

## **The Importance of an Ergonomic Model in the Distance Education Poles of the Federal University of Santa Catarina**

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### **Abstract**

*This article aims to demonstrate the importance of an ergonomic model in Poles of Distance Education (DL), in the courses of the Federal University of Santa Catarina (FUSC). Such a study becomes important, since DL is becoming more frequent and sought after, requiring that all those involved in the process be motivated, adapting the work environment to them. There is no specific legislation on what should be the appropriate environment for a distance education hub. In order to reach the proposed objectives and respond to the research problem, the qualitative, exploratory research and the case study were used, with a bibliographical survey, allowing a deepening of the study. The research evidenced the importance of the study of an ergonomic model in these poles, since it could increase the satisfaction and performance of those involved, improving the quality of life, comfort and health of students, tutors, teachers and technicians. This article also aims to inform and raise awareness of people and organizations that may have an interest in ergonomics, applying the specificities in constant development.*

**Keywords:** *Ergonomic model. Distance learning (DL). Centers for Distance Education*

### **1 Introduction**

The 21st Century emerges in a new globalizing socioeconomic order involved in the increase of education, science and technology. In this context, education has been one of the reasons why governments seek to minimize social differences. In order to reach the goal one can not be attached to the classroom, limited to teaching-learning, not neglecting here, its value (Litto & Formiga, 2009).

The use of large-scale computers facilitated access to learning, and distance education became much sought after, especially those who have difficulty locomotion, facilitating the reduction of costs, as well as the lack of time in being every day in the classroom, contributing to the growth of distance learning. In addition, such education narrows borders, and geographic distances are no longer a hindrance to studying in an educational institution.

The 21st Century is characterized by the Information and Knowledge Age, requiring more rapid and agile instruction, because at each moment something new arises, requiring constant training, unlike previous decades, in which knowledge was slow to arrive and remained long unmodified time (Litto & Formiga, 2009).

Distance Learning (DL), a modality of teaching, is making a great contribution to those who seek higher education, specialization and improvement. Because of the more flexible study facility, people are able to organize themselves better, taking time to work and attending higher education at a distance, of equal validity and recognition to that of traditional teaching. Functionality and popularization of the use of computers and the advancement of the internet, increasingly accessible, result in the great challenge of knowing if people are prepared for this new type of education. In view of this, the need for the study environment to be adequate for academics and professionals in order to have a higher quality of life, health, comfort, and productivity becomes important, as DL is increasingly being one of the main tools of learning, it becomes fundamental to acquire a differential before the market to meet this demand.

Ergonomics is a science that was born to adapt the work to the human being. The origin and evolution of this science are related to the socioeconomic and, above all, technological changes that have been taking place in the world of work. From the production of craftsmanship to automation, robotic computerization, from the direct relationship with the working environment and from people to virtual relationships, the interaction of the human being with his work has undergone profound changes (Rio & Pires, 2001).

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In ergonomics there is concern about information system rationalization projects, data processing centers, video projects and even complex systems organizations, such as power plants and transport system. Universities, like the poles in question, require equally complex system operations, offering many opportunities for studies and applications of ergonomics (Ilda, 2005).

At the level of legislation there is no specific determination as to how space should be used in the DL Poles. Corroborating, the ergonomics can come together to meet these needs of an ergonomic model in these Schools of teaching in DL.

In this sense, the present research hopes to answer the following question: "what is the importance of an ergonomic study to be used Poles of DL of the Federal University of Santa Catarina (FUSC)?"

The general objective of this research is to demonstrate the importance of an ergonomic model for the DL Poles of the FUSC.

The sense of elaborating this type of work is based on demonstrating the ergonomic importance of the DL Poles, given the increasing demand in this method of teaching.

Because there is no legal determination on the ergonomic model at the DL presence poles, many of these spaces are not recommended, most of which are municipal or student schools, which do not have an adequate structure, as there are no tables and desks for adults, library with the minimum of works to be researched, acoustics for videoconferences, among other aspects.

## **2 Theoretical Foundation**

### **2.1 Distance Learning**

According to Bernardo (2009), DL is a systematically organized form of self study where the student is instructed from the study material presented to him, has the follow-up, and supervision of student success is carried out by a group of teachers, this being possible through the application of means of communication, capable of overcoming long distances.

The DL is an invaluable resource for serving large numbers of students, more effectively than other modalities and without risk of reducing the quality of services offered as a result of the expansion of the clientele served. This is made possible by new technologies in the areas of information and communication that are opening up numerous possibilities for distance teaching-learning processes (Nunes, 1994).

The DL as a teaching modality shortens distances, promotes autonomy, benefits the community and carries out the teaching and learning process in places where classroom teaching can not act for different reasons (Ferreira & Elia, 2013).

Behar (2009), defines that the direct participation of the student through the face-to-face moments strengthens the relationship: teacher-student, student-student, student-content, where knowledge is blended through face-to-face and virtual activities, which enables a that there is better in each of the modalities - face *versus* distance. The distance courses use many communication resources for student-teacher interaction in order to allow their full functioning considered the virtual medium as a correspondence and link between many tools for: writing, reading, images, video, audio, video conferencing, web conferencing, chat, forum, e-mail, among other resources. One of the basic premises of DL is student autonomy. It is considered that the students must organize their time and space for the study, counting on the aid of technological resources, didactic and with the support of tutor face-to-face or at a distance, according to the pedagogical project of the institution.

For Alves (2009), the scientific historical milestone of the DL begins when Johannes Gutenberg invented the press in the 15th Century in Germany. Faced with this, it became indispensable to go to school to hear the masters read the books, since the privilege of obtaining a copy was restricted to the nobility and the clergy. In the middle of the XVII and XVIII Centuries the main way of scientific communication was the letters, constituting a new teaching-learning process.

In the third millennium the spread of the DL in the world, due to the pedagogical globalization, of which the present technology facilitates the interconnection between the countries even distant, was felt. Union and joint work among countries becomes interesting, since the cost is low, which characterizes the existence of common programs (Niskier, 2000).

The human factor has been evidenced, because allied to ergonomics, science that advocates comfort and quality of life, may bring these and other benefits to this modality of teaching.

## **2.2 Ergonomics**

Ergonomics is the study of the adaptation of work to man. The work in question is broad, not only referring to machines, but as the whole relationship between man and the work he performs. Not only the physical environment, but all organizational aspects of how the work is planned to produce the desired results (Ilda, 2005).

This science is considered a set of interdisciplinary knowledge, and each professional can contribute his knowledge in a transdisciplinary way, in the greater objective of maximizing the human potential in the human work interface (Rora *et al.*, 2009).

The practical goals of ergonomics are the satisfaction, safety and well-being of workers in their relationship with productive systems, aiming at efficiency free of sacrifices and sufferings (Weerdmeester, 2004).

A more appropriate definition of ergonomics would be "the study of the relationship between man and his work, equipment and environment, and particularly the application of the knowledge of anatomy, physiology and psychology in the solution of problems arising in this relationship" (Ilda, 2005, p. 4).

The Italian physician Bernardino Ramazzini (1633-1714) was the first to write about diseases and injuries related to work, in his publication of 1700 "De Morbis Artificum" (occupational diseases). Ramazzini was discriminated against by his fellow physicians by visiting the workplaces of his patients in order to identify the causes of their problems. The term ergonomics, derived from the Greek words *ergon* (labor) and *nomos* (natural law) entered into the modern lexicon when Wojciech Jastrzębowski used it in an article in 1857 (Rora *et al.*, 2009).

World War II marked the advent of sophisticated machines and weapons, creating cognitive demands never before seen by machine operators in terms of decision-making, attention, situational analysis, and hand-eye coordination (Melchior *et al.*, 2003).

Menezes and Santos (2014) emphasize that the objective of ergonomics is to adapt the work to the man, being interested in understanding the distance between the prescribed and the reality, since this non-adequacy can cause decrease of the performance of the workers, being the importance of the adaptation of the work, in what it says respect to machinery, equipment and the environment, to man, in terms of characteristics, constraints, values and limitations.

In 1949, K.F.H. Murrel, an English engineer, began to give a more precise content to this term, and made the recognition of this scientific discipline creating the first national association of ergonomics, Ergonomic Research Society, that reunited physiologists, psychologists and engineers who were interested in the adaptation of the work to man. And it was from there that ergonomics developed in other industrialized and developing countries (Abrahão, 2000).

Ergonomics may contribute to the reduction of psychophysiological overloads present in many work situations, when it is planned to use them in the desired environment (Rorthstein 2013).

In the decades following the war and to the present day, ergonomics continued to develop and diversify. The space age has created new ergonomics problems such as lack of gravity and extreme gravitational forces. To what extent could this environment be tolerated and what effects would it have on mind and body? The information age has reached the field of man-computer interaction as demand growth and competition between consumer goods and electronics has resulted in more companies taking into account ergonomic factors in product design (Tuomaala *et al.*, 2009).

In Brazil, ergonomics emerged linked to the areas of Production Engineering and Industrial Design, and its scope of work was focused on the application of the knowledge produced on human measures and the production of norms and standards for the Brazilian population. The second moment of ergonomics in the country began with the studies in the area of Psychology of the University of São Paulo (USP), with experimental researches on the behavior of drivers and socio-technical studies carried out by the Getúlio Vargas Foundation (GVF) in Rio de Janeiro (Abrahão, 2009).

The interdisciplinarity on which ergonomics is based, as an area of knowledge, results from the importance of analyzing the phenomenon of human work from different perspectives. Interdisciplinary is more than a simple dialogue between disciplines. It is a continuous process of development and reconstruction of the knowledge of the various areas involved, based on the principles of ergonomic action (Pacaud, 1970 *apud* Abrahão, 2009).

The effect of the Taylor Scientific Administration on the work environment has been enormous, greatly increasing productivity while accelerating the replacement of skilled skills by unskilled workers. Therefore, this type of administration has become very influential, although seen in a negative way, since productivity costs have often been reached through high human cost, reducing many workers to automata (Morgan, 2000).

A motivated professional produces more and better. You may suffer less from the effects of fatigue and monotony. In the human-computer interaction, one must consider the operational characteristics of each one and the form of interaction between them. The computer can process a large volume of information quickly and consistently, without forgetting any variable, being able to generate various hypotheses and alternatives, but, of course, it can only work with clearly defined systems and does not operate in an overload situation (Ilda, 2005).

The ergonomic concept of work has been evolving over the last hundred years, even before formal beginning as a science. Taylor developed studies at the beginning of the twentieth century that greatly influenced the question of work and provide, to this day, elements for ergonomic concepts and practices (Rio & Pires, 2001).

In order to adapt the work to human beings, it is necessary to know as much as possible about them, that is, what types of adaptation should be done at work so that the act of working is not exhaustingly unnecessary (Rio & Pires, 2001).

A motivated professional produces more and better, as it may suffer less from the effects of fatigue and monotony. The characteristics of the work and the level of stress in the occupational environment can be directly influenced by changes in the environment in which the work is inserted (Tuomaala *et al.*, 2009). Evaluations on the quality of life and work capacity can also contribute to monitor the changes in the mentioned environment, being these receptive to the adverse characteristics of the work (Melchior *et al.*, 2003).

### 2.3 Distance Learning Models

In an interesting document published in 1997, the United Nations Educational, Scientific and Cultural Organization (UNESCO) considered DL to be a challenge for education systems at the beginning of the 21st century. His argument is that DL and face-to-face education are ordered in a continuous line, which are not excluded, since both in one and the other contact with the teacher is indispensable (UNESCO, 1998). There is a more traditional educational function, seen from one pole, which explains, clarifies, communicates ideas and experiences and, while at the other pole, there is the sharing with the students of the same experiences, insofar as the student is a source information and learning facilitation (Melo & Collossi, 2004).

According to Rumble (2003, page 15), organizational management can thus be defined as "a process that allows the development of activities with efficiency and effectiveness, making decisions regarding actions that are necessary, choosing and verifying the best way to execute them".

The first example of distance education project was designed to attend a higher education course to be taught in municipalities of the state interior. The institution required a viable, low-cost model, opportunizing to migrate from a successful experience of free face-to-face courses given at weekends. A team of teachers traveled alternately to the localities and ministered their courses. The management wanted to maintain this dynamic of weekly meetings with its rotating team of teachers (Ribeiro, 2007).

The management team is composed of professionals who define, organize, and follow the activities of the DL project. They make up the multidisciplinary team, select the macro strategies to reach the objectives of the institution or the project. In medium and large institutions, different departments are involved in these assignments (Litto & Formiga, 2009, p. 66).

DL planning is seen as an indispensable tool for successful completion of teaching. Faced with many challenges that will come, education is an indispensable tool for humanity to progress in the ideals of peace, freedom and social justice. Educational policies are a permanent process of enriching knowledge, of technical capacity, but mainly of a privileged structure of people and of relationships between individuals, groups and between nations (Delors, 1996).

Depending on the complexity of the project, especially the scope and scale of service, the number of professionals involved and the distribution of roles may vary. It is normal to find institutions that maintains a fixed staff in their functional frameworks and another variable, outsourced or not, contracted on demand. Even institutions varying in the organization of their structures, some professional profiles are typical of DL projects, regardless of the scope and the predominantly used technologies (Litto & Formiga, 2009).

There are intangible benefits such as satisfaction, comfort, and increased motivation of DL professional students (Ilda, 2005). The attendance poles should be adapted for the students who study for this type of education, since the benefits are represented by the goods and services produced, such as comfortable tables and chairs, a properly lit environment, acoustics prepared for videoconferences, among other aspects. In the case of a proposed change in this planning, increases in productivity and quality, reduction of waste, energy savings, labor, maintenance, and other benefits should be estimated.

### **3 Methodology**

For the elaboration of the present article, some methodologies will be used to aid in its preparation.

According to Andrade (1999, p.11), methodology is "the set of methods or paths that are traversed in the search of knowledge".

Exploratory research will be used, since it is the first step in all scientific work, in order to provide more information about a certain subject, as well as to help define objectives, delimit the subject, collaborating to develop a good research of the subject (Andrade, 1999). The bibliographical researches were also used, because to carry out the article, it was necessary to use works already published.

The case study will be carried out by the author of the research, in on-site observations in the Poles of DL. The qualitative case study is a description (holistic and intensive) of a well-defined phenomenon (it can be a program, an institution, a person, a group of people, a process or a social unit). The use of the case study denotes that the researcher's interest is more focused on understanding the social processes that occur in a given context, than between relations established in the discovery, in the interpretation, much more than hypothesis verification (Godoi, Bandeira-de-Melo & Silva, 2007).

The methodology was fundamental to fulfill the proposed objective and to respond to the research problem. We will investigate and analyze the places where they are made and will do the tests, studies in groups, videoconference rooms, acoustics, comfort in chairs, to elaborate the proposed work.

### **4 Conclusion**

The research evidenced the importance of an ergonomic study in the Poles of DL, as this may increase the satisfaction and performance of those involved, such as students, tutors, teachers and technicians. This article also aims to inform and raise the awareness of people and organizations that may be interested in ergonomics, applying the specificities in constant development.

Clear notions of the virtual world are established as potential, nurtured by the flexibility of the time and space it provides for use in learning and dissemination of knowledge. What has already been done in many courses, however, to deny the participation of the name of educational institutions and of people circulating in communities on the Internet is to leave the context in which people live today, as the authors describe that is where a large part of them interact with their family, friends, colleagues and groups, and relate more constantly, and why not consider human capacities as the main factor for better distribution of knowledge? Since human capacities are more inclusive and consider the human being as a whole in their culture in their values and habits, in short, in their context.

The ergonomics comes against the study because it presents conditions to improve the study environment to those involved in the process, allowing better comfort in the work environment, yielding better satisfactions to the process of study and follow-up.

As there is no specific legislation that deals with ergonomics in DL Poles, the importance of similar works to raise interest in the subject is emphasized. Based on the project that will be developed, it can serve as a reference for use in other Poles of DL, either the FUSC or another institution of higher education.

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