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INFORMATION MANAGEMENT, INFORMATION TECHNOLOGY AND BEHAVIOR AND VALUES RELATION TO INFORMATION IN HIGHER EDUCATION INSTITUTIONS (HEI) OF BELO HORIZONTE

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ABSTRACT

The paper presents the results of a study about information management, information technology management and behaviors and values concerning information in Brazilian institutions of higher education. The 'information orientation' (IO) model, developed by Donald A. Marchand, William J. Kettinger and John D. Rollins (2000) was adopted as a conceptual basis for the study. The data was collected through questionnaires filled by 83 (eighty-three) managers of higher education institutions (HEI) located in Belo Horizonte, Brazil. The results show that, as perceptions of their managers, HEI are oriented towards information, although this guideline varies according to the dimensions of the construct of the HI Model, which has as central information management, information technology and informational values and behaviors. It was noted that the managers of HEI perceive each of these elements, there is a predominance of HEI Information Technology.

Keywords: Information Orientation; Information Management; Information Technology; Education; Information Culture; Information Behavior.

1 INTRODUÇÃO

The competitive environment in which companies operate has demanded an increase in their skills related to the search, retrieval, organization, interpretation and use of information. The development and mastery of these skills are increasingly crucial for organizations to achieve a better position in the market relative to their competitors. In the current work, it is considered that a company should be competent in three elements relative to the effective use of information, which are: i)

information management, ii) management of information technology e iii) appropriate behaviors and values concerning the effective use of information. These three elements jointly represent, according to Marchand, Ketting and Rollins (2000), the degree to which organizations are oriented toward information, i.e., their degree of 'informational orientation' (IO).

This paper will present the results of a survey with 83 (eighty-three) managers with respect to their levels of IO higher education institutions (HEI) located in *Belo Horizonte*, *Minas Gerais*, Brazil. Beyond this brief introduction, the fundamentals of informational orientation will be presented, and these consist of the principles of the Schools of *Information Management*, *Behavior and Control* and of *Information Technology*. Next, we will present the practical assumptions of IO, which consist of information management practices, values and behaviors regarding the use of information and information technology practices. Finally, we present the results of the research, as well as the final conclusions and recommendations.

2 THEORETICAL FOUNDATIONS OF INFORMATIONAL ORIENTATION IN ORGANIZATIONS

Technological advances, socioeconomic changes and high levels of competitiveness that currently characterize the global economy have significantly influenced the way organizations see themselves. That is, especially after the publication, in 1911, The Principles of Scientific Management, by Frederick Winslow Taylor, the perspectives according to which organizations are conceived have been profoundly altered. Especially as a result of the dissemination of information technology (IT), organizations have experienced accelerated changes under the most diverse aspects.

The new competitive environments demand fast decisions on the part of managers. In such context, decision makers assume a crucial role since their perceptions determine, to a large extent, strategic decisions in their companies. Managers are continually challenged to achieve results and, to fulfill such role, they employ people, information and IT to achieve their goals. These new challenges

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have motivated the emergence of a new kind of management thinking, called ‘orientation toward information’ or ‘informational orientation’ (IO).

According to Marchand, Kettinger and Rollins (2000), there are three main schools of thought on information in organizations, which are denominated *School of Information Management*, *School of Behavior and Control* and *School of Information Technology*. Based on the elements of these three schools of thought, and based on data from a survey of 1.009 senior managers of 98 (ninety-eight) companies from 22 (twenty-two) countries and 25 (twenty-five) industrial sectors, these authors developed the construct of Informational Orientation, which is the central theme of this work. Next, the fundamentals of each of these schools of thought will be presented.

2.1 School of Information Management

Amid the growing volume of information produced in the internal and external environments of contemporary organizations, it is not an easy task to find, select and effectively use such information. To know how to manage information, retrieve it and then identify which information will lead to the expected result is the greatest challenge organizations face when managing information. Accordingly, Santos (2005, our translation) states that "[…] the challenge is to remove a thin layer of relevant information from a large volume of irrelevant information". Therefore, one can say that the biggest problem of information management is associated to the huge amount of information and the speed with which information is disseminated, due to the development of information and communication technologies.

From the mid '70s, and largely influenced by the ideas of Robert S. Taylor, the *School of Information Management* [*Escola de Gerenciamento da Informação* (GRI)] is considered as a way of looking at and solving, in an integrated manner, information problems in organizations. The basic idea of the GRI is that information has a lifecycle, from its creation to its use in decision making and that managers need to understand and address it if they want to take advantage of their potentially valuable information.

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Managing the information lifecycle requires a suitable project for the budgeting, evaluation and an effective use of information (HORTON, 1968 *apud* MARCHAND; KETTINGER; ROLLINS, 2000). The GRI is considered an interdisciplinary area since, from the field of management of information resources, "[…] it embodies the concepts of planning, organizing, controlling and budgeting". According to Taylor (1986) the objective of GRI is to establish the mechanisms necessary for an organization to create or acquire, process and store data and information that are appropriate, timely and accurate to support, at minimum costs, organizational goals.

Thus, the management of information has to be legitimized within an organization so as to allow members to be are aware of organizational best practices on how people can use and share their knowledge with other members of the company.

2.2 The School of Behavior and Control

The *School of Behavior and Control* emphasizes the contributions of behaviors and values to organizational performance and the role of human motivation and behavior in actions that contribute to the organization's performance. This school covers two currents of thought which are the currents of human resources and of management control. The first focuses on how people behave in organizations and how they should be selected, motivated, rewarded or paid, trained and evaluated. This current has its origins in the areas of organizational behavior and human resources. The second stream comes from the evolution of information systems and management controls that are developed to connect people performance with organizational performance (MARCHAND; KETTINGER; ROLLINS, 2000).

One of the strengths of the current human resources and management control is the recognition that organizational culture can exert, according to Kotter and Heskett (1992, p.11) a "[…] significant impact on economic performance in the long term company".

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2.3 The School of Information Technology

The *School of Information Technology* (IT) thought highlights the evolution of IT applications in business and its relation to decision-making and organizational performance. This School, with roots in decision theory, operations research and computer science, focuses the role of IT in improving decision-making processes and the development of management practices directed to the automation of the different types of decisions that managers and employees make (MARCHAND, KETTINGER; ROLLINS, 2000).

The School of IT does not prioritize the behavioral aspects of information use. People's behavior in relation to information, as well as the influence of their beliefs and values on the effective use of information for decision making, is still poorly understood by many managers and IT professionals. However, despite these shortcomings, Marchand, Kettinger and Rollins (2000) recognize that the School of IT offered important contributions to promote the use of IT and also demonstrates a serious commitment to establish measures to determine the return on IT investments.

3 INFORMATION MANAGEMENT PRACTICES

The management of information is here understood as a set of activities or practices that occur through "[…] a logical succession of phases, each dependent on the other". Thus, the information resulting from the perception of a need for information is collected in a formalized way and organized in a useable format. Such information is then processed and used in decision making. Then the information is eventually preserved, or renewed for future use or disposal. This process is continuous and known as the ‘information life cycle’. The goal of this cycle is to improve the means by which the information is used by managers and others in decision making (MARCHAND; KETTINGER; ROLLINS, 2000).

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4 VALUES AND BEHAVIORS RELATED TO THE USE OF INFORMATION

The values and behaviors regarding information are the capabilities that companies instill in their personnel to support the effective use of information. They are thus "[…] values as personal beliefs that may manifest in behaviors that generate consequences to the company" (MARCHAND; KETTINGER; ROLLINS, 2000, p.99). According to these authors, the proactive use of information in organizations depends on a set of five dimensions of values and behaviors, which may have direct or indirect impacts on the proactive use of information.

First, the **integrity** that is directly linked to the promotion of trust among members of the organization, and which enable people to share common principles guiding appropriate behavior in the organization. Therefore, integrity acts as a support for the use of information, establishing appropriate boundaries for ethical behavior and directly influencing the use of information in formal organizational contexts (BROWN, 1993; BECKER, 1998; KOUZES; POSNER, 1993).

Secondly, the **formality** aspect of information occurs when organizations establish formal processes and flows of information to achieve results and business objectives. Managers and employees will often use sources and formal information systems to ensure the efficient management of processes and operations. They will also rely, to some extent, on formal uses of information for innovation and managerial decision making.

Thirdly, the question of **control** of information recognizes the role of information to manage people through the connection between individual and corporate performances. In addition, the level of **transparency** when dealing with information enables the consideration of errors, mistakes, failures and surprises as constructive learning opportunities, accelerates the cycle of feedback between the planned strategy of the company and its implementation, as well as the capacity to correct such strategy or change its course when necessary. Finally, information **sharing** is considered a key behavior in the use of information, since it enhances the communication between different levels and sectors of the organization.

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5 INFORMATION TECHNOLOGY PRACTICES

The School of IT has always sought to understand how computing is implemented at the various levels and used in organizational decision-making processes. Marchand, Kettinger and Rollins (2000) used the theoretical framework of Anthony Gorry and Michael Scott Morton, to classify TI applications in different decision making levels in organizations. According to such scheme, decisions can be classified as structured, semi-structured or non-structured. This theoretical framework was modified by those authors in order to contemplate four levels of IT practices applicable to organizational decision making. They are: a) IT for managerial support, b) IT for innovation support, c) IT for business processes support, e d) IT for operations support.

The use of IT to **managerial support** represents the contribution of IT to strategic decisions. The so called executive information systems and decision support systems are classified at this level. At the level of **innovation support** are groupware or computer-aided design systems. Here, IT practices are used to facilitate creativity and the exploration of new ideas, thus speeding the introduction of new products and services. IT applications to **support business** processes include resource planning systems, and sales and inventory management systems. Finally, the use of IT to **support operational** can be exemplified by accounting and payroll systems (MARCHAND; KETTINGER; ROLLINS, 2000).

Based on the theoretical framework presented above, this study aimed to answer the following question: How managers of private higher education institutions (HEI) from Belo Horizonte perceive the information orientation of their organizations? The specific objectives of the research are: a) to characterize the stages of the life cycle of information, b) to characterize the values and behaviors regarding information and c) to characterize the uses of information technology in organizations investigated.

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6 METHODOLOGICAL PROCEDURES

The universe here considered is the set of private HEI in Belo Horizonte, Brazil, registered with the Brazilian Ministry of Education and Culture [*Ministério de Educação e Cultura* (MEC)] until the second semester of 2008. Based on a search conducted at the portal of the National Institute of Educational Studies and Research [*Instituto Nacional de Estudos e Pesquisas Educacionais* (INEP)] (2009), in April 2009, it was confirmed the existence of 52 (fifty-two) private HEI in Belo Horizonte. Of these, 46 (forty-six) are colleges, 4 (four) university centers and 2 (two) universities. The study was conducted in higher education institutions as information and knowledge are crucial inputs for the supply of their products and services.

Data were collected through questionnaires were distributed to managers, directors, course coordinators and sectors responsible of the HEI. The effective sample consisted of 83 (eighty-three) respondents from 30 (thirty) HEI, since in four institutions the survey was not authorized, and seven others did not return the questionnaires in a timely manner. Initially, we tried to apply the questionnaires electronically. However, due to the low initial returns, questionnaires were delivered in a printed format. The questionnaire consists of 67 (sixty-seven) statements, built on a Likert scale of 5 (five) options, in which respondents could choose between ‘strongly disagree’, ‘disagree’, ‘neither agree or disagree’, ‘agree’ and ‘strongly agree’ relative to statements concerning IT practices (IT for management support, operations, business processes and innovation) and information management practices (phases of the life cycle of information: perception, collecting, organizing, processing, and maintenance) and the values and behaviors related to information (integrity, formality, control, transparency and sharing of information) in their institutions. Based on the scale adopted, the total disagreement corresponds to a minimum of one and total agreement corresponds to the maximum of five.

After pre-testing the questionnaire, some changes were made to the instrument, such as the inclusion of an explanatory text about the survey, the inclusion of a question to better characterize as well as some changes to the statements.

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7 PRESENTATION AND ANALYSIS OF RESULTS

Of the 22 (twenty-two) institutions of private higher education located in Belo Horizonte who agreed to participate, 11 (eleven) had completed questionnaires by their managers, representing 50% of the universe. Regarding the size of the organizations, it should be registered that three private HEI have up to 99 (ninety-nine) employees, five have between 100 (one hundred) and 499 (four hundred ninety-nine) employees and three have more than 500 (five hundred) employees. Most of the 83 (eighty-three) respondents, 48 (forty-eight) are area managers. There was an almost equal participation of both men and women in the survey, being 40 (forty) respondents male and 43 (forty-three) female. More than half, or 71 (seventy-one) managers are between 25 (twenty-five) and 54 (fifty-four) years of age. Only eight managers are over 55 (fifty-five) years of age.

The following results (Table 1) show, the levels of agreement of the respondents with statements regarding the practices of information management in their organizations.

Table 1: Practice information management.

Theme	Statement	Average	Standard Deviation
Perception of information	We always identify and seek information on economic trends and social policies that affect our organization.	3.71	0.90
	We're always looking for news on innovations that may affect our organization.	3.87	0.80
	We always follow market changes and the demand for new products and / or services by our clients / public.	3.83	0.80
	We always try to anticipate problems that could affect our relationship with suppliers and partners.	3.63	0.90
Collection of information	We seek to identify the information needs of employees to ensure that they have access to the right information at the right time.	3.57	1.01
	We always filter the information to avoid information overload on our managers and employees.	3.20	1.05
	We selected the best internal and external sources of information for our employees.	3.29	1.05
	We invest in training our employees so they are able to seek the information to be used in their work.	3.15	1.07
Organization	The organizational information is properly classified and indexed to ensure their availability.	3.16	1.04

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of information	The different databases of the organization are properly interconnected.	3.06	0.97
	Employees are trained and encouraged to correctly organize information.	3.32	0.99
Information Processing	Employees always have access to the necessary information before making decisions.	3.16	1.04
	The staff always analyzes the available information so as to extract the necessary knowledge for decision making.	3.23	0.97
	We value and hire people who are better able to analyze and deal with information.	3.44	0.90
	Employees are trained and encouraged to use the information appropriately.	3.38	1.02
	Our performance appraisal system takes into account the manner in which employees deal with information.	3.15	1.08
Maintenance of information	We always avoid to collect information that already exists in the organization.	3.06	0.93
	Our databases are always updated.	3.07	1.08
	The information and working documents used by staff are continually updated.	3.30	0.99
Average		**3.41**	

Source: Research data.

The results presented in Table 1 highlight the high level of agreement of respondents with questions concerning the search of news about innovations (3.87), monitoring of market changes and demand for new products and services (3.83) and seeking of information on economic trends and social policies that affect their organizations (3.71). Taken together, these results suggest a major concern of managers to monitor the business environments of their institutions to ensure them a proper strategic positioning in the market.

The lower levels of agreement of the respondents are related with the organization and maintenance of information. In fact, the scores related to the interconnection of databases (3.06), updating of databases (3.07) and concern to avoid collecting information that already exists in the organization (3.06) are the lowest of all those related to management information. In short, managers perceive that their organizations are well connected with the information about the external environment, but fall short when it comes to managing their internal information.

The results of Table 2, below, shows, levels of agreement with the statements related to the construct ‘information values and behavior’.

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Table 2: Values and behaviors relative to information.

Theme	Affirmative	Arithmetic	Deviation Standard
Proactive use of information	We are always looking for relevant information about changes and trends that come from outside my organization.	3.83	0.79
	We use the information to find answers to changes and developments external to my organization.	3.91	0.74
	We are always looking for information to create or enhance our products, services and / or processes.	3.89	0.75
Transparency in the use of information	People trust each other in order to share unsuccessful work experiences.	3.25	1.03
	Our managers seek to create a climate of openness and trust for information sharing.	3.55	0.99
	Information about failures, errors and mistakes are shared and discussed in a constructive manner.	3.27	1.08
Integrity in relation to information	It is common for people to pass along to others, purposefully incorrect information (inverse scale).	1.98	0.96
	It is common to disseminate information to justify or legitimize decisions already made (inverse scale).	3.08	1.00
	It is common for people to retain the information for themselves (inverse scale).	2.76	1.05
	It is common for people to use the information for their own benefit (inverse scale).	2.63	1.03
	People know to what extent they should share sensitive information.	3.37	1.06
Sharing of information	There is always information exchange inside my work team.	3.90	0.89
	There is always information exchange with people outside my work sector, but within the organization.	3.58	0.84
	There is always exchange of information with customers, suppliers and partners.	3.33	0.94
Control of information	Employees receive regular information about the organization's performance.	3.09	1.04
	Employees use information to improve their own performance.	3.58	0.87
	The information is so scattered that it hampers the control of processes and workflows (reverse scale).	2.78	1.18
	Employees have information about what they should do, but do not know the ultimate goal of their work	2.65	1.08
Formality of information	Employees rely more on other people than on formal sources (memos, reports, etc.) (reverse scale).	2.43	0.96
	Employees prefer to get information from others even when the formal sources (memos, reports, etc.) are available and reliable (reverse scale).	2.49	0.98
	Employees use the information from others to check and improve the quality of formal sources.	2.99	0.89
Average		**3.21**	

Source: Research data.

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According to respondents (Table 2), managers use information to find answers to the changes and developments outside their organizations, or seek to find proactive responses to changes in the external environment (3.91) and are always looking for information to create or enhance their products, services and/or processes (3.89). Another highlight refers to the fact that managers realize that there is always exchange of information among their staff (3.90).

Among managers, the lower degrees of agreement relate to the formality and integrity of information (Table 2). According to respondents, is not common in their organizations, people pass along to others, purposefully incorrect information (1.98 on reverse scale). In addition, employees trust more other people than formal sources (2.43 on reverse scale), preferring to obtain information from others even when the formal sources are available and reliable (2.49 on reverse scale). As these scales are inverted, the above results reflect the perception that, in the organizations of the respondents, there are adequate levels of formality and integrity as employees deal with information.

The results presented in Table 3 reveal high levels of agreement with statements relative to information technology practices. It should be mentioned that, in the questionnaire presented to the respondents, the statements presented in Table 3 are preceded by the phrase “In my organization, information technology is used for […]”.

Table 3: Information technology practices.

Theme	Statement	Average	Standard Deviation
IT operational support	Control processes and operations	4.42	0.59
	Ensure consistent and high quality performance by workers at operational levels	4.04	0.83
	Increase operational efficiency	4.30	0.62
IT support for business processes	Integrate the work of employees with organizational processes	4.19	0.63
	Establish connections between the processes of the organization / company and the processes of suppliers and customers	4.19	0.72
IT supporting innovation	Accelerate the introduction of new products and services	4.07	0.82
	Facilitate creativity and exploration of ideas	3.79	0.95

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IT to support managerial	Promote knowledge sharing among employees	4.06	0.83
	Obtain information to enable proactive actions in the market or with external stakeholders	4.32	0.68
	Analyze the business or external social environments	3.93	0.75
	Obtain information to defend the company's position in the market or ensure the provision of services to the population	4.16	0.74
	Forecast and anticipate trends in the business or the external social environments	4.00	0.77
	Assess possible risks associated with the business or organization	3.99	0.86
ARITHMETIC GENERAL		**4,11**	

Source: Research data.

Among the results present in table 3 stand out the high levels of concordance with statements related to the use of IT for processes and operations control (4.42), to the retrieval of information to enable proactive actions in the market or with external audiences (4.32) and to improve operational efficiency (4.30). On the whole, the IT practices investigated are privileged in the studied organizations. The smallest concordance indices relate to questions associated with the use of TI for innovation support and for management support. Managers revealed moderate levels of agreement with statements associated with the use of IT to facilitate creativity and exploration of ideas (3.79), to analyze the business or external social environment (3,93) and to assess possible risks associated with the organization (3,99). The above results demonstrate a predominance of TI practices over information management practices and behaviors and values associated with information in the HEI. These results may indicate the belief that information technology may solve, in itself, organizational problems.

8 CONCLUSIONS

In addition to identifying the views of managers of private HEI of *Belo Horizonte*, *Minas Gerais*, Brazil, concerning the information orientation of their organizations, with this paper the authors sought to contribute to the literature in the area of information science concerning information management in organizations.

Based on the results obtained in the investigation, one may conclude that HEI are generally highly oriented to information, although such orientation manifests

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itself in different levels in each OI dimension. What is shown is the presence in these organizations, of high levels of some indicators of Information Orientation practices. Nevertheless, their overall level of OI falls short of what an informationally oriented organization is, according to the authors Donald A. Marchand, William J. Kettinger and John D. Rollins.

Among the three capacities that the organization needs to have to be well oriented informationally, the results reveal the predominance, in the institutions participating in the research, of IT practices to achieve organizational goals.

The practices of perception or sensing information constitute, in the present study, the set of Information Management practices that deserve to be highlighted. Below these, one should mention those activities related with information retrieval and, finally, the practices relative to information maintenance.

One hopes that future studies will explore the information orientation perspective in greater depth. Among the many analytical possibilities are hypotheses testing of differences between means, as well as studies to investigate statistical relationships among variables. In spite of the difficulties and the characteristics of exploratory data analysis performed, the study reinforced the conviction that the theme OI opens avenues for future research related primarily to information management, information technology and behavior and values related to information.

The information orientation construct brings together three important pillars not only for the performance of an organization, but also the people who work in them. In short, one hopes that the OI perspective will occupy its rightful place in the agenda of the strategists, especially those of Brazilian institutions, since among them it still seems to prevail the idea that technology can solve everything by itself, without considering the role of people and the importance of proper management of information in organizational contexts.

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