SEVEN
publicações acadêmicas

The complexity of the classification: Representation in information science education

https://doi.org/10.56238/ptoketheeducati-071

Elisângela Cristina Aganette
Federal University of Minas Gerais (UFMG), Belo Horizonte/MG, Brazil; Graduate Program in Knowledge Management and Organization (PPGGOC)
E-mail: elisangelaaganette@gmail.com
ORCID 0000-0003-4357-8016

Benildes Coura Moreira dos Santos Maculan
Federal University of Minas Gerais (UFMG), Belo Horizonte/MG, Brazil; Graduate Program in Knowledge Management and Organization (PPGGOC)
E-mail: benildes@gmail.com
ORCID 0000-0003-4303-9071

ABSTRACT
The teaching-learning of classification for Brazilian Information Science education requires the apprehension of the use of table mechanisms for the formation of a notation or a document classification number and also to understand the variables that must be taken into account in the act of classifying an information resource. We start from the premise that classification is an act inherent to the human being, and, at the same time, involved in complexity, requiring a dimensional knowledge about things for the classification process. Based on Jansen (2008), this study explores the complexity of classification through the discussion of the taxonomy of Chinese animals, presented by Jorge Luís Borges (1981). It seeks to answer the objective question: What lessons can we learn from TAB, which is a classification built for the representation of Chinese animals, in order to contribute to the teaching-learning of classification of documentary resources? To this end, it conducted a narrative review and sought conceptual inputs from Aristotle's hierarchical principles: Rationale; Structure; Disjunction; Thoroughness; Clarity; Uniformity; and Explicitness and precision. These principles were scrutinized and related to the 14 classes of Borges' Taxonomy, enabling a heuristic analysis and pointing out some of the mistakes that can be made in the construction of a classification system.

Keywords: Classification, Bibliographic classification, Complexity of classification, Borges' taxonomy lessons, Hierarchical principles of Aristotle.

1 INTRODUCTION

The teaching of classification for Brazilian Information Science training includes undergraduate courses in Archivology, Librarianship and Museology, and requires going beyond the apprehension of the use of mechanisms for the formation of a notation or a document classification number, employing the syntax of classification schemes (tables) in an appropriate way. It is also necessary to understand the variables that must be taken into account when classifying an information resource, which makes this activity complex. Some of these variables involve knowing the types of resources in the collection, the subject matter, the institution, the type of information unit and, most importantly, the user community.

Thus, the classification process can be considered an act involved in complexity, indicating the possibility of a close relationship between these two concepts. This can be evidenced when we look

for the origin of the two words. The word *complexity*[1] , of etymology complex + age, derives from the Latin *complexus*, meaning encompassed and understood, which acts in an integrated and not isolated way, as a whole articulated by actions that show a phenomenon (RIBEIRO, 2011). The ending of the word in *-idade* gives the noun an attribute (quality, state, condition, among others).

In turn, the word *classification*[2] , of etymology classify + *-tion, and* the word classify, derives from the Latin *class* + *ficāre*, meaning, according to the Priberam Dictionary (©2020), to distribute in classes, categories or taxonomic groups[3] , bringing together, according to pre-established criteria, those objects or things with similar characteristics. The suffix -ção, derived from the Latin *-tio,* conveys the meaning of action or result of an action, and occurs in the formation of nouns derived from verbs.

So, if the principle of complexity determines that it is "necessary to build multidimensional knowledge", which allows us to integrate "things that are disjointed in relation to each other" (RIBEIRO, 2011, p. 44), the action of classification is inherently linked to this principle, since it is the search for structuring that gives order to chaos, based on the actions of grouping similar ones under pre-established criteria. Given these findings, it can be said that, even though they are distinct, complexity and classification are closely related.

The classification, as mentioned, even being something apparently commonplace and intrinsic to human nature, since in historical-methodological terms there has always been a need to organize objects and information for location, has in its essence a problem. Pombo (2006) points out that this problem presents itself as its inscription in the desire and primordial need to understand and order the variety of things that surround us. The author reports that there are four orientations for classification, which cover both beings and knowledge: 1) ontological (classification of beings); 2) gnosiological (classification of sciences); 3) librarianship (classification of books); and 4) informational (classification of information). For this article, guidelines 3 and 4 will be considered, which deal respectively with Librarianship and Information Science.

The complexity of information classification was explored by Jansen (2008) when he discussed a taxonomy of Chinese animals, taken from the Chinese encyclopedia "*Celestial Emporium of Benevolent Knowledge*" and presented by Jorge Luis Borges[4] (1985) and created by John Wilkins, a 17th century philosopher. For the present study, Borges' taxonomy was named TAB, short for Borges' taxonomy, in order to facilitate and simplify the discourse, since it will be analyzed to answer the following question, which closes the proposed objective: *What lessons can we learn from TAB, which*

[1] Retrieved from https://www.dicio.com.br
[2] Retrieved from https://dicionario.priberam.org
[3] Taxonomy: derives from the Greek *taxis*, meaning order, and *nomos*, meaning rule.
[4] Jorge Luis Borges, translator, critic and writer, lived to the age of 87. He was born in 1899 in Buenos Aires and died in 1986 in Geneva (FUX, GOMES, 2013).

is a classification built for the representation of Chinese animals, in order to contribute to the teaching-learning of the classification of documentary resources?

To answer the question, we used the narrative review strategy, which allowed us to explore the literature and seek conceptual inputs on complexity, classification and Aristotle's hierarchy principles. This methodological basis, described by Elias *et al.* (2012) and Rother (2007), supported the choice of documents used, which sought to stick to seminal authors in the field and quality sources, whose contents supported the critical interpretation of the phenomena under discussion in this study.

After this introduction, this chapter is organized as follows: section two addresses the concept of complexity, seeking to relate it to the representation of knowledge, which encompasses all recorded knowledge, showing that this representation goes beyond disciplinary boundaries; section three describes the classification process and characterizes bibliographic classification systems; section four presents the principles of building hierarchies proposed by Aristotle, providing inputs for the process of grouping and forming classes in classification systems; section five discusses the classes of Borges' taxonomy (TAB) from the perspective of Aristotle's principles, seeking to highlight the lessons learned; and finally in section six, it concludes with the final considerations.

2 A LITTLE ABOUT THE CONCEPT OF COMPLEXITY AND THE CLASSIFICATION OF KNOWLEDGE

The specific meaning of complexity comes into play in a more forceful way only at the end of the 20th century, built by the transformations that occurred in the natural and mathematical sciences, which put the deterministic view of the world into suspicion (NEVES; NEVES, 2006). In this new scenario of uncertainties, Morin (2003) proposes the concept of complexity for a new notion of knowledge, because, according to the author,

> All knowledge is both a translation and a reconstruction, based on signs, signals, symbols, in the form of representations, ideas, theories, discourses. The organization of knowledge is carried out according to principles and rules that it is not appropriate to analyze here; it involves operations of connection (conjunction, inclusion, implication) and separation (differentiation, opposition, selection, exclusion). The process is circular, moving from separation to connection, from connection to separation, and, furthermore, from analysis to synthesis, from synthesis to analysis. That is: knowledge involves, at the same time, separation and connection, analysis and synthesis (MORIN, 2003, p. 24).

In this conception, knowledge is interrelated and, as such, there is no room for fragmentation and simplification.

Within the scope of Library and Information Science, Dodebei (2002) discusses the need for individuals to order their own knowledge, creating models of representation, because the "models derive from the human need to understand reality, apparently complex and are, therefore, simplified and intelligible representations of the world [...]" (DODEBEI, 2002, p. 19), which allow the

communication process. These representations, which we can call social, are, as Moscovici (2004) describes, representations under which human creatures

> conventionalize the objects, people or events they encounter. They give them a definite shape, locate them in a certain category and gradually place them as a model of a certain kind, distinctive and shared by a group of people. All new elements are added to this model and synthesized in it. Thus, we come to say that the earth is round, we associate communism with the color red, inflation as a decrease in the value of money. Even when a person or object does not exactly fit the model, we force it to take a certain form, to enter a certain category, in fact, to become identical to others, otherwise it will neither be understood nor decoded (MOSCOVICI, 2004, p. 34).

From this perspective, we can consider that representing and classifying are essentially human processes, carried out to understand the context in which the individual is inserted and the reality that surrounds him. In this regard, Torres, Tornay-Mejías and Gómez-Milan (1999) state that these categorization processes occur from multiple perceptions, in accordance with different learning situations of each individual throughout life.

Also for contemporary science, the complexity of the phenomenal world, which expands and crosses disciplinary boundaries, requires considering the existence of different views on the same situation, objects or animals (rational and irrational). Thus, reality shows that it is also "impossible for science to eliminate the complexity of the world, even if it is heavy and oppressive for all of us" (PENA-VEGA; NASCIMENTO, 1999, p. 10).

Considering that knowledge has information as its essential constituent element, Baptista, Araújo and Carlan (2010) identified three levels of information analysis: 1) intuitive level; 2) rational level; and 3) professional level. The intuitive level occurs when we process information for everyday situations, for example, when classifying plants and animals into edible and inedible. At the rational level, we have solutions for occasions in which variable levels of analysis are required, in diverse circumstances (professional, leisure), which emerge from explicit criteria, when, for example, Aristotle classified living beings into viviparous (hot and humid, like men and horses), oviparous (hot and dry, which have perfect eggs, like birds and reptiles) or insects (cold, which produce larvae), among others. The professional level encompasses situations of specialized mediation of information products and services for different user communities.

It is at the third level, the professional level, that issues related to training in Information Science are involved, as this is where the processes involved in the construction of classification systems fall. These processes require the analysis and systematization of information about a given domain for its representation. Evidently, in this activity the rational level of information analysis is also used, although it must be taken into account that there will always be ambiguous cases and that, to some extent, every classification will be prescriptive. For example, in biology, there is the case of platypuses, which are oviparous mammals, challenging their classification. However, the presence of

exceptions does not invalidate a classification nor the criteria that were adopted in the subdivision of classes, but only demonstrates that reality will always have more complexity than the classification systems created as representations can establish.

3 BIBLIOGRAPHIC CLASSIFICATION AND CLASSIFICATION SYSTEMS

Classification reveals a process of the mind that seeks to group things according to their degrees of similarity and separate them according to their degrees of similarity, being inherent in the way the human being places himself in the world to try to understand it. That said, it is necessary to emphasize the importance of categorizing and classifying for human living (ARANALDE 2009). Thus, classifying is, in fact, as useful as it is natural. The indefinite multitude of particular and changing events is faced by the mind as acts of definition, inventorying, listing, reduction to common entries and separation into groups (DEWEY 1922, *apud* CASSIRER, 1994). Borges (1985, p.125) warns that there is no classification of the universe that is not arbitrary and conjectural, since we do not know what the universe is. And this could dissuade us from planning human schemes, although we are told that these are provisional.

Thinking about the essence of classification, it can be said that we classify from similarities and differences, and, according to Foucault (2007, p. 24), it is from the similarity that "the order of conjunction and distance" is imposed, which the author named as *convenientia*: "things that, approaching each other, come to be paired are 'convenient'; they touch at the edges, their bangs mix, the end of one designates the beginning of the other". Foucault (2007, p.25) states that this chain of similarities causes a spatial convenience, imposing a relationship of similarity between things from the sign of kinship. It is then possible to ensure classification through a closed circle, because "similarity imposes neighborhoods that, in turn, ensure similarities".

It can be said that such characteristics apply to both science classifications and historically produced bibliographic classifications, since according to Bhattacharyya and Ranganathan (1974: 119, *apud* Pombo 1998), the difference between science classifications and documentary and library classifications lies precisely in the generally merely speculative character of the former in contrast to the immediate functional purposes of the latter. While the former are global schemes, theoretical systems that do not go into detail or get entangled in the minutiae of classifying restricted domains, the latter are minutely elaborated proposals, generally accompanied by a code in which each class is designated by a symbol (see the case of Melvil Dewey's decimal classification). Within the scope of specific training in Brazilian Library Science courses, bibliographic classification systems play a relevant role among the work activities of these professionals. "In fact, when we refer to bibliographic classification, we imply a classification based on the subjects dealt with in the documents" (PIEDADE, 1977, p. 65). Thus, as a documentary language, a bibliographic classification system enables the

> arrangement of books into classes of subjects, while assigning them places on the shelves, according to these subjects. According to their hierarchical structure, the classifications assign to each descriptor an indicator that can be formed by numbers, letters or a combination of numbers and letters, identifying which group it belongs to (SOUZA, 1943, p. 24).

These systems are composed of headings that represent concepts and objects of a domain, in a systematic and hierarchical way. And we add that, in addition to subjects, there are other elements that can be represented (document type, dates, places, etc.).

A bibliographic classification system consists of "a set of classes presented in systematic order; a distribution of a set of ideas by a certain number of partial, coordinated and subordinate sets" (PIEDADE, 1983, p. 29), or even a complete map of any area of knowledge, showing its concepts and their relationships (LANGRIDGE, 1977). Classification systems, according to Piedade (1983), have some attributes, the main one being the principle of classification or division; it must contain natural characteristics, inherent or inseparable from the object and artificial characteristics, the occasional, accidental and variable; and yet, a classification system must have consistent, exhaustive and mutually exclusive classes.

As for the types of bibliographic classification system, there are: i) philosophical classification systems, created by philosophers, in order to give order to sciences or things, also known as classification of beings; ii) social classification systems, applied by individuals to organize things, people, objects and phenomena, based on their own purposes and classification interests; iii) bibliographic classification systems, developed to establish relationships between documents in a collection, in libraries and information or documentation centers, to facilitate their location, also known as classification of knowledge. For the present article, only the third type will be dealt with here.

It is after the documentary explosion that occurred during the Second World War, when the traditional methods of documentation were no longer effective, that the documentary and librarianship classifications began to be developed in order to facilitate the automation of the relationships between the various classes of documents (POMBO, 1998). According to the author, from the 1970s onwards, library classifications definitely began to allow the electronic computerization of the documentary process.

San Segundo Manuel (1996) states that in the 19th century the French bibliographic classification system dominated, which was replaced by Anglo-Saxon systems, still at the end of that same century, as occurred with the Dewey Decimal Classification (CDD) system, developed by Melvil Dewey. After that, according to the author, the Universal Decimal Classification (UDC) system was disseminated, created by Paul Otlet and Henri La Fontaine, who innovated by creating a classification system capable of allowing synthesis, represented by the combination of numbers, relational symbols and other auxiliary tables. Next, the author indicates the proposal of Shiyan Ramarita Ranganathan,

who revolutionized library systems by including the possibility of multidimensional representation of the subjects dealt with in information resources, so that their parts could be common characteristics and attributes, distributed in a set of categories (Personality; Matter; Energy; eSpace; Time: PMEST), of the same subject.

In the context of Information Science training, especially in Brazilian Library Science courses, we distinguish between the terms categorization and classification. The first term can be conceptualized as amorphous groupings, that is, more abstract, which do not have a well-defined delimitation, and which refer to a set of things that lacks a fixed or stable form, thus being able to change according to the circumstances of representation (TAYLOR; JOUDREY, 2009). The second term, according to the authors, can be understood as a hierarchical structure that encompasses more comprehensive knowledge, with the primary purpose of organizing information resources from collections on shelves.

The philosophical principles that Aristotle applied determined categories to classify nature in a dichotomous way, following rules and criteria of association and distinction of classes, in hierarchies ordered and systematized by different, which, according to Kwasnik (1999), are still applied today in the construction of classification systems, content that is discussed in the next section.

4 ARISTOTLE'S PRINCIPLES OF HIERARCHY

According to Aristotle, knowledge can be grouped into ten categories, which is the greatest possible generalization. For the philosopher, this knowledge is evidenced from the phenomena that we can observe, and not by ideas about reality, which can be expressed by each of the ten categories, according to the following example:

Table 1 - Aristotelian categories of knowledge

CATEGORY	ELEMENT
Substance	Composition of a being, without its predicates (accidents): table
Quantity	Measure or count (length, volume, etc.): table is three meters long
Quality	Something to be said about the substance (triangular, round, sweet, etc.): rectangular table
Relation or relative	Relation to something else or complement for understanding: table is higher than chair
Place	Location (in relation to objects surrounding the substance): table is in the dining room
Time or date	a point in time in relation to extrinsic events: table bought in 1930.
Situation or position	Arrangement or position of the substance in relation to a place: table is in the center of the dining room

CATEGORY	ELEMENT
Possession or state or condition	What the substance has with it or the state it is in: table has one of its feet broken off
Action	Action or process in relation to substance: table with peeling paint
Passion	Effect suffered by the substance from an action performed by some agent: deteriorated table (due to peeling paint, for example).

Source: prepared by the authors (2023), based on Aristotle's categories.

Starting from Aristotle's principles, beginning with the basic substance "table", which has two elements: matter (potential for a set of possible realizations; it could be the name of the class) and form (realization of the substance, which differentiates it from other objects with different forms). The other nine categories express attributes linked to it, which can be modified without "table" losing its essence. By analyzing the set of attributes for the substance "table", we find a pattern that makes it possible to insert it into a particular class, a principle that can be used for its classification.

Looking at the universe of living beings, some animals seem to offer some difficulty to be classified. For example, we could have doubts in identifying whether whales, seals and porpoises are mammals or fish, a decision that has already been made by anatomists.

Aristotle was the first to try to classify all types of animals, in a dichotomous way. He grouped and distinguished animals according to their similarities and differences, as animals with blood (vertebrates), without blood (invertebrates), living in water and living on land, describing the characteristics of each of them.

It can be seen that the principle of the classification system that Aristotle modeled was not evolutionary, and that the species of each class had no specific genetic relationship with each other. Another principle of the philosopher was that he considered the essence of species as fixed and immutable. With his hierarchical view of things, Aristotle determined, as a principle, that beings could be grouped in order, from the highest (genus) to the lowest (species). From this fact was born the principle of binomial definition (real definition), under which each type of organism can be defined by the names of its "proximate genus" and "specific difference", placing each object in a family and differentiating them by some unique characteristic.

5 BORGES' TAXONOMY (BAT) AND ARISTOTLE'S PRINCIPLES: LESSONS LEARNED

As mentioned, the concept of *Complexity* and *Classification* are closely related. This conceptual link is justified simply by the fact that classification is considered an action inherent to the human being. This action presents itself in a contradictory way, since it is necessary, commonplace and, at the same time, exhaustively complex. According to Jansen (2008), classifying is a standard practice, used for a long time by the natural sciences. Thus, it is no wonder that, for two and a half

millennia, philosophers have reflected on classifications, from Plato and Aristotle to contemporary philosophy of science. And it is on this statement that the present article deals, in order to bring some reflections about such complexity through a "parody of a classification, namely: the supposed ancient Chinese classification of animals described by Jorge Luis Borges" (JANSEN, 2008, p. 159).

Like Jansen (2008), the present authors corroborate the statement that Borges' taxonomy is a sophisticated piece of literature and that it is a good example of a classification that presents several inconsistencies. It is believed that sometimes the best way to teach is through counterexamples, following a deconstruction approach to the construction of concepts on a given topic. Jansen (2008) states that many of the errors that appear as comical features of GRT also appear in the scientific databases we use daily. And to illustrate such complexity, the author presents, in his study, the terminology database of the *National Cancer Institute* (NCI) of the United States, the NCI Thesaurus.

In view of such elucidations and facts, a question arises: *What lessons can we learn from the TAB, which is a classification built for the representation of Chinese animals, in order to contribute to the teaching-learning of the classification of documentary resources*? For this question to be answered conclusively, it is necessary to recall the already conceptualized and known hierarchical principles proposed by Aristotle, described in section four, and then relate them to Borges' Taxonomy. Thus, the reflection will be more fruitful and assertive.

Aristotle was responsible for bringing up the concept of dichotomy of objects in genus and species, which consequently ended up decomposing the unified nature into a whole and the whole into parts: through classes, subclasses, consecutively and exhaustively. This process, according to Carlan (2010), must follow a series of ordered and systematized rules of association and distinction. According to the principles of hierarchy proposed by Aristotle, only an exhaustive observation can reveal each true attribute of an entity and only philosophy can guide us in determining the necessary and sufficient attributes for the members of a class. Only when the entity is correctly classified and its essential properties are identified can we say that we truly know it (CARLAN, 2010). In the Aristotelian context, there are the defining characteristics, which are used to define things, and it is these that contain the essential characteristics, which are a reference to the Aristotelian term "real essential" of things (AGANETTE, 2015).

In view of this, Kwasnik (1999) states that Aristotle's legacy survives in the spirit of modern classification applications and suggests some requirements for an adequate hierarchical structure: inclusiveness, genus/species, inheritance, transitivity, systematic and predetermined rules for association and distinction, mutual exclusivity, necessary and sufficient criteria, complete and comprehensible information, inheritance and economy in notations, inference, real definitions and high-level view and holistic perspective.

Thus, presented the hierarchical principles proposed by Aristotle, it is necessary to relate them to the TAB, and for this, the study of Jansen (2008) is used, where he discusses the short story of Jorge Luis Borges, also entitled by him as "The analytical language of John Wilkins", which mentions a Chinese encyclopedia. This TAB categorizes and classifies Chinese animals into 14 distinct groups:

1. those who belong to the emperor,
2. embalmed animals,
3. trained animals,
4. Piglets,
5. mermaids,
6. fabulous animals,
7. stray dogs,
8. the animals included in this classification,
9. animals that tremble as if they were mad,
10. numerous animals,
11. animals drawn with a very fine camel brush,
12. others (etcetera),
13. animals that have just broken a flower pot,
14. animals that look like flies from a distance.

Based on the assumption of Jansen (2008), that it is necessary to emphasize the importance of categorizing and classifying for human living, since the classification reveals the attempt of the human mind, which is always seeking to group or separate things according to their similarities, the motivating question of the present study is resumed, based on principles proposed by Jansen (2008), such as: (i) Reasoning; (ii) Structure; (iii) Disjunction; (iv) Thoroughness; (v) Clarity; and (vi) Uniformity and (vii) Explicitness and precision. These principles, according to the author, are indispensable for building good classifications (hierarchies), which were disregarded when building the TAB and the NCI Thesaurus as well:

> i) Ontological foundation: in this principle, to build good taxonomies, one should create and define classes by means of properties, based on their essential characteristics. This premise excludes class (12): others (etcetera) from TAB. And yet, another misconception of TAB can be verified, since it classifies things by their relative appearance, as for example in (14) "animals that look like flies from afar", that is, it does not classify things based on their essential characteristics, belonging to them.
>
> ii) Structure: Jansen (2008) points out that to meet this criterion, good taxonomies should consider the fact that types of things have subtypes: for example, in biology there are genera and species. In parallel, for the structure of a taxonomy, one should consider the

classes and their respective subclasses. In the TAB there is a class (5) "mermaids" and at the same level a class (6) "fabulous animals", i.e. they occupy the same hierarchical position in the taxonomy. Ideally, given the "structure" of a taxonomy, (5) "mermaids" should be classified as a fabulous animal, and consequently become a subclass of (6) "fabulous animals".

iii) Disjunction: this principle provides that in a hierarchy of types and subtypes, classes of the same level must have characteristics that distinguish them, i.e. something that makes them different from other classes. The author presents biological systematics as an example of such a principle: every animal that is a horse is also a mammal. However, types with the same level of biological classification must be arranged in different classes, since no animal can be a mammal and a reptile concomitantly. Thus, it is clear that the GRT does not fit the "disjunction" criterion, since it presents class (1) "those belonging to the emperor" which theoretically would include class (3) "trained animals", but which are hierarchically arranged at the same level.

iv) Completeness: taxonomies must have an exhaustive class structure, that is, comprehensive, that seeks completeness, and that encompasses all the entities they intend to include. This is an arduous task, since in the current informational and technological context, frequent and new discoveries are common. And as far as can be seen, Borges disregarded in his proposed taxonomy, which has nothing exhaustive, on the contrary, it presents superficial classes and generic superclasses, as in (12) "others (etcetera)", a class that because it is so generic, would welcome all other animals, that is, all other classes presented. Class 12 also shows the impossibility of classifying: in the classification, however exhaustive it may be and however much one tries to order all the elements, there is always one (others), which, by definition, is responsible for the "rest", and through this it is possible to include "everything" in the classification. It can be said that a class of this nature, puts to waste all the effort spent on a good taxonomy, since it makes it unnecessary to classify.

v) Clarity: this principle indicates that classes should be defined without ambiguity or double meaning, since good taxonomies do not use terms that denote ambiguity. And once again, the TAB does not meet this criterion, since it presents in its structure class (2) "embalmed animals", class (5) "mermaids", class (6) "fabulous animals", and class (11) "animals drawn with a very fine camel brush". These classes refer us to the concept of dead animals, which according to the author, is different from the meaning given when referring to live animals, such as pigs or dogs. He adds that it can also be said that the painted animals are not animals, but paintings in which animals are represented.

vi) Uniformity: the criterion of uniformity is that which is uniform, similar, coherent; harmonious, constant and regular. Thus, taxonomies must have a well-defined domain, in which hierarchies must deal with specific subjects. When verifying the presence of uniformity in the TAB, there are different criteria, such as class (1) "those belonging to the emperor" classified according to their owners, class (4) "piglets" classified according to their species, class (7) "stray dogs" classified according to species and the absence of an owner, class (9) "animals that tremble as if they were crazy" classified according to the momentary behavior of the animal, class (13) "animals that have just broken a flower pot" classified according to the consequence of the behavior and finally class (14) "animals that from afar look like flies" classified according to the appearance of an animal from the perspective of a remote observer.

vii) Explicitness and precision: good classifications are explicit and precise. Thus, in TAB classes such as (10) numerous animals and (12) others (etcetera), do not meet this important criterion.

The classification under review, which makes us laugh at first, also,

> with its reading, it disturbs all the familiarities of thought - ours: the one that has our age and our geography -, shaking all the ordered surfaces and all the plans that make the profusion of beings sensible to us (FOUCAULT, 1999, p. ix).

For the author, in addition to being a distorted classification, it refers us to China, a mystical place, according to the Western imagination. However, we must remember that this classification was constructed by a 17th century philosopher. Foucault (1999, p. 59) points out that "in the seventeenth and eighteenth centuries, the very existence of language, its old solidity as a thing inscribed in the world were dissolved in the functioning of representation; all language was valid as discourse". Thus, things and words are distanced, giving way to an ordering of "classes, a nominal grouping by which their similarities and differences are designated" (FOUCAULT, 1999, p. ix), without commitment to the things of the concrete and real world. According to the author, it is at this time that taxonomies proliferate, creating classes and groupings no longer based on infinite similarities and real things, but as things classified according to their identities and differences, based on a particular interpretation of things.

Foucault (1999) clarifies that after the nineteenth century this classification thought gave way to a biological approach, which considers each being in itself, based on its functions, and not in relation to the characteristics it possesses. In contemporary times, we consider that, within the scope of courses in the field of Information Science, classifications are aligned with the communicational episteme, since the instrument can represent different sociocultural practices and experiences, as a communication mechanism as a space of alterity. Based on this principle, complexity is inherently

linked to the creation of a classification, when, initially, it is necessary to define the target audience (profile, behavior, culture, ideology), the context and the purpose it will serve, because, in the end, the classification should be useful for the proposed purpose. It is also necessary to take into account that a classification will never be finished, since knowledge is dynamic and the classification, as a representation tool, should be constantly updated and revised. When building a classification for materials used in furniture, for example, we have to take into account that the "classification of materials increases in complexity as new materials are constantly launched on the market" (FERROLI *et al*., 2019, p. 656). The authors explain that

> The simplistic view of the use of traditional materials such as wood for the body of the furniture, fabrics for upholstery and metals in the hardware, commonly used in the project descriptions of the catalogs, is no longer accepted in modern furniture, that is, a greater detail of specification is necessary. Especially today, with an audience increasingly attentive to environmental and sustainability issues as a whole, the description of the origin, origin and artificiality of the materials used can be decisive in making a purchase decision (FERROLI *et al.*, 2019, p. 659).

Thus, the complexity of contemporary reality will require classifications to be flexible enough to accommodate constant updates without having to reformulate their entire structure.

If we were to create a classification of the Chinese animals that predominate in this country, we could have the following representation.

domestic animals
puppies
chickens
geese
cats
ducks
pigs
wild animals
Golden pheasant (*Chrysolophus pictus*)
Manchurian crane (*Grus japonensis*)
naja artra (*Naja atra*)
pika-de-ili (*Ochotona iliensis*)
Asiatic black bear (*Ursus thibetanus*)
aquatic animals
herring
mackerel
eels
alligator

lizards

lubina

oysters

frogs

salamanders

turtles

sharks

representations of animals in the zodiac

Gŏu (Dog)

Hóu (Monkey)

Hŭ (Tiger or Panther)

Jī (Rooster or Hen)

Lóng (Dragon or Crocodile)

Mă (Horse)

Niú (Ox, Buffalo or Cow)

Shé (Snake or Serpent)

Shŭ (Rat)

Tù (Rabbit or Cat)

Yáng (Goat, Sheep or Ram)

Zhū (Pig or Boar)

China is recognized as an environment of great animal biodiversity, with many species that are endemic, i.e. cannot thrive in other environments, and others that are considered sacred. This same set of terms could be classified differently if, for example, we were to consider the consumption of fresh meat from domesticated and wild animals in China.

6 FINAL CONSIDERATIONS

This study had as its central point to reflect on complexity as an inherent element in the classification activity, with a view to guiding teaching-learning in the training of information scientists, including archivists, librarians and museologists. The analysis was guided by Jansen's (2008) proposal, by the TAB, which is the taxonomy presented by Jorge Luís Borges (1981), and sought to answer the following question: *What lessons can we learn from the TAB, which is a classification built for the representation of Chinese animals, in order to contribute to the teaching-learning of the classification of documentary resources?*

The TAB was used as a heuristic tool to highlight and, thus, facilitate pointing out some of the mistakes that can be made in the construction of a classification system. These errors can be verified

not only in literary parodies, such as the one presented by Borges (1981), and scrutinized in this study, but also in the contemporary practice of classifications, precisely because classification is an activity involved in complexity. The TAB can be considered as a caricature of such errors, since it was created at a time when there was a break with the principle of representation, which generated a series of distortions in the creation of classes and groupings, in a reductionist simplification that can cause both laughter and discomfort.

We have seen that Foucault (1999) establishes that from the twentieth century onwards language becomes an object of study and, as a consequence, man, who works, produces and lives, is considered as the bearer of a discourse. Thus, there is an epistemic difference between the time of the creation of GRT and the classifications that are built in contemporary times, when there is a need for an analytical approach to things. In this analytical exercise, the gathering of the parts enhances the whole of the whole, as it is linked to the concept of complexity. And we conclude with the words of Morin (2007, p. 13) on this concept when he states that "complexity is a fabric (*complexus*: what is woven together) of heterogeneous constituents inseparably associated: it poses the paradox of the one and the multiple". And it is with this responsibility that classifications should be built and also used in the work activities of information scientists.

REFERENCES

AGANETTE, Elisângela C. Representação do Conhecimento Biomédico: Uma Investigação Sobre a Teoria Da Terminologia e a Teoria da Ontologia Aplicada no Domínio do Sangue Humano. 2015. Tese (Doutorado em Ciência da Informação) Escola de Ciência da Informação, Universidade Federal de Minas Gerais, Belo Horizonte, 2015.

BAPTISTA, D. M.; ARAÚJO JR., R. H.; CARLAN, E. Atributos dos Requisitos Funcionais para Registros Bibliográficos (FRBR). In: Jaime Robredo e Marisa Bräscher (Org.). Passeios no bosque da informação: estudos sobre representação e organização da informação e do conhecimento. Brasília DF: IBICT, 2010. cap. 3, p. 61-80.

CARLAN, Eliana; MEDEIROS; Marisa Bräscher Basílio. Sistemas de Organização do Conhecimento na visão da Ciência da Informação. RICI: R. Ibero-Amer. Ci. Inf., Brasília, v. 4, n. 2, p. 53-73, ago./dez. 2011.

DODEBEI, Vera Lúcia. Tesauro: linguagem de representação da memória documentária. Rio de Janeiro: Intertexto, 2002.

ELIAS, Claudia de Souza Rodrigues *et al*. Quando chega o fim?: uma revisão narrativa sobre terminalidade do período escolar para alunos deficientes mentais. SMAD: Rev. Eletrônica Saúde Mental Álcool Drog. (Ed. port.), Ribeirão Preto, v. 8, n. 1, p. 48-53, abr. 2012.

FERROLI, Paulo Cesar Machado et al. Materiais para móveis: proposta de classificação. In: VII ENCONTRO DE SUSTENTABILIDADE EM PROJETOS, 7., 8 a 10 de maio de 2019, Universidade Federal de Santa Catarina. Anais [...]. Florianópolis: UFSC, 2019.

FOUCAULT, Michel, As palavras e as coisas: uma arqueologia das ciências humanas. 8. ed. São Paulo: Martins Fontes, 1999. (Coleção tópicos).

JANSEN, Ludger. Classifications. *In*: MUNN, Katherine; SMITH, Barry (eds.). Applied ontology: an introduction. Frankfurt: Ontos Verlag, 2008. cap. 7.

KWASNIK, B. H. The role of classification in knowledge representation and discovery. Library Trends, FindArticles.com, 1999.

MORIN, E. A cabeça bem feita. Rio de Janeiro: Bertrand Brasil, 2003.

MORIN, E. Introdução ao pensamento complexo. 3. ed. Porto Alegre: Sulina, 2007.

MOSCOVICI, Serge. Representações sociais: investigações em psicologia social. Petrópolis: Vozes, 2004.

NEVES, C. E. B.; NEVES, F. M. O que há de complexo no mundo complexo? Niklas Luhmann e a Teoria dos Sistemas Sociais. Sociologias, Porto Alegre, v. 8, n. 15, p. 182-207, jan/jun 2006.

PENA-VEGA, A.; NASCIMENTO, E. P. Edgar Morin: o pensador de fronteiras. *In*: PENA-VEGA, A.; ALMEIDA, E. P. (org.). O pensar complexo: Edgar Morin e a crise da modernidade. Rio de Janeiro: Garamond, 1999. p. 7-20.

PIEDADE, Maria Antonieta Requião. Introdução à teoria da classificação. Rio de Janeiro: Interciência, 1977.

RIBEIRO, Flávia Nascimento. Edgar Morin, o pensamento complexo e a educação. Pró-Discente: Caderno de Prod. Acad.-Cient. Progr. Pós-Grad. Educ., Vitória-ES, v. 17, n. 2, p. 40-50, jul./dez. 2011.

ROTHER, Edna Terezinha. Revisão sistemática X revisão narrativa. Acta Paulista de Enfermagem, São Paulo, v. 20, n. 2, editorial, abr./jun. 2007.

SAN SEGUNDO MANUEL, R. Sistemas de organización del conocimiento: la organización del conocimiento en las bibliotecas españolas. Madrid: Imprenta Nacional del Boletín Oficial del Estado, 1996.

SOUZA, J. S. de. Classificação: sistemas de classificação bibliográfica. Rio de Janeiro: Imprensa Nacional, 1943.

TAYLOR, A. G.; JOUDREY, D. N. The organization of information. 3rd ed. Westport, CT: Libraries Unlimited, 2009.

TORRES, J. S.; TORNAY-MEJIAS, F.; GOMEZ-MILAN, E. La organización del conocimiento. In: _____. Procesos psicológicos básicos. MCGRAW-HILL: Madrid, 1999.

POMBO, O. Enciclopédia e hipertexto. Lisboa: Duarte Reis, 2006

BORGES, J. L. O idioma analítico de John Wilkins, in prosa completa. Barcelona: Bruguera, 1985a. v. 3, 109-113.

POMBO, O. Da classificação dos seres à classificação dos saberes. Leituras: Revista da Biblioteca Nacional de Lisboa, [*S.l.*], n.2, p.19-33, primavera 1998.

CARLAN, E. Sistemas de organização do conhecimento: uma reflexão no contexto da ciência da Informação. Dissertação de Mestrado, Universidade de Brasília, Brasília, DF, Brasil, 2010.

KWASNIK, B. H. The Role of Classification in Knowledge Representation and Discovery – 1. Library Trends. FindArticles.com. 1999. Disponível em: . Acesso em: mar. 2022.

DEWEY, J. Human, Nature and Coduct. New York: Holt & Co., 1922, p. 131 *apud* CASSIRER, Ernst. *Ensaio sobre o Homem*: introdução a uma filosofia da cultura humana. São Paulo: Martins Fontes, 1994. p. 113-4.

FOUCAULT, M. As palavras e as coisas. São Paulo: Martins Fontes, 2007.

ARANALDE, M. M. Reflexões sobre os sistemas categoriais de Aristóteles, Kant e Ranganathan. Ciência da Informação, Brasília, v. 38, n. 1, p. 86-108, abr. 2009 .