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BUILDING SOCIO-EMOTIONAL SKILLS IN THE 4TH INDUSTRIAL REVOLUTION

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Abstract: The chapter aims to present an initiative to carry out an Integrating Project, entitled "Building the Technologist's Socio-Emotional Competencies in the 4th Industrial Revolution", for students at the Faculty of Technology of Sorocaba, in which the focus of the project was to develop the skills and abilities of the technologist. This project was aimed at students from two technological courses (Mechanical Projects and Mechanical Fabrication), but it can be extended to other courses at the Faculty of Technology of Sorocaba. From this perspective, the project corresponds to an attempt to bring up other skills, not only those that refer to technological skills, but also socio-emotional skills, which represent a crucial point for the improvement of the student for the world of work. Thus, the chapter has 3 sections. Section 1 presents the origin and guiding principles that led to the emergence of Industry 4.0 as one of the basic foundations for the development of the Integrating Project in technological courses at the Faculty of Technology of Sorocaba. Section 2 presents the theoretical frameworks for the development of the three dimensions of human intelligence: rational, emotional and spiritual. Section 3 describes the Integrator Project developed for application in technological courses at Fatec/Sorocaba.
Keywords: Emotional intelligence. Socioemotional competence. Leadership.

INTRODUCTION

This chapter aims to present an initiative to carry out an Integrating Project, for students of the Faculty of Technology of Sorocaba, entitled "Building Socio-emotional Competencies of the Technologist in the 4th Industrial Revolution", in which the focus of the project was to develop the competencies and skills of the technologist. It started from the assumption that the technologist's competence has two bases: that of the technological sciences and that of the socio-emotional sciences.

From this perspective, the objective of the project was directed to students of two technological courses (Mechanical Projects and Mechanical Fabrication), but it can be extended to other courses of the Faculty of Technology of Sorocaba. This initiative corresponded to a work to propose an integration between the disciplines characteristic of technological courses. Indeed, the theoretical-methodological support for carrying out a project of this magnitude is based on the guiding principles of Industry 4.0.

From the construction of a conceptual basis, referring to socio-emotional skills, the intention was to characterize guiding parameters, so that each one, from the establishment of objectives, acquire skills that could transcend efficiency, achieve effectiveness, and mobilize attitudes proactive in the face of life, for the real consolidation of their personal and professional goals. From this initiative, there was the possibility of a presentation of the guidelines that supported this project with the participation in the VIII Week of Pedagogical Planning and Improvement - VIII SPAP.

Based on these assumptions, this chapter presents 3 sections. Section 1 presents the origin and guiding principles that led to the emergence of Industry 4.0 as one of the basic foundations for the development of the Integrating Project in technological courses at the Faculty of Technology of Sorocaba. Section 2 deals with the theoretical frameworks that guided the study of the three dimensions of human intelligence, and in a broader aspect, the development of leadership. In this part, the fundamental importance of theorists who carried out studies of this nature is considered (GARDNER, 1995; GOLEMAN, 2001, et al.). In section 3, the description of the

Integrator Project developed for application in technological courses at Fatec Sorocaba.

INDUSTRY 4.0: ORIGIN AND GUIDING PRINCIPLES

In Germany, in 2011, at the Hannover fair, the term "Industry 4.0" appears, to designate "smart factories", where physical and virtual manufacturing systems cooperate in a global and flexible way. This allows for full customization of products and the creation of new operating models.

The 4th industrial revolution has a parallel analysis, according to Alvin Tofller, the 4th Wave, called the Productivity Wave. In the quote from Tom Chung (2002, p. 25): the main criterion is the optimization of resources and energies. The focus of attention is on "humanware", that is, on human intelligence and potential.

Thus, for the 4th Industrial Revolution to be inclusive, that is, to encompass a large part of society, it is necessary that all sectors of society work together: universities, companies, governments and civil society with the objective of optimizing and enjoying emerging trends and thus promote quality of life.

Referring to Steve Covey (2004, p. 318), in the book The 8th Habit, the scholar endorses and ratifies the current world scenario, and the most pressing human needs:

> The new economy is mainly based on knowledge work (according to Peter Drucker). This means that wealth has migrated from things to people – such as intellectual and social capital. In fact, our biggest financial investment is in knowledge workers. The potential contribution of knowledge work is no longer arithmetical, but exponential and geometric, and this kind of intellectual and social capital is the key to leveraging or optimizing all other investments. In addition, the Industrial Age style of management control and "people as expenses" systems are becoming increasingly obsolete and/or dysfunctional as a result of competitive market forces. There is also a growing realization that the human dimension, especially the level of trust, is at the root of all problems. The factors that control success are people-related, not technology-related, and everyone is starting to realize that. This is why leadership is the highest of all the arts; it is the enabling art.

Given the scenario and demands of today's world, the importance and need for the formation of intuitive (intrapersonal) and interpersonal skills in academic training is perceived, since these skills are the parameters in which the fundamental decision-making processes of the human being reside. , skills be they: leadership, ethics, motivation, commitment, innovation, creativity, development of Emotional and Spiritual Intelligence.

THREE DIMENSIONS OF HUMAN INTELLIGENCE: RATIONAL, EMOTIONAL AND SPIRITUAL

Howard Gardner was a pioneer in the study of the dimensions of intelligence, which is reported in his book: Multiple Intelligences in 1995. According to Gardner, in his work Multiple Intelligences (1995), what differentiates individuals is the so-called profile of intelligences, or that is, the vigor as these intelligences manifest in each individual, what Gardner defines as "Multiple Intelligences" and the way they are combined to intervene in the resolution of a problem. According to his analysis, we are all able to know the world through language, logical-mathematical analysis, spatial representation, musical thinking, the use of the body to solve and to do things, the understanding of ourselves and others. people; denoting quality intrapersonal and interpersonal relationships. According to Gardner:

> Instead of a single dimension called intellect, according to which individuals can

be classified, there are immense differences between individuals in their intellectual strengths and difficulties, and also in their attack styles in their cognitive pursuits. (GARDNER, 1995, p. 147).

Pedagogical methodologies must be concerned with diversifying the "possible confluences" of modes and forms of knowing, and not pedagogically imposing a single model of knowledge construction. It is then up to the educator to provide activities in which students can make use of their various intelligences, which can awaken in each one a greater predisposition to understand certain concepts. The personal way of learning of each student must be valued and learning can take place in a full and effective way. It is a "pedagogy centered on understanding".

Thus, learning will only be consolidated if it has as a starting point the real understanding of what is being researched, that is, a purpose with meaning, inserted in projects that mobilize the various dimensions of the student's intelligence. As a theoretical foundation in neuroscience, the starting point is Howard Gardner and Daniel Goleman, a precursor in the professional environment, in their book Emotional Intelligence (2001), Goleman published numerous researches, carried out by several neuroscientists and psychologists, evidencing a second intelligence, as important as the first - rational intelligence -, called emotional intelligence, the EQ (Emotional Quotient). According to the author:

> A view of human nature that ignores the power of emotions is woefully short-sighted. The very denomination Homo sapiens, the thinking species is misleading in light of science says about the place that emotions occupy in our lives. Today we know from experience, when it comes to shaping our decisions and actions, emotion weighs just as much – and sometimes much more – than reason. We went too far when we emphasized the value and importance of

the purely rational – of what IQ measures – in human life. For better or worse, when emotions dominate, the intellect can lead us nowhere." (GOLEMAN, 2001, p. 18).

Furthermore, the development of attitudes is based on the "Ethics of Character", based on inner values. According to James C. Hunter (2006, p. 96), when quoting Daniel Golemann: "There is an old word for the set of skills that emotional intelligence represents: character".

At the end of the 20th century, through numerous researches, scientists arrived at a third Q, the Spiritual Intelligence, the SQ – Spiritual Quotient (Spiritual Quocient). As reported by physicist and philosopher Danah Zohar and psychiatrist and therapist Ian Marshall:

> By SQ I mean the intelligence with which we approach and solve problems of meaning and value, the intelligence with which we can put our actions and our lives in a broader, richer, more meaningful context, the intelligence with which we can assess that one course of action or path in life makes more sense than another. (ZOHAR AND MARSHAL, 2000, p. 18).

QS unifies and integrates data across the brain through synchronized neural oscillations and has the potential to transform material arising from the other two processes. It establishes a point between body and mind, between reason and emotion. It gives the "I" the possibility of transformation and growth, through an active center, which unifies and generates meaning.

A lot of research has been done on the neurological functioning of the brain. Emphasis is placed on the work of Rodolfo Llinas and Denis Pare and their colleagues at the New York University School of Medicine on the nature and functions of 40 Hertz (Hz) oscillations throughout the brain, with the aim of understanding the inter- - relationship between mind and body.

Such research concluded about the nature of QS, 40 Hz oscillations that run through the entire brain called neural substrate. In the same way that rational logical data processing (QI) is characterized by linear networks (serial neural wiring), while preconscious and unconscious associative data processing (QE) are characterized by parallel neural networks. The SQ establishes that the experience of the human being can be aggregated and inserted in a broader sense, through oscillations of 40 Hz from one side of the brain to the other.

According to Zohar and Marshall.

> QS (based on the third neural system, the synchronized neural oscillations that unify data across the brain) offers us, for the first time, a viable third process. This process unifies, integrates and has the potential to transform the material arising from the other two processes. It facilitates a dialogue between reason and emotion, between mind and body. It provides a center for growth and transformation, it gives the self an active, unifying, meaning-making center. (ZOHAR AND MARSHALL, 2000, p. 21).

Spiritual intelligence makes it possible for us to reach full self-knowledge and hetero-knowledge, essential in understanding and interacting with the human being in the world in which he lives. According to Zohar and Marshall:

> SQ allows us to integrate the intrapersonal and the interpersonal, to transcend the chasm between self and other. Daniel Goleman has written about intrapersonal and interpersonal emotions – the ones we share with other people and use to relate to them. Mere EQ, however, cannot help us to bridge the chasm. We need SQ to understand who we are, what things mean to us and how they give others and their senses a place in our own world." (ZOHAR & MARSHALL, 2000, p. 29).

SQ gives us moral sense, the ability to better understand feelings like compassion and understanding. To position ourselves on issues of good and evil, finally being able to aspire, dream, finally transcend. It is this transformative power (emphasis mine) that differentiates SQ from EQ, which is evidenced by the following report:

> My emotional intelligence allows me to judge what situation I am in and then to behave appropriately within it. This means working within the confines of the situation, allowing it to guide me. My spiritual intelligence allows me to ask myself if I want to be in this particular situation. Could I not change it by creating a better one? This implies working with the limits of the situation I find myself in, allowing myself to direct the situation. ZOHAR AND MAHAL, 2000, p. 21).

Thus, spiritual intelligence characterizes a greater understanding of spirituality. Not necessarily having any interdependence with formal religions. However, many people find parameters in spirituality, which is in line with what is professed in religions. Being religious does not guarantee a high SQ, but many people unrelated to any religion have a high SQ, which is reflected in attitudes based on a rationality permeated by ethics.

Most religions follow rules and beliefs that were imposed on them from outside, while SQ implies a rationality intrinsic to human beings, which determines knowledge guided by ethics, which leads to a transcendent understanding of the universe, and makes it a being endowed with spirituality.

We are entering a phase of humanity in which the human being is becoming aware of the search for new values, giving a broader and more real meaning to life, through values of spirituality, arising from spiritual intelligence.

In order for full education to achieve its goals, it must allow the human being to reach a state of consciousness, resulting from the meeting of behavior and knowledge. According to educator Ubiratan D'Ambrosio: (2001, p. 42) "The acquisition of consciousness is what leads the human being [noun] to be

a human [verb]". The emphasis on human values: love, ethics, morals and justice, is the starting point for human beings to reach transcendence, leading them to ask "why?", "how?", "where? ", "When?".

D'Ambrosio (2001) addresses the importance of full education to human beings, stimulating individual and collective creativity and solidarity, so that the exercise of planetary citizenship can be achieved:

> Full education reconciles these two aspects, the individual – which leads to reaching the fullness of their creativity – and the social – which leads to integration into humanity as a whole. This integration, in humanity as a whole, is what I understand by planetary citizenship. But, far from representing the homogenization of uses and customs, of knowledge in a broad sense, this citizenship demands respect for individualities, including in terms of dealing with physical space. (D'AMBROSIO, 2001, p. 108).

Thus, it is up to the educator, making use of his resources, objective and subjective, to plan his classes under a transdisciplinary approach, in which each content can be glimpsed in a global context and this way, it is possible to promote a meaningful learning, based on the development of the three dimensions of human intelligence: rational, emotional and spiritual.

INTEGRATING PROJECT IN TECHNOLOGICAL COURSES AT FATEC/SOROCABA

This project began in 2013, through lectures given by Professor Olivia Cristina Vituli Chicolami, entitled Leadership & Human Development. From 2014 onwards, seminars were held in the Coordination of Mechanical Manufacturing, Mechanical Projects and Metallurgical Processes, having as basic books: The Monk and the Executive and The Seven Habits of Highly Effective People.

In 2017, the work "Developing behavioral competences in the 4th Industrial Revolution, was prepared by Olivia Cristina Vituli Chicolami and Nirlei Santos de Lima and presented orally at IV Cimatech, in São José dos Campos.

In 2020, there was a synthesis of the Project "Building the Technologist's Socio-emotional Competencies in the 4th Industrial Revolution", was presented by Professor Olivia, through a banner at the event held at the technological park in Sorocaba, entitled: "Industry 4.0, Are we ready?"

In 2021, the Project was accepted at the NAAP: Advanced Nucleus in the Project Area in the Mechanical Projects and Mechanical Fabrication coordinators, which enabled the guidance of a student from the Mechanical Projects Coordinator, featuring a Supervised Internship. And the presentation of the Integrator Project: "Building the Technologist's Socio-Emotional Competencies in the 4th Industrial Revolution", at the VIII SPAP in 2021, a theme that meets the objectives of the Paula Souza Center.

Through the emergence of new technologies and the interconnection between them, they demand better prepared professional organizations, endowed with greater emotional preparation, who know how to work as a team, sharing a common purpose, in the consolidation of objectives and goals.

At Google, a technology giant, for more than a decade, engineers, psychologists and statisticians have been dedicated to understanding the formula for the most efficient employees, which results in team chemistry that gives good results. The first conclusions of the study generated a project called Aristotle in honor of the maxim of the Greek philosopher: "the whole is greater than the sum of the parts". Google's worldwide president, Sundar Pichai, has become the

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biggest promoter of these new practices, starting with keeping eye contact with team members during meetings, going all the way to focusing on solutions, avoiding blame. Such research is echoed in recent discoveries in the neurosciences. (Exame Magazine: The Secret of the Productive Mind, February 15, 2018).

From this perspective, the project "Building the Technologist's Socio-Emotional Competencies in the 4th Industrial Revolution" aims at the development of Behavioral Sciences, with the objective of training the technologist, meeting the demands of organizations.

The project presented some constitutive parts: methodology, proposed activities, expected results. In the methodology, there was the division of the class into groups, in which each group was responsible for a chapter of the book, as well as the presentation of the schedule of activities.

I) A motivational talk with the aim of establishing the purpose and meaning of the Project; thus encouraging students to read the books indicated;

II) A review of the chapter;

III) Presentation of a seminar, with Power Point slides, short films, etc.

a) Explaining and emphasizing the concepts described in the chapter;

b) Exemplification through real facts, that is, people or companies that use the concepts discussed in the chapter, with the objective of endorsing, ratifying and evidencing the applicability of the concepts.

IV) An evaluation with the objective of the student to reflect and discuss the importance that the knowledge built through the Project, promoted in his life in the personal, social and professional aspects.

Regarding the proposed activities, it was divided into two parts. The first, the study and analysis of the book: "The Seven Habits of Highly Effective People" by Stephen R. Covey.

The second, the study was directed to the books by James C. Hunter: "The Monk and the Executive" - A History of the Essence of Leadership, and the book "How to Become a Servant Leader - The Leadership Principles of The Monk and the Executive".

The choice of book The Seven Habits of Highly Effective People, by Steve Covey, constitutes the basis of human development, enabling it to go beyond efficiency in achieving its goals, that is, to achieve effectiveness. Thus, going against the definition of habits, according to the author: "For our purposes, we will define the intersection between knowledge, skill and desire. Knowledge is the theoretical paradigm, what to do and why. Skill is how to do it. And desire is motivation, wanting to do." (COVEY, 2014, p. 76).

The book develops universal, timeless principles that contribute to personal victory, through the internalization and practice of habits: 1st Be Proactive, 2nd Start with a Goal in Mind and 3rd First the Most Important; characterizing a quality intrapersonal relationship, that is, making it possible to go from dependence to independence.

Quality intrapersonal relationships are essential in the development of learning, as it makes it possible to rescue self-esteem, providing the development of skills related to creativity, reflective and critical capacity.

Satisfaction or success can only be achieved from the development of intrapersonal skills, because such skills show the quality of our character. Subsequently, the achievements of Vitória Pública, through the internalization and practice of the habits: 4th Think about Win Win; 5th Seek First to Understand, Then Be Understood and 6th Create Synergy, characterizing a quality interpersonal relationship, that is, enabling you to go from independence to interdependence. And the 7th Habit Tune the Instrument, consolidating, thus, going beyond efficiency, reaching

effectiveness, reaching greatness in human relationships.

The development of interpersonal relationships enables the ability to work as a team, with respect and consideration for each one's individuality, promoting synergy, that is, the whole is greater than the sum of the parts; for a harmonious, productive and supportive coexistence.

From the books by James C. Hunter: "The Monk and the Executive" – A History of the Essence of Leadership, and the book "How to Become a Servant Leader – The Leadership Principles of The Monk and the Executive".

According to James C. Hunter's definition of Leadership, "The ability to influence people to work enthusiastically toward common goals, inspiring confidence through strength of character." (2006, p.18). Influence is exerted when the inner virtues of the human being become evident. According to Hunter:

> Character is our moral and ethical strength, that which guides our behavior according to proper values and principles – which explains why leadership can be defined as
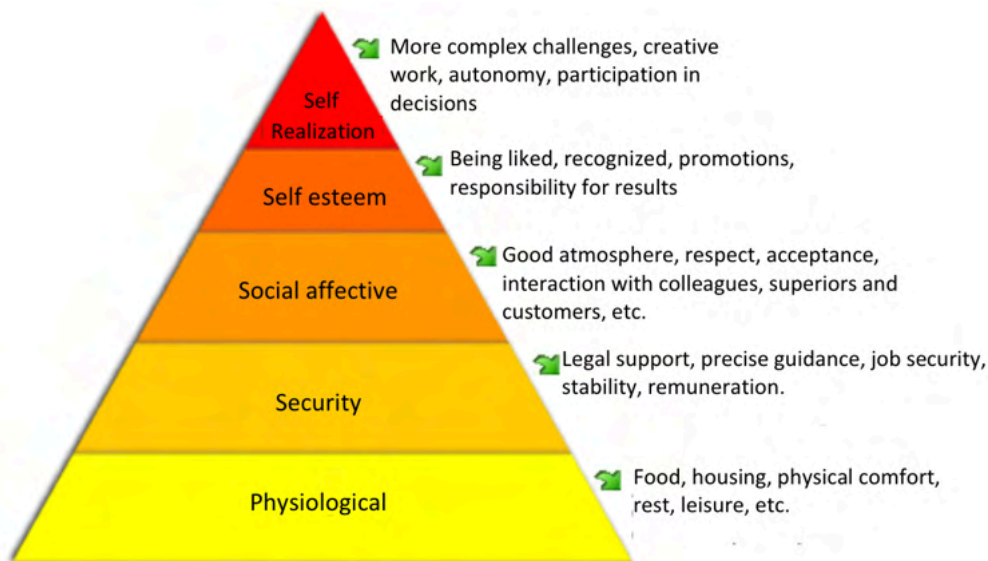
"character in action". Leaders seek to do the right thing. (HUNTER, 2006, p. 82).

According to James C. Hunter, "Self-fulfillment is becoming the best you can or are capable of being. Thus, the leader must encourage and provide conditions for people to become the best they can be". (2004, p. 56).

What is also described in Maslow's hierarchy of human needs, that is, self-actualization is at the top of the pyramid.

According to Covey, 2014, p. 31, in studies carried out, states that: "Even the great psychologist Abraham Maslow placed, at the end of his life, happiness, fulfillment and the contributions of his descendants ahead of his self-fulfillment. He called it self-transcendence."

The book, in addition to containing concepts that constitute the basis of the formation of the individual's character, there is also the way in which the character Simeão conducts his teachings, using his version of the Socratic Method - which is based on the establishment of an intense dialogue between

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the teacher and the teacher. the student, that is, a pedagogical method used by the philosopher Socrates in which the teacher leads the student to a process of reflection and discovery of their own values, which contribute to the formation of character and human efficiency.

Finally, with regard to the expected results, the project, when it was applied at the Faculty of Sorocaba, proved to be quite relevant, as the choice of works was approved by the students. Their involvement with reading was notorious, as they were often seen with the books and commenting on the readings made.

Dynamism was present in all groups. Some even read "Back to the Monastery" by James C Hunter. During the presentation of a group, the others were receptive, accepting the exposed concepts and contributing with their readings, as well as the reports reaffirmed the enriching experience, lived by the students regarding the new vision of social interaction, a more proactive attitude in front of life as a dynamic agent in the consolidation of their goals.

FINAL CONSIDERATIONS

This chapter aimed to present an initiative to carry out an Integrating Project, for courses at the Faculty of Technology of Sorocaba (*Mechanical Projects and Mechanical Manufacturing*), entitled "Building Socio-Emotional Competencies of the Technologist in the 4th Industrial Revolution", in which the focus of the project was to develop the technologist's skills and abilities. The starting point was the assumption that the technologist's competence has two bases: that of the technological sciences and that of the socio-emotional sciences.

Therefore, the objective of the project was the development of socio-emotional sciences, by Fatec Sorocaba students, through knowledge, skills and attitudes. This initiative corresponded to a work to propose an integration between the disciplines characteristic of technological courses.

With the realization of the integrative project, the importance of the student's development of inner values is evident: ethics, motivation, commitment, innovation, creativity, quality communication through knowing how to listen and empathy. These values characterize the broader context of character development, in the sense of making it possible to go beyond efficiency, as well as achieving personal, social and professional goals.

In this regard, Klaus Schawb (2016, p.109) recognizes that

> Emotional intelligence is an increasingly essential attribute in the fourth industrial revolution [...] it is the vital foundation of crucial skills for success. Expert academics show that the difference between great decision makers and ordinary decision makers lies in their degree of emotional intelligence and the ability to continually cultivate this quality.

From this guideline, it is believed that it is through the construction of competences that students will be able to establish meanings about their professional performance, which can generate projects of social impact, that is, the technologist can act as an agent of change, collaborating for the quality of life of society that enables their personal and professional fulfillment and to be a protagonist in the construction of a world with more quality of life and more humanized. As Freire (1992, p.10) reminds us, there will always be hope for an education for humanization, since "[...] as an ontological necessity, hope needs practice to become historical concreteness [...] ".

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