# THEORICAL ASPECTS AND MONITORS REPORT OF THE UFRN ENGINEERING DISTANCE EDUCATION

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**Abstract.** T*he advancement of technology and knowledge challenge continuous teachers and students relationship. In this scenario, the distance education allied to the traditional aid the spread of learning. This study presents a proposal for a teaching content methodology and reports Materials and Mechanical Engineering monitors experiences on materials structure and heat treatment courses in the UFRN. Theoretical aspects of distance education in engineering teaching, technology evolution and its influence on learning mode were considered.*

***Keywords****: Distance education, monitoring, internet.*

## 1. INTRODUCTION

The man has sought solutions to adapt in demanding world and undergoes transformation including education. The new professional must have among other requirements, multidisciplinary knowledge and multifunctional expertise. In other words, be a competent and committed engineer to the development of society in which they live. (Vicari *et. a*l., 2005).

Although there is no doubt among teachers that teaching is a collective action, but learning is an individual act, strategies and educational procedures used in engineering education, are still supported in a model of formal education, whose disabilities increased from the statement of its limited features and suitability to current students' needs and requirements of enterprises and society (Belhot and Neto, 2006).

The Engineer perform requires a combination of basics concepts, mathematics, physics and chemistry, involving knowledge of mechanical, metallurgy and chemistry engineering. The better methodology is the interdisciplinary, including contents of each of these broad areas of scientific and technological knowledge, beyond the specific area.
Hence, arises the necessity of the knowledge from other sources. So, the engineer assignments will be consistent with those proposed by the Federal Council of Engineering and Architecture, viewing the demand imposed by the industrial modernization (Araujo et al, 2010).

The education have far advance by continuous technology evolution. Among the technologies developed for education especially engineering arose the distance education, classroom learning supplement. Besides, serve a large number of people who are geographically dispersed, the DL (Distance Education) collaborates on the development of critical individuals, able to reflect and transform the society. The main point has been to transform and creates constant innovation learning environments (Bismarck, et al., 2010).

The DL has relied on the support of new technologies to be an alternative to meet the extensive and diverse skill needs (Preti, 1996). The DL can be defined as a bi-directional communication technology system, which replaces the personal contact teacher / student, as preferential mode of teaching, by systematic and joint action of several teaching resources and organization and mentoring support, enabling independent and flexible learning. (Aretio, 1995). The DL is planned learning that normally occurs far the teacher and as a result requires special design, instructional techniques, methods of communication, electronic or otherwise, as well as organizational structure and arrangements. (Moore and Kearsley, 1996).

The amount of available information on the Internet shows the data access facility that were kept locked away in libraries. In this context, the virtual communities connection between institutions, teachers and students has created and provided better conditions for these students. (Kurc et. al., 2006).

The DL objectives are: increasing access to knowledge by reducing geographic barriers; ease study with flexible time, classroom place and development of learning communities, among others. (Steil, 2004).

The aim of paper is to convey the experience and details of monitoring progress in engineering, the discipline of metallography and heat treatment, as reports of lectures and practices, and the search for electronic material to be available.

## 2. METHODOLOGY

The monitoring project was carried out with the classes of Metallography and Heat Treatment in periods of 2010.1 and 2010.2, where in addition to distance learning itself, with the availability of electronic material to students interested in complementing their research was done in the classroom teaching classroom, where they were given lectures on metallography, a class of about 45 students per semester, where the universe of students were divided into several groups, in order to make teaching more feasible in practice metallographic laboratory materials characterization. Students participated directly with three monitors, where these setbacks between theoretical and practical discipline, and track the progress of students agreed that the doubts were emerging, other monitors participated in assisting in the preparation and storage of electronic material.

In practical classes, students had notions of metallurgy and optical microscope, operating microscope, learning the main constituents of steel in general and most common non-ferrous alloys, which allied with the theoretical research, forms the basis of discipline and metallography heat treatments. Heat treatments were made in studies of these samples for the students to simulate situations found in industry, in order to stimulate students to solve problems quickly and safely, finding the type of material to be used or the heat treatment by which the material passed.

The flowchart Fig. 1 shows schematically the data collection on the DL program.

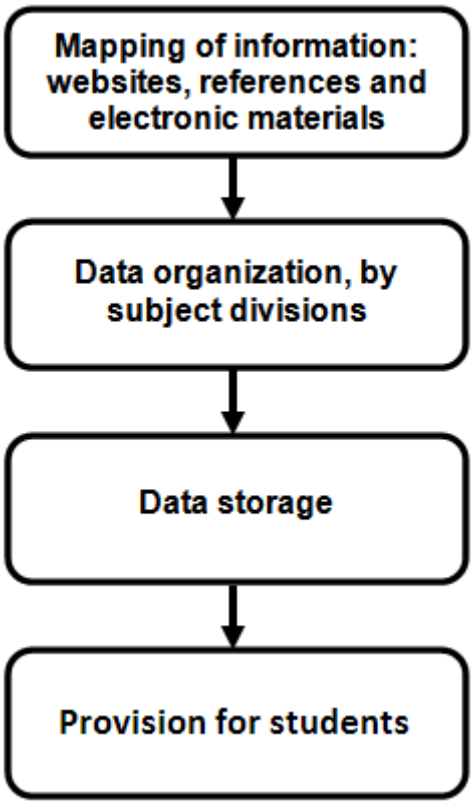


**Figure 1.** Flowchart of DL program.

The availability of these electronic materials for students took place in an informal way, the students who are interested in a complementary study material was available site links and files to it, as a difficulty was how to provide materials in general, with access for all, since the content was very large, large size to be transferred by the electronic system of disciplines (SIGAA).

The focus was found and gather the relevant references, author and research groups cited in papers and conferences in the area. Another issue was research the main sites of companies and organizations with content focused on materials engineering. The sites were:

- REDEMAT - http://www.redemat.ufop.br
- Ciência dos Materiais Multimídia - http://www.cienciadosmateriais.org

- Infomet - http://www.infomet.com.br
- CIMM - http://www.cimm.com.br
- Revista Matéria - http://www.materia.coppe.ufrj.br
- Periódicos Capes - http://www.periodicos.capes.gov.br
- Inovação tecnológica - http://www.inovacaotecnologica.com.br
- Infomimet - http://200.20.105.7/infomimet
- Instituto Nacional de Engenharia de superfícies -http://www.engenhariadesuperficies.com.br
- Efunda - http://www.efunda.com
- MatWeb - http://www.matweb.com

All of these sites highlight the presentation of their content, availability of articles, database and reference for various materials and issues on technology and innovation. Some, containing didactic animation, contribute to learning (Fig. 2).

Another highlight is INFOMIMET (information for the mining-metallurgical), which consists of an electronic guide that provides important information for the mining-metallurgical sector in the context of sustainable development. The site purpose is to help students, researchers, businessmen and other professionals involved in various activities in this sector, directing the search and selection of more appropriate information for their purposes. Figure 3 shows the home page of the database INFOMIMET. This guide provides 798 databases to search for the latest issues of materials engineering and other areas like steel and metallurgy, for example.


**Figure 2.** Login page of the materials science multimedia site. (www.cienciadosmateriais.org).


**Figure 3.** Home INFOMIMET, database mining and metallurgical industry. (w3.cetem.gov.br/infomimet).

## 3. CONCLUSIONS

The experience of a class monitor is a great contribution to the formation of the future engineer with tutorial teaching. Contact the student's early assignments with a teacher is learning relevant.The DL contributes to the engineer formation in access nonexistent content at student. The stimulus and the use of creative and DL tools, increase the teaching process given required profile to the new engineer. The technological process provides ample opportunity for innovative experiments, through the use of Internet.

The DL is the knowledge construction for engineer students, combining theory and practice, making them more prepared for the academic courses, business and industry.

The DL main difficulties are: Lack of habit and preparation of engineering students in accessing the Internet; Few electronic materials available *on line;* Lack of an appropriate methodology for providing material for engineering students; Low level of demand for the monitors to solve laboratory and theoretical problems and Lack of pro-activity of engineering students in laboratory classes. Studies should be made and practices to encourage students to be more proactive and seek out more doubts with the monitors.

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## 5. RESPONSIBILITY NOTICE

The authors I. J. C. Araujo; B. L. Silva; L. C. O. Felipe; G. O. A. Azevedo, L. D. B. da Silva, P. T. C. Silva, J. G. O. Junior and M. Furukava are the only responsible for the printed material included in this paper.