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**APPLICATION OF THE
'CONTENT ANALYSIS'
METHOD IN RESEARCH
ON INFORMATION
AND KNOWLEDGE
MANAGEMENT
PROCESSES AS
SUBSIDIES FOR
INNOVATION
GENERATION**

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Abstract: **Introduction:** It reports the evaluation of the application of the 'Content Analysis' method, more specifically the 'Categorical Analysis' technique for the collection and analysis of data in the development of a research that focused on the processes of information and knowledge management as subsidies for the generation of innovation in a business context. **Objective:** Demonstrate the relevance of using the qualitative method 'Content Analysis' applied in the field of Applied Social Sciences, more specifically in the field of Information Science. **Methodology:** It includes the description of the method, the universe and the subjects researched, the description of the data collection and the process of construction of the analysis categories. **Results:** The application of the 'Content Analysis' method, specifically the 'Categorical Analysis' technique, made it possible to understand the investigated topic in depth, proving to be adequate to the proposed initial objectives and the type of investigation, resulting in a consistent analysis. **Conclusions:** Regarding the analyzed theme, the investigated institution lacks an informational culture, since isolated actions of information management and knowledge management are perceived, which, in turn, are not inserted in institutionalized organizational management processes and, thus, do not exploit their potential. It was evidenced that some activities of information management and knowledge management are already practiced, realizing which ones need to be adopted in order to implement an effective model focused on the generation of innovation, a determining factor for the generation of innovation and that reveals itself as a contribution to the institution.

Keywords: Content analysis, Category Analysis, Information management, Knowledge management, Innovation Generation.

INTRODUCTION

The 'Content Analysis' is a versatile qualitative research method, applicable in different domains and in different informational supports, such as: written, oral, iconic (signs, graphics, photographs, films, etc.) and other semiotic codes (such as: music, objects, and behaviors). It can be applied in communications of a single person, of dialogues between two people or of a restricted group or, still, of mass communication.

Considering the versatility of the 'Content Analysis' method, this article is dedicated to analyzing its application in a research developed in the field of Information Science.

In this context, it presents the steps of the application of the qualitative method 'Content Analysis' in an investigation carried out in an organizational context, which sought to know which are the Information Management (IG) and Knowledge Management (KM) processes used for the generation activities of innovation.

The general objective is to demonstrate the relevance and feasibility of using this qualitative method for the collection and analysis of data in a research in the area of Applied Social Sciences, more specifically in the field of Information Science.

It must be noted that, in order to preserve the institution that constituted the research universe, identification data were suppressed, without any prejudice to the proposal of the article, whose focus lies in the application of the 'Content Analysis' method.

METHOD: 'CONTENT ANALYSIS'

Although the origin of the qualitative method 'Content Analysis' has reference in the Middle Ages (TRIVIÑOS, 1987; RICHARDSON, 1999) it is from the second half of the 20th century that this method starts to be applied both in the instrumental conception, focusing on the quantitative aspect; and in

the representational conception, focusing on the qualitative aspect (VALENTIM, 2005, p.120) and even providing a combination of both approaches. "In quantitative analysis, what serves as information is the frequency with which certain characteristics of the content appear. In qualitative analysis, it is the presence or absence of a given characteristic that is taken into consideration" (BARDIN, 2009, p.23).

Krippendorff (2013) considers the 'Content Analysis' method to be the most important set of research techniques in the field of Social Sciences, as it allows not only the analysis of information supports, but also analyzes the message (text, image, sound or sign), considering the context in which it was created, a factor that, according to this author, distinguishes it from other research methods. Lima and Manini (2016) believe that 'Content Analysis' is characterized as a method capable of unraveling symbolic and polysemic aspects present behind the discourse.

Bardin (2009) highlights that 'Content Analysis' is an empirical method, which can be reinvented according to the type of 'speech' to which it is dedicated and the interpretation that is intended. It can be applied in communications that involve from a single person to mass communications, in written, oral, iconic linguistic contexts and semiotic codes such as objects and behaviors.

The 'Content Analysis' is organized into three phases: pre-analysis; material exploration; treatment of results, inference and interpretation.

The pre-analysis aims to systematize the initial ideas, being the basis for the development of the following phases. It usually includes the choice of documents to be submitted for analysis, the formulation of hypotheses and objectives, as well as the elaboration of indicators that support the final

interpretation (BARDIN, 2009, p.121). The exploration phase comprises the coding of the material that composes the analysis corpus, based on previously established criteria. The treatment of results condenses and highlights the information provided by the analysis, and can result in tables, diagrams, figures and models. In view of this, the researcher proposes inferences and interpretations regarding the previously determined objectives.

In 'Content Analysis' different techniques can be used, such as: 'Category Analysis'; 'Evaluation Analysis'; 'Analysis of Enunciation'; 'Propositional Discourse Analysis' and 'Expression Analysis' (BARDIN, 2009). In the context of the research described here, we chose to use the 'Categorical Analysis' technique, which "[...] works by breaking up the text into units, into categories according to analogical regrouping" (BARDIN, 2009, p.199).

López Noguero (2011) mentions the importance of inference in the context of 'Content Analysis', since it makes it possible to analyze a large amount of material, focusing on ideas and not the style or structure of the text, code or object analyzed. According to this author, 'Content Analysis' moves between two poles: the rigor of objectivity and the fecundity of subjectivity: finding ways to analyze not only what is apparent, but also what is latent, 'unspoken', present between the lines.

As noted, 'Content Analysis' consists of a method that can be applied in different contexts, being quite suitable for qualitative research in which it is necessary to identify the presence or absence of certain investigated aspects. Therefore, knowledge about the universe and context to be analyzed, data collection and the definition of analysis categories, constitute the themes addressed in the next sections.

MATERIALS AND METHODS

The qualitative research, characterized as exploratory descriptive, has as research universe an institution of vocational education, part of a complex of national vocational education, more specifically a management aimed at promoting innovation.

Qualitative research is due to the fact that the researched object is a social, complex and unique phenomenon. The descriptive and exploratory characteristics of the research make it possible to rescue, through observations and analysis, information about a given reality. Thus, the research covers the elaboration of instruments for data collection, followed by their application and, finally, the analysis and presentation of the results.

As mentioned in the introductory section, among the techniques that make up the scope of the 'Content Analysis' method, 'Categorical Analysis' was applied to interpret the data obtained from the information available on the intranet and institutional website and also from the application of a semi-structured interview script applied to the subjects surveyed.

The researched universe refers to an institution of vocational education, more specifically the management responsible for the institution's innovation processes.

DATA COLLECTION AND ANALYSIS PROCEDURES

Data collection was carried out in three stages: 1) analysis of information available on the intranet; 2) analysis of information available on the website; and 3) interview with selected subjects from the researched institution and management.

For data collection on the institutional intranet, a script was prepared, based on the 'Base Activities of Information Management' and 'Base Activities of Knowledge Management' by Valentim (2004). The

instrument aims to investigate the 'presence' or 'absence' of IM and KM core activities in electronic organizational environments intended for the internal public (intranet).

The elaboration of the instrument for data collection on the website was also carried out based on the description of the 'Base Activities of Information Management' by Valentim (2004), considering only the steps of the IM process relevant to communication with external customers.

A semi-structured interview script was also developed, characterized by supporting the interviewer without, however, delimiting or influencing the interviewee's participation when explaining the questions formulated.

The semi-structured interview script was elaborated based on the 'Base Activities of Information Management' and on the 'Base Activities of Knowledge Management' by Valentim (2004) and also on the 'Three Arenas of Use of Information' by Choo (2006). The instrument was divided into 4 (four) modules which, in turn, were divided into blocks, in order to translate the categories of analysis and contribute to the achievement of the objectives initially proposed in the research.

The instrument for data collection 'Script for semi-structured interview' was applied to selected professionals, members of the researched institution and management. The option for selected representatives instead of a quantitative sample is due to the fact that in the defined universe, subjects with a high degree of influence and decision-making power are sought. In this context, 4 (four) subjects were elected to participate in the interviews, more specifically the occupants of the following positions: Manager (Interviewee A); Innovation Agents (Interviewees B, C and D).

DATA ANALYSIS PROCEDURES

As mentioned earlier, the analysis of

the collected data was carried out through the application of the 'Categorical Analysis' technique, described by Bardin (2009) as the oldest among the techniques of the 'Content Analysis' method. The option was for semantic categories.

According to the aforementioned author, the categories must be established observing the following characteristics: mutual exclusion; homogeneity; relevance; objectivity and fidelity; and productivity.

The categorical analysis of the data collected through the instruments developed (script for analyzing intranet information, script for analyzing information from the website and semi-structured interview script) provided not only the analysis of what is explicitly stated by documents and by the interviewee, but also also the analysis of information and phenomena present subliminally in the discourse.

ANALYSIS AND PRESENTATION OF RESULTS

As explained in the previous section, three different instruments were used to collect data from three different sources: information available on the intranet; information available on the website and information collected through interviews. As the research universe consists of a single institution, the collection from different sources was important, as it made it possible to identify different points of view on the researched topic:

- What the organization communicates to internal customers;
- What organization communicates to external customers;
- What responsible employees say about innovation-related processes.

Ten categories of analysis were established (Chart 1), in order to consider the presence or absence of themes related to the categories

and, also, the registration units, extracted from the intranet, the website or the speech of the interviewees.

CATEGORIES INSTITUTED FOR DATA ANALYSIS

The categories for analysis of the collected data were defined and prepared based on the following IG and GC models mentioned in 'Section 4 – Procedures for Data Collection'. From these models, it was possible to elaborate the data collection instruments, resulting in 10 (ten) categories of analysis (Chart 1).

Table 1 presents all the categories of analysis used in the research, however, each data collection was responsible for the application of certain categories, as shown in figure 1.

The definition of which categories to apply to the analysis of data collection from one or another instrument was due to the source of data collection. Thus, the analysis resulting from the application of the instrument for data collection on the intranet, considered only the IG categories, since the collection revealed that there were no analyzable elements referring to the GC and the Information Flows (IF) on the intranet.

Likewise, the analysis resulting from the application of the instrument for data collection on the website only considered the categories 'Identification of Information Needs and Requirements'; 'Development of Information Products and Services' and 'Distribution, Dissemination and Transfer of Information'. Finally, the resulting analysis of the interview script covered all categories, due to the possibility of direct contact with the interviewees.

SUMMARY OF DATA ANALYSIS AND RESULTS

The first 6 (six) categories of analysis focused on GI and its respective stages, seeking to identify its presence in the processes

Category	Inferences
1. Identification and information requirements	<ul style="list-style-type: none"> • Organizational culture focused on information sharing; • Informational communication using ICT; • Structured channels for expressing doubts and/or contributions.
2. Obtaining and entering information	<ul style="list-style-type: none"> • Information prospecting; • Information collection and filtering; • Information monitoring.
3. Treatment and presentation of information	<ul style="list-style-type: none"> • Information selection; • Analysis, organization, storage of information.
4. Development of information products and services	<ul style="list-style-type: none"> • Adding value; • Information products; • Information services.
5. Distribution, dissemination and transfer of information	<ul style="list-style-type: none"> • Distribution; • Dissemination; • Transference.
6. Analysis and use of information	<ul style="list-style-type: none"> • Culture of access and use of information; • Rules and standards for the use of information; • Cycle feedback.
7. Creation of meaning	<ul style="list-style-type: none"> • Organizational culture aimed at generating innovation; • Use of tacit knowledge to support innovation; • Mapping the tacit knowledge of organizational subjects.
8. Knowledge construction	<ul style="list-style-type: none"> • Systematized procedures for converting tacit knowledge of organizational subjects (externalization and/or socialization); • Actions and spaces to promote creativity; • Development of skills and abilities aimed at generating innovation.
9. Decision making	<ul style="list-style-type: none"> • GI information products and services that support the decision-making process; • Systematized procedure for IM and GC applied in the decision-making process.
10. Information flows	<ul style="list-style-type: none"> • Structured process for circulating information relevant to innovation; • Structured process of socialization and externalization of knowledge relevant to innovation.

Table 1: Categories for data analysis and respective inferences.

Source: Own elaboration (2017).

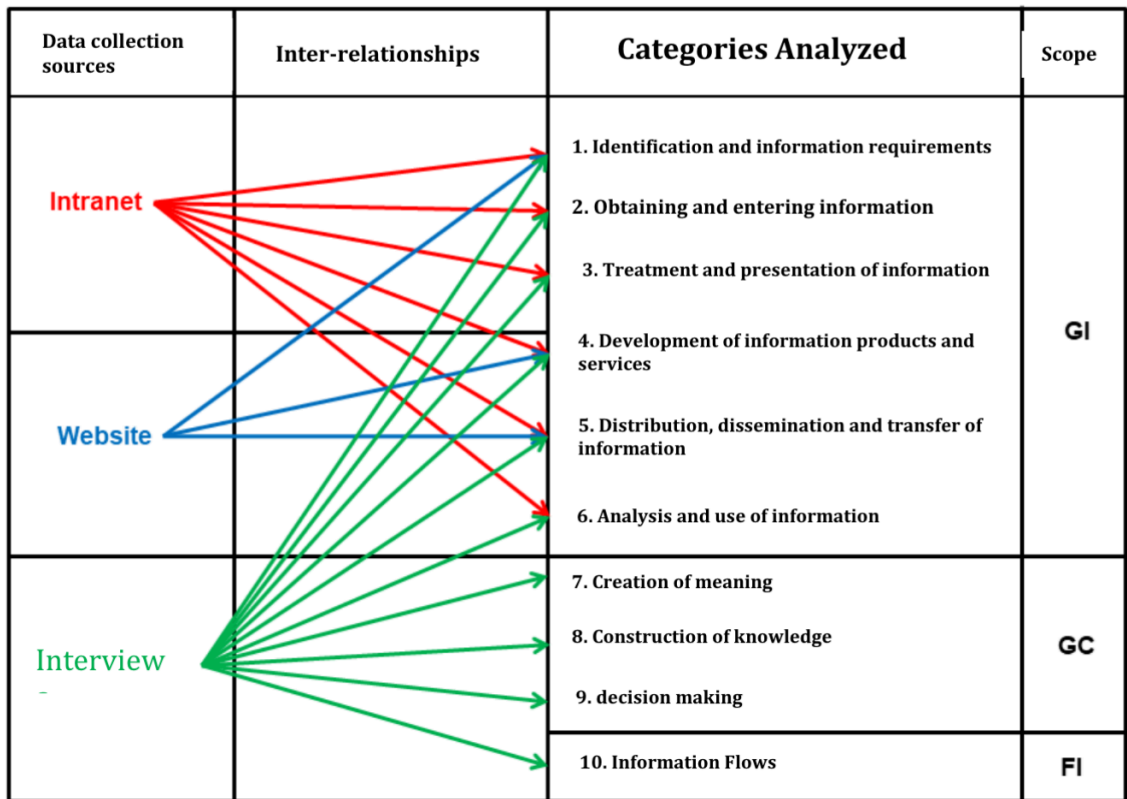


Figure 1: Data collection sources and analyzed categories.

Fonte: Elaboração própria (2017).

and routines of the researched institution. Categories 7 (seven), 8 (eight) and 9 (nine) focused on KM, and category 10 (ten) focused on the perception of information flows.

The 'Content Analysis' highlights relevant elements in which the institution already operates, such as information prospecting, development of information services and products, and development of skills and abilities aimed at generating innovation. However, elements such as the monitoring of prospected information, information transfer, norms and standards for the use of information, systematized procedures for the use of IM and KM in decision-making processes lack attention and indicate that the institution still does not have processes of GI and GC implemented and consolidated.

With regard to IF, they certainly exist, but they are not recognized and worked on, which certainly leads organizational subjects not to know about their existence and, therefore, not to use valuable information that transits in formal and informal flows.

Aspects of organizational culture, for example, for the creation of spaces that promote creativity, sharing and use of information and knowledge aimed at generating innovation, demonstrate that they are partially present. It is noteworthy that the organizational culture is extremely relevant in the implementation and success of IM and KM processes.

FINAL CONSIDERATIONS

Understanding how the researched institution, potentially a member of the

Brazilian SNI, uses information and knowledge and the respective ways of managing these resources to generate innovation, proved to be an essential proposal for the organization itself and, also, for the development of the SNI.

The application of the data collection instruments 'Route for the Analysis of Information Available on the Intranet' and 'Route for the Analysis of Information Available on the Website' showed which GI activities are declared in the forms chosen by the institution for its communication with the internal public and external respectively, and the application of the instrument 'Semi-structured Interview Guide' revealed which IM and KM actions the professionals involved with innovation-oriented processes recognize as present in the organizational environment.

The application of three different instruments for data collection in the same research universe provided a significant contribution, as it was possible to collect data from different sources of information. There is a lack of consensus regarding the perception

of what information and knowledge are relevant to innovation and how to make use of these elements. Thus, the 'Content Analysis' indicates the absence of an informational culture, as IG and GC actions are seen to be watertight and, precisely because they are not part of an implemented management process, they do not fully exploit their effectiveness.

The use of the 'Content Analysis' method, specifically the 'Categorical Analysis' technique, made it possible to understand the investigated topic in depth, leading to the conclusion that the information and knowledge management processes are not effectively applied to subsidize the generation and management of innovation, in the researched institution. The application of this method proved to be adequate for the proposed initial objectives and the type of investigation, resulting in a consistent analysis that indicates which IG and GC activities are already practiced by the institution, and which need to be adopted in order to implement an effective model with focus on generating innovation.

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