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Knowledge Organization in the digital age: the complexity of the global labor market

Abstract

In this paper, we focus on strategic aspects of the new profile of knowledge organization professionals. First, we discuss the dimensions of knowledge organization in a current globalized and competitive scenario as an inherent characteristic in any organizational action, a vital element in the production of social reality. Secondly, we highlight the skills of knowledge organization professionals in the field of new technologies and knowledge distribution. Thirdly, we approach the restructuring of the organizational environment considering the perspective of the global labor market complexity. Finally, we present our reflections on the skills and competences of the knowledge organization professional with respect to the global labor market's expectations and demands in the digital age.

Introduction

The strategic value of science, technology and innovation has been accepted unquestionably. Improvements in these areas act like a fundamental driving force of industrialized countries and they are also responsible for enhancing their wealth. In recent years, industrialized countries like Singapore, China and South Korea, have revolutionized their economies; they are now modern and extremely dynamic. Even when following specific political tracks, it has been no different in those cases: the incentive and dissemination of a culture based on promotion of information, knowledge and technological innovation. Technological development represents an indispensable condition to effectively compete for best levels of position in crowded global markets.

In recent years, information literacy has constituted a new research field that corresponds to education, information science, knowledge organization, and cognitive science. First, the challenge is to learn the basic use of technological resources - digital literacy - and second to adapt and generate new knowledge - information literacy. In the information literacy context, the challenges are multiple: the difficulties of university libraries with their expensive collections to compete with digital collections; virtual libraries and search engines providing information instantaneously at no cost; the deconstruction of the individual author concept and the emergence of digital collectives.

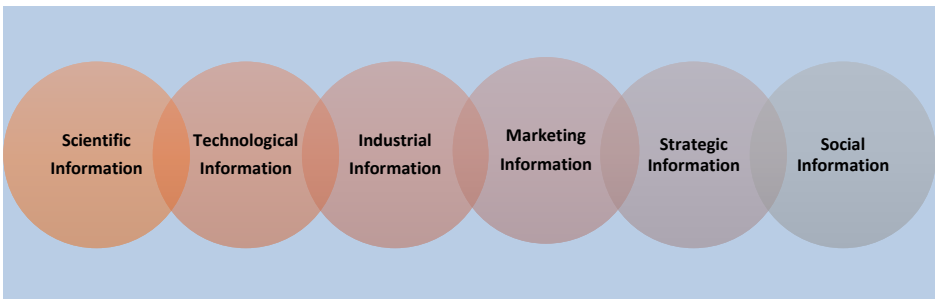
The recent and rapid development of emerging countries, grounded in a culture that promotes information, knowledge and innovation, highlights the importance of education as an economic element to further wealth generation and income distribution. In the globalized scenario in which knowledge has a strategic role in the definition of management policies focused on organizations' competitive advantage, information

science plays a strategic role in the development of a country's competitiveness.

The advent of rapid knowledge obsolescence also reflects the need for professionals with holistic vision, management skills, methodological approach, cultural and systemic vision, creativity, entrepreneurship, innovation, environmental responsibility, communication and leadership. Global competitiveness requires a new professional profile, which can face the challenge of balancing the skills of a strong academic and technical background and production process management, focusing on global competitiveness where information has strategic value in decision making. This situation requires educational and professional skills that meet the demands of the global labor market. In addition to an excellent humanistic, cultural and technical formal education, organizations need professionals with new competencies and abilities.

The network society's new configuration constitutes the object of study and research for professionals from various fields, especially information workers, who deal with the challenges of information management and knowledge organization in their dimensions (Figure 1): scientific, technological, industrial, marketing, strategic and more recently, social.

Figure 1: Information dimension



Source: Author Research Project

In this new context, one of the most imperative challenges of education in science and information technology, where technology plays a central and decisive role in information organization and management, as well as the production of new knowledge, is to develop curricula that provide training aligned with the challenges of the global marketplace and, at the same time, considering the cultural and humanistic education of professionals that are working in the area, aiming for the training of leaders that can actively contribute to sustainable development and wealth generation (Observatório 2011).

In the process of training professionals with globalized skills, a relevant factor that

should be considered by universities in shaping their faculties is to consider not only academics with PhDs and Master`s, but also professionals who hold active and strategic positions in the work market, thus enriching the academic environment with new experiences, technologies and trends. Lessons, both theoretical and practical, should make use of modern computational resources to enable renewal of the research environment, development and production of the productive sector and research, leading the student and teacher to experience the competitive environment in which organizations are located (Brascom 2018).

To face international competitiveness, we need to reappraise the strategic value of information and knowledge as well as understand that there is still a lot of work to be done in this field. There is a connection between technological development and sustainable economic growth that is essential and involves many areas. Among them, one of great interest deals with the modernization and internationalization of the current academic model. It is not enough to ensure good student training, we need to develop new skills required by global labor markets.

In this context of increasingly dynamic change, knowledge becomes obsolete quickly. In the case of information science, which is cutting edge compared to many fields of scientific and technological knowledge, it is possible to say that half of what the student learns at university will be obsolete in five years. It is recommended to organize a holistic qualification, enhancing management, communication, leadership, methodological, cultural, multidisciplinary and systemic skills - all of them highlighted in the knowledge economy.

We need to understand and appreciate the complexity of the contemporary world to face the challenges of education. In addition to specific technical skills - indispensable in information science, most new or renewed professions will require the practice of many cultural abilities. To educate the information professional for the 21st century is to balance the binomial of expert - in its technical dimension - versus generalist; in short, by adopting a multidisciplinary approach.

Education and professional skills in knowledge organization

In a world where to achieve higher reaches indicates the measure of organization survival, to remain oriented to a more globalized market, despite all the economic and structural difficulties, is not an easy task. The focus must always be on the future. We must dedicate ourselves to build an innovative educational project, preparing the new information and knowledge professional to accept the challenge of exploring the path of innovation and sustainable growth. The best performing organizations are those able to identify opportunities, take advantage of the changes, turn ideas into reality and get the results that put them one step ahead of the competition, ahead of their time.

Keeping in mind the vital importance of the role of information and knowledge in

defining the competitive strategies of organizations, establishing methodologies for its organization, management, access and use is the bridge between science and society. Education in this field of knowledge must be based on three pillars: technical training, cultural and humanistic education, and environmental responsibility for sustainable development.

Of crucial importance, the lessons of information science courses, which are preparing these new professionals, should develop, in their pedagogical projects, the principles of sustainable development, focusing beyond the immediate future, with innovation and creativity seeking balanced solutions between the needs of society and the effects on the environment. Science, information and technology are strongly interconnected, and it is important to have a better comprehension of how to manage access and use of information in converting the new scientific knowledge into a technology at the service of modernity (Paletta, Maldonado 2014).

In a world without barriers to knowledge production, "mobility" has become a key concept for every professional and for all organizations that compete in an increasingly globalized market. Mobility must be understood not only in its physical aspect – because in a world dominated by information and communication technology, mobility is becoming increasingly "virtual" - but especially in the sense of flexibility, adaptability and interactivity (Canclini 2009).

Mobility is the set of attributes that enables one professional to seize new opportunities, either in foreign countries or at the place of origin. Mobility requires skills that go beyond traditional academic training, and the guarantee offered by international standards certification and accreditation of higher education diplomas.

This is an irreversible trend that results in new forms of organization of production on a global scale, examples of which are outsourcing or third part services within national borders; the offshore or international third-party services; and the formation of supply chains and information. Mobility imposed by the need to guarantee competitiveness in regional economic blocks, as well as local development, in response to the efforts of global competitiveness.

To achieve this mobility, the information and knowledge worker needs to combine traditional technical and scientific knowledge – basic elements of information science – with management skills that qualify him to assume responsibilities in the new organizational environment and the need for the spread of organized and productive information.

The development of information technology has followed the course of the industrialization process. In the first place, the required competence was eminently technical. In a second stage, as the industry diversified and became more sophisticated, scientific qualifications were required. In a third step, managerial skills were then required. The direction followed in this process was one of increasing specialization.

Progress was then made to a fourth stage, which was reached by the reverse direction - going from expertise to holistic training (Paletta 2012).

Holistic training as a requirement of mobility, is related to mental flexibility and, therefore, with a kind of innovation. The relationship between holistic knowledge, globalized markets, the knowledge economy and sustainable development is intrinsic.

For this global professional, to have holistic competency means adding new knowledge and ability to basic technical skills, such that this professional should live together with communities and cultures that are living and solving daily issues and problems considering a specific and characteristic point of view. The professional should have communication skills and know how to work in multidisciplinary teams and be aware of social, ecological and ethical implications involved in the management, access and use of information and knowledge production.

Another important point is to speak more than one language and be able to work anywhere in the world. A compilation of recent studies sums up the type of expertise and skills required today in a global professional:

- performance in multidisciplinary teams;
- identification, formulation and solution of knowledge management problems;
- sense of ethics and professional responsibility;
- recognition of the need for continuous training;
- use of modern techniques and tools to have good search practices, access, ownership and use of information;
- informed socio-environmental responsibility;
- understanding of ICT solutions' impact in a global and social context.

The formation of such skills requires that the technical disciplines provided in the curriculum guidelines of university classes should be complemented with interdisciplinary content, and to the theory to be attached to problem solving. In this case, cooperation between universities and organizations is fundamental. Understanding the historical context in which they develop information science in different countries contributes to breaking down cultural barriers.

The complexity of the global labor market

Knowledge is the factor that currently adds more value to people, services and products, in any area or professional field. For this reason, qualification should be the training goal of information science professionals. Qualification is understood as a logical result of a process that depends on what is loaded in the brain and not the mere enhancement of information without connections or contexts, memorization without critical consideration. To the extent that the world is sophisticated and diversified, the competence required of the information professional that can be considered highly technical - remembering it is impossible to dispose of it or move forward without its

consolidation - widens and encompasses other important responsibilities in the new organizational environment.

Thus, it is necessary to think in a holistic qualification aligned to the demands of the knowledge economy. The knowledge economy can be highlighted in reference to the cognitive and pedagogical models able to dialogue with the ever-changing world. Nowadays, intelligence has another meaning. It means to perceive things that have not yet been seen. It indicates an extensive qualification. It is a qualification that teaches students to think, catalyzing several multidisciplinary and transdisciplinary projects, valuing curiosity, the ability to explore, to solve new problems, be constantly updated, and develop a leadership profile, requiring the autonomous pursuit of knowledge on the complexity of the world.

In two decades of the new millennium, the development of organizations relies on technology from both a social and economic point of view. Technology is a decisive factor in the digital divide and wealthy generation issues, based on new products, services and processes, all of them heavily dependent on innovation. The ability of an organization to act in a global market depends on a competitive positioning, as the creator and developer of technology-based products and solutions. Therefore, in the coming years emphasis should be given to technology-based entrepreneurship, that is, the ability to offer new products and services based on innovative technologies to the market.

This challenging role is up to all sectors of society and to information science professionals, who should be able to organize and manage information with a focus on producing new knowledge, using new techniques, creativity and audacity to offer global society solutions with differentiated content that can improve not only the productivity of organizations, but also the quality of life. This entrepreneurial mindset, not purely commercial, is a key feature in the development of professional skills with ability to create wealth through technology and knowledge.

The influence of science, information and technology is evident in organizations' abilities to compete aimed at achieving sustainable development of society within a well-defined global positioning. It is up to the university, in technological cooperation with the production and services sector, to contribute to the proper training of human resources, offering not only technical training but also humanistic and global expertise, so that new information professionals can become wealth-producing vectors of income distribution and sustainable economic development.

To consider the education mission, it is necessary to comprehend and appreciate the complexity in contemporaneity. The future intelligence and the future of intelligence depend on the acceptance of complexity and how we deal with it. It is important to consider dialogue in any educational project. It is possible to say that we are bound to complexity and it will respond by guaranteeing future advances in medicine, genetics,

robotics, artificial intelligence, energy, environment, pharmacology, nanotechnology, computing, agriculture and of course all areas of information science. Jacques Attali (2001), in his dictionary of the 21st century, says, "According to Moore's Law, the complexity of electronic chip increases 50% in eighteen months. According to Metcalfe law, the value of a network increases with the square of the number of those who use it. According to Kao's law, the creativity of a group increases exponentially with the diversity and divergence of which it is composed." Therefore, complexity will increase in consequence of the human adventure during this century (Paletta, Maldonado 2014).

Complexity is the great gift that life brought to our planet. Of course, a correspondence can be established between the complexity of the human nervous system and the complexity of human knowledge. Like the world around us, neurons are extremely complex: they are numerous, multiple and engage in several different ways, creating a web of diversity. Maturana and Varela (2000), in *The Tree of Knowledge*, understand that a nervous system is just as rich and vast as the man is - "tens of billions of cells in a combination of truly astronomical possible interactions" - provides new dimensions of complexity, responsible for language and self-consciousness; in short, the raw material to be treated by education. Either we learn to deal with complexity or paradoxically, the result will be chaos.

Complexity renews the concept of education, which is intrinsically problematic because it is related to an activity that transforms and creates alternatives to the usual. If the world is infinite and, more interesting, "infinite in all directions", education needs to be even more open to possibilities, expanding its versatility (Freeman 2000).

The philosopher Pierre Lévy (1998), professor of the chair of Research in Collective Intelligence at the University of Ottawa, reaffirms the importance of education to the world's complexity. He observes: "In every place to where we direct our gaze with sufficient accuracy and perseverance, the world in which we live shows its complexity". The possibilities opened by a qualification that takes complexity into account are ample and appropriate to the future scenario of professional work.

The dynamics of most professional activity in the next decade are not clearly established. Professions will continue diversifying and new professions that do not yet exist will be in great demand. In addition to specific technical skills – indispensable, in the case of information science – most new or renewed professions require the practice of many cultural capabilities. To educate the information professional for the 21st century is to balance the binomial of expert (technical dimension) versus generalist (qualification for complexity), in a smart way because the future possibilities in the labor market are undoubtedly smart (Lévy 1997).

Conclusion

Knowledge organization links three processes of strategic information use – the

creation of meanings, knowledge construction and decision making – a continuous cycle of learning and adaptation that can be named a knowledge cycle. In recent years, the value of science, technology and innovation has established itself as strategically unquestionable. Advances in these fields act as the driving force of industrialized countries, in response expanding their wealth.

In this context, in France we can highlight the Professional Association of Librarians and Professional Information, established in 1963 as “Association des Bibliothécaires et Documentalistes Spécialisés” and which in 1993, in recognition of the expansion of the profession scope, was renamed to “Association des Professionnels de l'Information et de la Documentation”. The Association aims to promote the profession in its various forms and develop information competencies of professional interest. According to the L'Observatoire de la Fonction Information (2018), the activities related to information organization and management are developed in a complex and challenging ecosystem. Different actors coexist in perimeters of action throughout the chain of information services. In a network society, it is imperative that information professionals work in cooperation with several fields of knowledge and specialized activities considering technical and methodological expertise.

Scientific knowledge and access to technological innovations are very unevenly distributed considering the comparison between countries, regions, social class, age groups, educational levels, among others. Thus, the issue of cultural diversity and research about it, should be part of the theoretical consideration, of empirical research and policy planning in the information area of literacy development. In addition, the typical information professional does not want only to extract specific and definitive information as soon as possible or, alternatively, the professional is willing to invest effort to seek and exploit information and knowledge. The truth is that people continually oscillate between extract and exploit, and use of information is a confused process, disordered, subject to fluctuations of human nature, like any other activity. Among the most important elements that influence the use of information are the individual's attitudes toward information and its search. To the extent that the world is becoming more complex and diversified, the skills required of information professionals, in a first stage, are a highly technical flare which will come to encompass other responsibilities. It is necessary to consider a holistic qualification, enhancing managerial, methodological, cultural, multidisciplinary and systemic skills. However, the role of technical training should not be minimized.

The professional must update his/her knowledge and skills constantly since the technology becomes obsolete so quickly. This process involves not only ensuring the proper technical training for students, but also finding ways to develop new skills such as management, communication and leadership because these qualities are increasingly demanded by the labor market.

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