GROUNDED THEORY ABOUT THE USE OF LEARNING MANAGEMENT SYSTEM (LMS) TO DISTANCE EDUCATION MANAGEMENT

TEORIA FUNDAMENTADA SOBRE O USO DO AMBIENTE VIRTUAL DE APRENDIZAGEM (AVA) PARA A GESTÃO DA EDUCAÇÃO A DISTÂNCIA

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ABSTRACT

Purpose: develop a substantive theory of factors influencing the use of Learning Management System in the management of Distance Education.

Method / approach: the Grounded Theory guided the methodological procedures in the light of Strauss and Corbin (2008), and ATLAS.ti Software was used for data analysis.

Mains findings: six factors were integrated around the central category, allowing the elaboration of the theory fundamental hypothesis and the establishment of causal and intervening conditions. The relational model, which consists of eight propositions, allowed the emergence of four consequences. The central category analysis revealed four sub processes, which involve its mechanisms of action/interaction. In addition, it was possible to identify external and internal contextual conditions that influence the mediation strategies in a sequence of four movements in three phases along time.

Methodological / social / managerial contributions: the research responds to the general theories about the use of LMS from the perspective of managers. Also, can represent an advance in the sense of contributing with a systemic view of the LMS as an administrative-educational mediator element, recognizing components, dynamics, and movement. The study can assist in the development of technological and management solutions based on business Intelligence systems (BI), big data, and learning analytics systems aligned to the LMS to improve distance education management.

Originality / relevance: the results will add up to this area research, showing implications of digital technologies use at distance education management process.

Keywords: Distance Education Management. Learning Management System. Grounded Theory.

RESUMO

Objetivo: desenvolver uma teoria fundamentada dos fatores que influenciam a utilização do Ambiente Virtual de Aprendizagem na gestão da Educação a Distância.

Método / abordagem: foram utilizados os procedimentos metodológicos da *Grounded Theory*, à luz de Strauss e Corbin (2008), com apoio do *software* ATLAS.ti.

Principais resultados: seis fatores foram integrados em torno da categoria central, permitindo a elaboração da hipótese fundamental da teoria e o estabelecimento de condições causais e interventoras. O modelo relacional, com oito proposições, permitiu demonstrar quatro consequências. A análise da categoria central revelou quatro subprocessos, que envolvem mecanismos de ação/interação. Também foram identificadas condições contextuais externas e internas que influenciam as estratégias do processo de mediação, numa sequência de quatro movimentos, em três fases no decorrer do tempo.

Contribuições metodológicas / sociais / gerenciais: a pesquisa responde às teorias gerais sobre o uso de AVA na perspectiva dos gestores. Além disso, pode representar um avanço no sentido de contribuir com uma visão sistêmica do AVA como elemento mediador administrativo-educacional, reconhecendo componentes, dinâmicas e movimentos. O estudo pode auxiliar no desenvolvimento de soluções tecnológicas e de gestão baseadas em sistemas de Business Intelligence (BI), big data e sistemas analíticos de aprendizagem alinhados ao AVA para melhorar a gestão da educação a distância.

Originalidade / relevância: o estudo contribui para expandir o conhecimento sobre a utilização das tecnologias digitais no gerenciamento de cursos à distância.

Palavras-chave: Gestão da Educação a Distância. Ambiente Virtual de Aprendizagem. Teoria Fundamentada.

1 INTRODUCTION

The feasibility of integrating different tools, resources, and Information Technology (IT) into web structures or platforms occurs through the Learning Management System (LMS) (Cheng & Yuen, 2018; Rosini, 2014). The LMS literature has emphasized pedagogical (Macfadyen & Dawson, 2010; Matucheski & Lupion, 2010) and technological aspects (Mcgill & Klobas, 2009), in the view of teachers/tutors and/or students (Alonso, Sahari, Zin, & Alsmadi, 2011; Lonn & Teasley, 2009). Although many institutions are focusing efforts to increase their performance in distance education are still incipient the discussions about the role of IT in this management (Silva, 2013) as new situations have been experienced by the administrative teams. There are theoretical reviews on topics related to this research (Bach, Domingues & Walter, 2013; Oliveira, Cunha & Nakayama, 2016; Shaikh & Karjaluoto, 2015; Zawacki-Richter, Bäcker & Vogt, 2009). These studies indicated gaps in these theories. Especially on the use of LMS in the management of distance education and that there is a shortage of qualitative studies in the area of IT.

Considering the relevance of the theme, we investigated the use of LMS as a tool for the management of distance education in the context of a Brazilian public university. The objective of the study was to develop a grounded theory about the experience of using LMS in the management of distance education. Its specific objectives were: (1) to identify the most relevant factors in the use of LMS in the management of distance education; (2) to create a

theoretical scheme that represents the proceeding of the factors that influence the use of LMS in the management of distance education and, (3) to define the mechanisms of action/interaction of the central process, relating them to the theoretical scheme. The following are the fundamental concepts, methodological procedures, results, return to literature and final considerations.

2 FUNDAMENTAL CONCEPTS

In order to conduct a grounded theory, it is not necessary to review the literature in advance exhaustively. It is impossible to know what problems will arise or which theoretical concepts will emerge during the research (Strauss & Corbin, 2008). The role of IT in organizations has changed significantly over time (Rosini, 2014; Santos, 2015). This paper corroborates Laurindo (2008), understanding the concept of IT broad. Encompassing telecommunications and automation, as well as a whole spectrum of hardware and software technologies used by organizations to provide data, information, and knowledge. IT has assumed increasingly important roles in education and management. The initial focus, with attention only to data processing, has evolved to managerial support and support to competitive performance, using tools for business intelligence and analysis of unstructured information (Shaikh & Karjaluoto, 2015).

Distance education is considered a gradual process of restructuring, involving new educational and managerial demands related to the Knowledge Society, converging with the vision of Moore and Kearsley (2007), Moran, Masetto, and Behrens (2014) and Mesquita et al. (2014). In the last decade, distance education has been boosted by the use of IT tools. Whose models have evolved from the simple transmission of didactic content, without interaction with the teacher, to the current interactive models based on interactive multimedia on the internet. It is emphasized that distance education is a phenomenon in an intense phase of the study, discussion, and research, as pointed out by Bach, Domingues, and Walter (2013) and Zawacki-Richter, Bäcker and Vogt (2009).

The use of LMS is a recurrent practice in distance education activities. This study understands that an LMS is a software that automates the administration of training events. It is registering users, organizing the courses in a catalog, and recording the data related to their use (Rosini, 2014). The LMS should be more than just a repository for content or posting activities. It has the characteristics of integrating multiple media, different languages and resources, enabling alternative technologies. In addition, presenting information in an organized way to fulfill its main purpose, which is the construction of learning through interaction. The application of IT in distance education has created possibilities in administrative and educational spheres (Santos, 2015). Associating the LMS with the management of distance education, it is possible to facilitate the decision-making of the managers and to improve their processes. In this respect, Belloni (2001) emphasizes that a significant trend is an investment in IT, not only in equipment but also in the research of suitable methodologies and training for its use. This points to the need to carry out studies, both in improving the efficiency and effectiveness of existing management methods. Also, in creating new mechanisms for the improvement of distance education processes. There are lacks process monitoring and assessment in the courses, through the resources available through the LMS. The management of education in the Knowledge Society is not only the discursive updating of the educational paradigm. It is also a deepening of the understanding of the contributions of IT to the development of differentiated practices, considering each social and cultural context (Sartori & Garcia, 2009).

3 RESEARCH DESIGN

The method's choice is justified by the consolidation of the Knowledge Society and the advance of Information Technology that has influenced the growth of Distance Education (DE). The structure of DE, which is based on digital technologies, such as the Learning Management System (LMS), takes on an important role in this context. However, there are gaps in theories concerning the application of these technologies in the management of the modality as shown in Oliveira, Cunha & Nakayama (2016). That way, this research adopts the grounded theory, with an emphasis on the Straussian current (Strauss & Corbin, 2008). The 2015 edition by Strauss and Corbin was released during the execution of this research, therefore, the 2008 edition was maintained for conducting the study, since the methodological procedures were already in progress.

A substantive theory, which is the result of the use of the grounded theory (Apramian et. al, 2016; Murphy et. al, 2016), seeks the integrated explanation of concepts, through statements of relations, of a specific area and context, which goes beyond simple description and conceptual ordering (Strauss & Corbin, 2008). The design of this study was adapted from the scripts proposed by Strauss and Corbin (2008) and Bandeira-de-Mello and Cunha (2003). The research phases were: (1) identification of an investigation area, (2) definition of a generative research question, (3) decision about methods and instruments, (4) open coding, (5) elaboration of memos, (6) theoretical sampling, (7) axial coding, (8) selective coding, (9) report preparation and, finally, (10) research evaluation. In addition to the ten phases, the research process had two stages for data collection. Each stage had six analytical steps, detailed below, which explored the field and post-field research procedures and demonstrated the non-linearity of the method.

The field procedures involved two stages and six analytical steps that were repeated in each of the steps: Step 1: conducting an interview with the manager (seeking theoretical sampling) and preparing a memo. Step 2: transcription of the interview. Step 3: validation, by the manager, of the interview transcript. Step 4: analysis of the interview (initial or open, axial or selective coding) and preparation of memos. Step 5: based on the analysis, adaptation of the script for the next interview and, Step 6: conducting the interview with the next manager, seeking theoretical saturation based on the analyzes already carried out. For Bandeira-de-Mello and Cunha (2003) theoretical saturation should be understood as a "stimulating utopia", as it would be a goal that the researcher should pursue. The search for theoretical saturation would be the limit of the researcher's efforts and the available data, where no new data generates discoveries or is associated with new categories.

Participated in the survey leaders who worked on an extension project within a Brazilian public university. This research analyzed at the second edition of the Integrated Student Extension Project developed at the university. The course is part of the National Program for Continuing Education in Educational Technology, which was created by Administrative Rule number 522/Ministry of Education (MEC). The training was offered to students from the ninth year of elementary school, with a 180-hour workload and a duration of five months. The Program had an interdisciplinary focus, where topics were approached from the relationships between IT and basic education.

The interviewees, initially four, were intentionally chosen based on their role in the Project. All signed the Free and Informed Consent Term. Individuals were heard who played roles focused on decision-making, whether technical or administrative at the strategic level of the Project and who had access to the LMS, based on an Initial Script of Interviews in Step 1. Due to the dynamic nature of the method, which directs collections from field data, this scope

was expanded as new data were collected so that it could move towards theoretical saturation. Therefore, in the end, six managers participated in the study. A second interview was carried out with each of the participants, based on an Initial Script of the Interviews of Stage 2. In both stages, the researchers' impressions about each interview and the analysis steps were recorded in memos. At the end of each collection and after transcription of each interview, these were checked by the managers, based on the Term of Validation of the Interviews.

During the operationalization of the coding process (Step 4) it became clear that, despite the analytical steps being presented sequentially, they overlap, admitting circularity. As pointed out by Bandeira-de-Mello and Cunha (2003, p. 8), coding should be better understood as "the researcher's task and not as a step in a linear process", because despite the literature pointing to a systematic set of procedures, the researcher's creativity is very important for data analysis.

The first stage of the study, consisting of six semi-structured interviews, aimed to explore the description of the context, develop categories, properties, dimensions and propositions of the theory. It involved carrying out the interviews and document analysis and According to Strauss and Corbin (2008), theoretical sensitivity refers to the ability to give meaning to data, the ability to understand and the ability to separate what is relevant and what is not relevant to the research. It is developed by the scientific knowledge accumulated by the researcher, by his professional and personal experience. However, the use of techniques and procedures is important to mitigate the researcher's prejudices in the interpretive process. Thus, two tasks are fundamental for the researcher to be able to carry out the analyses: asking questions about the possible meanings and making comparisons. It should be noted that, as the fieldwork progressed, data analysis also gained momentum and the interview script gradually underwent changes in pursuit of theoretical saturation. Thus, new questions were included, arising from the categories that emerged from the analysis of the previous ones, converging with Pinto and Santos (2012). We emphasize that all interviews lasted approximately one hour, were carried out in person and recorded with the prior authorization of the interviewees. Concomitant with the interviews, the analysis of documentation on the Integrated Student, provided by the managers, was carried out.

At the end of the first stage of interviews, we prepared a scheme seeking to compare and map the questions asked to each of the managers, so that we could understand the paths and directions that each one of them took. In this sense, we observed that: interview A had around 25 questions. Interview B had around 24 questions. Interviews C and D were the most extensive in number of questions (reaching 27 and 26 different interventions, respectively). Interviews E and F both had 24 questions, although different. As pointed out by Pinto and Santos (2012), we realized the importance of not keeping the data collection instruments closed, on the contrary, the interview scripts were being "tailored" throughout the research process, undergoing substantial changes depending on the data. that were revealed by the managers. At this point in the research, there were at least 1503 codes, with an average of 250 codes per interview, some theory sketches, that is, initial categories, proposition sketches and many questions about the data.

In addition, we also carried out a manual incident-incident comparison (in the transcripts of the interviews), seeking to compare the possible categories in their properties and dimensions and evaluating whether any new data or quotation would have the same properties as the other identified categories. We had the perception that the empirical foundation gained strength as new data were associated with existing categories. We

emphasize that the process of transcribing the interviews, despite being quite costly in terms of time, was also a very rich moment for reflection on the data and preparation for subsequent interviews. The interviews were read and analyzed several times. Due to the great workload due to the performance of mechanical tasks associated with the management of text fragments and elements constructed throughout the analysis process, we resorted to a software of the type "program to support qualitative analysis" (Bandeira-de-Mello, 2006). According to Bandeira-de-Mello and Cunha (2003) it is "extremely recommended the use of software to support interpretations and document organization". ATLAS.ti is a viable alternative, among existing systems, as it was designed mainly for this purpose, be it theory building. Therefore, we used the ATLAS.ti software version 7.5.6.

The second stage of the study aimed to carry out another interview with each of the managers interviewed in the first stage of the research, based on the Initial Script of the Interviews of Stage 2 and analysis of new documents, such as partial progress reports of the Project. In the interview script there were theoretical questions (which sought to relate one concept to another) and of a practical and structural nature (Strauss & Corbin, 2008, p. 82). In this stage, which focused on stimulating the unfolding of axial and selective coding, we were able to validate categories, properties and dimensions and advance in the analysis process, empirically validating the fundamental hypothesis and propositions of the study. We consolidated the perception that we had reached theoretical saturation and theoretical sampling, as we considered that the categories were adequately developed.

From the experience of approximately 24 months in the field building the theory, we clearly perceive the circularity or non-linearity of the method, which are necessary for understanding and maturity in outlining the categories and their relationships, converging with Suddaby (2006). The research process in GT is not "perfect" in the sense of sequentiality and predictability of the researcher's findings and actions. You have to be open to comings and goings, advances and setbacks and new advances. If the researcher does not attend to the details and subtleties of the data, favoring the automation of the analysis, the research may have good quantitative indicators in the software, but be constituted in a shallow or superficial way. The great challenge in this sense is, as Strauss and Corbin (2008) say, to combine "objectivity and sensitivity" in the construction of theory and in the understanding of a process. This was one of our main wishes, as "instruments" for analyzing, understanding and organizing data.

3.1 THEORY EVALUATION

As presented by Bandeira-de-Mello and Cunha (2006), the evaluation of the quality of this substantive theory developed from six criteria will be discussed: degree of coherence (fit), functionality, flexibility, relevance, density and integration.

The functionality involves that the theory should explain the variations found in the data and the interrelationships of the constructs, in order to provide predictive capacity about the explained phenomenon. As for this criterion, it should be noted that it can be verified through the construction of the theoretical scheme that organized the central hypothesis of the theory around the central category and that was also empirically based on the data and validated with the study participants. Thus, this substantive theory is functional because it was understood as a useful theory for those involved at the time of the second data collection and because it presents a central scheme and predictive capacity.

Flexibility means that the theory must be subject to modification, allowing new cases to enrich it with the introduction of new properties and categories. As for this criterion, it

should be noted that the theory was built so that new cases can be incorporated and can increase its scope. Thus, the substantive theory is open to improving its generalization capacity, mainly by considering different scenarios and the variation of the properties of the categories found.

Relevance says that the theory must emerge as a result of the theoretical sensitivity of the researcher, who must be able to identify the central category, most important to explain the phenomenon. Regarding this criterion, it should be noted that there was a concern to validate with the interviewees their view regarding the study findings. Thus, the relevance was verified by the immediate recognition of the meaning of the central category by those involved, also during the second stage of the research that validated it with them.

Density implies that the theory should have few key elements and a large number of related properties and categories. As for this criterion, it should be noted that, in the end, 23 codes, 576 quotes and 6 analysis notes, or memos, corresponding to each of the categories, in addition to the interview memos, were generated in this theory. Of the 23 codes generated, 17 were of the first order, that is, those directly linked to citations, and the other 6 were abstract theoretical constructs, which corresponded to the categories. The relationship between codes and citations, in the order of 6/17/576, seems to provide evidence that there is a degree of theoretical density, since few theoretical constructs are related to a significant number of other categories and citations. It is also noteworthy that the density of the categories, in ATLAS.ti, were the following: Mediation Process (8), Manager's intentions in using the LMS (7), External agents (5), Internal elements (5), Understanding the situation (5) and the manager's feelings in using the LMS (3). This rootedness and density of the categories could be visualized in the ATLAS.ti software. Thus, the density confers greater validity to the constructs of the theory. Integration, in turn, indicates that all constructs must be related to a central category and expressed in terms of propositions derived from a theoretical framework. It should be noted that the integration avoids the existence of flaws in the explanatory logic of the theory and therefore all categories were integrated into the central category and this integration was empirically based on data with the support of the ATLAS.ti.

Bandeira-de-Mello and Cunha (2003) also highlight some techniques that seek to improve quality in each of the previously presented criteria. Among the techniques, those used in this research are mentioned: (1) Triangulation: consisted of the use of multiple sources of data (interviews and documents), where divergences were sought, which could reveal new views on the phenomenon. (2) Checking with the interviewees: at the end of each collection and analysis, the data were checked and validated by the informants. At the end of the analyses, the main results of the theory, the summary (storyline) were shown and discussed with the Project managers. (3) Long time in the field: during the period of contact, which lasted approximately 24 months, it was possible to get to know the managers and their characteristics, which could also contribute to the deepening of the analysis. The researchers were in no hurry to end the analysis, as the time for maturation was fundamental for reflection and for an impartial analysis. (4) Audits: the research and analysis process is recorded in the ATLAS.ti notes and diagrams and in the research documentation, allowing auditors to retrieve the interpretation process and confirm the results found.

The same authors state that the presented criteria provide a comprehensive perspective to assess the quality of a substantive theory. In addition, they point out that quality must be free from arbitrariness by the researcher, being able to allow free public scrutiny through audits that assess the research process used. In addition, it is highlighted that

the theory seeks to respect the criteria for evaluating the empirical basis of the research indicated by Strauss and Corbin (2008) and Bandeira-de-Mello and Cunha (2003).

4 RESULTS

This section presents the factors in the use of the LMS in course management, the theoretical scheme developed, the action/interaction mechanisms of the central process and the summary of substantive theory components.

4.1 FACTORS IN THE USE OF LMS FOR DISTANCE EDUCATION MANAGEMENT

From the open coding step (Strauss & Corbin, 2008), the categories are identified in the italicized text, the properties in bold, their respective rooting in the data between parentheses and their variations underlined:

• The Internal Elements category is the way in which components intrinsic to the Project can influence and be related to the use of LMS in course management. Properties: Student participation (22 codes), ranging from adequate to not adequate; Team performance (44 codes), ranging from adequate to not adequate; Manager action (16 codes), ranging from adequate to not adequate.

• The External Agents category is the way in which components extrinsic to the Project can influence and be related to the use of the LMS in management. Properties: Relation with the federal government (22 codes), ranging from favorable conditions to unfavorable conditions; Relation with the state government (22 codes), ranging from favorable conditions to unfavorable conditions; Relation to university (12 codes), ranging from favorable conditions to unfavorable conditions.

• The category Understanding the situation is how the strategies that managers use to see what is happening with the project. Properties: Creation of reports (20 codes), ranging from available information to information not available; Use of reports (24 codes), ranging from available information to Information not available; Adequacy of reports (15 codes), ranging from available information to information not available.

• The Manager Sensations category in the use of LMS is how the different emotions. Properties: Expectations (37 codes), ranging from many to few; Frustrations (66 codes), ranging from many to few.

• The category Manager Intentions in the use of LMS is like the set of different purposes that the manager has when using the LMS, for his activities in the Project. Properties: Planning (37 codes), ranging from favorable scenario to unfavorable scenario; Follow-up (56 codes), ranging from very to little; Interference (60 codes), ranging from very to little; Prediction (38 codes), ranging from very to little.

• The central category called Mediation Process is how the tension between educational and administrative issues in LMS can be equated. This category proved to be adequate as the center of this grounded theory since it influences and is influenced by the other categories. Properties: Educational (49 codes), ranging from intense to weak; Administrative (36 codes), ranging from intense to weak.

The densities of the categories in the ATLAS.ti software were as follows: Mediation Process (8), Manager Intentions in the use of LMS (7), External agents (5), Internal elements (5), Understanding the situation (5) and Manager sensations in the use of LMS (3). The density of the code gives greater validity to the constructs of the theory. The categories represent part of the phenomenon in question, that is, they reveal "what are the factors that influence the use of LMS in the management of distance education in the context of this research".

4.2 THEORETICAL SCHEME

Figure 1 details the fundamental hypothesis of this grounded theory:

Figure 1
Fundamental hypothesis

"In the management of distance education the LMS is essentially oriented by the Mediation Process, which can influence (and can be influenced) by Internal Elements, External Agents, Manager Intentions in the use of LMS and by the Understanding of the situation with the manager. The Mediation Process, moderated by Understanding the situation, can influence (and be influenced) by the Manager's sensations in the use of LMS. The Manager's Intentions in the use of the LMS, in turn, can also influence (and can be influenced) by the Manager's sensations in the use of the LMS, by the Internal Elements and by the external Agents".

The assertion considers the fundamental hypothesis of the theory because the other propositions can only be applied and tested if it is considered true. However, it is not a hypothesis formulated a priori, based on formal theories. It emerged from the data, based on the analyzes detailed in the previous section, with empirical support in the data.

For this, each of the propositions is presented, with its possible configurations and perceptions of the managers, seeking to explore how and why these relations can occur. We chose to use the term 'configuration', to present a direct consequence of a proposition demonstration. Seeking to bring the meaning of 'configuring the variation of the categories properties so that, at the end of this section, scenarios (consequences) can be presented that can illustrate the 'arrangements' of the propositions against the fundamental hypothesis of the theory. Each category was oriented according to the variability of its properties with the variability of the category with which it is related, as shown below:

The first proposition (P1) points out that internal elements are associated with the Mediation Process and vice-versa. The emphasis of the managers privileged the configuration P1-C1, that is to say: "When the student's participation is adequate, with adequate team performance and with the adequate manager's action, there may be an intense educational mediation process and administrative mediation process".

The second proposition (P2) suggests that external agents are associated with the Mediation Process and vice-versa. The emphasis of the leaders privileged the configuration P2-C1, that is to say: "When the relationship with the federal government finds favorable conditions, the relationship with the state government finds favorable conditions and the relationship with the university finds favorable conditions, there may be an intense educational mediation process and an intense administrative mediation process".

The third proposition (P3) points out that Understanding the situation is associated with the Mediation Process and vice-versa. The emphasis of the leaders privileged the

configuration P3-C1, that is to say: "When the information is available to create reports, information is available for the Use of reports and information is available for Adequacy of reports, there may be an intensive educational Mediation Process and an intense Administrative Mediation Process".

The fourth proposition (P4) suggests that Understanding the situation may moderate the association between the Mediation Process and the Manager's sensations in the use of LMS and vice-versa. The emphasis of the leaders privileged the configuration P4-C1, that is to say: "When there is information available to create reports, there is information available for the use of reports and there is information available to adequate the reports there may be many Expectations and few frustrations and intense educational mediation process and intense administrative mediation process".

The fifth proposition (P5) points out that Manager intentions in the use of the LMS are associated with the Manager's sensations in the use of the LMS and vice-versa. The emphasis of the leaders privileged the configuration P5-C1, that is to say: "When Planning finds a favorable scenario, there is the many Follow-up, much Interference, and many Previsions, there can be many Expectations and many Frustrations."

The sixth proposition (P6) suggests that Manager intentions are associated with the Mediation Process and vice-versa. The emphasis of the leaders privileged the configuration P6-C1, that is to say: "When Planning finds a favorable scenario, there is many Follow-up, there is much Interference and there are many previsions, there can be an intense Educational Mediation Process and an intense Administrative Mediation Process".

The seventh proposition (P7) points out that the intentions of the manager in the use of the LMS associate with external agents and vice-versa. The emphasis of the leaders privileged the configuration P7-C1, that is to say: "When Planning finds favorable scenario, there is many Follow-up, there is little Interference and there are many previsions, there may be Relationship with the federal government in favorable conditions, Relation with the state government in favorable conditions and Relation with the University on favorable conditions".

The eighth proposition (P8) proposes that the intentions of the manager in the use of the LMS are associated with internal Elements and vice-versa. The emphasis of the leaders privileged the configuration P8-C1, that is to say: "When Planning finds a favorable scenario, there is many Follow-up, there is much Interference and there are many previsions, there may be an adequate Student Participation, an adequate Team Performance, and an adequate Manager's Action."

Considering the configurations of each of the propositions, four scenarios or consequences (Strauss & Corbin, 2008), from the fundamental hypothesis, are presented as examples of applications of this theory:

- Scenario 1 - illustrates an intended consequence. This may characterize a possible ideal and optimistic scenario, regarding the orientation of the factors that influence the use of LMS in the management of distance education. In this case, the Administrative and Educational Mediation Process acts synergistically in what can be characterized as positive tuning; administrative (+), educational (+).

- Scenario 2 - illustrates an unintended consequence. This may characterize a scenario of optimism, but only as regards factors that influence the use of LMS in the management of distance education from the perspective of managers. However, problems and deficiencies in activities developed by the team and students can

characterize educational problems. In this case, only the Administrative Mediation Process is <u>intense</u>; administrative (+), educational (-).

• Scenario 3 - illustrates an unintended consequence. This may characterize the manager's apathy scenario, on the factors that influence the use of LMS in distance education management. In this case, problems and deficiencies in the activities developed by the managers can characterize administrative problems. In this case, only the Educational Mediation Process is <u>intense</u>; administrative (-), educational (+).

• Scenario 4 - illustrates a consequence not intended by managers. This may characterize a possible the worst conjuncture. Where the actions of all involved are faulty and this affects the factors that influence the use of LMS in the management of distance education. In this case, the Administration and Educational Mediation Processes act, in what can be characterized as a phenomenon with a high degree of entropy; administrative (-), educational (-).

The four scenarios/consequences presented allow us to visualize the application of the theory proposed by this research, indicating possible configurations, derived from the fundamental hypothesis and the propositions. It should be noted that other scenarios can be elaborated from different possible configurations. As indicated by Strauss and Corbin (2008), the relationships between categories may be implicit or even subtle and that the researcher needs to be careful not to occupy a dogmatic position on the data. In this sense, the important thing is not to classify the type of relationship, in a strictly technical way. However, to explore under what conditions it occurs or not, seeking to expand the explanatory comprehension of the theory.

In order to do this, it tried to bring examples of possible configurations of the propositions. In addition, to bring as a function of the dimensional variation of the properties of the categories such as high (+) or low (-), that allowed investigating conditions and their possible effects in each proposition and in the theoretical scheme. It is necessary to recognize that the oscillation of the data and the non-convergence of the manager's visions in relation to the dimensional variations of the properties can increase the explanatory value of the theory. It is noteworthy, although the goal was not to achieve this convergence, it was important so that the prevailing visions could be observed across the explored process. In this sense, there was the hegemony of what can be understood as optimistic visions of the leaders, hence the greater emphasis on Scenario 1, involving the process of administrative and educational mediation in a positive tuning. This view can also illustrate the other configurations presented here, in order to validate them, indirectly, by what can be identified in the configuration of the other three scenarios. The connections between the six categories were explored through eight propositions. Also, theoretical subsidies were brought to guide the integration of the categories. This integration allowed the formation of a relational framework focused on the central category, which was validated by managers and, empirically, in the data. Figure 2 details this category, which in turn involves sub processes related to the variability of its properties:

Figure 2
Dynamics of action/interaction of the central process
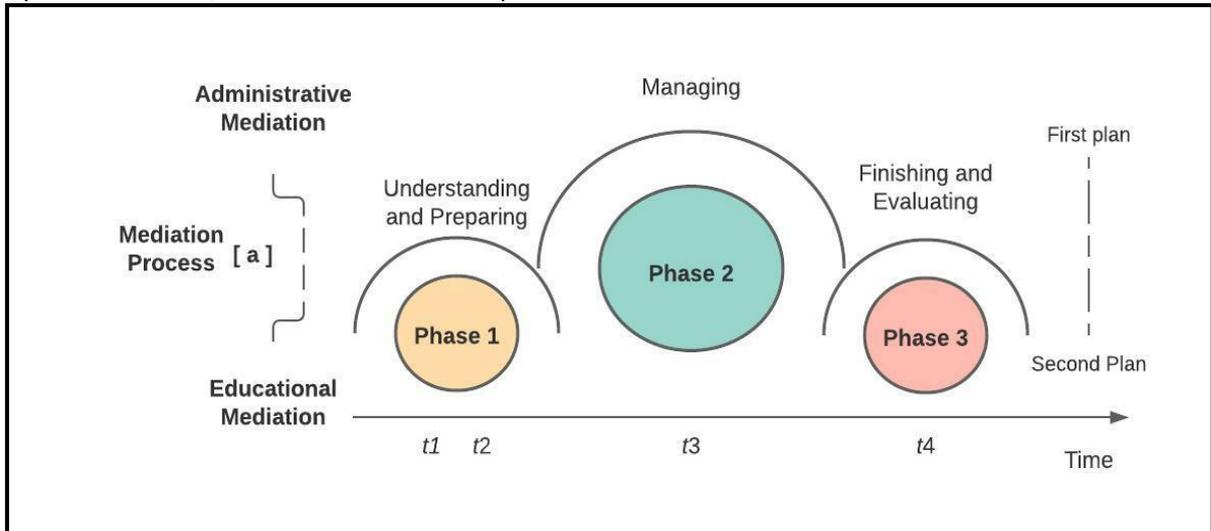
The process can be an organizing line or the central category of the study. However, regardless of the role-played, it presents different perspectives and provides insights into how events associated with theory develop. "The theory without process loses a vital part of its history - the way action/interaction develops" (Strauss & Corbin, 2008, p. 175). The process evidenced by the category must allow us to represent the dynamic and the evolutionary nature of the action/interaction, where the structure creates a context, giving it rhythm, compass, form, and character. Thus, considering the Mediation Process as the central category of this grounded theory, it will be explored as a process:

- Phase one begins the first movement/subprocess (t1) of the LMS Mediation Process in the management of distance education, which involves the understanding of the course. It includes the set of activities related to the manager´s understanding of the needs that punctuate the offer of the training at a given moment. It helps to plan in front of the orientations and parameters defined by the External Agents.

- Phase two begins the third movement/subprocess (t3) of the LMS Mediation Process in the management of distance education, which involves course management. It includes the set of activities related to the administration, by the manager, of the resources needed during the training offer, and also includes the pedagogical activities of the team. It is possible to observe a strong interaction between the actors in this movement because it is the core of the course, through the interaction between team-student-content, generating subsidies that will punctuate manager's decisions against possible contingencies.

- Phase three begins the fourth movement (t4) of the LMS Mediation Process in the management of distance education, which involves the completion and evaluation of the course. This movement includes the set of activities related to the closure of the graduation by the manager. Its results, administrative and pedagogical, which may provide subsidies for the course to be offered again.

The movement of the central process, represented in three phases and four times, reveals the inseparability between the two dimensions of the central category. This often permeated the data analysis, as already presented, integrating it with the other elements of the theory. It can be affirmed that the LMS acts as a strong element of administrative and educational processes, mediating the relationship between the actors: managers, the federal government, State Government, University, tutorial supervisors, tutors, and students. It is worth emphasizing that the factors that interfere with this movement are related to the technological disposition, management disposition, and educational competence of the institution.

4.3 GROUNDED THEORY COMPONENTS

Figure 3 summarizes the components of this grounded theory:

Figure 3
Summary of grounded theory paradigm components
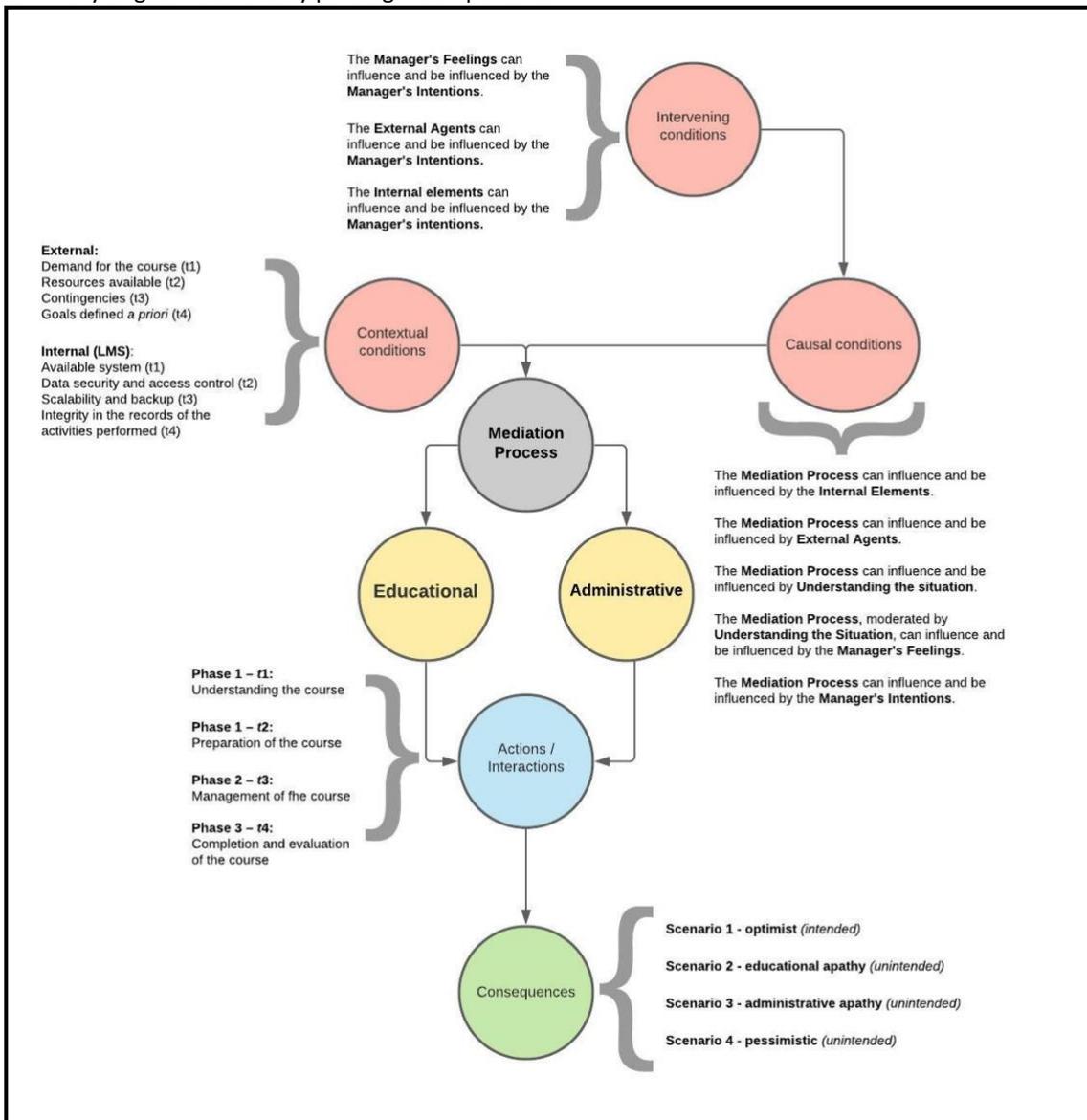
It should be emphasized that the research identified the contextual conditions (external and internal), the causal conditions (punctuated by the Mediation Process). Identified the intervening conditions (punctuated by the Manager's Feelings, external Agents, and internal Elements), actions/interactions (Understanding the course, Preparing the course, Managing the course, and finalizing, and evaluating the course). In addition, identified the consequences (Optimistic scenarios, educational apathy, management, and pessimistic apathy), relating them to the central process (Mediation Process) and their respective dimensions (educational and administrative). The presented paradigm allows visualizing what the categories are and how they relate to each other.

5 RETURN TO LITERATURA

Strauss and Corbin (2008) provide some indications for the use of literature in a Grounded Theory. For them, the literature should support the researcher in the sense of increasing the development of the theory and not, on the contrary, restrict it. They indicate that at the beginning of the study "there is no need to review the entire theoretical framework of the area in advance [...], as it is impossible to know before the investigation what the salient problems will be or what theoretical concepts will emerge" (p. 58). However, the same authors point out some indications for the use of the literature, among them, that the researcher, when finishing his data collection and analysis, uses it to confirm results or even illustrate where the theory can be simplistic, incorrect, or partially explain the phenomenon. In Grounded Theory, the bibliography is used as an analytical tool, as it promotes contrast with the conceptualization developed, expanding, validating, and refining knowledge in the field. Tarozzi (2011) complements by indicating that it is important to build a dialogue between the research results and the literature, so that one can favor the positioning of the theory itself, showing its limits or highlighting gaps in existing theories. Thus, a theoretical discussion of the factors that influence the use of LMS in distance learning management is carried out with other theoretical perspectives and with the results of other researches that involved the theme of work.

At the end of this study, an attempt was made to return to the literature and discuss the factors that influence the use of the LMS in distance learning management with other theoretical perspectives and with research results that involved the theme, as foreseen in the research design. Considering the findings of this research, a systematic review of the literature was carried out (Cordeiro, Oliveira, Rentería and Guimarães, 2007). The construction of this section was guided by the study by Galvão, Sawada and Trevizan (2004), who indicate seven stages in the process of preparing a systematic review. The phases are as follows: (1) construction of the protocol, (2) definition of the research question, (3) search for studies, (4) selection of studies, (5) critical evaluation of studies, (6) data collection and, (7) data synthesis. For the construction of the research protocol (phase 1) it was sought to adopt as a fundamental strategy to list studies that dealt with "mediation" and "distance education", in order to verify if the focus given by them would be convergent or divergent to the results presented here. The question that guided the development of the review was: "What aspects can characterize the scientific production on mediation in distance education?". This question aimed to identify if there are studies that relate them and if the literature in the area points out factors that can influence the use of the LMS in the management of DE and its convergence with this study.

The articles were selected from the following databases: Web of Science, Scopus, Ebsco, Eric and Scielo, as they include research in interdisciplinary areas, education, and

management. The following keywords or descriptors were used: "mediat*" (Mediation) and "Distance education" (Distance Education). The asterisk was used to allow the inclusion of articles that mention both "mediation" and possible variations of the term and the Boolean operator "and" to refine the search, since exploratory searches with other combinations were tested and the Boolean operator "or" did not bring significant results. It should be noted that the terms "learning management system" and "e-learning" were not used together with the other terms in the searches, so that the results were not too restrictive (as observed in the preliminary searches, which did not bring significant material). Therefore, it was decided to use broader terms, hoping to obtain more comprehensive results, but that could dialogue with this research.

A total of 94 articles were identified, eight of which were selected for systematic analysis, as they were in line with the present study (Balbé, 2003; Belloni, 2001; Hraste & Rodríguez, 2008; Moré, Moritz, Pereira, & Melo, 2010; Ozdemir & Abrevaya, 2007; Rangel, Costa, De-Angelis & Martins, 2015; Silva & Guimarães, 2011; Tarouco, Moro & Estabel, 2003). A rescue of the specific literature on LMS and on DE management, initially consulted, was also carried out, complementing it with studies identified in the theoretical review carried out at the end of the research, which totaled the consultation of more than twenty references on the subject. It is noteworthy that propositions P1, P2, P3, P4 and P6 found support in the theoretical framework, considering the systematic review on "mediation" and "distance education" and the specific literature on LMS and distance education management. It was observed that none of the studies involved all the causal propositions and that the studies did not indicate a relationship with the intervening conditions identified by this study (P5, P7 and P8), that is, that the manager's Sensations can influence and be influenced by Intentions of the manager in the use of the LMS, that the external Agents can influence and be influenced by the Intentions of the manager and that the Internal Elements can influence and be influenced by the Intentions of the manager in the use of the LMS. In the systematic review on "mediation" and "distance education" there was a focus on educational issues, except for the studies by Moré et al. (2010) and Ozdemir and Abrevaya (2007).

The analysis indicates that research on "mediation" characterizes it as only an educational phenomenon and not "administrative-educational-administrative", as presented here. In the rescue of the specific literature on LMS, there was a focus either on educational issues or on administrative issues, except in the study by Mesquita, Piva Junior and Gara (2014), which addressed both, although it did not deepen the manager's relationship with the LMS, as it was mentioned superficially. In the literature on distance education management, there was a focus on both educational and administrative issues by all authors, except in the study by Hong (2011) which emphasizes only distance education management, without mentioning educational issues. Given these aspects, it can be said that this research captured, in a broad and empirically based way in the data, aspects hitherto dispersedly delineated and not integrated by the literature in the area, presenting a paradigm that considers structure and process and organizes connections between data, revealing factors and how these factors influence the use of the LMS in distance learning management in a Brazilian public university, in a dynamic that integrates educational and administrative elements. It can be seen that this substantive theory fills gaps in scientific production, since none of the analyzed articles, despite dealing with borderline themes, did not fully converge with the results presented here. This theory brought new elements in relation to the factors that influence the use of the LMS in distance learning management.

6 FINAL CONSIDERATIONS

The evolution of IT and impacts in the social, economic, managerial, and educational environments has been a fertile field of research (Shaikh & Karjaluoto, 2015). This impact, in part, is still unknown and exploited, often in an incipient and poorly integrated way, due to the complexity of factors involved and the variety of software and hardware, as well as their rapid dynamics of absorption and replacement by new technologies by individuals and organizations. In order to answer the research question, this study recognizes the properties or attributes and the variability of which factors (or categories of grounded theory points of view), based on the data that influence the use of LMS in the management of distance education. From the fundamental hypothesis, the answer to the research question also recognizes how these factors influence the use of LMS in the management of distance education in the studied context.

Study restrictions are related to their nature and scope. Regarding the nature of the research, this may have an influence on the investigator's assumptions in the data analysis and the design of the research, which could be improved in future studies that use the grounded theory method. In relation to scope, this theory has restricted scope to a specific and well-delimited context, spatially, and temporally. The study did not focus on analyzing the adoption of technology by managers, but its user post-implantation. With regard to this article, it is highlighted that due to space limitations, it was not possible to present the literal speeches of the participants, which could be included in future texts, exploring each of the specific objectives. This study also has as a limitation, possible changes in the use of tools, habits, and processes can affect the proposed model for the research.

The study contributes to the development of an original grounded theory about the experience of using LMS in the management of distance education in a Brazilian public university. The subsidy of this research should be registered for future qualitative research in the information systems area and for interdisciplinary research, according to Oliveira and Nakayama (2018). From the experience of constructing the theory, the researchers could clearly perceive the circularity and non-linearity of the method, which are necessary for understanding and maturity in constructing the categories and their relations, converging with Suddaby (2006). This research responds to the general theories about the use of LMS from the perspective of managers. Also, can represent an advance in the sense of contributing with a systemic view of the LMS as an administrative-educational mediator element, recognizing components, dynamics, and movement. This study can also assist in the development of technological and management solutions based on business Intelligence systems (BI), big data, and learning analytic systems aligned to the LMS to improve distance education management.

In the end, it should be emphasized that this research is based on the description and analysis depths of an organizational reality, offering elements for a rich debate scientific. The theoretical scheme, endowed with an interdisciplinary look, with an empirical and theoretical articulation, expands and deepens knowledge about factors related to use of IT in management, particularly on the LMS, in the context of a university public in Brazil. The findings, which are based on the managers' experience and vision, offer elements for reflection on the use of technology, which can help them to rethink your practices.

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