

Organizational Learning: Informal Learning as a Strategy of Knowledge and Support for the Decision-making of Managers of the Federal Institute of Rondônia

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Abstract—The objective of the research is to analyze how the managers of an Institution of the Federal Network of Education learn, that is, what strategies of learning use in the work and if the informal learning is seen like strategy to obtain knowledge and is influenced in the decision making of the managers. For this, a research was developed with Likert scale, mixed, descriptive, type of case study. The universe of this research was 125 managers. The participation of 57 managers was obtained. The research instruments developed were adapted from Brandão [6]. It was verified that informal learning is seen as a tool for obtaining knowledge and it was inquired whether informal learning influences the decision-making of managers. The data treatment was performed using paraconsistent logic. The results showed that the managers of the research institution learn mainly through the active reflection strategy and the search for interpersonal help. It was identified that Informal Learning is seen as a strategy to obtain knowledge and is taken into account in the decision process, consequently, influencing managers in their decision-making.

Keywords—Organizational and informal learning, Knowledge and Decision Making, Logic Paraconsistent.

I. INTRODUCTION

In a totally dynamic, competitive and interconnected world, there is the moment when the organizational environment is increasingly changing, so that managers are led to rethink the way they act within organizations. In recent years there has been a growing interest in the learning process in the organizational context, fueled by the belief that learning is essential for survival in dynamic

environments, and that organizational learning is addressed as an important factor that positively impacts innovation [25].

For Nespolo and Dias [22] the result of learning is knowledge, since knowledge is linked to beliefs and commitments, aiming to reach a certain end. In fact, organizational decision-making is achieved through people, who carry out actions based on their learning, information processing and knowledge skills [33].

According to Miller, Hickson and Willson [21], the decisions of a more strategic nature, that is, decisions that happen in a more managerial degree and escape to the routine and the normality, end up determining that the administrator looks for new ways, new alternatives and information. This shows that the more uncertainty a decision has, the more likely it is for individuals to seek new knowledge and new sources of information, for learning strategies, and for structured formal learning.

Maluli [19] brings that schools, colleges and universities are organizations that develop formal learning processes within which individuals are expected to learn new knowledge, develop skills, and be able to make decisions. However, in addition to classrooms, teachers and students, there are a variety of managed and strategic procedures to be established and fulfilled, which, in a way, brings an educational institution closer to a company. Thereby, in the face of the valuation of the public manager, it is necessary to investigate the perception of these in relation to learning [10].

The research environment is an Institution of the Federal Network of Education located in Rondônia. The Federal

Institute of Rondônia (IFRO) has 9 Campuses implanted and 01 Rectory.

In this scenario it is necessary to think about learning beyond the formal strategies of teaching and its various modalities (face-to-face, virtual); the informal environment must be taken into account. Given the above, it is relevant to research on organizational learning and to identify the importance of informal learning for these public managers.

Given the context presented, the present study aims to analyze how managers learn by verifying whether informal learning is valued as a knowledge strategy and used for decision making in the management of the public organization studied. More specifically, to identify the learning strategies used by the managers in the work, to verify if the informal learning is seen as a strategy of knowledge and to analyze if the informal learning influences in the managerial decision making in the researched organization.

The research was carried out with 57 managers. For the application of the quantitative approach, we opted for the survey method. The research has consistent data and a good reliability of the data, proven by means of Cronbach's Alpha coefficient and Paraconsistent Analysis.

The results showed that managers use the "active reflection" and "search for interpersonal" strategies, using the Brandão [6] scale, which obtained a concordance of the factor considered substantial, it was also verified that the managers consider the AI as a tool to gain more knowledge in their work environment and that informal learning almost always influences the decision-making of respondents.

The article is divided into five parts. This first one, already described, presents an initial contextualization, the second brings the theoretical referential, the third reports the methodological procedures, the fourth presents the analysis of the data and the last one emphasizes the final considerations of this research.

II. REVIEW OF LITERATURE

Organizational Learning

Learning, in the organizational context, can be considered as a response to changes faced by organizations, since it seeks to develop the capacity to learn continuously, based on organizational experiences, and translate such knowledge into practices that contribute to a better performance [28].

Studies about learning in organizations have increased in recent years, especially those related to theories and tools that provide means for greater efficiency of people or processes, as well as for the management of knowledge acquired by individuals in their professional routines [30].

The learning process aims to promote changes in the cognitive, psychomotor and attitudinal domains, and may occur both to respond to current work needs and to develop relevant skills for future activities [1]. This process may be implicit or explicit, formal or informal [30; 27].

Informal Learning

The formal learning and training methods, such as courses, lectures and workshops represent the main tool structured by organizations with respect to the field of learning of individuals [30]. However, it should be noted that these types of learning resulting from practical work situations do not appear in isolation. There is an interaction in the course of the development of daily activities [34].

Santoro and Bido [27] corroborate that formal strategies are generally planned by the company, while informal strategies are used by people as a way of solving a more immediate problem.

Antonello [3] brings a summary of the most important aspects of informal learning, which is set out in Table 1:

Table. 1: Synthesis of the main aspects of informal learning. Source: Antonello (2005).

Informal Learning	
Definition	It is an activity that involves the pursuit of understanding, knowledge or skill. It occurs outside the curriculum that constitute educational programs, courses or workshops.
Emphasis	It implies valuing not only the relational side (the role of the individual within a social group), but also the quality of learning. It usually involves some degree of awareness that the person is learning.
How it occurs	It can occur from a formally structured experience, based on specific activities for this purpose. It can be planned or unplanned. It can occur in communities of practice.
Result	The individual can acquire skills by being involved in an ongoing process of learning. Learning is not just reproduction, but reformulation and renewal of knowledge and skills.

Barros et al. [5] brings that the approaches in informal learning research in organizations are the following: cognitive, behavioral and sociocultural. The cognitive perspective considers learning from the information process that occurs within the cognition of each individual, starting from the operational to the conceptual level. The behavioral perspective focuses on the action,

that is, the responses of the individuals after the stimulus of a learning process. However, it does not focus on the cognitive process and the context that the individual is inserted. The sociological view considers the meanings, actions and knowledge acquired by the individual, the result of social and collective practices. In this way, the organizational learning is based on the culture, the socialization and the practices of the individuals [13]. According to Svensson, Ellstron and Aberg [29], the central point of departure for informal learning is for people to act, to perform tasks, to make affirmations, to solve problems, and to cooperate with others. The interaction between the individual and the environment occurs continuously and this forms the basis for the learning process.

Learning Strategies

For Deo [12], the world of work has undergone constant changes that have repercussions on the way organizations and workers learn the skills needed for professional performance. As the people do not learn in the same way, it is necessary to understand each person's learning strategy, from how each individual hold information, how they mentally order it, and even how they transform it into action.

Strategies of learning at work can be understood as practices that people use to help acquire knowledge and skills in their professional context [17; 7].

Leading into consideration the need to improve some items of the Holman, Epitropaki and Fernie [17] scale, they better represent the idea of the individual's effort to learn something. Brandão [6], in his work, proposed the validation of a new scale as well as to investigate the frequency with which employees of a Brazilian public bank used such strategies. The description of the types of strategies used in the Brandão Scale is presented in Table 2.

Table. 2: Learning Strategies of the Learning Strategies Scale at Work. Source: Brandão (2009).

Strategy	Description
Active reflection	Reflection of the individual on the component parts of his work, as well as the reflection of mental structures that relate the work of the person to different aspects of the organization.
Search for help Interpersonal	Active search of the individual for the help of other people.
Search for help in written material	Research and localization of information in documents, manuals, regulations, books and other non-social sources.

Reproduction	Memorization of information without reflection on its meaning.
Practical application	The individual's attempt to learn through experimentation.

Brandão and Borges-Andrade [7] affirm that, although these strategies are conceptually distinct, the study did not show empirical differences between them. As these strategies have the same cognitive bias, respondents appear to have understood these items as representative of the same practice. According [10], this may have arisen from the occupational role of the respondents, who were managers, and understood by their professional practice that it is not possible to dissociate the two types of reflection.

Organizational Knowledge Management

Frizzo and Gomes [14] affirm that acquiring knowledge is not limited to data that individuals capture on a daily basis in the organizational environment, but also when that information becomes information that is correctly passed on and understood by the same, that is, when the information is understandable and helps in the development of the organization.

Organizational knowledge, according to Nonaka and Takeuchi [23], is based on the identification of tacit knowledge treating it as the main element in the creation of organizational knowledge. This understanding makes clear the direct dependence of knowledge on people and, of course, on human action, which involves the creation of an organizational environment conducive to the development of skills such as autonomy, creativity, sharing and availability of information.

D'Arisbo et al. [11] brings that knowledge is subjective, aesthetic and created by practice. The consequence of this is that knowledge affects and is affected by the environment at all times. In this sense, the human being must be understood, since he is an essential part of the knowledge process.

In this way, it is perceived that the definition of knowledge is linked to movement-fluidity, action, intention-and thus is a mechanism of strategic importance in an organizational world of constant change.

Organizational Knowledge Management

For Nespolo and Dias [22], decision making is a procedure that is present in all activities carried out, whether organizational or not. As a process that favors the effectiveness of decisions, organizational learning has received increasing attention in debates in the country's academic, editorial and business circles, as described in Valladares and Leal Filho [31].

Recent studies on decision-making, such as those by Reis and Löbner [35], Oliveira, Miranda and Amaral [24] are examples of national surveys that demonstrate the growing interest in the subject.

For Caravantes et al. [8] decision-making can be approached in many ways, but generally the main ones are: the rational and the behavioralist. It stands out by the model behavioralist has:

1. The decision maker has imperfect information (incomplete and possibly inaccurate).
2. The decision-maker has a defined rationality and is restricted to values, experience, habits, etc.

Ansoff [2] brings the classification of the decision making as to its scope, shown in Table 3:

Table. 3: Classification of the decision making regarding its comprehensiveness. Source: Ansoff (1965).

Classification	Concept
Strategic	More related to the external environment of the organization. Top management responsibility.
Administrative	They refer to the structuring of resources in order to optimize performance, related to the organization and to the acquisition and development of resources. They are usually associated with intermediate levels of management, managers.
Operational	Concerning the problems of the day to day, aiming the optimization of efficiency. They absorb considerable attention and energy. Usually delegated to lower hierarchical levels. Although different decisions are interdependent and complementary.

According to Gontijo and Maia [15] "decision-making happens all the time, at all levels, and directly influences the performance of the organization (...). In fact, it is impossible to think of the organization without considering the constant occurrence of the decision-making process". Thus, the decision-making process is the regulatory point of organizations, making it conceive lines of thought that would guide it to a specific point in the future [24].

III. METHODOLOGY

For the application of the quantitative approach, we opted for the survey method, which is characterized by the use of well-defined variables [20]. A survey, according to Babbie [4], can have three purposes, the one used in this research was descriptive and the model used was the

intersectional one. The research was carried out through questionnaires read and filled directly by the managers, by means of an *online* tool, in nine campuses of the institution studied and rectory.

The universe studied was 125 managers of the Federal Institute of Rondônia (IFRO). It was obtained the return of 46% of the managers of the researched institution, that is, 57 managers belonging to the Management Positions and Gratified Function.

To measure the reliability of the data using the Cronbach Alpha model, the IBM SPSS Statistics software was used. Reliability, that is, "the degree to which a variable or set of variables is consistent with what we intend to measure" [16].

The data collection instrument described 28 strategies, in which respondents should indicate the frequency with which they use each one at work, using a Likert scale of five points, ranging from 1 (Never do) to 5 (I always do).

IV. DATA ANALYSIS

In the category of practical application, we emphasize the proposition 25 that obtained as a degree of agreement the value of 78.9, considered thus, moderate degree, alias all the prepositions of this strategy fit, by their values, in the degree of moderate agreement.

Table 4 presents a summary of the interpretation of the degree of agreement of the factors.

Category	GCF	Interpretation
1- Active reflection	86,04	Substantial concordance
2- Search for interpersonal help	80,35	Substantial concordance
3- Search for help in written material	75,44	Moderate concordance
4- Reproduction	69,72	Low concordance
5- Practical application	75,44	Moderate concordance

Table. 4: Interpretation of the degree of agreement of the factor (GCF). Source: Prepared by the authors (2019).

Looking at Table 4, analyzing the degree of agreement of the factor (GCF), it can be seen that the "active reflection" strategy is the one most used by the researched managers, who seek to learn, from the reflection on component parts of their work. This category obtained as a degree of agreement of the factor (GCF) 86.04, considered in this way, with a substantial agreement of the managers.

Next, we have the category "search for interpersonal help" as the most used by managers, with the (GCF) of 80.35 obtaining also as an interpretation of the value, of substantial agreement. According to Brandão [6], this category consists of the active search of the individual for

the help of other people, that is, they seek the help of more experienced colleagues, the same team and even other areas of work within the institution to learn.

Costa's research [10] showed that the "search for interpersonal help" was used primarily by the respondents, which differs from this research, which brought the category as the second most used, but what highlights the same as important for the management.

The strategies of "search for material help", "practical application" and "reproduction" are the least used by the managers of this research. But these seek to learn, respectively, from the research in documents, manuals, norms, books and other non-social sources; seek to learn in the workplace by testing in practice new ways of performing the work and encompassing new knowledge,

and in addition, it finds that the managers participating in the research memorize the information without reflection on its meaning. The first two strategies cited above have moderate agreement with the same value of agreement degree 75.43 and the reproduction category has a lower agreement, considered low, with the degree of 69.69.

After step 1 we present the analysis of the paraconsistent logic made on the propositions of learning strategies, as shown in Figure 1. In step 2, after the transduction process, we have an "OR" and "AND" network for the 5 learning categories. According to Carvalho [9] in the "OR" connectivity the output is the highest value of the two inputs and in the "AND" connective the output is the smallest value of the two inputs.

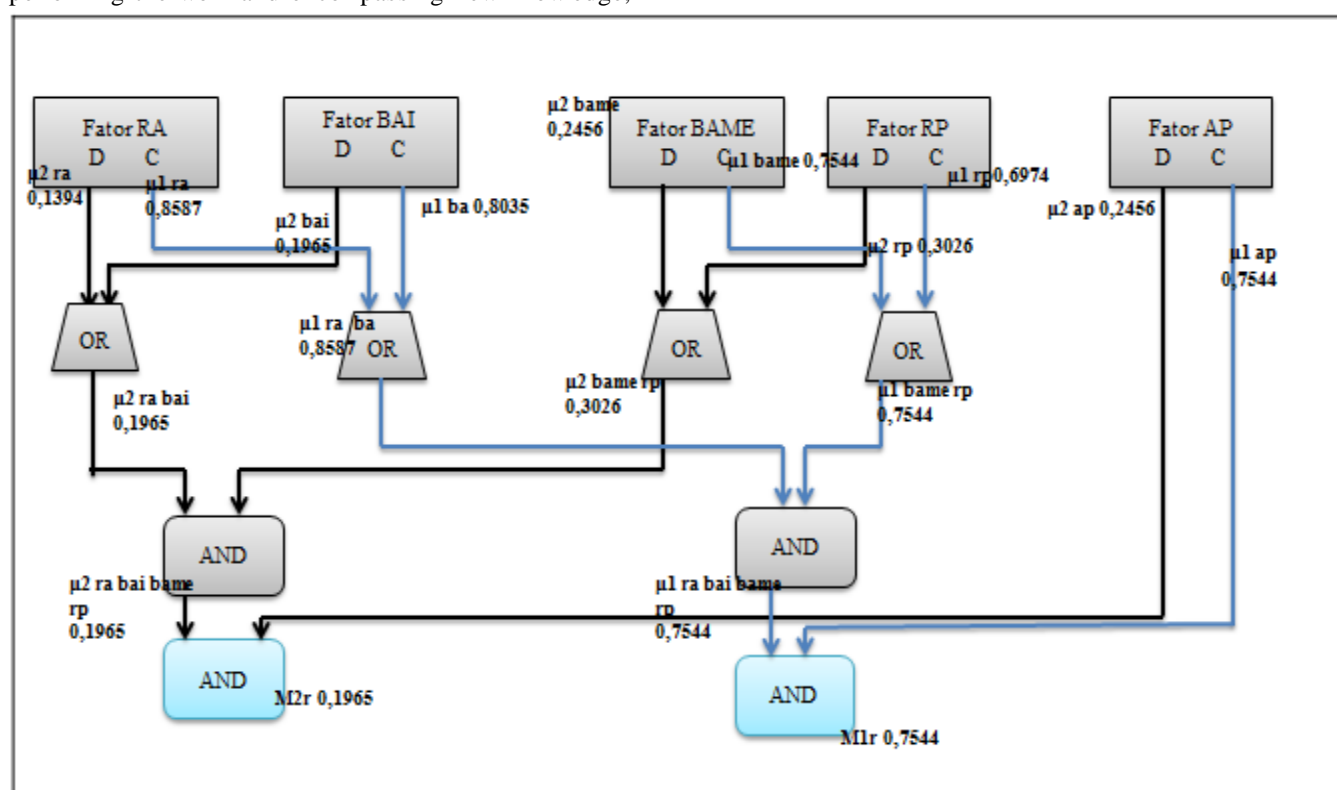


Fig.1: Analysis by the Paraconsistent Logic of the propositions regarding the Learning Strategies. Source: Prepared by the authors (2019).

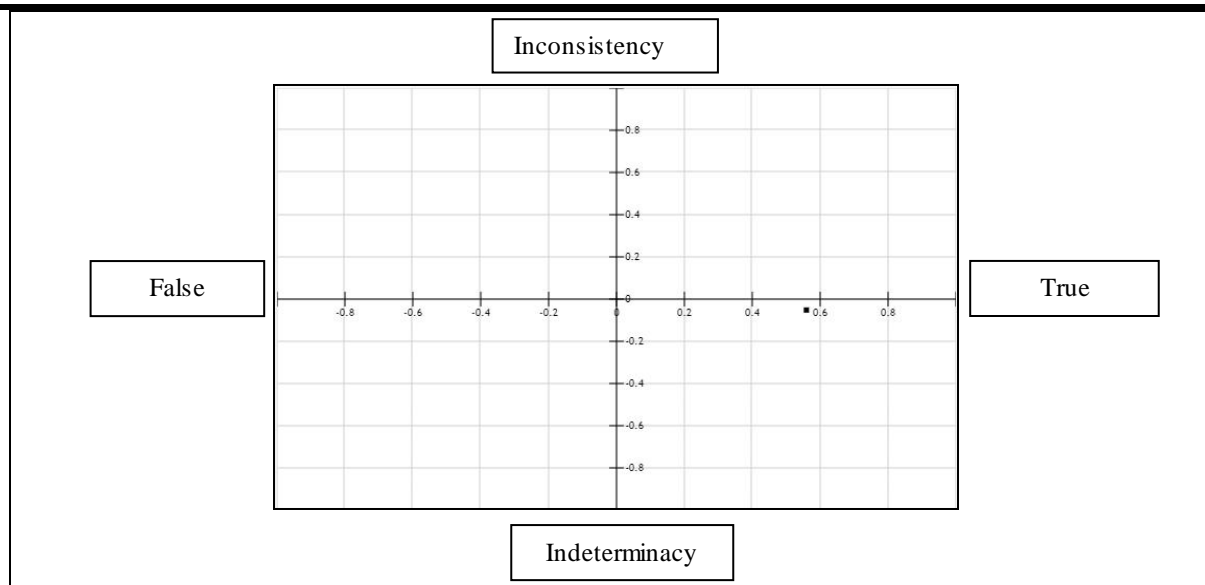


Fig.2: Unit Square of the Cartesian Plane for interpretation of the result of the analysis by the Paraconsistent Logic.

Source: Prepared by the authors (2019).

After conversion of belief μ_{1R} and disbelief μ_{2R} , the values were transformed into a certain degree of certainty ($G_1 = \mu_{1R} - \mu_{2R}$) and degree of contradiction ($G_2 = \mu_{1R} + \mu_{2R} - 1$), which presented the following values:

$G_1 = 0,5579$;

$G_2 = -0,0491$;

At the end of this step, for the five categories, the value pair (G_1 , G_2) is valid (0.5579; -0.0491). In step 4, which is the interpretation of the result in the QUPC - Unit Square of the Cartesian Plane, when interpreting the acquired values the degree of certainty of 0.5579 is to the right of the central axis, being close to the unit value that expresses the "truth"; therefore being in the region "almost true" and the degree of contradiction -0.0491 is practically on the horizontal axis denoting that there is no lack of conflicting information or information.

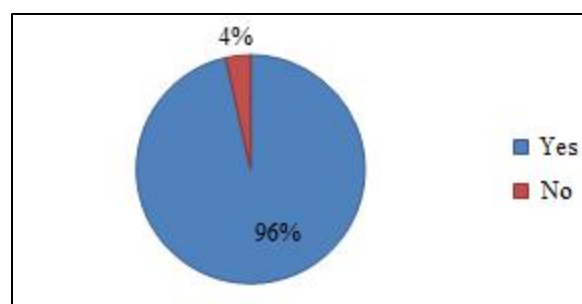
Figure 2 shows the result obtained positioned in the QUPC - Unit Square of the Cartesian Plane. Note that the values 0.5579 and -0.0491 refer to measures placed on scales ranging from -1 to 1. To facilitate understanding and interpretation, normalization is recommended, that is, the conversion of these values into scales ranging from 0 to 1.

Step 5, which is the normalization process, making use of the convention to describe the interpretation and synthesis of the information obtained by Likert scale with respect to the normalized degree of certainty G_{1n} and the degree of normalized contradiction G_{2n} , which convention is contained in Table 7, it is possible to affirm that the respondents, with respect to the five categories considered (active reflection, search for interpersonal help, search for help in written material reproduction, practical application) regarding the

managers' learning strategies, with data that can be considered consistent ($G_{2n} = 0,47545$) and contains substantial adhesion ($G_{1n} = 0,77895$).

Informal learning as a strategic tool for gaining knowledge

The second objective of this research was to verify if the AI is seen as a strategic tool for the managers to obtain knowledge, and before this, as can be observed in Graph 1, managers were asked if they considered the AI to acquire knowledge and 96% of the managers of the organization studied have confirmed that this is a strategy to obtain knowledge.



Graphic. 1: Informal Learning as a strategic tool for obtaining knowledge. Source: Prepared by the authors (2019).

This result corroborates with the analysis of Von Krogh, Ichijo and Nonaka [32], who report that one of the central aspects for creating and generating knowledge is "managing conversations", that is, providing good relationships between employees and managers, of AI

characteristics, as well as providing an enabling environment for knowledge, where personal and organizational barriers are eliminated.

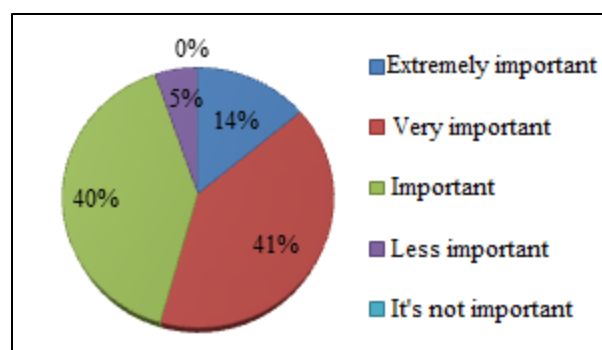
In this way, conversations become effective and instigate the sharing of tacit knowledge. Thus, it also meets the category of learning strategies, the search for interpersonal help, the second most used by the respondents of this research, which reports precisely the interaction, conversation among the colleagues of the institution, the search for their help.

Antonello [3] reports that all learning situations contain formal and informal characteristics, but the nature and balance between these vary significantly from occasion to occasion.

The importance and influence of AI in decision-making

In order to answer the third objective of this research, which is to analyze if informal learning influences the managerial decision making in the research organization, respondents were asked about the importance of AI in the decision making process of the same and, as observed in the Graph 2, between important and very important icons, 95% of managers consider that the AI is at least important when they make a decision.

Huang [18] complements that there are the scheduled and unscheduled decisions. Scheduled decisions are repetitive and routine and provide stability, efficiency and cost savings. There is no difference between the way and the way the decision is actually made. On the other hand, unscheduled decisions do not follow the same reasoning. Therefore, it is a challenge for managers, the lack of a path composed of steps to be followed for decision making. These decisions are of great importance as they may direct future action, and as the future is uncertain, the consequences can be serious implications for managers.



Graphic. 2: Importance of Informal Learning in Decision Making. Source: Prepared by the authors (2019).

Regarding AI's influence in decision-making, 70% of managers affirm that it always or almost always

influences decision-making in the institution's activities, as shown in Table 5, that is, we can see that AI influences the process decision-making process of the researched managers.

Variable	Percent Response
1 (Never)	0%
2 (Almost never)	7%
3 (sometimes)	23%
4 (often)	60%
5 (ever)	10%

Table. 5: Compilation of data regarding the influence of AI in decision making. Source: Prepared by the authors (2019).

Panosso [26] suggests that in addressing the issues of identification and evaluation of informal learning, it is crucial not to forget its contextual nature. This perspective implies valuing not only the relational side (the role of the individual within a social group), but also the quality of learning. Learning in individual terms means acquiring performance skills by engaging in an ongoing process of learning. As such, learning is not only reproduction, but also reformulation and renewal of knowledge and skills [3]. And this includes decision-making from the acquired knowledge.

V. CONCLUSION

In this article we have tried to analyze the learning strategies used by the managers, verifying if the informal learning is seen as a strategy of knowledge and analyzing if the same influence in the decision making of the management of the studied public organization. To describe this phenomenon is important, since one can analyze the most used forms of learning, providing the creation of strategies to strengthen the ways of making organizational learning viable.

In relation to AI, it is also important to study the conception that the managers have of it as a tool to obtain knowledge and its influence in the decision making brings the relevance that this type of learning is already having in the organizational environment of the researched managers.

It should be emphasized that in this research the paraconsistent analysis was used and it can be affirmed that the respondents, regarding the five categories considered (active reflection, search for interpersonal help, search for help in written material reproduction, practical application) of managers, with data that can be considered as consistent, have a substantial adherence.

The first specific objective of the research is to identify the learning strategies used by managers at work; it was

possible to recognize, using the Brandão scale [6], that managers primarily use the strategies "active reflection" and "search for interpersonal help", which obtained a concordance of the factor considered substantial. The uses of these strategies denote that the learning is obtained through the reflections of the elements of the work, there is the quest to improve it, through the help of other people, that is, that learning happens naturally, not systematically, on the day the day of the manager. In addition, the results pointed out that the research subjects use the different learning strategies, and that there is no great variability between them.

In relation to the second objective of the research, which aimed to verify if the informal learning is seen as a strategy of knowledge for the managers of the Institution researched; it has been found that they consider AI as a tool to gain more knowledge in their work environment. Studies of the knowledge creation theory of Nonaka and Takeuchi [23] argue that tacit knowledge is socialized, then outsourced and combined in new ways and then internalized, opening the window for the generation of innovations. And this brings strong relationships with the learning of these managers and their way of managing.

When responding to the third specific objective of the research, to analyze whether informal learning influences the managerial decision-making in the researched organization, it was found that managers in the vast majority (95%) consider that AI is important and very important for the decision-making process that almost always influences decision making.

With this information in mind, the institution can develop strategies to stimulate new ways of making informal learning possible, for example, to create environments that provide this type of learning exchange, whether it is a specific room for snacking on servers or an environment outside the administrative building. organization, so that the employees can talk, because, as Madergan observes [34], the organization consciously creates an environment that favors the interaction, exchange of experiences and knowledge between colleagues facilitates the learning of individuals within the institution, which comes to become a benefit to the organization.

Thus, this research can be expanded by investigating different institutions from different regions of Brazil in order to verify the relationships between the learning strategies used by managers and decision making. Another possibility is to investigate the learning strategies used by the managers, trying to compare the strategies from the training, position of the managers, in order to bring new findings related to the themes proposed in this article.

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