

# SAILING THROUGH THE WISNDOM SEA TRAINING TO INSPIRE

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## Abstract

One Nation is truly independent when all its citizens have access to an Educational System with quality. This is the principle for the human being development and for the social, economic and political growth of any Nation around the world.

However, looking at the Brazilian educational scheme it's possible to notice that it we're far away to have an Educational System with quality. In agreement with INEP, a Brazilian Organization of Educational Research, nowadays, 97% of all students have access to the basic educational system, but only 52% of these students finish all the periods of the system. The Changing of this scheme is possible and depends on the efforts of everyone. Transform the educational system that we have to what we see as ideal depends on new actions that will be taken by students, teachers, parents, citizens, companies and the government.

It will be a long journey with truly developed actions through an integrated planning with purposes to motivate and inspire!

In the Industrial Maintenance Area in Brazil, the situation is not different, there a lot of professionals available, but without the expertise needed. There are pioneer actions at the PNQC, a National Program to Develop and Certified professionals in the Maintenance Area. This program is developed by ABRAMAN – Brazilian Maintenance Organization since 1999.

In the agreement with this action, this work calls the attention of the industrial maintenance area about the importance of an Educational Plan to Specialize Maintenance Company with the main role to provide services to their clients.

Implemented, in March-07, by a Brazilian Specialized Maintenance Company with the support of Ensitex Technical College, the Basic Maintenance Course had the objectives of developing individual potential skills, creating teamwork spirit and developing human behaviour suitable to different clients.

Established through a process to identify the needs of different clients and productive process, this course was formed by the following modules: safety-health-environment, human relationships at work, mathematics, drawing, reading, basic electricity, basic electronics, hydraulics, informatics and PLC.

The main result expected of this action is the development of the Maintenance Professional and, the results reflected in the client's business – let's sail through de Wisdom Sea!

**Key-words:** education, capability, human being development

## 1 Critical Factor of Success: The Maintenance Professional's Qualification

A recent study of the World Bank published that the illiteracy tax in Brazil is 13%, and the medium time of Brazilian students in the classroom is about six years. In a competitive market and in a business global environment, how do the companies work with that?

In Brazil, the education is responsibility of the state, however, the companies suffer directly with the lack of the education. The professionals' low level of education makes an impact directly in the productivity of the companies. The worker needs to have the capacity to read, to interpret and to have to think fast, because he will work with technology and procedures.

Another decisive fact is that according to data of INEP (Brazilian Organization of Educational Research), today, 97% of the students that have access to the Fundamental Teaching, only 52% of them get to conclude it.

In the Maintenance Industrial Area, the human resources are decisive for the success of the activities and results to be achieve. The business challenges are bigger: competitiveness, profitability, quality demands and delivery. A large amount of investments in equipments and in new techniques are done. However, nothing of that is fast and possible without a connection with the human resources.

Therefore, effective measures should be taken with the objective to have the best people and to keep them in the organization. Finally, it is necessary to look at the Human Resource, once that the maintenance worker could not attend the scenery described below:

- Decrease of hand works;
- The Globalization Process;
- Fast thinking to take decisions;
- Technological innovations;
- Multidisciplinary Workers;
- New education and training requirements;

- High competitiveness among companies and professionals;
- Changes in the legislation;
- Interest of the government, society, companies and unions for the processes of professional certification;

## 2 The Professional Profile of 21<sup>st</sup> Century

The professional certification is today an indispensable condition for the companies that look for the excellence in their productive processes and the worker's operational efficiency. The worker, in this way, can see himself recognized in his professional competences as survival factor and motivation in a market highly competitive.

So, the professional of the 21<sup>st</sup> century, has as demand of the job market, to have the following abilities:

- Know how to teamwork;
- Good skills of writing and speaking;
- Skills to read and interpret texts;
- Holistic Vision of the business;
- Auto-motivated;
- Leadership;
- Know how to manage critical situations;

Understanding that the professionals' development it's a part of the internal factors that will go to influence the results of the business, the training initiatives and development could have a great meaning.

*In this moment, the act of training becomes the act of learning.*

## 3 Motivating for Action: The Learning Process

In agreement with CHIAVENATTO (2002), the professional education has three interdependent stages:

Stage 1 - Professional Degree: wide and long term objectives can prepare the professional for a profession;

Stage 2 - Professional Development: less wide objectives and medium term can prepare the professional for a career;

Stage 3 – Specific Trainings: specifics and of short term trainings can adapt the professional for a job position;

If we want to have learning and results, it is fundamental that the learning objectives don't just limit to the theoretical and conceptual aspects of the learning, but that have a reach application. In other words, they should not just be guided for the "knowledge", (theoretical and conceptual knowledge) but also for "knowing to do" (abilities) and to "know to be / act (attitudes and behaviors)."

The inclusion of the learning objectives is similar to the inclusion of a competence, in other words, they explore knowledge, abilities and behaviors. Besides informing the arrival point, the learning objectives also inform what lacks to arrive there.

The reach application will also depend on opportunities or of demands for the competence in the work day by day, out of the training atmosphere.

If that doesn't happen, the retention of the learning certainly will be prejudiced, besides the organization not to have the return on the investment that did in training and development.

As reminds SENGE (2002): "The most powerful learning comes from the direct experience", it is "tempting think that just because understood a certain meaning already "learned" the discipline. That is the acquaintance trap of confusing intellectual understanding with learning. The learning always involves new understandings and new behaviors, "thinking" and "doing."

As already mentioned, the objective of learning is that that "lacks" to reach a certain competence. So, it's interesting to do some reflections:

- What is the competence that a professional must reach in the training?
- What is the starting point of each professional before the training, what he already knows?
- What is the capacity of each professional?

Answering these answers, it's possible to define the actions and periods that will drive each professional in the best way.

## 4 Strategic Patnership of Knowledge

### 4.1 The Motivation for the Professional Development

Inspired by Confucio (551-479 AC):

*"Speak and I listen. Show me and I see.  
Let me do and I learn."*

It started in January of 2007, a plan of training for workers to a company specialized in services in the Industrial Maintenance area aligned with its the identified needs to its operations. This plan, pioneer in the services in Brazil, had as goal the development of the individual potential and the teamwork, focused in technical and human competences.

That action was supported by a partnership institution: Ensitec – Technical College, located in Curitiba, active in the market of technical teaching since 1999, being the first school of the State of Paraná to launch the Mecatronics Course. With 1300 students, distributed in the technical courses of Mecatronics, Electronics, Mechanics, Safety, Web Design, HR and occuppies, today, an area of 4.000 m2, with 30 rooms, laboratories and workshops and other facilities.

The Plan of Training, nominated Basic Maintenance Course, it was formatted with base in the following modules:

**BASIC METROLOGY - 20 HOURS** (practices of pieces inspections and tolerances ISO).

**APPLIED MATHEMATICS - 16 HOURS** (Numbering: writing and reading, basic operations, maximum common divisor and least common multiple, ordinary fractions, decimal numbers and decimal fractions, inches: transformations and equivalence, decimal metric system, perimeter, area and volume, angles: classification and measures).

**READING AND INTERPRETATION-DRAWING - 24 HOURS** (Identification of lines used in drawing, projection, interpretation and quotas and dimensions).

**SAFETY IN THE WORK - 08 HOURS** (Valorization of the safety of the work, what is and as the accidents, causes of work accidents, consequences of the work accidents, NR's).

**COMPUTER SCIENCE - 24 HOURS** ( components of a computer, hardware and software, operating system, text editor. Word, Excel).

**HUMAN RELATIONSHIPS IN THE WORK - 12 HOURS** (I Work in team, leadership styles, communication).

**BASIC HYDRAULICS - 25 HOURS** (Introduction the hydraulics, hydraulic bombs, directional valves, hydraulic actuator, filters and flowed, flow valves, pressure valves, accumulators, accessories, basic circuits, assembly of a circuit in practice).

**BASIC ELECTRICITY - 40 HOUR-CLASS** (basic Laws of the electricity, measure instruments,, electric motors, etc).

**PLC. – PROGRAMMABLE LOGICAL CONTROLLER - 40 HOURS** (Programmable Logical Controller, basic architecture of CLPs; configuration and programming of CLPs, language Ladder, language of list of instructions, GRAFCET, designs functional sequential, programming foundations, bit instructions, byte and Word, application exercises with systems).

**BASIC ELECTRONICS - 40 HOURS** (Differentiation between electronics and electricity, basic laws of the electricity, diodes rectifiers, special diodes, sources of basic feeding, bipolar transistors, transistors, operational amplifiers, feeding sources, integrated circuit, techniques for maintenance of electronic circuits).

**4.2 Structuring of the Plano of Training and Development**

The development of this plan, it were realized during January to February, 2007, a research of workers needs in each contract of the specialized company in Industrial Maintenance Services.

That research was accomplished in 5 existent contracts in the metropolitan area of Curitiba in the following industrial sectors: chemical, nutritious, fertilizers,

explosives and cosmetics. 200 employees were evaluated and as result, it was possible to draw a picture of needs for the people's development in the technical and behaviour areas.

In a second stage, meetings were accomplished between the managers of the contracts and teachers' of Ensitec with only objective of guaranteeing that the menu of the disciplines assisted the identified needs.



Picture 1: The meeting to discuss the Training Plan

After that stage, it was established priorities to attend the needs of the workers identified (see the picture below).

Módulos	CONTRATO A	CONTRATO B	CONTRATO C	CONTRATO D	CONTRATO E	TOTAL
Matemática Aplicada	<b>PRÉ-REQUISITO</b>					
Elettricidade Básica	4	2	5	3	2	16 (1 <sup>o</sup> )
Eletrônica Básica	5	4	7	4	3	23 (2 <sup>o</sup> )
Metrologia Básica	1	8	3	5	7	24 (3 <sup>o</sup> )
Leitura e Interpretação de Desenhos	2	7	2	8	8	27 (4 <sup>o</sup> )
Relações Humanas no Trabalho	3	9	4	7	5	28 (5 <sup>o</sup> )
Hidráulica Básica	7	3	8	9	4	29 (6 <sup>o</sup> )
Segurança no Trabalho	8	1	1	10	10	30 (7 <sup>o</sup> )
CLP	6	5	10	2	9	32 (8 <sup>o</sup> )
Informática	9	10	8	1	8	34 (9 <sup>o</sup> )

Picture 2: The priority training table

Some rules were created before the start of the trainings:

- The training would be divided in sequential modules;;
- Each module will hold groups of at the most 20 students;
- The modules will be accomplished on Saturdays start at 08:00 to 17:00 with 1:00 of interval for lunch;
- The place of the accomplishment of the modules will be Ensitec's facilities.
- The module would be free to the workers, in other words, the total cost will be realized by the company;
- The Plan of Training is not obligatory to the workers;
- The workers with the minimum frequency of 75% and Final Average of the Evaluations > 7,0 will receive an approval certification;

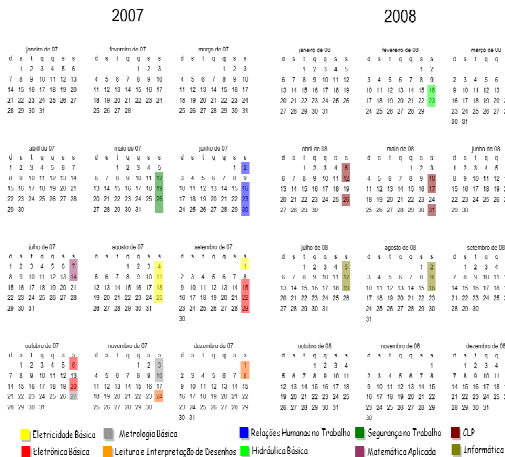
Finally, based on the previous hours of training was created a Calendar to the modules during 2008.

Hh - Treinamento Programados	
Metrologia Básica	520
Matemática Aplicada	832
Leitura e Interpretação de Desenhos	1126
Informática	1246
Segurança no Trabalho	1064
Relações Humanas no Trabalho	998
Hidráulica Básica	1026
CLP	1700
Eletrônica Básica	1720
Estatística Básica	1720
<b>TOTALIZAÇÃO</b>	<b>11953</b>
(Hh - Treinamento/Hh Disponível)	4,4%

Hh - Treinamento Programados/Contrato		
Contrato	Hh Prog.	% Treinamento
CONTRATO A	2659	4,46%
CONTRATO B	2890	10,33%
CONTRATO C	1126	1,50%
CONTRATO D	2602	3,80%
CONTRATO E	2676	5,50%

Número de Alunos/Treinamento		
Contrato	Nro Alunos	% Alcançe
CONTRATO A	134	34,72%
CONTRATO B	119	88,11%
CONTRATO C	76	15,80%
CONTRATO D	132	28,21%
CONTRATO E	98	31,21%

Picture 3: The previous hours of training



Picture 4: The Training Plan Calendar 2008/2009

## 5 Conclusion: Results Achieved and that one still expected

Since the beginning of the elaboration of this plan of training and Training with the partnership, Ensitec Technical College, the maximum objective was to promote the professional growth waiting practical reflections in common work day in the contractors.

At the moment, this plan it is going on, there are some improvements trying to assist more professionals and more demands; what demonstrates that the initial project was a success.

Until the moment it can stand out the following tangible and intangible results:

- Hours trained/Total hours available:4,5%;
- The number of professional estimated in the beginning was 200 and until now 150 have done some module;

Thst is a program that came to be established in the company. Inspired by the teacher Sandro Pires,

representative of Ensitec, expert of the market of industrial maintenance has said:

"With that initiative, there is an expectation of valorization of the actions developed by that company, because it is fact that whole processes of professional improvement pass through structured education actions. Good luck for the users and that good winds blow on the future".

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