Approach to Information as a guiding principle. This perspective presents the possibility of investigating information behavior considering the influence of cultural, symbolic, cognitive and affective elements, as well as conscious and unconscious psychodynamic factors. The methods included in this approach are interviews, task analysis, the Critical Incident Technique and the verbal protocol. The results obtained enabled the understanding of how subjective aspects integrate themselves to individual competences influencing the process of treatment of information, having an impact on information retrieval by users. The results of the study point out the need to determine more accurate guidelines to enable the establishment of more efficient parameters to guide the performance of this task.

Keywords: Cataloging, Indexing, Information retrieval, Subject analysis, Treatment of information

Introduction

Information consumption by North Americans in 2008 was 1.3 trillion hours, according to the study 'How Much Information? 2009'[1]. This corresponds to an average of 34 gigabytes for an average person on an average day, considering 20 different sources of information. In 2012 the consumption increased to 1.46 trillion hours, an average increase of 5% per year. It is estimated that in 2015 the average volume will be 74 gigabytes/day[2]. This scenario shows how activities related to the treatment of information have become complex, especially those related to information retrieval: how should information be treated to enable the retrieval of exactly what is desired in this vastness of information?

The information retrieval is one of the most important aspects of the treatment of information in libraries. According to Araújo (2013) to "treat" information is to carry out a host of activities to enable the user to retrieve the desired information with the greatest possible efficacy and speed. Kobashi (1994), however, states that despite the existence of methodologies that orient the treatment of information there is a theoretical and methodological gap in many of the rules of production of documentary information, as they don't present objective indications regarding how to obtain the desired products. The success, according to the author, is due to the good judgement and experience of the indexer. This draws our attention to the influence of subjective aspects in this process.

The understanding of how subjectivity integrates itself with behaviors related to the treatment of information can provide indications of how to minimize their interference, enabling a more efficient retrieval of information. To enter this universe a study was undertaken in university libraries with the objective of obtaining, through a symbolic path, perceptions regarding intrinsic aspects present in this activity.

Theoretical Context[3]

The guideline of the study was a perspective proposed by Paula (2011) called Clinical Approach to Information, which presents the possibility of

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[1] *How much information 2009.* Report on American Consumers. Roger E. Bohn; James E. Short. Global Information Industry Center University of California, San Diego. 2009.

[2] Source: https://news.usc.edu/56894/americans-consume-media-in-a-major-way-study-finds/

[3] For the preparation of this literature review searches were made in the 'Portal de Periódicos' of the 'Coordenação de Aperfeiçoamento de Pessoal de Nível Superior' (Capes - Higher Education Personnel Improvement Coordination) seeking for recent (2013-2016) international articles regarding the following terms: subject analysis, imaginary structures and AT- 9. These searches found only one article regarding subject analysis (Almeida, 2013). The 'Portal de Periódicos Capes' is a virtual library maintained by the Brazilian government that collects and makes available for educational and research institutions in Brazil a collection of over 37,000 titles with full text, 126 referential bases, 11 bases exclusively dedicated to patents, and books, encyclopedias and reference works, technical standards, statistics and audio-visual contents.

investigating informational behavior considering the influence of cultural, symbolic, cognitive and affective elements, as well as psychodynamic factors – both conscious and unconscious. This expression was inspired by the French term *approche clinique,* which enables a more profound view into the phenomena of information using a clinical perspective to attain levels of analysis that are not usual in traditional behavioral and cognitive studies. In this sense, "clinical" refers to the attitude associated to doctors since ancient times of "reclining", "bending over the bed" – *kliné* in Greek – to observe the patient closely.

The theory of Gilbert Durand (1997) was used for the symbolic analysis as it considers the imaginary as the foundation on which the conceptions of man and the world are built. This theory was systematized by Yves Durand (1988) who created the Archetypal Test with Nine Elements (AT-9). The objective of the test, according to Paula (2012), is to use archetypal stimuli to "place the problem at hand in a perspective of time, threat and finitude" in order to construct ways of confronting the problem.

In this study, the "problem" is the attribution of terms in the activity of subject analysis, which is one of the stages of the treatment of information. In this activity, the document is analysed with the objective of extracting concepts which translate its essence. It is relevant, among other reasons, because the correct selection of words makes it easier to adequately attend the informational demands of users in computarized systems.

Naves (1996) considers subject analysis the basic operation for information retrieval activities and states, according to Harris (1970), that the false idea that this is an apparently simple area "is due to total ignorance about the complexity of the process which demands effort […] in trying to follow an adequate methodology to obtain satisfactory results" (NAVES, 1996, p.217). Besides the problem of terminology, the influence of the person who performs the activity is also highlighted as "there is no doubt that the indexer interposes his own ideas and prejudices when he acts as a intermediary between authors and users." (NAVES, 1996, p.221). The same perception is ratified, most recently, by Almeida (2013).

Ferneda (2003) highlights that the subject analysis involves the interpretation of the document by the indexer, with the objective of making it visible to users of an informational system, aggregating themes which are not explicit in the textual surface. It is a complex process, as the user demand will be represented by a search term which is not always compatible with the words used by the indexer to represent the documents. This will impact the result of the retrieval.

Methods

The study was conducted in a library that integrates a system of libraries of a higher education institution. The subjects of the study were three librarians,

denominated S1, S2 and S3. The criteria for the selection of these subjects were their experience in the activity of cataloging /indexing.

Symbolic and affective aspects were included in the interview with the objective of obtaining elements to compose a scenario of perception and affective constructions related to the professional activity of each librarian. The Critical Incidence Technique (CIT) was also included. It is a set of procedures used to collect direct observations of human behavior. Each of the librarians chose a critical incidence related to a relevant experience in the activity of subject analysis.

The task analysis was performed with the activity of subject analysis of three pre-selected books with a focus on term attribution. The selection of material considered only that the books should not belong to the university collection and that the themes were generic. A form to be filled out based on Coutinho and Araújo (2010) was included in the execution of this activity with the objective of identifying the procedures performed.

After the task was performed the Verbal Protocol technique was used. It consists of a verbal report of the individual's thoughts after the execution of an activity with the objective of presenting information about their mental processes. Finally, the protocols of the AT-9 were applied.

Results

The analysis of the task showed that the performance of the librarians was not uniform (Table 1) as the procedures varied according to the book analyzed. The only procedure executed with all the books was the reading of the title and subtitle.

Table 1. *Procedures for Choosing the Terms*

Procedure	Book 1			Book 2			Book 3		
	S1	S2	S3	S1	S2	S3	S1	S2	S3
Reading of title and subtitle	■	■	■	■	■	■	■	■	■
Author's name	■			■			■		■
Spine		■							
Book area	■		■						■
Reading of summary		■			■				■
Reading of index									
Reading of contents	■		■						■
Reading of Introduction	■	■		■					
Reading of chapters					■				
Reading of book flap	■		■	■	■				
Speed reading									
Browsing the book		■	■	■	■		■		
Illustrations, diagrams, tables and their explanatory titles							■		
Reading highlighted words or word groups (underlined, printed in different types, etc.)	■								
Examination of references	■						■		
Additional material									
Cataloguing-in-Publication	■			■		■			■
Consulting another librarian	■			■					
Others (added by librarians)									
Consulting other data bases	■			■			■		
Pergamum Network			■						
Catalogue of the university that published the book									■

The other perspective used in the study of the analysis of the terms attributed by the librarians also showed different results:

- First book: there was a certain homogeneity in the definition of the terms with the use of the expressions "community outreach programs" and "higher education" by the three librarians;
- Second book: the selection of terms had a common axis – climate changes – even though the different terms that were chosen: Brazil – Climate (S1); Weather (S2); Climatology (S3);
- Third book: the terms were diversified and there was nothing in common which could be used in the retrieval of this book. The following terms were presented: Informatics – study and teaching (S1), Computer programming – computing (S2) and Data storage (S3).

Symbolic Analysis

The CIT showed critical situations experienced in the activity of subject analysis and identified events reported by the subjects interviewed. This made it possible to analyze the subjective aspects in a holistic manner, considering the individuals in their context and history, enabling the relation of present and past facts and a deep analysis of the phenomena.

The incidents reported presented the following critical points in the situations presented (Table 2):

Table 2. *Critical Incidents – Central Aspects*

	Central aspect	**Critical aspect**
S1	Doubt regarding the term to be used. The term was not authorized.	The user will not find the book.
S2	Disagreement with user	Conflict of authority.
S3	Diversity of definitions of a term.	A term may have various meanings depending on the context.

Regarding the symbolic aspects, the consolidation of the characteristic images of the cataloging exercise that represent the critical incident is presented in Tables 3 and 4.

Table 3. *Representative Images of the Cataloging Activity*

	S1	**S2**	**S3**
Image	*"Open book"*	*"Tree"*	*"I would get the globe and set it in movement like this"*
Explanation	*"Every time I think of something ... good, I think of an open book...."*	*"Because the tree is growing, it grows fruit, it grows leaves; I really see it as a tree, something productive."*	*"... because its movement, movement of ideas, of subjects, of knowledge, of.. so... movement, something that would represent movement, a globe."*

Table 4. *Representative Images of the Critical Incident*

	Image	**Explanation**
S1	*"Ah, barrier, I think a stone wall. (laughs) It is a barrier, like this, you know…"*	*"Ah, because it is, because it really is a barrier, you know, I think it is, it is the difficulty the user has in finding, and we have to make it available like this."*
S2	*"a boy running, running, and you're not managing to catch him ... a really naughty boy, like the one that you smack lightly and he..., he runs off desperate."*	*"So ... it is more or less like that, because we don't engage in ... a dialogue, isn't it?*
S3	*"mmm... the image that comes to me is much like... antenna."*	*"The antenna with these... always... never alone.. always something together with it…"*

The images suggested by the interviewees allowed us to observe that the symbols translate their unconscious effort to "decipher and subjugate a destiny which escapes them through the obscurity that surrounds them" (Chevalier and Gheerbrant, 2008, p.XII). These perceptions are identified in the meanings that are "embodied" in the behavior of each librarian.

S1 represents the cataloging activity as an "open book". Cirlot (1984) treats the symbol of a book stating that the Chinese considered emblems with books as symbols of power to ward off evil spirits; Chevalier and Gheerbrant (2008) point out that the Sybilline books were consulted by the Romans in exceptional situations to find divine answers to their distresses. The authors stress that the Egyptian book of the dead was used to ask the gods for a safe crossing of hell and, consequently, the arrival at the eternal sun. It is interesting that when S1 represents her critical incident with the image of a barrier, she unknowingly creates a metaphor that constellates with the symbol of a book. As the barrier (or stone wall) is describe by Cirlot (1984) as an inability to advance in the intended path, the book, as it was mentioned (*"something good"*) seems to evoke a safe-conduct or protection to ward off the "evil spirits" or as a source of "divine answers to your distresses" and the prescription to request a "crossing of hell" and access to the "eternal sun". Thus, there are clear associations not only to the book as a lenitive for distress when facing the unknown and the stone wall as a barrier – an element which has in its fundamental meaning a sense of separation – but also between these two images (book and barrier/stone wall) as if they were each other's Nemesis. This reveals the view of S1 regarding the process of cataloging and difficulties: it seems to be an easy activity which, however, can become turbulent when the impossibility of access configures itself as a separation, an "interrupted communication", making it impossible for the greater objective – to offer the user access to information in the best way possible – to be fulfilled as intended.

S2 represents cataloging as a tree. The main interpretations of the symbolism of the tree articulate around the idea of a living cosmos in a never-ending process of regeneration (Chevalier and Gheerbrant, 2008). As an unending life, it corresponds to immortality and this concept of life without death is translated to absolute reality. The tree becomes the center of the world (Cirlot, 1984). It is one of the richest and most widespread symbolic themes and consolidates the "cyclical aspect of cosmic evolution: death and regeneration". This meaning is referenced by Mircea Eliade in Chevalier and Gheerbrant, (2008, p.85): "it is because it is vertical, because it grows, loses its leaves and recovers them again, and because, consequently, it regenerates itself: it dies and is reborn countless times."

This meaning can be seen in the imaginary of S2 who justifies the choice of this symbol as something that *"is growing, growing fruit, growing leaves [...] something productive"*. This image of death and regeneration related to cataloging reminds us of the processes in which the text that is being analyzed "dies", "regenerating" itself in the terms attributed to represent it at the end of the process of subject analysis, an activity which holds a sense of production and transformation. The verticalism of the tree that has its roots buried in the

ground and its branches rose to the sky, evokes it as a symbol of the relationship between heaven and earth. This interpretation is seen in Shiite muslims of Ismaelite rites, in which the tree symbolizes *hakikal*, a state of beatitude in which the mythical encounters supreme reality as it overcomes the duality of appearances (Chevalier and Gheerbrant, 2008).

An attitude of "supremacy" can be inferred from the position S2 adopts in relation to the result of her work, regarded as the "absolute truth", reflected in the meaning of the tree as the "center of the world", which indicates that questioning will not be welcomed. This finding is clearly presented when S2 justifies the evocation of the image of the critical incident. When a position of S2 is questioned and there is no agreement with her point of view this is considered a deadlock situation, as it confronts the sense of the "axis of the world" and the "central pillar", which are symbolized by the tree. The interviewee considers the cataloging activity as this axis around which her behaviors are referenced.

This interpretation is reinforced by the image that represents the critical incident. The confrontation of opinions – which generated a conflict of authority and a questioning of the "supreme truth" (the decision made) – configures itself as an act of rebelliousness and non-acceptance of an adverse reality. According to Cirlot (1984, p.378) the image of the boy represents "the product of the *coniunctio* between unconscious and conscious" defined as an alchemic symbol of the union of different substances. Running refers to fleeing, which could indicate resistance to the union of "opposite ideas", differences. The impulse to flee is due to the pressure of the context that S2 resists and from which she would like to run. The image of the boy, according to Chevalier and Gheerbrant (2008, p.302), refers to "victory over complexity and anxiety and conquering inner peace and self confidence" and the flight, in the representation of the critical incident, tries to preserve this state of completeness which is being threatened.

S3 chooses the image of a moving globe to represent the activity of cataloging. This symbol evokes a sense of power, "the domain or territory over which the authority of the ruler extends itself and the *totalitarian* characteristic of this authority" (Chevalier and Gheerbrant, 2008, p.472). Another association to this image is its spherical shape, which corresponds to perfection and happiness (as the absence of edges/corners suggests the absence of inconveniences and obstacles). In Chinese emblems, this means activity, symbol of the masculine principle (*Yang*) represented by a white circle (CIRLOT, 1984).

To justify the choice of this image, S3 associates the concept of movement, reinforcing the symbolism of perfection as mentioned by Chevalier and Gheerbrant (2008, p.389): "The notion of a sphere and of an orbicular movement is dominant and expresses perfection. If a being is conceived as perfect, it is symbolically imagined as a sphere".

The representation of the activity of classification as a moving globe suggests that S3 sees her work as "perfect" activity, which makes it possible to understand how the antenna – image associated to the critical incident – can be

responsible for disarticulating this world, which is considered complete. The symbolism of the antenna in this context is associated to what is inconstant, to multiplicity, to what is uncontrollable in itself, as it can have different meanings depending on the context. This aspect, which the antenna represented, is a threat to the perfect and controlled universe of S3 because, despite representing movement, this movement is orbital and turns around itself and the dynamicity represented by the antenna is not linear, bringing in its representation the sense of the "imperfect" and unpredictable.

When we put the associations of S1, S2 and S3 together, a close symbolic connection between these metaphors can be seen. When S2 and S3 evoke a tree and the globe as representing the activity of cataloging, the concept of plenitude – translated in "absolute truth" and in "perfection" – resonates in the imaginary of both interviewees, suggesting that the product of the work is complete in itself. The same similarity can be seen in the images evoked in the critical incidents, which are characterized by a rupture of this hegemony expressed both in the figure of a different opinion, and in the dynamicity of meanings a term can have. Both situations represent a conflict that threatens this concept of "supremacy" which permeates the views of the interviewees regarding their activities. What threatens both of them is something that challenges their certainties.

Interestingly, the book, metaphor attributed to cataloging by S1 has, among its meanings, one related to the "Book of Life of the Apocalypse". It is identified with the Tree of Life with "the leaves of the tree being like the characters of the book" representing "the totality of the divine decrees" (Chevalier and Gheerbrant, 2008, p.555).

The associations between the meanings attributed to the symbols enabled the construction of a network of meanings (Figure 1). The stitching is done by the interpretation of cataloging as an activity that has a "closed product", total and complete. Even though this meaning was constructed through different views and paths by the different interviewees, for each one of them the work has a sense of an "indisputable" truth.

Figure 1. *Interconnected Network of Symbols and Meanings*
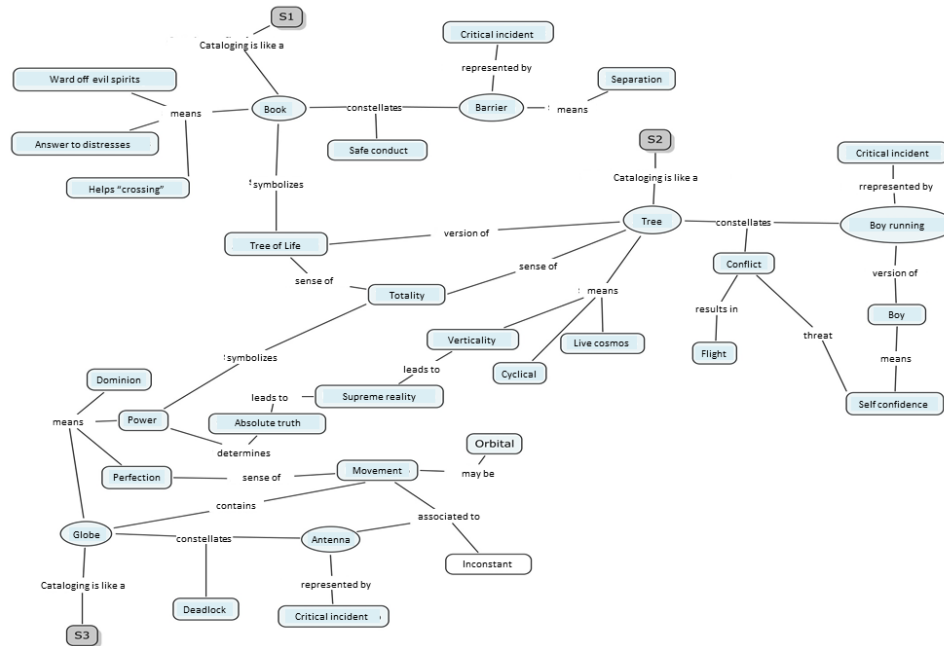
According to Cirlot (1984), the doctrine of *Mohyiddin ibn Arabi* proposed the universe as a condensation of the immense book written by the divine quill. The transcendent universe of the book descends to take shape of the manifest universe where man lives. This symbolism, points the author, is what the Rose Cross called *Liber Mundi* and the Apocalypse *Liber Vitae*. Chevalier and Gheerbrant (2008) refer to the book (*Liber Mundi*) not only as a symbol of the relationship/correspondence, by a divine message, of the macrocosmos to the microcosmos, but also refer to versions of the quest for the Grail. The book would represent the Grail itself and the quest would be a "search for the lost word", for wisdom made accessible to common mortals. The symbolic connection with the activity to cataloging appears to be unquestionable. The authors stress that a closed book represents untouched matter, while the "open book" represents matter that has been fertilized. While the book remains closed, it keeps its secrets; when it is open, its contents are accessible to those who investigate it. Would this not be the essence of the cataloging activity, to open the books to allow investigators to have access to their messages? Still referring to the authors above, cataloging repeats the work of the alchemists who, through their successive operations, open the seals and ribbons that close the *Great Book of Nature* and allow raw matter to be extracted from the mine and worked on. For this to happen it is necessary that the essence be extracted from the intrinsic contents of the books so they can be faithfully represented.

This activity has an analogy with the verticality of the tree presented by Chevalier and Gheerbrant (2008), which connects the three levels of the cosmos: the underground, the surface and the heights. In the cataloging process, these levels can be reflected, in the text of the book, in the terms attributed and in the information user. The roots give access to the underground

where the essences are buried; on the surface of the earth the trunk, a visible representation of the structure will take the sap (information) needed to quench and attend the need of those who are at the end of the process to the branches and leaves. "Thus it establishes a relationship between the Chthonian and the Uranian worlds" and brings all the elements together (Chevalier and Gheerbrant, 2008, p.84).

The completion of this full cycle leads us to the meaning contained in the globe, which corresponds to the wholeness of what was accomplished due to the spheroidal shape. This shape is associated to symbolic properties of perfection and homogeneity, attributes that are expected from the cataloging activity, which is a perfect representation of the book and a codification that translates its content in a homogeneous and accurate way. In the Greek tradition, especially in Parmenides and in the Orphic texts, spheres are used to represent two worlds: the earthly world and the Other-World. Death is responsible for the passage from one sphere to the other. In the same sense, cataloging can be seen as representing the passage from a world of content to a world of concepts. The first is "abandoned/eliminated" after the entry into the new world, which will represent the desired world.

It is important to stress that this analysis does not end in the interpretation of the latent meanings, as the words are incapable of expressing all the value of a symbol (Chevalier and Gheerbrant, 2008, p. XIII). Care is needed not to enclose all the dimensions revealed by the symbolic interpretation in narrow limits, but to amplify their meaning with other methodologies. In this study, this was complemented by the use of the AT-9, to understand what permeates the action of the subjects in situations of anxiety, represented in this study by the choice of the adequate term in subject analysis.

The use of the Archetypal Test with Nine Elements (AT-9) and other complementary techniques, such as the critical incident and the use of creative expression, made it possible to explore subjective aspects using the symbolic-affective dimensions. Data compilation was done using the framework of the anthropological structures of the imaginary of Gilbert Durant (1997), consolidated in the methodology developed by Yves Durand (1988) with the objective of identifying evidence of the informational, subjective and affective process involved in the activity that was performed.

As a result, it was possible to identify the mythic micro universes of each individual (described as profiles) and their relationship to the informational behaviors presented, enabling the comprehension of the reason for the different results in the activity of subject analysis.

The mythical profile of S1 characterizes her as a person who tries to disfunctionalize the threat by bringing it into her controlled universe and submitting it to her experience as a way to neutralize the anxiety it contains. This profile directs her attitudes in the process of informational treatment and the terms selected in the activity of subject analysis close to a "perfect" circle, in her understanding, which is to attend the user (Figure 2).

The synthetic symbolic profile of S2, which translates the cyclical movement as an "eternal return", indicated that her decision making process is

blocked to external influences, enabling her to deal with the challenges of this process by closing herself off (Figure 3). The terms selected in the activity of subject analysis were in line with the interviewee profile of looking in an internal environment – the book itself – for the answer to the activity, thus maintaining a hermetic environment.
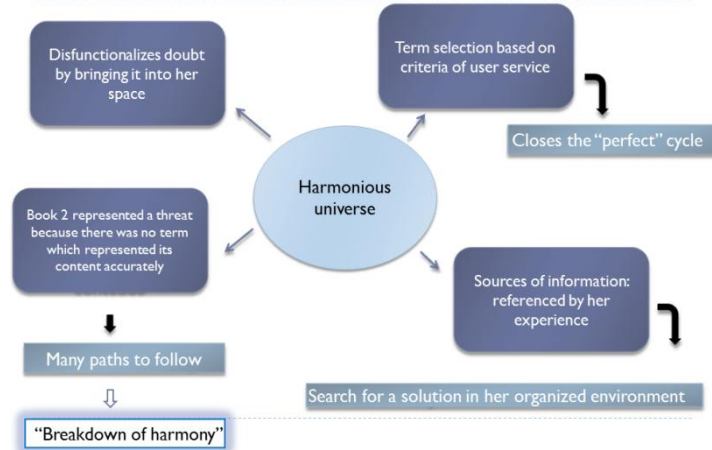
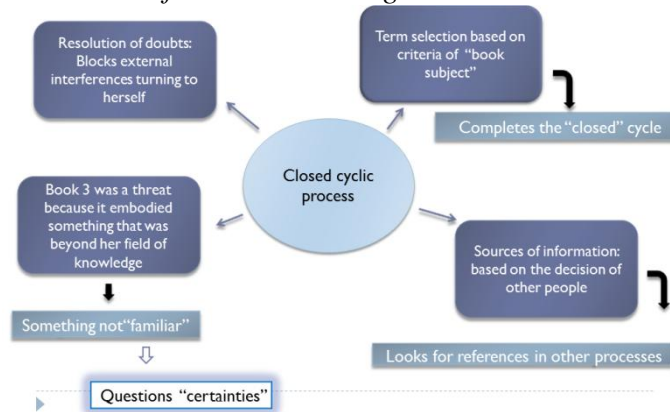**Figure 2.** *Micro Universe of S1 and Resulting Actions*

Figure 3. *Micro Universe of S2 and Resulting Actions*

The diachronic synthetic profile of S3 characterizes her as an individual who deals with the decision by turning to herself to find the answers and then moving to a confronting posture using the instruments available to confront doubt and decide (Figure 4). In term attribution, she claimed the process of analysis but when deciding, used an external instrument capable of pragmatically supporting her decision.

Figure 4. *Micro Universe of S3 and Resulting Actions*
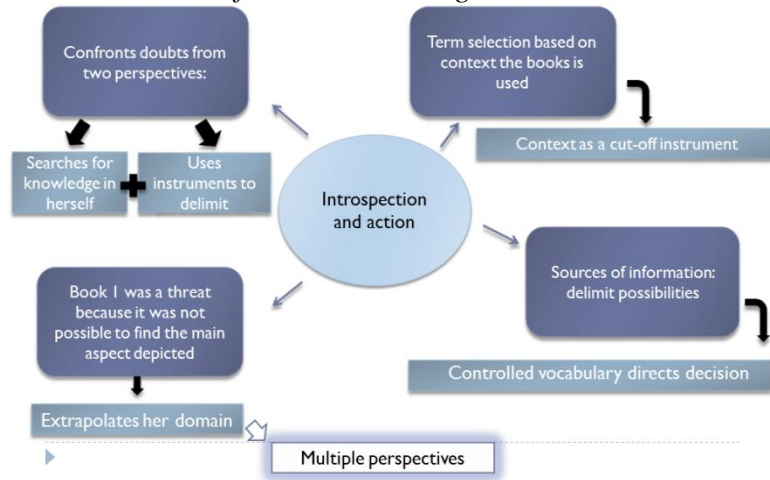
Conclusions

The study showed that subjective aspects – even in a methodologically structured process formalized by controlled vocabulary, standardization of procedures and sources of information such as subject analysis – are responsible for differences in results. The process of term selection, as a decision making activity, is a relatively rational action, permeated by life history, professional experience, preferences, mental structures and psychological profiles of the indexer, making this process a result of a confluence not only of conscious factors but of underlying intangible psychic contents.

This study enabled the understanding of the complexity of the process of the treatment of information and points to the need to establish clearer standards and criteria and more accurate guidelines to determine more efficient parameters to guide the indexing process.

A process of the treatment of information guided by more effective criteria and considering subjectivity as an intrinsic factor will result in information retrieval that is more accurate and with greater user satisfaction.

According to Ferneda (2003) to retrieve information is to operate a stock of information selectively, an action which involves the users' cognitive processes and the indexers' capacity for abstraction, apprehension and representation of the meaning in context. It is difficult for this to be formalized through an algorithm, but it should be observed from other perspectives with the objective of obtaining more effective results in the process.

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