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Leadership development: an experiential learning approach for engineering students

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UNIVERSIDADE DE SÃO PAULO
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Leadership development: an experiential learning approach for engineering students

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DEDICATION

To all my friends and family, especially my parents, who have always incentivized me to go after my dreams and seek to become a better person.

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ABSTRACT

GIACOMASSI, R. **Leadership development: an experiential learning approach for engineering students.** Dissertation (Master of Science) – São Carlos School of Engineering, University of São Paulo, São Carlos, 2018.

Lots of companies recognize the need for leadership development. However, there is still not a consensus about what practices or bundle of practices can be used for the effective development of leadership competencies. Many existing methods are focused on emulation of characteristics of successful leaders or the development of personal competencies based, for example, on psychological traits tests. Therefore, a better understanding of the application of more holistic methods for leadership development is necessary. Such methods consider personality traits as well as the organizational context where leaders are inserted. Some recent theories that have contributed to this area include Authentic Leadership Development (ALD) and Positive Organizational Scholarship (POS). Furthermore, emotional and social intelligence continue to be highly relevant subjects for leadership development because of the correlation between these attributes and leaders` performance. This study proposes a leadership development program that encompasses fundamental concepts related to the implementation of practices that are considered suitable for organizations and individuals. The focus on the development of positive behaviors instead of the identification and resolution of imperfections is a characteristic of the proposed program. The research includes four steps: research motivation and goals definition, literature review, action research, and final considerations and conclusion. The action research step included two iterations in which the program was tested and optimized according to the learning process of the researcher. The program was offered to engineering students due to the necessity for leadership development for these future professionals and due to the lack of disciplines focused on leadership development in the engineering curriculum. Thus, the study aims to achieve a better understanding of leadership development and the implementation of practices for leadership development in engineering. Finally, a detailed syllabus of the proposed leadership development course and a method for evaluating the program is presented along with the insights acquired in the action research and recommendations for future research.

Keywords: Authentic leadership. Leadership education in engineering. Emotional intelligence. Social intelligence. Experiential learning.

RESUMO

GIACOMASSI, R. **Desenvolvimento em liderança: uma abordagem de aprendizagem por experiências para estudantes de engenharia.** Dissertação (Mestrado em Ciências) – Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos, 2018.

Muitas empresas reconhecem a necessidade do desenvolvimento dos seus líderes, porém ainda não há um consenso sobre quais práticas ou conjunto de práticas podem ser usadas para o desenvolvimento efetivo de competências relacionadas à liderança. Muitos dos métodos usados focam em emular características de líderes que obtiveram sucesso e em desenvolver habilidades pessoais com base, por exemplo, em testes de traço psicológicos de personalidade. Portanto, é necessário um maior entendimento do potencial de aplicação de métodos mais holísticos para o desenvolvimento de líderes, que considerem características pessoais dos indivíduos assim como habilidades adotadas no contexto organizacional onde estão inseridos. Algumas teorias recentes que contribuíram nessa área incluem desenvolvimento de liderança autêntica e o estudo de organizações positivas. Além disso, inteligência emocional e inteligência social continuam sendo tópicos altamente relevantes para o desenvolvimento de líderes por influenciarem significativamente no desempenho dos mesmos. Este projeto propôs a elaboração de um programa para desenvolvimento de liderança positiva que engloba conceitos fundamentais relacionados a implementação de práticas consideras apropriadas para a organização e indivíduos. O foco no desenvolvimento experiencial de comportamentos positivos ao invés da identificação e resolução de defeitos é uma característica fundamental do programa proposto. A pesquisa inclui quatro fases: definição da motivação e objetivos de pesquisa, revisão bibliográfica, pesquisa ação, e conclusão e considerações finais. A fase de pesquisa ação contou com duas interações nas quais o programa para desenvolvimento de liderança positiva foi testado e otimizado de acordo com a aprendizagem do pesquisador. Tal programa foi oferecido a alunos de engenharia devido a necessidade de competências de liderança para esses futuros profissionais e a falta de disciplinas focadas no desenvolvimento de liderança nos currículos de engenharia. Assim, espera-se alcançar uma melhor compreensão sobre os métodos para desenvolvimento de liderança e a aplicação de tais métodos para o desenvolvimento de liderança em engenharia. Por fim a programação detalhada do curso de desenvolvimento de líderes e os métodos para avaliação do mesmo são apresentados assim como a aprendizagem adquirida durante a pesquisa e recomendações para pesquisas futuras.

Palavras-chave: Liderança autêntica. Ensino de liderança em engenharia. Inteligência emocional. Inteligência social. Aprendizagem experiencial.

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ALD	Authentic Leadership Development
CVF	Competing Values Framework
DAC	Direction, Alignment, and Commitment
EESC	São Carlos School of Engineering
POB	Positive Organizational Behavior
POS	Positive Organizational Scholarship
USP	University of São Paulo

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Contextualization

Many authors have explored the importance of Management and Leadership in organizations' theories (YUKL, 1989; KOTTER, 2001; DRUCKER, 2004; JONES, 2010). Thus, it is important to clarify the distinction between leadership and management. Even though leadership and management are interrelated concepts, they have different emphases on the organizational context (YUKL, 1989). On the one hand, management is related to coping with complexity by planning, budgeting, organizing and staffing, providing control, and solving problems. On the other hand, leadership is related to coping with change by setting direction, aligning people and providing motivation. Even though leadership and management are two different systems in action, both are necessary for complex and volatile business environments (KOTTER, 2001). Consequently, even though this study is particularly concerned with leadership development, it recognizes that leadership should be developed in conjunction with management skills for superior organizational performance.

Leadership researchers have focused both on individual-level skills and on interpersonal competencies. Day (2001) states that organizations need to invest in developing both individual leaders and collective leadership. The use of personality psychology for leaders' development is one example of an approach that focuses on several traits of individuals. For instance, on an interview conducted by McNulty (2017), Linda Ginzel, a clinical professor of managerial psychology at the University of Chicago Booth School of Business, noted that "there is a $500 million business in the use of the Myers-Briggs Type Indicator, five-factor model, Clifton StrengthsFinder, and other psychometric instruments". Also, Lord and Hall (2005) postulate that leaders' development is influenced not only by identity but also by meta-cognitive processes, emotional regulation, and authentic values. These findings are supported by researchers on emotional and social intelligence that suggest that, beyond intellectual and technical abilities, emotional and social intelligence competencies such as self-awareness, self-regulation, and social skills are connected with effective leadership performance (GOLEMAN, 1998, 2000; BOYATZIS, 2008).

Leadership development occurs in a social context and is primarily focused on building interpersonal competencies. Through this approach, organizations can help people to relate and coordinate with each other, develop extensive social networks, and build commitment, trust, and respect (DAY, 2001). The transformational leadership theory developed by Bass (1985,

1990, 1998) is one example of a theory that aims to understand how the knowledge, skills, and behaviors of effective leaders influence their followers. For instance, this theory states that charisma, individual consideration, and intellectual stimulation of followers allow for superior leadership performance (BASS, 1990). Also, there is an emerging literature on team-level leadership capacity including shared or distributed leadership. These theories consider that leadership emerges from the team level of analysis regardless of attributes or traits brought by individual leaders (DAY; GRONN; SALAS, 2004). Therefore, leaders are responsible for creating environments where people can complement one another in a way that leadership is distributed across multiple people within the organization (ANCONA et al., 2007). Lastly, Goleman and Boyatzis (2008) state that leaders who exhibit social intelligence competencies can inspire others to be effective; therefore, improving group performance. Social intelligence competencies, including social awareness and relationship management, are associated with capabilities such as empathy, service orientation, motivation, visioning, teamwork and collaboration (GOLEMAN, 1998, 2000; BOYATZIS, 2009).

Up until recently, there was little evidence that leadership could be developed using one or more specific leadership theories (AVOLIO; WALUMBWA; WEBER, 2009). That topic concerns a core question on leadership development which is whether leaders are born or made. Since the earlier debates on the literature, researchers have demonstrated that this is not an either-or question as many recent studies such as Arvey et al. (2006), Zhang, Ilies, and Arvey (2009), and Neve et al. (2013) agree that leadership development depends on a complex interaction of genetic and environmental influences.

Individuals are born with certain leadership traits that enable them to develop relevant leadership competencies (AVOLIO, 2005). For example, the ability to exhibit self-control from an early age can influence performance as demonstrated in a series of studies on delayed gratification based on the Stanford marshmallow experiment (MISCHEL; EBBESEN; ZEISS, 1972). These studies have proved that children that exhibited self-regulation were able to achieve better life outcomes regarding SAT[1] scores (MISCHEL; SHODA; RODRIGUEZ, 1989), educational attainment (AYDUK et al., 2000), and other life measures (SHODA; MISCHEL; PEAKE, 1990). Even though natural leadership traits can contribute to leadership development, subsequent research has demonstrated that leaders can improve their capabilities through life learning opportunities, experiences, and events (AVOLIO, 2005; QUINN, 2005).

[1] SAT is a standardized test widely used for college admissions in the United States. Originally called the Scholastic Aptitude Test, it was later renamed the Scholastic Assessment Test.

This study considers that leadership development requires both exposing individuals to personal experiences where they are challenged to engage in leadership processes in their organizational context and allowing them to make sense out of those experiences through self-reflection. Practices for leadership development include mindfulness meditation, appreciative inquiry (COOPERRIDER; SEKERKA, 2006; COOPERRIDER; SRIVASTVA, 1987), reflective journaling (SCHARMER, 2009), 360-degree feedback (LUTHANS; PETERSON, 2003), coaching and mentorship (LUTHANS; PETERSON, 2003), and many others. These premises are aligned with Mcdermott, Kidney and Flood (2011, p. 360-361, 374) findings that:

> Leadership development requires a tailored and individual-focused approach to meet needs of the individual leader, and the organizational context in which s/he is embedded as opposed to a generic 'one size fits all' development model. [and that] [...] leadership development involves a complex interaction between personal traits, early life experiences, and career-related learning opportunities.

Some leadership development programs incorporate both individual leaders' development and leadership development in the organizational context include: The Harry L. Davis Center for Leadership at the University of Chicago Booth School of Business, The Center for Positive Organizations at The University of Michigan Ross School of Business, and the National Preparedness Leadership Initiative at University of Harvard.

Even though the programs mentioned above are mainly focused on executive development, there is also a need for developing leadership competencies on university students, who will eventually enter the job market. The Leadership Development Programs in Engineering (PROLIDER) at São Carlos School of Engineering at the University of São Paulo (EESC-USP), Brazil (GEROLAMO; GAMBI, 2013), is an example of leadership program that help university students to develop leadership by mixing theory studied at the university with experiences acquired on internship opportunities. The Interpersonal Professional Development Program (PRODIP) at EESC-USP is another example of a program focused on developing social competencies by exposing students to interactive activities (LOPES et al., 2015). Similar leadership development programs are rare or minimal on technical undergraduate programs such as engineering which curriculum concentrate on technical knowledge in detriment of social skills related to leadership.

In light of this problem, is it possible to create a hands-on leadership development program for engineering students that incorporates both an individual and an organizational approach? Considering this question, the objective of this research as well as some of the

justification and implications of leadership development for technical students, in special for engineering students, are presented as follow.

1.2 Objectives

The goal of this study is to develop an experiential leadership development program for improving engineering undergraduate students emotional and social competencies. The proposed experiential approach for leadership development is grounded on the authentic leadership theory and consists on promoting self-reflection and exposing students to activities, inside and outside the classroom, which stimulate actions, feelings, and thoughts so that students can practice behaviors and skills associated with effective leadership performance. The different leadership capabilities covered in the program are grounded in leadership researches that associate emotional and social intelligence competencies with superior work performance as well as better quality of work relationships. Thus, the program incorporates a mixture of individual leadership development and planned events for practicing leadership in organizational contexts.

Some specific goals are:

a) Propose a leadership program for engineering students grounded on the main concepts and theories related to leadership development.
b) Assess if the leadership development program can contribute to an improvement in the student's perceived emotional and social intelligence competencies.
c) Identify future improvements to the proposed leadership program and on the methodology for assessing students' leadership development.

1.3 Justification

For a long time, engineering education has been closely associated with the development of technical competencies. For instance, according to Russell and Yao (1996, p.18), "an engineer is hired for his or her technical skills, fired for poor people skills, and promoted for leadership and management skills." A white paper published by the Center of Creative Leadership has demonstrated that leaders lack the skills they need to be effective in today`s business environment and they have not been prepared to meet future leadership requirement. This paper also states that there is a gap between the current needs and the actual skill levels related to inspiring commitment, leading employees, strategic planning, change management, employees' development and self-awareness (LESLIE, 2015). This gap might be even bigger

for leaders that hold engineering degrees since such graduation curriculums are typically strong in basic and engineering sciences, as outlined by the Grinter Report (AMERICAN SOCIETY FOR ENGINEERING EDUCATION, COMMITTEE ON EVALUATION OF ENGINEERING EDUCATION, 1955). Though, they rarely incorporate disciplines related to soft skills such as teamwork, active learning, communication, leadership, system thinking, entrepreneurship and ethics (FARR; BRAZIL, 2009).

Although engineering students lack formal training on leadership during their education, these students often assume leadership position early on their careers. For instance, a survey of 134 engineers graduated from EESC-USP has shown that 92,8% of the respondents claim to often assume leadership roles in their job regardless of having an official leadership position. In the same study, 75% of the respondents who have a management position in the organization stated achieving this position within the first three years after starting their professional activities (GEROLAMO; GAMBI, 2013). Even though the students that participated in the study were part of a select group of engineers with a predisposition to leadership, the study shows that there is a need for leadership development in engineering. To address this discrepancy, an influential publication on engineering education by the National Academy of Engineering (2005, p. 52) has stated that "technical excellence is the essential attribute of engineering graduates, but those graduates should also possess team, communication, ethical reasoning, and societal and global contextual analysis skills as well as understand work strategies".

Also, even though engineering education has lacked formal training in leadership, engineering has long been one of the most common undergraduate degrees among Fortune 500 CEOs (MARTELLI; ABELS, 2010). Examples of CEOs that hold an engineering degree and lead some of the biggest companies in the world include Exxon Mobil`s Darren W. Woods[2], Apple`s Timothy D. Cook[3], General Motor`s Mary T. Barra[4], Amazon`s Jeffrey P. Bezos[5], Microsoft`s Satya Nadella[6], and many others. Also, among the prominent leaders that hold an engineering degree is Klaus Schwab[7], founder and executive chairman of the World Economic Forum. These findings support the argument that there is a demand for engineers in leadership

[2] http://corporate.exxonmobil.com/en/company/about-us/management/darren-w-woods
[3] https://www.apple.com/br/pr/bios/tim-cook.html
[4] https://www.gm.com/company/leadership/corporate-officers/mary-barra.html
[5] http://www.achievement.org/achiever/jeffrey-p-bezos/
[6] https://news.microsoft.com/exec/satya-nadella/
[7] https://www.weforum.org/about/klaus-schwab

positions. Therefore, engineering students need to be better trained in leadership to assume such roles and effectively influence the organizations where they work.

Although the need for leadership development for engineers has been strongly discussed in the past few years (BAYLESS, 2013; CRAWLEY et al., 2011; ROTTMANN, et al., 2015; OSAGIEDE et al., 2013; REEVE et al., 2015), there is still a need for understanding the impact of leadership development programs for such professionals. Due to the characteristics of engineering professionals, commonly stereotyped as technical-minded, the effectiveness of leadership development programs may be reduced, and several barriers may get in the way of letting them develop such competencies.

1.4 Contribution

The purpose of this study is to evaluate the implications of an experiential learning approach as a method for teaching leadership to professionals with formal technical education, in special, engineering students. The premise of this study is that because leadership requires personal interactions, participants are best capable of practicing such competencies in the social context in which they are embedded such as university classes, extracurricular groups, small companies, departments, or other groups within an organization.

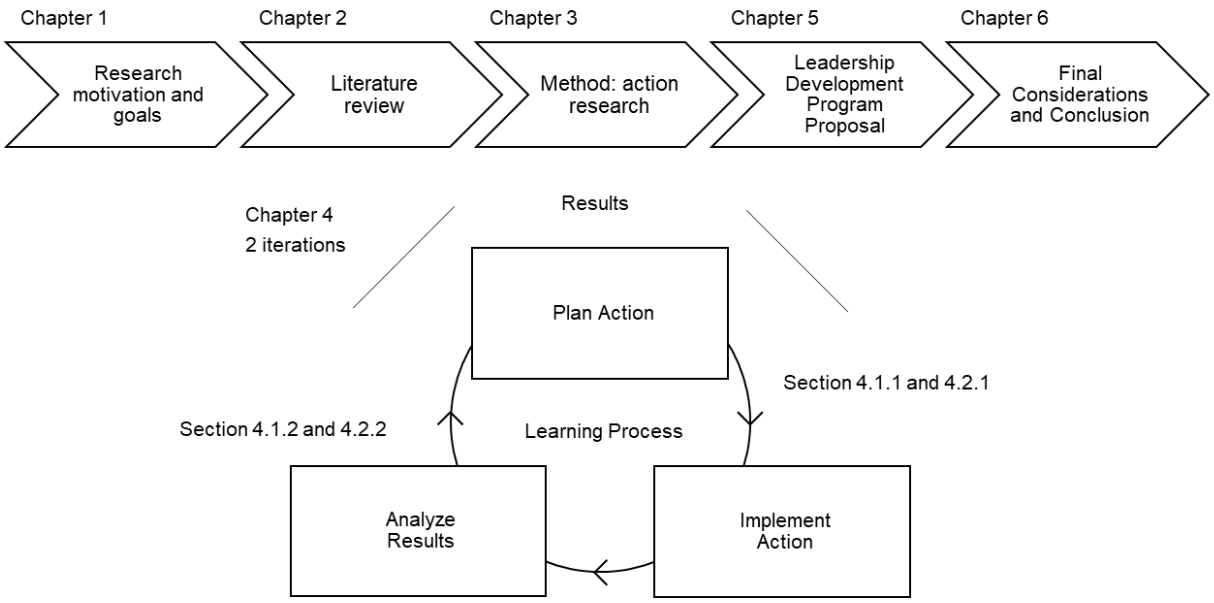
This study identified leadership concepts considered essential for today's leaders and practices for developing leadership-related competencies in an academic setting. Such concepts were integrated into a comprehensive leadership development program for engineering students proposed as part of this research.

Finally, the suggested leadership development program was tested through action research with selected groups of engineering students. The method was assessed through two iterations and helped the author to identify flaws in the methodology and barriers related to its implementation for engineering students. Such analysis was conducted based on quantitative data such as the average improvement on the level of emotional and social intelligence competencies of the students before and after the program as well as other qualitative data collected during the implementation of the program.

1.5 Research Overview

Figure 1 presents the roadmap applied in this research and how the dissertation text is structure based on it.

Figure 1 – Roadmap of Research and Dissertation Structure



Source: Created by the author

The motivation and goals of this study are presented in the introduction in chapter 1. This chapter was divided into four sections. First, the contextualization of the research was presented in section 1.1, which ends with a motivational research question. Then the research objective and specific goals were presented in section 1.2. Finally, the justification and the contribution of the research were offered in sections 1.3 and 1.4, respectively.

Then, the author conducted an exploratory literature review (chapter 2) about leadership (section 2.1), the role of emotional, social, and cognitive intelligence for leadership (section 2.2), and leadership development (section 2.3). This chapter is intended to cover fundamental concepts and theories related to leadership and leadership development.

Chapter 3 clarifies the research method chosen for this study. In this section, the author explains what constitutes an action research and how this research method was applied in this study.

Following the literature review, the author presents two iterations of the development and test of the leadership development programs conducted in 2016 and 2017. The program includes some of the most important practices and tools present in the literature. The action used in this research consisted of exposing individuals to time boxed formative experiences in

which they were challenged to apply leadership concepts learned in class and making sense of those experiences through self-reflection. The program was implemented and tested with groups of engineering students that participate in extracurricular groups at the university. That fact that the students in consideration are participants of extracurricular groups is desirable because of the nature of the proposed program, which requires students to apply leadership concepts in an organizational context. Sections 4.1.1 and 4.2.1 show the planning and implementation of the leadership course in 2016 and 2017 respectively as well as the changes in the program between iterations. Sections 4.1.2 and 4.2.2 show the results of the quantitative and qualitative analysis of the implementation process of 2016 and 2017 respectively.

The leadership development program proposal for future iterations is presented in chapter 5. This chapter also includes suggestions of how the evaluation of the course can be improved to provide better data for further program optimizations.

Finally, the initial results served as proof for the original justification for the leadership development program for engineering students and helped the author to identify pitfalls and flaws in the methodology. Thus, chapter 6 presents some final considerations about this study including limitations and suggestions for future researches.

2 LITERATURE REVIEW

The literature research started with a consideration of classic books and articles recommended by specialists on the subjects. This initial research led the author to identify other writers, journals, topics, and keywords relevant to this study. Then, complementary research at the University of São Paulo (USP) articles database, mainly Scopus, ScienceDirect and Web of Science, offered additional relevant references that were prioritized based on the number of quotes and subsequent reading of the titles and summaries. Consequently, the literature review presented in this study explores the latest advancements in theories and practices related to leadership and leaders` development. It also elucidates how leadership competencies can be developed through formative experiences.

2.1 Understanding Leadership

Many authors have argued that there is a fundamental difference between managing and leading. Managing means coping with complexity, establishing control mechanisms and executing a strategy under stable circumstances while leadership is related to dealing with change, facing adaptive challenges and mobilizing people towards new ways of operating (HEIFETZ; LAURIE, 1997; KOTTER, 2001). This premise is pinned on the idea that during transformational moments, people must challenge their values, beliefs, attitudes, and behaviors to learn the new norms and enable the desired progress to take place.

Although management and leadership are applied in distinguish circumstances, the responsibilities associated with those functions are very similar. Drucker (2004) states that effective executives should be able to gain the knowledge to make smart decisions, convert knowledge into practical actions and keep people accountable for those actions. Table 1 draws on thought leadership studies including Kotter (2001), Heifetz and Laurie (1997), and Ancona et al. (2007) to show how managers and leaders accomplish their responsibilities.

Table 1 – The work of leaders and managers

Responsibilities (DRUCKER, 2004)	**Managers (Under routine stable situations)**	**Leaders (Under adaptive situations)**
Understanding what needs to be done	Shield the organization from external threats (HEIFETZ; LAURIE, 1997) Define problems (HEIFETZ; LAURIE, 1997)	Let the team feel external pressures within a range it can stand (HEIFETZ; LAURIE, 1997) Constantly understand changes in the business environment and interpret their ramifications for the company and industry. (ANCONA et al., 2007) Identify the adaptive challenge and frame key questions and issues (HEIFETZ; LAURIE, 1997)
Converting knowledge into practical actions	Provide solutions (HEIFETZ; LAURIE, 1997) Set targets or goals for the future (KOTTER, 2001) Establish detailed steps for achieving the organizational objectives (KOTTER, 2001) Clarify roles and responsibilities (HEIFETZ; LAURIE, 1997) Allocate resources to achieve the plan. Create an organizational structure and set of jobs for accomplishing plan requirements (KOTTER, 2001) Staffing the jobs with qualified individuals (KOTTER, 2001) Communicate the plan to those people (KOTTER, 2001) Delegate responsibilities for carrying out the plan (KOTTER, 2001)	Develop a vision of the future along with strategies for producing the changes needed to achieve that vision (KOTTER, 2001) Create credible and compelling images of the desired future that people in the organization want to create together (ANCONA et al., 2007) Communicate the new direction to those who can create coalitions that understand the vision and are committed to its achievements (KOTTER, 2001) Build trusting relationships, balancing inquiry (listening to understand others' viewpoints) with advocacy (explaining viewpoints) (ANCONA, et al., 2007)
Ensuring companywide accountability	Devise systems to monitor implementation (KOTTER, 2001) Restore order (HEIFETZ; LAURIE, 1997) Maintain norms (HEIFETZ; LAURIE, 1997) Monitor results versus plan in some detail through reports, meetings and other tools (KOTTER, 2001) Identify deviations (KOTTER, 2001) Plan and organize to solve problems (KOTTER, 2001)	Challenge current roles and resist pressure to define new functions quickly (HEIFETZ; LAURIE, 1997) Create new ways of approaching tasks or overcoming seemingly insurmountable problems to turn ideas into reality (ANCONA et al., 2007) Expose conflict or let it emerge (HEIFETZ; LAURIE, 1997) Challenge unproductive norms (HEIFETZ; LAURIE, 1997) Keep people moving in the right direction, despite major obstacles to change, by appealing to basic but often untapped human needs, values, and emotions (KOTTER, 2001) Cultivating networks of supportive confidants (ANCONA et al., 2007)

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Even though managing and leading require different competencies, companies should strive in both to be successful. On the one hand, businesses that present strong leadership with weak management skills tend to become chaotic in a way that it cannot hold itself during turbulent times; therefore, threatening its survival. On the other hand, good management without leadership can freeze the organization and keep it from adapting to changes in the environment, which might be essential to sustain a competitive advantage. Since the world faces rapid shifts in the business climate including technological changes, shifts in demographics of the workforce, new consumer behaviors, greater competition and changes in regulations, organizations must balance management and leadership to promote changes at the same time it deals with the complexities of their operations (KOTTER, 2001).

Sometimes the role of leading and managing can be shared among people in the organization. Therefore, the idea that executives should possess all the skills for superior management and leadership performance is a myth (ANCONA et al., 2007). Instead, leaders can build upon the different skills and personalities that people bring to organizations to create a positive culture where people exceed expectations and flourish. Leaders can succeed in such responsibilities, in part, through their development of emotional and social intelligence competencies (DRUCKER, 2004; GOLEMAN, 1998).

2.2 Leadership requires emotional, social, and cognitive intelligence

Intelligence is a construct that has been broadly discussed in the literature since the nineteenth century, especially after Herbert Spencer and Francis Galton suggested that intelligence is an overall superior human capacity. These and other authors like Raymond Cattell believed that simple mental skills such as reaction time, sensorial discrimination, and words association could be used to predict academic performance (WOYCIEKOSKI; HUTZ, 2009).

Subsequent research has demonstrated that measurements of intelligence that included more complex capacities and day-to-day activities would constitute better measurements of intelligence. This interpretation led to two lines of theories in which intelligence is defined either as a general capacity or as a diverse set of human capacities considerably independent of each other. Some of the earliest valid measurements of intelligence, for example, the Binet-Simon scale and the Wechsler Adult Intelligence Scale, were adept at the theory of intelligence as a general capacity related to comprehension and logic. On the other hand, authors such as

Thurstone[8] (1938), Guilford[9] (1967), and Gardner[10] (1995) supported the theory that intelligence could be a factor of several human competencies (apud WOYCIEKOSKI; HUTZ, 2009). For instance, Gardner (1983) developed The Theory of Multiple Intelligence that included linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal intelligence. The multi-factor theories of intelligence imply that comprehension and logic alone in the absence of sensorial and social skills does not guarantee superior academic or work performance.

Thorndike (1936) made one of the first attempts to broaden the concept of intelligence beyond general intellectual capacities. He considered social intelligence was associated with the capacity of judgment in social situations, recognition of a mental state, observation of human behavior, memory for names and faces, and sense of humor. Since then, authors such as Sternberg (1997) and Siqueira, Barbosa, and Alves (1999) have emphasized the importance of social intelligence for perceiving and interpreting clues in social environments and adapting behaviors for achieving personal and shared goals.

Emotions play an important role in social interactions and communication. Thus, Mayer and Salovey (1990, p. 189) initially introduced the concept of emotional intelligence as "a subcategory of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and action." Then they revised their definition to include a model of four abilities: (a) to perceive, appraise, and express emotion, (b) to access and/or generate feelings when they facilitate thought, (c) to understand emotion and emotional knowledge, and (d) to regulate emotions to promote emotional and intellectual growth (MAYER; SALOVEY, 1997). This definition considers that emotional intelligence should represent a mental ability and measured with objective mental performance tasks.

Since then the term Emotional Intelligence has been defined and redefined many times especially after Goleman (1995) published his best seller books entitled "Emotional Intelligence." Some of these different variations of the term emotional intelligence have been criticized in the literature for mixing distinct personality traits such as motivation, service orientation, self-confidence, optimism, and achievement drive (MAYER, SALOVEY; CARUSO, 2000; WOYCIEKOSKI; HUTZ, 2009). In response to the research community

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[8] Thurstone, L. L. (1938). Primary mental abilities. Chicago: University of Chicago Press.
[9] Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
[10] Gardner, H. (1995). *Inteligências múltiplas: A teoria na prática* (M. A. V. Veronese, Trad.). Porto Alegre, RS: Artes Médicas.

critiques, Boyatsis (2007) have redefined the assessment method initially introduced by Goleman and him to assess emotional and social intelligence competencies in preference to intelligence. Such assessment aims to identify observable, recognizable, distinct, and concise behaviors, for example, initiating actions to improve own performance, acting appropriately even in emotionally charged situations, and convincing others by using multiple approaches.

Figure 2 shows the model of 12 competencies adopted in this study, which are clustered into four categories related to emotional and social intelligence competencies. Two of those categories are related to awareness, and the other two are associated with management. The model also includes two competencies related to cognitive intelligence (BOYATZIS, 2009).

Figure 2 – Emotional, social, and cognitive intelligence model

	Emotional Intelligence Competencies	**Social Intelligence Competencies**
Awareness	**Self-awareness:** knowing one's internal states, preferences, resources, and intuition. - **Emotional self-awareness:** recognizing own emotions and the effect of those emotions on behavior, performance, and relationships.	**Social awareness:** handling relationships and awareness of others' feelings, needs, and concerns. - **Empathy:** recognizing others' emotions and perspectives, and demonstrating genuine interest in others' problems and concerns; - **Organizational awareness**: perceiving a group's emotional situation and power relationships.
Management	**Self-management:** managing one's internal states, impulses, and resources. - **Achievement orientation:** striving to improve or meeting a standard of excellence; - **Adaptability:** flexibility in handling change; - **Emotional self-control:** keeping disruptive emotions and impulses under control; - **Positive outlook:** seeing the positive aspects of people, situations, and the future.	**Relationship management:** the skills or adeptness at inducing desirable responses in others. - **Conflict management:** orchestrating resolutions when there is disagreement; - **Coach and mentor:** recognizing when someone needs help and strengthening their abilities; - **Influence:** applying effective tactics of persuasion; - **Inspirational leadership:** inspiring and guiding individuals and groups; - **Teamwork:** working with others toward shared goals and promoting group synergy in pursuing collective goals.

Cognitive Intelligence Competencies

- **System thinking:** Perceiving causal relationships in understanding phenomena or events
- **Pattern recognition:** Recognizing themes and patterns in items, events, or phenomena

Source: adapted from Boyatzis (2009)

Researchers on emotional and social intelligence (MAYER; SALOVEY; CARUSO, 2004; GOLEMAN, 1998, 2006) have suggested that talent and capability are linked to performance. Mayer, Salovey, and Caruso (2004) proposed that emotional intelligence contributes to job performance especially when the maintenance of real personal commitments is necessary. Thus, understanding how to measure and develop emotional and social intelligence competencies can have a considerable impact on improving leaders' performance.

There are currently many assessment instruments for measuring emotional and social intelligence. Most of these instruments fit into three categories of methods and models depending on the conceptual theme adopted by the authors (BOYATZIS, 2009). The first type consists of measuring emotional and social intelligence as an ability. The MSCEIT (MAYER; SALOVEY; CARUSO, 1999; MAYER; CARUSO; SALOVEY, 2000) is one of the major assessments of this type. The second type involves measuring emotional and social intelligence related behaviors. The emotional and social competency inventory (ESCI) (BOYATZIS, 2007) and the EQ-i (BAR-ON, 1997), although initially introduced as a self-report test, are examples of this type of assessment since they focus on identifying observed behaviors through multi-rater approaches. The third type comprises the measurement of emotional and social intelligence through self-report which is strongly influenced by internal self-perception. For instance, the original EQ-i test, the Schutte Self-Report Inventory (SSRI) (SCHUTTE et al., 1998), and the WLEIS (LAW; WONG; SONG, 2004), which is a self-assessment model based on the MSCEIT, are assessments based on internal self-perception. Some authors criticize the use of behavioral and self-report methods for considering personality dimensions on the assessment of emotional and social intelligence (MAYER; SALOVEY; CARUSO, 2000; WOYCIEKOSKI; HUTZ, 2009). However, Boyatzis (2009) consider the ESCI assessment more outcome-oriented and realistic in real settings since it is intended to assess how people express their handling of emotions in life and work settings through the competencies described earlier, while the MSCEIT assesses a person's direct handling of emotions. Though, Boyatzis (2009) recognizes that there may be reasons to label the behavioral approach to emotional and social intelligence as something other than an "intelligence."

Competencies can be developed through formative experiences since new habits can affect and rewire neural circuits and invoke certain neuroendocrine pathways that determine behavior (BOYATZIS, 2009). Mayer, Caruso, and Salovey (2000) support that emotional intelligence can be directly improved through skills development and knowledge acquisition regardless of its effect on personality enhancement. Though, these authors also recognize that more researches need to explore the contribution of emotional and social intelligence to

personality development and growth. Regardless of the different interpretations of emotional intelligence, there is a consensus that emotional and social competencies can be developed through real-life practices and experiences.

The following sections provide additional information about how professionals and students can develop emotional and social competencies. To better explore the concept of emotional intelligence, the constructs associated with this type of competencies are broken into the following two sections. The first one explores how people can enhance personal self-awareness upon understanding themselves and finding their purpose. Then the second section associated with emotional intelligence discuss how individuals can better manage themselves to improve their capacity for self-control. Finally, the concepts related to social intelligence are presented regarding practices for leading positive organizations. The concepts associated with cognitive competencies are not detailed in this study due to the understanding that such concepts are already covered on other technical disciplines of the engineering curriculum.

2.2.1 Understanding ourselves and finding our purpose

On a speech in 1960 the HP co-founder David Packard said that “although purpose itself does not change, it does inspire change. The very fact that purpose can never be fully realized means that an organization can never stop stimulating change and progress” (JONES, 2016, p. 2). Having a clear purpose is considered key to guide change on the volatile, uncertain, complex, ambiguous world we face today, where most decisions are not obviously right or wrong (CRAIG; SNOOK, 2014). Therefore, many authors have defined the concept of organizational purpose as the reason for the organization existence, which guides it on its intention to transform society (COLLINS; PORRAS, 1996; SINEK, 2009; REIMAN, 2012; SISODIA et al., 2003).

Likewise, individuals need a well-defined purpose to guide their decisions in life. According to George (2003, p.9), “we need leaders who lead with purpose, values, and integrity [...] leaders who build enduring organizations, motivate their employees to provide superior customer service, and create long-term value for shareholders.” However, Craig and Snook (2014) stated that in their training with thousands of managers and executives they have found that only fewer than 20% of leaders have a strong sense of individual purpose and even fewer can describe their purpose into a concrete statement.

Self-awareness allows people to be happy in their careers, build robust and enduring relationships with friends and relatives, and make decisions with integrity. Understanding our

goals, values, and beliefs can help us make better decisions and allocate our time and energy on what is important to us. Many times, we make short-term decisions based on the demand of others, so if we are not entirely aware of our purpose, we can end up losing control of our destiny. Therefore, if leaders do not develop a clear sense of purpose, they are likely to lose their time and energy on obtaining quick, tangible gains even if that is not what matters for them and their organization (CHRISTENSEN, 2010).

Developing a clear sense of purpose is an emerging process where one continually explore his or her unique talents, strengths, values, beliefs and desires (AVOLIO; GARDNER, 2005). The process suggested by Craig and Snook (2014) encompasses mining your life story for common threads and major themes and then using this reflective work to craft a clear, concise, and declarative statement of purpose. The authors also emphasize that writing the statement is not enough and that actions, not words, are what really matter. Therefore, the purpose statement should be considered when setting up goals to the medium-term (two to five years) and short-term (one to six months).

Finally, individuals should consider the marginal costs of their decisions when defining their personal goals. The idea of marginal costs explains why sometimes people and corporations make bad decisions that can jeopardize their long-term objectives (CHRISTENSEN, 2010). People make decisions based on the gains or benefit for themselves. The problem is that sometimes these decisions can put other areas of our life at risk. For example, a father might decide to work extra hours to improve his family financial conditions, but because of this decision he might end up not spending enough time with his family; therefore, jeopardizing his relationship with them. The key to avoiding marginal costs is to know our values and ambitions and then use this knowledge about ourselves to guide our decisions.

As leaders, we must manage the tension between the different roles we play in life. Accomplishing this requires self-awareness in all life domains including work, home, community, and self, which includes mind, body, and spirit. When making decisions in one area of life, we should consider how this decision will affect the other areas. For example, overwork for the sake of being more productive can lead to burnout and exhaustion of the mind and body. The opposite is also true since the over excessive focus on the self or the family can result in absence at work. The thoughtful analysis of the marginal costs of decision has the potential to help leaders to achieve balance in their lives and align all their life domain as an enduring source of happiness (FRIEDMAN, 2008).

2.2.2 Managing ourselves

In addition to having clarity about their purpose, values, and goal, leaders should be able to control their decisions and behavior to achieve their desired results. Sometimes, in the face of immediate impulses, people make decisions that are contrary to what they want for the long term. It is common for people to act against their will when it comes to waking up, stop smoking, eating healthier, and developing more positive habits. According to Baumeister et al. (2007, p. 351) "self-control refers to the capacity for altering one's responses, especially to bring them into line with standards such as ideals, values, morals, and social expectations, and to support the pursuit of long-term goals." Therefore, self-control is essential to help leaders resist immediate impulses and act according to their real purpose, values, and goals.

Most times human behavior is not influenced by deliberative, conscious, controlled responses to external stimulus (BARGH; CHARTRAND, 1999). Stanovich and West (2000) coined the terms System 1 and System 2 to explain the dual process of thinking. According to these authors, System 1 is related to an automatic and mainly unconscious decision-making process while System 2 is associated with conscious decision making, effortful mental activities, and complex computations. In the bestselling book "Thinking Fast and Slow," winner of the Nobel Prize in Economics, Kahneman (2011), demonstrates that the way systems 1 and 2 operate have a significant influence on many human heuristics and biases including the ability to exert self-control.

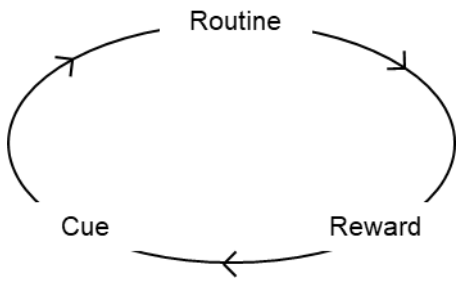
The idea of willpower implies that there is a kind of mental energy that allows individuals to deliberatively make decisions, regulate behavior, and act according to pre-established plans (BAUMEISTER et al., 1998, 2007). Kahneman (2011) argues that activities that demand the attention of System 2 require self-control, which is depleting and unpleasant. That means System 1 has more influence on decisions and behaviors when System 2 is busy or weary. Baumeister et al. (1998) coined the term ego depletion to describe this phenomenon. Ego depletion refers to "a temporary reduction in the self's capacity or willingness to engage in volitional action (including controlling the environment, controlling the self, making choices, and initiating action) caused by prior exercise of volition." (BAUMEISTER et al., 1998, p. 1253). Hence, exerting self-control can be compared to physical exercising. The energy or strength required to exert self-control is drained after recent demands similarly to the way muscles get tired after exercising (MURAVEN; BAUMEISTER, 2000). Therefore, ego depletion can have a negative impact on leaders' ability to demonstrate self-control and even increase cheating, immoral, and unethical behaviors as demonstrated by Gino et al. (2011).

The information age, characterized by increasingly fast and available communication technologies, have increased the demand for our attention and time drastically. Most people nowadays are constantly interacting with their smartphones from the moment they wake up to the time they sleep. It is also common when necessary tasks are interrupted by phone calls, emails, news, messages, and notifications. Such behaviors can lead to a neurological phenomenon called attention deficit trait (ADT) caused by brain overload. ADT can undermine the work of otherwise effective leaders since it leads to distractibility, emotional frenzy, and impatience (HALLOWELL, 2005). The ego-depletion theory to some degree explains why ADT occurs; that is, the overuse of the depleting System 2 can lead to burnout and affect leaders' decisions and actions. Because of the epidemic of ADT in today's organizations, leaders should be able to find ways to manage not only their time but also their energy; therefore, being able to apply self-control and make better decisions.

Managing ourselves require regulating our energy levels to ensure physical, emotional, mental, and spiritual energy. Leaders often put in longer hours at work, skip meals, don't exercise, and adopt other unhealthy behaviors because of the increasing demands in the workplace (SCHWARTZ; MCCARTHY, 2007). Such behaviors can lead to an energy burnout and lower capacity of self-control, which in turn, can result in errors in judgment and biases. In the energy renewal program proposed by Schwartz and McCarthy (2007), participants implement simple energy renewal rituals, such as, taking regular breaks, showing gratitude to others, reducing distractions, and spending more time working on their strengths, to improve their energy levels. In a study on a bank institution, participants of the energy renewal program performed significantly better than a control group regarding financial metrics such as gain in revenue from deposits. Subsequent research at Sony Pictures Entertainment has also demonstrated that participants report higher levels of performance, productivity, focus and engagement (SCHWARTZ, 2010). Thus, leaders that know how to manage their energy levels through energy renewal rituals can improve their capacity for self-control and, consequently, achieve better results.

Implementing new habits is not easy, but there are some tricks that people can use to increase their chances of adopting the new behavior. Figure 3 shows a process for creating habits. The process includes three steps: (a) a cue that triggers the behavior and tells our brain to go into automatic mode, (b) a routine that can be physical, mental or emotional, and (c) a reward which helps to reinforce the use of the loop in the future. Understanding the structure of the habit loop and considering it while implementing new behaviors can make them easier to control (DUHIGG, 2012).

Figure 3 – The habit loop



Source: Duhigg (2012)

2.2.3 Leading positive organizations

Luthans (2002a, p. 59) specifically define Positive Organizational Behavior (POB) as "the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today's workplace." Thus, positive organizations are institutions that focus on promoting leaders and human resource strengths and competencies such as confidence, hope, optimism, happiness, and emotional intelligence at the organizational level.

Positive Organizations require leaders that understand the organizational culture and know how to change it to improve the value it generates to all its stakeholders. In positive organizations, leaders make decisions that benefit not only the shareholders but also its clients, employees, suppliers, partners, collaborators, and community in general. Recent researches on Positive Organizational Scholarship (POS) have shed light on how fostering positive emotions, strengths, and virtues can energize the organization and contribute to creating a culture that allows people to thrive, exceed expectation, and build better communities (QUINN; QUINN, 2009).

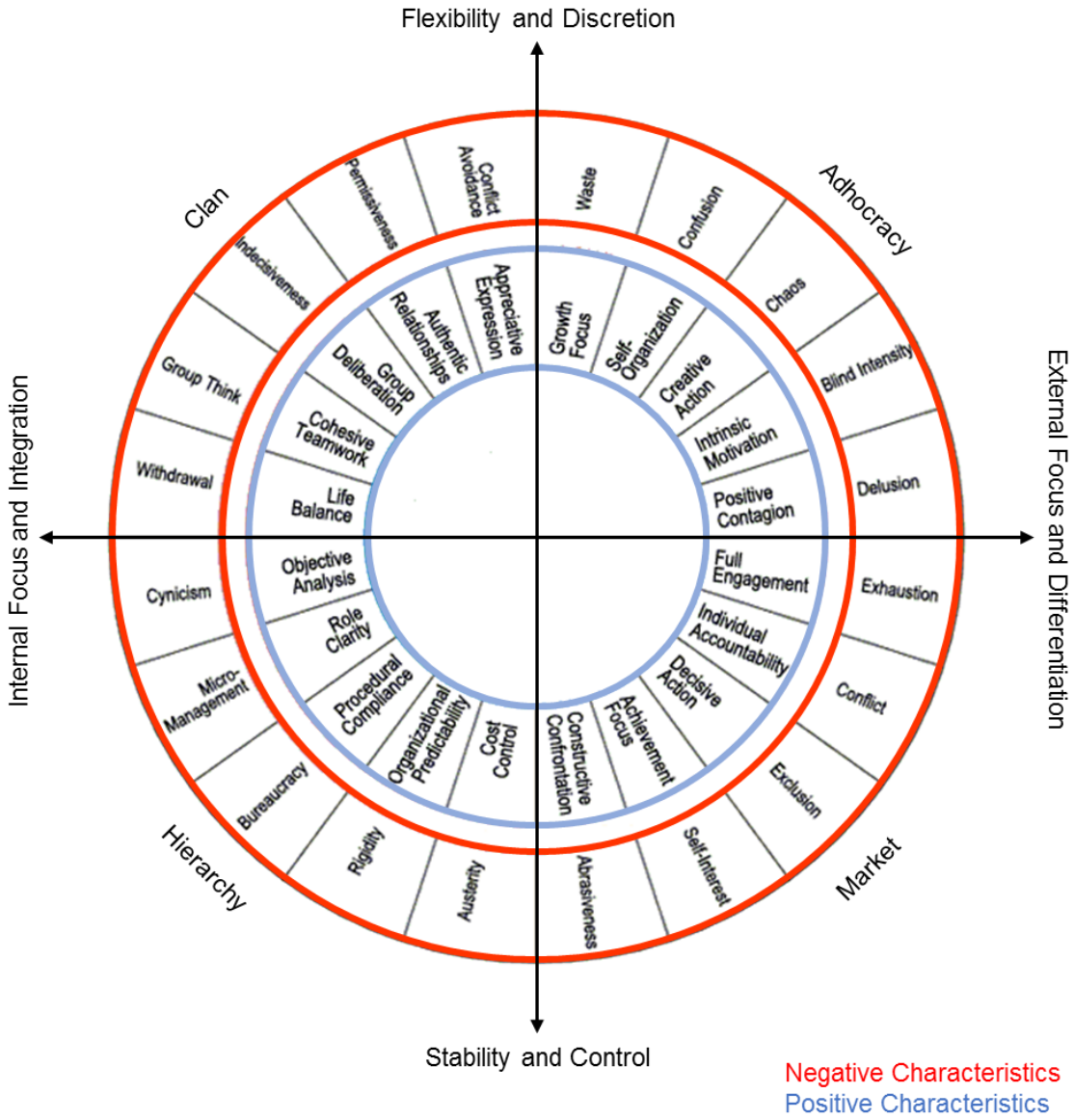
The POS is a field of research that seeks to apply positive psychology theory in organizational contexts and offers a new way of thinking about positive leadership (QUINN; QUINN, 2009). Positive psychology aims to understand how humans can build positive qualities such as hope, wisdom, creativity, courage, spirituality responsibility, perseverance and other characteristics that allow individuals, communities, and societies to flourish (SELIGMAN; CSIKSZENTMIHALYI, 2000). The focus on positive aspects of life offers a new perspective on the field of psychology that for a long time have been preoccupied with solving pathologies and fixing the worst things in life (SELIGMAN; CSIKSZENTMIHALYI, 2000). Building positive organizations involve leaders that can understand and facilitate the

emergence of new, more positive organizational practices; therefore, building better cultures where people thrive and exceed expectations (QUINN, 2015).

Building a positive organization requires leaders that can balance a system of tensions (QUINN, 2015). Since Quinn and Rohrbaugh (1981, 1983) published their theory about the competing values framework (CVF), many studies have used their model to explain how conflicting values affect organizational behavior. The main idea behind their framework is that different view of what effectiveness means can lead to different decisions and influence people's behavior within an organizational culture.

The CVF considers that organization effectiveness criteria can be allocated in two dimensions that combined determine four types of corporate culture. The first dimension refers to the trade-off between of flexibility (or discretion) and stability (or control) while the second dimension relates to the difference between internal focus (or integration) and external focus (or differentiation). The combination of these dimensions determines the four different types of cultures naming Adhocracy, Clan, Hierarchic, and Market. (CAMERON; QUINN, 2011). Figure 4 shows how organizational tensions can be developed among different organizational culture types. The characteristics of each culture, as presented in Figure 4, determine the assumptions and beliefs that people acquire over time in an organization and define mental maps that guide people`s behavior and responses to the situations they face every day (QUINN, 2015). Because people are biased by the mental map they hold, that is, by the organizational culture they live in and by what has worked in the past, they might be closed to accept that a different metal map can also be positive and bring improvements to the organization (QUINN, 2015). Thus, leaders should be willing to consider possibilities beyond the constraints of the organizational culture. They should be able to imagine and pursue positive practices even if those practices are grounded in values that seem opposite to what has worked in the past.

Figure 4 – Organizational Tensions and Culture Types



Source: adapted from Quinn (2015) and Cameron and Quinn (2011)

Although all values presented in each of the four quadrants of the model shown in Figure 4 are inherently positive, companies usually have a preference for one or some of these culture types. This fact can lead them to undervalue and, possibly, undermine aspects of the culture type on the other side of the model (CAMERON; QUINN, 2011).

Consequently, people tend to attribute negative labels to characteristics related to the opposite aspect of the culture they favor (QUINN; QUINN, 2009). For example, in hierarchical organizations, people may think that creative actions and the implementation of new ideas may lead to chaos and generate instability. In contrast, people that live in a predominantly adhocratic

organization may believe that procedural compliance produces bureaucracy and prevents the team from changing in the face of challenges and opportunities.

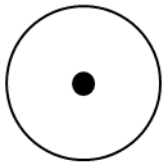
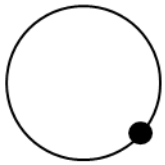
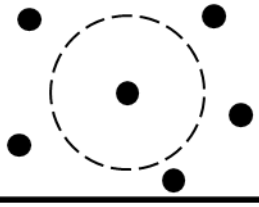
Quinn (2015) suggests specific actions that leaders can make to create more positive organizations. These activities include: creating a sense of purpose, nurturing authentic conversations, seeing possibilities, and embracing the common good. Additionally, he states that leaders should trust the emergent future, which requires letting go of our expert role and trust people who are working on the issue. This idea is reinforced by the Theory U proposed by Scharmer (2009). The Theory U considers that since changes occur on self-organizing social systems, leaders should explore the social field with open minds, open hearts, and open will to let go of what is no longer valid and let come the future the emerges. If leaders learn how to trust the emerging future and apply the actions proposed by Quinn (2015), they should be able to implement positive practices to improve their organization.

Quinn (2015, p. 37) states that "the primary purpose of a leader is to connect people to their purpose." Creating a sense of purpose is directly related to motivating followers. Some organizations try to motivate their employees by offering good financial returns and benefits. This approach is supported, for example, by the transactional leadership theory (BASS, 1990). However, it is important to consider the financial returns and compensations are not the only factors that motivate followers. According to the Maslow's (1943) theory of human motivation, people are driven by a hierarchical chain of desires in which the satisfaction of a primary need leads to an appearance of a higher-level necessity. This chain starts with the satisfaction of physiological needs followed by the provision of safety, love, esteem, and self-actualization. Based on this theory, leaders should understand that offering sound financial return and desirable working conditions is not enough to motivate their followers. For instance, Herzberg (1968) argues that the job satisfaction depends on factors related to the job content such as achievement, recognition, the work itself, responsibility, and growth while job dissatisfaction is related to job environment factors for example company policy, supervision, working conditions, salary, status, and security. After all basic job environment conditions are met, people will seek to build trustworthy relationships and to find a way to feel good about themselves on their work and to achieve their dreams. In organizations moved by a shared sense of purpose, people find meaning in their work and are willing to dedicate extra energy to achieve the desired business goals (QUINN, 2015).

Nurturing authentic conversations requires leaders that know how to engage in dialogue. People should have a safe environment to share what they are thinking and feeling without fearing repercussion (QUINN, 2015). Leaders should be able to suspend the voice of judgment,

the voice of cynicism, and the voice of fear to sincerely listen to what people have to say (SCHARMER, 2009). Figure 5 shows the model with four levels for the fields of conversation.

Figure 5 – Fields of conversation

Field structure of attention	Field	
1. I-in-me 	**1. Downloading** talking nice	**Speaking from what they want to hear** polite routines, empty phrases AUTISTIC SYSTEM (not saying what you think)
2. I-in-it 	**2. Talking nice** talking tough	**Speaking from what I think** Divergent views: I am my point of view ADAPTIVE SYSTEM (say what you think)
3. I-in-you 	**3. Dialogue** reflective inquiry	**Speaking from seeing myself as part of the whole** from defending to inquiry into viewpoints SELF-REFLECTIVE SYSTEM (reflect on your part)
4. I-in-now 	**4. Presencing** generative flow	**Speaking from what is moving through** stillness, collective creativity, flow GENERATIVE SYSTEM (identity shift: authentic self)

Source: Scharmer (2009, p. 236)

Also, to change others, leaders must first change themselves. Avolio and Gardner (2005, p. 317) state that “through self-awareness, self-regulation, and positive modelling, authentic leaders foster the development of authenticity in followers.” Thus, leaders should be able to communicate their values and goals clearly and should act according to what they preach. By listening to others and by leading with integrity and strong ethical convictions, leaders should serve as an example for their followers and nurture a culture of authentic communication.

In positive organizations, leaders pursue the collective interest above their own. Embracing the common good requires leaders that think about the organization not only as a political system but also as a moral system. These leaders understand that organizations should be ethical, principled, honorable, honest, and good and they see people in the organization as fully human beings for whom they have compassion. They see the goodness in people (QUINN, 2015). According to Scharmer and Kaufer (2013), leaders should move from an ego-system to an eco-system awareness. They should see themselves through the eyes of other and from the

whole. This perspective allows leaders to empathize with their followers and engage them on co-creating the future that emerges. Upon listening with genuine intention, leaders can understand the thoughts and feelings of people in the organization and, with time, build trusting relationships, which is a requirement for effective leadership (ANCONA et al., 2007).

Leaders should be able to work around the constraints of their organization to make people believe in the reality of possibility. Even though people fear the unknown, they have an intrinsic desire to build a better future (QUINN, 2015). The positive deviance theory (PASCALE; STERNIN; STERNIN, 2010) argues that problems can be solved by uncovering hidden assets or resources within a community or organizations. This theory implies that leaders can look for unusual but successful behaviors and strategies within the organization and disseminate their findings to other members. For example, this method was applied successfully in Vietnam in the early 1990's to reduce the problem of childhood malnutrition significantly (PASCALE; STERNIN; STERNIN, 2010). That means leaders should always be open to see possibilities and to spread positive behaviors to the whole organization. By making members believe that it is possible to build a better organization, leaders can ignite the spark of change and make people move forward and grow along with the organization (QUINN, 2015).

Finally, it is important to notice that by applying the four actions suggested by Quinn (2005), leaders can improve their social intelligence competencies. For instance, leaders that know how to create a sense of purpose will inspire others to follow their vision and proactively initiate change. Nurturing authentic conversations will contribute to cultivating and managing existing relationships networks, orchestrating resolutions when there is disagreement, understanding others points of views, and promoting cooperation between members. Embracing the common good allow leaders to recognize when someone needs help, identify others` emotions and feelings, demonstrate a genuine interest in others` problems and concerns, and develop other's skills through mentorship and coaching. Finally, seeing possibility allow leaders to recognize what is happening at the organization in which they are involved and navigate organizational politics and social compacts to facilitate the emergence of desired changes.

2.3 Leadership Development

Leadership development is defined as “the expansion of a collective’s capacity to produce direction, alignment, and commitment (DAC)” (VELSOR; MCCAULEY; MARIAN N. RUDERMAN, 2010, p. 20). Note that this definition considers that leadership is a social process in which leaders assume the role of setting direction, creating alignment, and maintaining commitment. In the Center for Creative Leadership Handbook of Leadership Development, Velsor et al. (2010) present some assumptions about the leader development process. First, they state that leaders learn from a variety of developmental experiences. Second, they say that developmental experiences can improve a leader`s ability to learn, which in turn can result in further development. Finally, they explain that leaders` development happens in particular situations that are influenced by broad elements such as demographics, economic conditions, and organizational purpose, mission, and strategy. Therefore, leadership development occurs when individuals learn from their experiences in organizational situations and change behaviors to promote better DAC in the group.

There is much buzz in the media around successful leaders. This situation can lead to the wrong impression that if individuals emulate those leaders’ behaviors, they will also be successful. On the contrary, Quinn (2005) and his colleagues have found that leaders do their best work when they are authentic to their values and capabilities. The development of authentic leadership theory has shed light on how leadership interventions can contribute to the development of such leaders.

2.3.1 Authentic Leadership Development

To understand Authentic Leadership Development (ALD), we must first clarify the constructs of authenticity and authentic leadership. According to Avolio and Gardner (2005), the concept of authenticity has its origins in the Greek philosophy “to thine own self be true.” It was also explored on the work of humanistic psychologist including Rogers (1959, 1963) and Maslow (1968, 1971) that focus on developing fully functional and self-actualized individuals. According to Harter (2002, p.27), authenticity “involves owning one’s personal experiences, be they thoughts, emotions, needs, wants, preferences, or beliefs, processes captured by the injunction to ‘know oneself’” and to “act in accord with the true self, expressing oneself in ways that are consistent with inner thoughts and feelings”. Therefore, enhancing self-awareness and exerting self-control are central components of developing authentic leadership behaviors.

Luthans and Avolio (2003, p. 243) define authentic leadership in organizations as

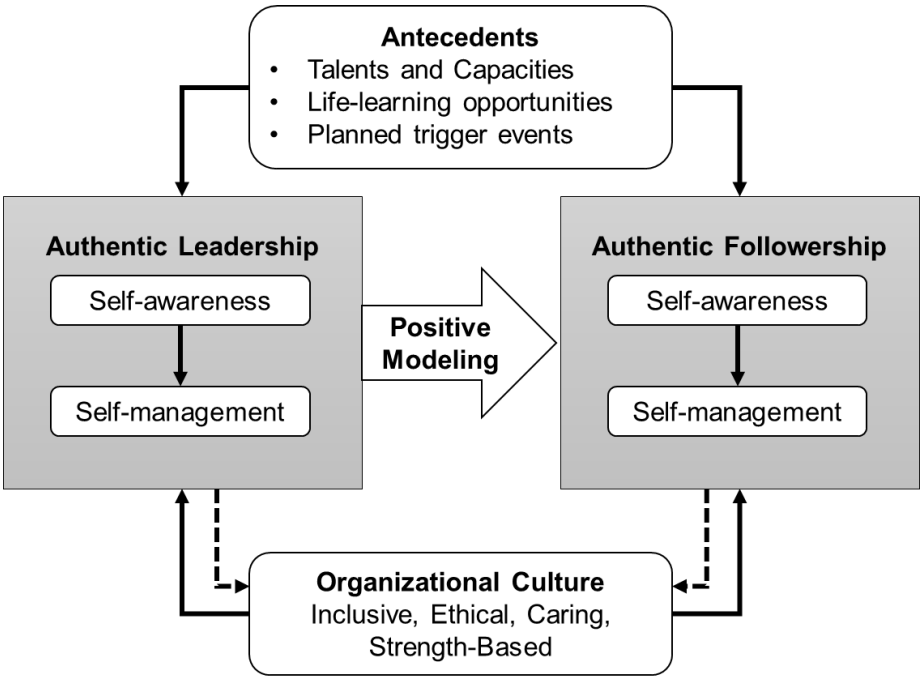
> A process that draws from both positive psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive behaviors on the part of leaders and associates, fostering positive self-development.

The need for positive organizational behavior was emphasized by Luthans (2002b) as a mean to performance improvement in the workplace. Authentic leaders can positively transform followers and entire organizations by promoting confidence, hopefulness, optimism, resilience, transparency, strong moral/ethical values, future-oriented goals, and development of followers (LUTHANS; AVOLIO, 2003). The positive aspects of authentic leadership in organizations justify the development of methods to help leaders to develop such competencies.

The emerging literature on ALD (AVOLIO; LUTHANS, 2006; WALUMBWA et al., 2008) has offered a new perspective on how leadership interventions can impact leadership development and performance (AVOLIO; WALUMBWA; WEBER, 2009). ALD is an ongoing process whereby leaders build upon life-learning opportunities and planned trigger events to enhance self-awareness, improve behavior consistency through self-control, and positively influence followers through open, transparent, honest, and genuine relationships (AVOLIO, 2005). Such model considers that leadership development is influenced by innate talents and capabilities as well as by the organizational culture in which leaders are operating (AVOLIO, 2005). Lastly, ALD can impact the organizational culture to be more transformational and less transactional, which means it can foster a culture that continuously supports the development of each person`s potential (AVOLIO, 2005).

Due to the contextual nature of ALD, it is important to notice the impact of leaders` development on followers. Therefore, Gardner et al. (2005) explores the relationship between leaders and followers' development and states that authentic leadership and followership can lead to a more inclusive, ethical, caring and strength-based culture. These authors also say that authentic leaders help followers to achieve a higher level of self-awareness and self-management leading to positive outcomes such as trust, engagement and workplace well-being. Figure 6 shows an integrated conceptual framework for authentic leadership and followership development. This framework suggests that through ALD, leaders can achieve higher leadership standards for themselves, foster the development of followers, and create a culture that nurtures leadership development.

Figure 6 – Integrate conceptual framework for authentic leader and follower development



Source: adapted from Gardner et al. (2005, p. 346) and Avolio (2005, p. 195)

According to the model presented in Figure 6, leaders and followers learn from life events that come from the personal history of the leader, which may include family influences and role models, life challenges, educational, and work experiences (GARDNER et al., 2005). Because people do not always have control of their life events, the ALD model considers that leaders can engage in planned trigger events to take more active control of their development. For example, they can take new job roles, pursue an advanced degree, try new habits, or take new responsibilities related to foster their strengths (AVOLIO, 2005). Therefore, ALD can be considered an experiential learning approach for leadership development in which leaders can design experiments and situations to develop their leadership competencies actively.

Finally, by working on improving their authentic leadership skills, leaders should inspire others to higher levels of achievement. In a broader sense, leaders should be able to influence followers by disseminating specific values and creating a collective identity that team members will embrace as their own (LORD; BROWN, 2001). Therefore, leaders should look inward and change behaviors to become more authentic and inspire others. Quinn and Quinn (2009) state that by lifting our hearts and minds, we can become a positive force, whatever the situation might be. That means leaders should constantly work on improving themselves, which requires the understanding that leadership is a psychological state that can be developed.

2.3.2 Leadership is a state and can be developed

Challenging moments such as a job interview or the risk of a project failure force us to tap into our deepest values and instincts and perform at our best. These moments are life learning opportunities that play a major role in building our leadership competencies (QUINN, 2005). Most time in our everyday routine we find ourselves in a more normal state of being in which we do not have a clear sense of purpose, act in self-interest, become paralyzed by fear and perform within our comfort zone. According to Quinn (2005), you do not need moments of crises to shift from the normal state to a more authentic state of leadership. We can do it by asking ourselves the following four questions:

Table 2 – The Fundamental State of Leadership Questions

Questions	**Other ways to ask the same question**
Am I results centered?	What results do I want to create? Do I know my real purpose? Have I articulated the results I want to achieve?
Am I internally directed?	What would my story be if I were living the values I expect of others? Am I acting according to my values and beliefs? Is there anything holding me from acting?
Am I other focused?	How do others feel about this situation? Am I acting for the collective good? Am I paying attention to other people's needs?
Am I externally open?	What are three (or four or five) strategies I could use to accomplish my purpose for this situation? Am I open to change? Am I working within my comfort zone?

Source: adapted from Quinn (2005) and Quinn and Quinn (2009)

Asking ourselves the questions from Table 2 allows for both reflective and social thinking. It helps us to review the past, present and future stories we tell ourselves and experiment with new behaviors based on what we learn. On this regard, leadership development is a result of trying different possible selves instead of focusing on finding a "true self" (IBARRA, 2015). These life learning moments allow us to test new behaviors in the social context as we change them to become better leaders.

3 RESEARCH METHOD

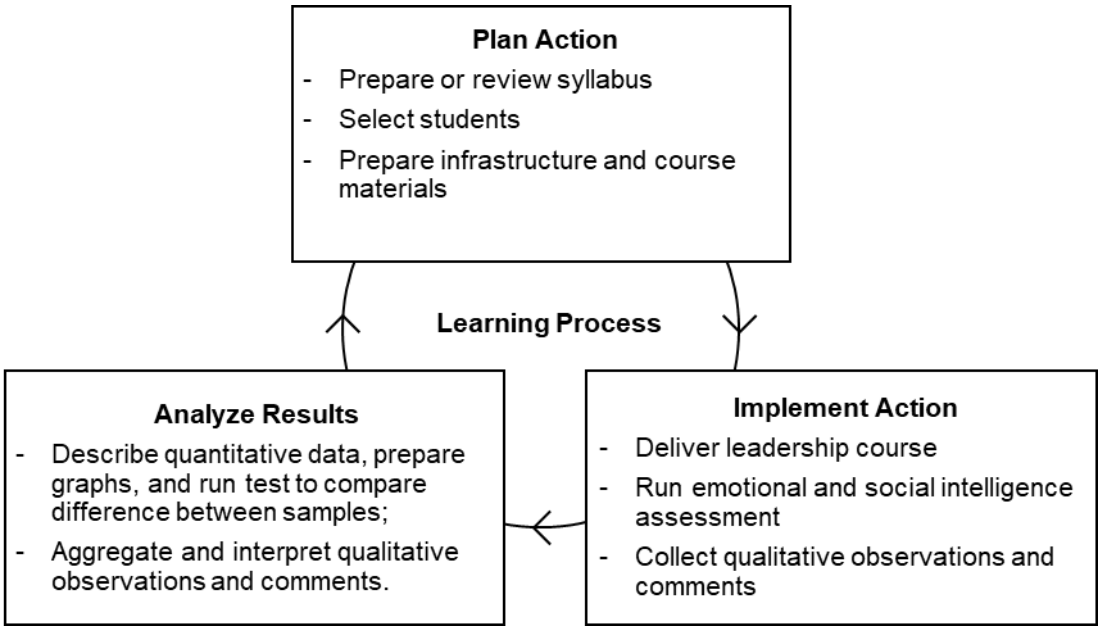
This study draws on action research to link theory and practice related to leadership development. Action research is a family of practices that aim to link theory and practice through a process of participative intervention and inquiry. Reason and Bradbury (2008, p. 4) define action research as

> A participatory process concerned with developing practical knowing in the pursuit of worthwhile human purposes. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities.

Action-research is an iterative process that involves planning an action, implementing the action, and analyzing the results, which then leads to further planning and so on. During these cyclical steps, participants collaborate actively with the researcher to produce the desired outcomes of the intervention and to improve the implementation method. Therefore, the goal of action research is to implement solutions for the immediate problems being addressed as well as help to improve the scientific knowledge and theories (COUGHLAN; COGHLAN, 2002).

Figure 7 shows the iterative process used in this research with specific actions of each step of the process. The first step of each iteration consisted on preparing the leadership development program syllabus, selecting students from extracurricular groups to participate in the course, preparing the infrastructure, which included booking an appropriate classroom and communicating the requirements to students, and preparing course materials including slides and handouts for the in-class exercises. The second step consisted of delivering the leadership development program for the selected students, assessing students emotional and social intelligence competencies before and after the course, and collect observations and comments about the implementation. Finally, the last step of each iteration included describing the quantitative data gathered in the assessment, preparing graphs for analysis, and running tests to compare samples from before and after the course to evaluate the development of the students. The last step also included a qualitative analysis of the observations and comments gathered during the implantation. The study counted with two iterations of the action research and a final proposal of the leadership development program based on the learning of the researcher during the iterations.

Figure 7 – Iterative action research methodology



Source: based on Coughlan and Coghlan (2002)

The following chapter presents the details of the planning, implantation, and analysis of the two iterations of the leadership development program delivered in 2016 and 2017 at EESC-USP. Then a final leadership development program proposal and the conclusion of the research project are presented.

4 RESULTS

The proposed leadership development program includes five classes based on some of the main concepts explored in the literature review including authentic leadership as a state, emotional and social Intelligence, purpose and self-awareness, self-management, and leading positive organization.

By the end of each class, the students prepare an action plan to decide how to apply the recently learned concepts in their real life during the two weeks that preceded the next class. Before coming to each class, the students submit a result report describing the results and insights they had while applying their action plan in their life. This reflexive writing activity was designed to help the students to think about the effect of the experiment on their life. It also provided qualitative data to help the researcher to understand how the participants design their experiments and how they benefit from them. The process of creating action plans and documenting results was facilitated by an online tool called Breakthrough, which can be found on the website www.liftexchange.com.

The following sections will present both iterations of the cycle of the development and test of the leadership development program during 2016 and 2017. All the details about the planning, implementation, and results of each iteration as well as the changes to the program and the methodology for evaluating the program are presented.

4.1 First Iteration: the leadership development course of 2016

4.1.1 Planning and implementation

The first implementation of the leadership development program was conducted through a leadership course that was offered in the second semester of 2016 to 54 engineering students at EESC-USP. The students were all member of a self-organized extracurricular group with a formal organizational structure that is focused on providing management and engineering consulting jobs. This extracurricular group offers the students the opportunity to work on a professional organization and practice management and leadership skills during their undergraduate programs.

At the beginning of each class in 2016, students had to complete a survey developed by this author to evaluate themselves on 24 emotional and social competencies strengths identified in the literature review. This evaluation used a ten-point Likert scale system self-assessment survey. This metric was used as a quantitative measurement of leadership development

throughout five classes in ten weeks of intervention. The test presented several semantic, cultural, and reliability validity issues since it was not validated before the application.

The leadership development course included five biweekly lectures in which the students studied and practiced some of the leadership concepts identified in the literature review. APPENDIX A shows the syllabus of the course of 2016 and the related competencies developed in each class.

The first class started with a discussion about the differences between leadership and management according to Kotter (2001). Then, the concept of The Fundamental State of Leadership (QUINN, 2005), as well as the four-question proposed by Quinn for achieving a more authentic state of leadership, were introduced. Finally, the students had to create their first action plan for applying the Fundamental State of Leadership questions to a specific event or challenge that they would face in between the first and second class of the course, for example, an important meeting, a difficult conversation, a presentation, or a job interview.

The second class started with a discussion of the competencies related to emotional and social intelligence and how these competencies can contribute to superior work performance and better organizational climate (GOLEMAN, 1998; GOLEMAN, 2000). The class also included four practical activities. During the first activity, the students had to establish eye contact with a classmate for a few minutes while they observed their emotions and feelings. The students then shared their insights and observations with the rest of their classmates. The remaining activities were adapted from Goleman, Boyatzis, and Mckee (2001) process for strengthening emotional leadership. On the second activity, the students were invited to write down whom they want to be eight years in the future on a self-visioning exercise. The third activity was a feedback exercise in which the students had to work on small groups to evaluate each other according to the impact of their emotion on people as well as other competencies related to emotional and social intelligence. Students were asked to observe their posture (e.g. not crossing arms) and to practice active listening while receiving feedback. Finally, the students had to create an action plan considering the self-visioning exercise and the feedback from their colleagues. They were asked to decide about one new behavior that they would try to implement between the second and third class of the course to improve their emotional or social intelligence, for example, meditate daily, take a few minutes per day to show appreciation to others, spend some time daily or weekly to reflect if planned your actions are compatible with your long-term goals and values.

The third class started with a discussion about how purpose and self-awareness can help leaders to achieve career happiness, build trustworthy relationships, and act with integrity (CHRISTENSEN, 2010). The first and second exercise of this class were focused on helping students to clarify their general purpose in life and then explore specific goals in different life domains including self, work, home, and community using a framework adapted from the total leadership theory presented by Friedman (2008). Then during the third activity, students had to write down what was holding them back from achieving their different goals and think about the tradeoffs between goals in different domains of life. The fourth activity involved recognizing emotion related to self-liming beliefs and practice letting those beliefs go away. Students were asked to hold an object (e.g., a pen or a rubber) and to pretend that the object was one of their previously identified self-limiting belief. After spending some time observing their emotion related to holding the self-limiting belief, represented by the object in their hands, they were asked to open their hands and let the object fall on the ground and again observe their emotions after letting the object go. The exercise finished with a discussion about their emotions concerning their goals and self-limiting beliefs and about how emotion can influence action. Finally, students had to create an action plan considering individual purpose statement and the goals for each life domain and determine a new ritual that they could implement in between classes for improving satisfaction and performance in more than one life domain (work, home, community, and self) at the same time.

The fourth class started with a discussion about the definition of self-control (BAUMEISTER; VOHS; TIEE, 2007) and ego depletion (BAUMEISTER et al., 1998), a conversation about how the increasing availability of information in our daily lives can contribute to distractions and burn out (HALLOWELL, 2005), and the benefit of energy management for dealing with ego depletion and enhancing self-control (SCHWARTZ; MCCARTHY, 2007; SCHWARTZ, 2010). During the first activity, the students participated in some mental games including the baseball bat and ball cost exercise[11] (KAHNEMAN, 2011) and the invisible gorilla experiment created by Chabris and Simons[12] (apud KAHNEMAN, 2011). These exercises were designed to demonstrate how System 1 and System 2 process of thinking can lead to biased judgment and cognitive errors. The second activity was a self-

[11] The bat and ball cost exercise consist on asking students to an answer the following mathematical question as quick as possible: “A bat and ball cost $1.10. The bat costs one dollar more than the ball. How much does the ball cost?” (KAHNEMAN, 2011, p. 44). Kahnman (2011) argues that many students fail to answer this question correctly when under presure.

[12] CHABRIS, C. F., & SIMONS, D. J. **The invisible gorilla**: and other ways our intuitions deceive us. New York: Harmony, 2010.

assessment of the students' ability to manage physical, emotional, mental, and spiritual energy according to the dimensions proposed by Schwartz and Mccarthy (2007). Finally, the students had to create an action plan considering the results from the energy management survey defining a new ritual or behavior to improve their physical, emotional, mental, or spiritual energy.

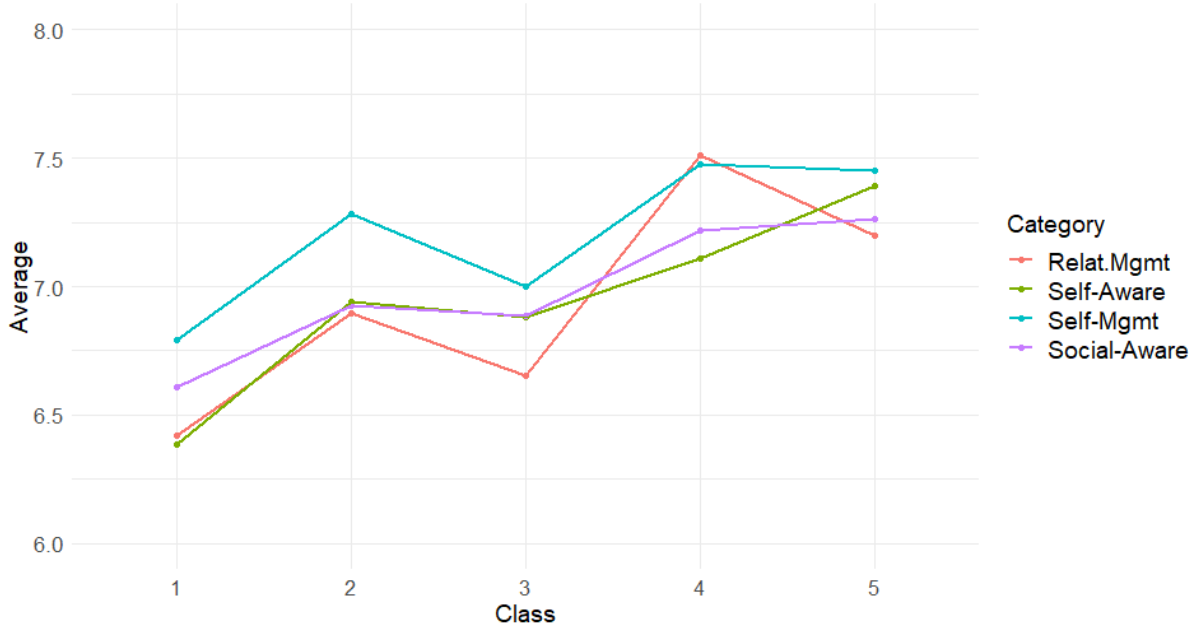
The last class started with a discussion about how past experiences contribute to building their mental maps which in turn shape their decisions in the present and influence the beliefs about the organizational culture. The only activity in this class was a group exercise for generating ideas of positive organizational practices for the students` extracurricular group according to the process suggested by Quinn (2015). The process includes: (a) clarify Vision for Organizational; (b) assess positive and negative characteristics of the organization using the model presented in Figure 4 (Quinn, 2015); (c) read through and rate one hundred example of practices adopted by other companies for creating a sense of purpose, nurturing authentic conversations, seeing possibilities, embracing the common good, and trusting the emergent future (QUINN, 2015, p. 120-132); (d) choose three practices that can be applied to re-invent the organization, in this case, the extracurricular group; and (e) adapt practice and determine how they will be implemented in the organization. This process was facilitated by the Generator tool, which can also be found at www.liftexchange.com.

4.1.2 Results and analysis

The emotional and social intelligence self-assessment survey was completed by 50 students in the first class, 27 students in the second class, 41 students in the third class, 37 students on the fourth class, and 34 students in the last class of the leadership development course of 2016. Also, 31 students completed both the first and last survey. The reduction in the number of students who completed the assessment throughout the course reflects a decrease in the number of students who participated in the classes since students had to conciliate the course with other mandatory classes in their undergraduate program and other personal duties.

The analysis of the data provided by the students' evaluation of their emotional and social intelligence competencies during the five sections program demonstrated that the students perceived an overall improvement on their emotional and social intelligence competencies throughout the program. Figure 8 shows the average of students' assessment of their perceived emotional and social intelligence competencies by class.

Figure 8 – Average of categories of students' assessment of their perceived emotional and social intelligence competencies by class.

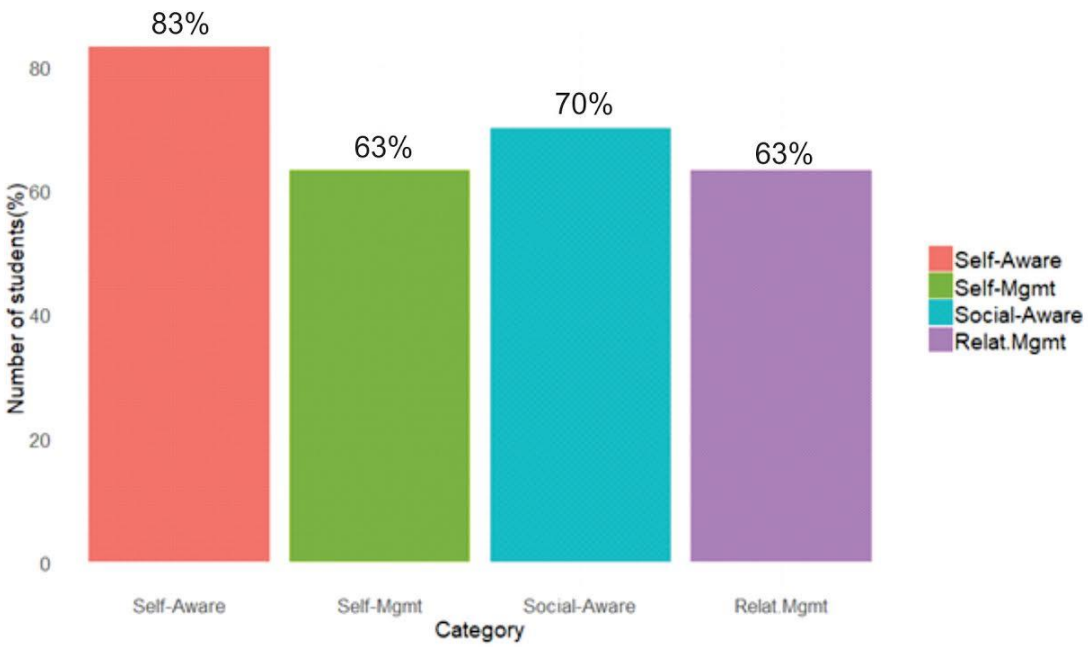


Source: Created by the author

The graph in Figure 8 shows that in average the students reported an improvement in all categories in the second class, then a decline on the third class, another improvement in all categories in the fourth class of the course, and finally a decline on the fourth class for categories related to self-management and relationship management and an improvement on self and social awareness. The overall decline after the second class could be explained by a better understanding of the definition of emotional and social competencies since the definition of those competencies was part of the concepts presented in that class. Also, the observed decline on self-management and relationship management as well as the improvement on self and social awareness after the fourth class could be explained by the student's better understanding of their energy management deficits and how this can influence their ability to exert self-control and manage relationships.

The graph in Figure 9 shows the percentage of students who have reported an improvement in each category of the survey. The results show that 83% of students reported an improvement in self-awareness, 63% reported an improvement in self-management, 70% reported an improvement in social awareness, and 63% reported an improvement in relationship management.

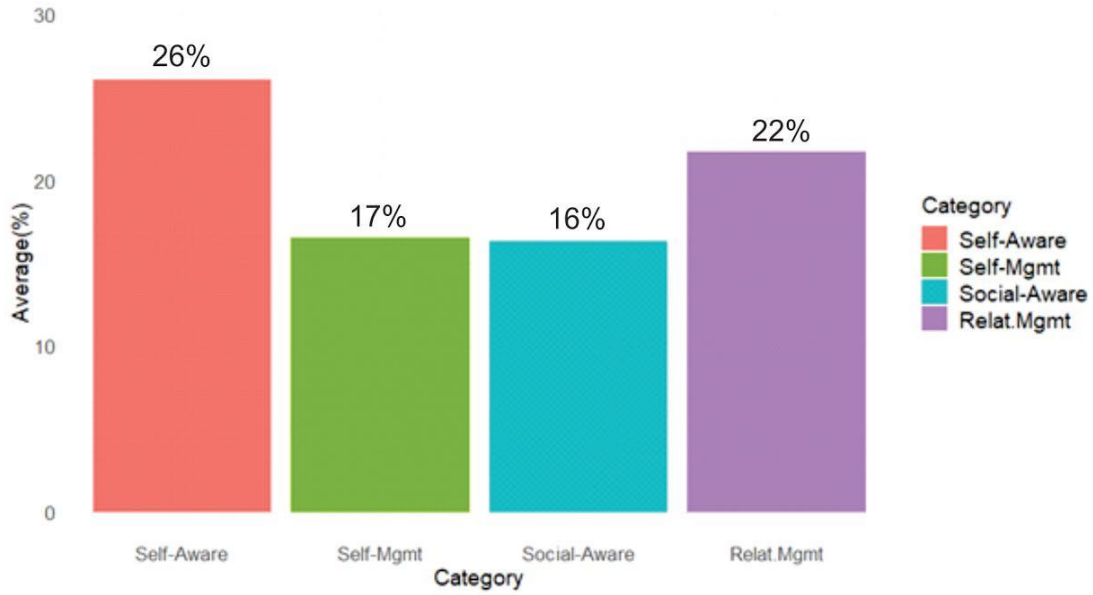
Figure 9 – Percentage of students who have reported improvement by category (2016)



Source: created by the author

The graph in Figure 10 shows the average development of the competencies' strengths reported by the students in each category. The students reported on average an improvement of 26% in self-awareness, 17% in self-management, 16% in social awareness, and 22% in relationship management.

Figure 10 – Average development by category (2016)



Source: created by the author

According to the results presented in Figure 9 and Figure 10, emotional self-awareness was the category with the biggest improvement during the program both regarding the percentage of students that have improved this category and the average development in competencies strengths from the first to the last assessment. This result is not a surprise since most of the activities in the program evolved some aspect of self-awareness directly or indirectly.

Finally, a non-parametric test was conducted to assess if the leadership development program can contribute to an improvement in the student's perceived emotional and social intelligence competencies. Non-parametric tests have gained relevance in the statistics literature since Hotelling and Pabst (1936) published one of the first articles about the use of rank correlation to test the probability of the existence of a relationship between two samples where no assumption is made as to the form of distribution. Since then, non-parametric tests have been used for analyzing one sample, for comparing two or more sample, for paired samples, for bivariate correlations, and many other analyses.

Since the samples of the students perceived emotional and social competencies were collected in two distinct times, at the start and the end of the course, the non-parametric Wilcoxon Signed Ranked Test was used to compare if there is a significant difference between samples (HOLLANDER; WOLFE; CHICKEN, 2014). This test adopts the following assumptions:

a) The samples are paired and come from the same population. That is, only the data from students that completed both surveys were considered;
b) The pairs are independent among them. That is, the data collected from each student is independent of the data collected from the other students;
c) The data is collected using an ordinal scale.

Based on these assumptions, the test considers two hypotheses:

H0 = The averages are the same. That is, there is no significant difference between samples (Null Hypothesis).

H1 = The average on the samples are different. That is, there is a significant difference between samples (Alternative Hypothesis).

The data from the 2016 assessment demonstrated an overall improvement on all categories of social and emotional intelligence competencies, so if the null hypothesis is rejected for any category, that is an indication that there was a significant improvement on that category. For this test, the P value was calculated for each category and then compared with a

pre-established significance level of 0.05 or 0.1 that to determine if the samples are different. In other words, if the P value is lower than the significance level, the null hypothesis can be rejected. Table 3 shows the Wilcoxon Signed Ranked Test of the emotional and social intelligence survey used in 2016 course.

Table 3 – Wilcoxon Signed Ranked Test of 2016 course by category

Category	P value - 2016	Result
Emotional self-awareness	0.00002*	H0 Rejected*
Self-management	0.0029*	H0 Rejected*
Social awareness	0.0004*	H0 Rejected*
Relationship management	0.0033*	H0 Rejected*

*sig<0.05
Source: created by the author

The Table 3 shows that the null hypothesis was rejected in all categories with a P value lower than a significance level of 0.05 which is a strong indication that there was a real improvement in emotional and social intelligence competencies between the start and the end of the course. Emotional self-awareness was the category with the lowest P value, which indicates an even stronger significant relevance that there was an improvement during the course followed by an improvement on social awareness, self-management, and, lastly, relationship management competencies.

In addition to completing the survey in each class, students were asked to provide feedback about the survey structure and content. Comments included:

a) Some competencies were unclear and difficult to understand (lack of definition);
b) There were too many questions (24), which makes the survey tiring and boring to be answered every class;
c) The answers are influenced by temporary situations which may lead the results to oscillate by external variables not related to the program;
d) Evaluating competencies in a 10 point Likert system is difficult. For example, it was hard to assess the difference between attributing a grade 6 or 7 to a competency.

Regardless of the problems identified in the survey, the qualitative analysis of the intervention demonstrated with statistical significance that the students perceived an improvement in all emotional and social intelligence competencies analyzed. This finding is supported by the following qualitative observations of the classes.

The first class consisted of an overview of the theory of leadership and the concept of leadership as a state. Even though the students demonstrated that they understood the concepts

presented in class, some students requested more practical exercises to clarify the ideas that were presented. The only opportunity students had to start practicing the concepts in the first class was the action plan, for which they delivered 30 reports with reflections about how applying the theory helped them to deal with real-life situations.

On the second class, the students demonstrated all sort of feelings during the eye-contact exercise. Reactions included laughs, continuous blinking, and desire to look away. Students understood how a simple eye-contact could influence their emotions and the emotions of others. The students then completed the self-visioning exercise, and some students shared the vision with their classmates. Some of them reported that their current efforts might not be aligned with their future goals. The students then formed small groups according to their departments on the extracurricular group for the feedback exercise. They found the exercise very useful for helping them to reevaluate themselves as leaders and demonstrated to be open to listening to feedback. The fact of receiving feedback from people they directly work with on the extracurricular group was considered essential for this exercise. The students delivered 26 reports with reflections about the action plans they created in this class.

After discussing the concepts presented in the third class, the students took some time to come up with a description of their purpose in life. They recognized that it is not so simple to come up with an individual purpose statement, which might be an indicator of lack of self-awareness. Students stated their goals in different domains of their life and recognized some incompatibilities between goals. For example, one student stated to have the desired to spend more time with his father and the desired to spend more time exercising. In this case, time was identified as a constraint to achieve both objectives. In the next exercise, students successfully stated their self-limiting beliefs, but some of them were unable to identify self-limiting beliefs for all life domains. Also, because students had the exercise sheet in hand, some of them started filling out the part about self-limiting beliefs before carefully considering the trade-offs between life domains. In the example of the students that wanted to spend more time with his father as well as to exercise more, time was identified as a constraint to achieve both objectives. Finally, during the letting go exercise most students reported discomforting feelings such as fear, anger, sadness, and pressure while holding the belief objectified by the object they were holding and subsequently reported feeling joy, empowerment, and other positive emotions after letting it go. Together, the class concluded that sometimes there are self-limiting beliefs that hold people from reaching their goals and, nonetheless, they keep holding those beliefs even though are

associated with bad feelings. Students delivered 30 with reflections about the action plans they created in this class.

On the fourth class, most students considered that the mental games exercises provided a good example of how unconsciously mental factors can influence biased judgment and cognitive mistakes. Then the students proceeded to evaluate their energy management skills. Table 4 shows the general results of this assessment and Table 5 shows the specific results of the survey. Even though the students presented a significant deficit of energy management skills in almost all categories, the discussion in class demonstrated that the students stated that even though they know that they should have better self-management skills, implementing new positive habit is difficult. Students delivered 37 reports in total with reflections about the action plans they created to improve their energy management skills.

Table 4 – General results of energy management survey in 2016

General Results	**# of Students**	**% of students**
0 – 3: Excellent energy management skills	2	5%
4 – 6: Reasonable energy management skills	10	26%
7 – 10: Significant energy management deficits	12	32%
11 – 16: A full-fledged energy management crisis	14	37%

Source: based on Schwartz and McCarthy (2007)

Table 5 – Specific results of energy management survey in 2016 by category

Body Energy	**# of Students**	**% of students**
0: Excellent energy management skills	1	3%
1: Strong energy management skills	9	24%
2: Significant deficits	13	34%
3: Poor energy management skills	8	21%
4: A full-fledged energy crisis	7	18%
Emotional Energy	**# of Students**	**% of students**
0: Excellent energy management skills	5	13%
1: Strong energy management skills	8	21%
2: Significant deficits	9	24%
3: Poor energy management skills	11	29%
4: A full-fledged energy crisis	5	13%
Mental Energy	**# of Students**	**% of students**
0: Excellent energy management skills	2	5%
1: Strong energy management skills	6	16%
2: Significant deficits	10	26%
3: Poor energy management skills	10	26%
4: A full-fledged energy crisis	10	26%
Spiritual Energy	**# of Students**	**% of students**
0: Excellent energy management skills	6	16%
1: Strong energy management skills	8	21%
2: Significant deficits	11	29%
3: Poor energy management skills	11	29%
4: A full-fledged energy crisis	2	5%

Source: based on Schwartz and McCarthy (2007)

On the last class, the students formed groups according to their departments in the extracurricular group to complete the exercise. The extracurricular groups present included: sales department, impact department, management department, financial department, and the presidency. According to the president of the extracurricular group, the organization has gone through a dramatic change recently due to pressure from the institution that regulates the extracurricular nationally. This pressure led the organization to focus more on external projects and other local projects that were important to the community, in special, for the students at the university. Therefore, the analysis of positive and negative characteristics of the group demonstrated that the impact, management, and financial departments prefer characteristics of a clan culture and see the recent focus on market activities as a weakness. The financial department had a slightly more balanced view of how the organization should integrate characteristics of both cultures. On the other hand, the sales department demonstrated to be unaware of the problems faced by the organization and desire to achieve the organizational objective. They see creativity as a strength and cynicism as one of the main weakness of the organization. The presidency stated a need for aligning the organization toward a common goal and vision. The suggested practices included: (a) modify selective process to be longer and more efficient so that candidates can learn in the process; (b) conduct social project in the city like a D-day; (c) redefine the extracurricular group purpose as a way to motivate and engage members, empower individual with creativity, autonomy, and innovative thinking so they are free to decide how to conduct their activities; (d) make decisions as a team with leaders always available to help, allow for more flexible project scopes; and many others.

The data, as well as comments from the students and observations of the intervention process, were used to reevaluate the method and gather insights to advance the leadership development program in the next iteration.

4.2 Second Iteration: the leadership development course of 2017

4.2.1 Planning and implementation

The second implementation of the program was delivered in the second semester of 2017 to 21 engineering students at EESC-USP. Most of the students in the second edition of the course were members of an extracurricular group that represents a local branch of an international non-profit organization focused on promoting social entrepreneurship. A few students from three other extracurricular groups also participated in the course. Two of those groups promote research and extension projects on topics related to leadership, and

organizational culture and the other one was a group that helps to connect students with job opportunities and prepares them for job interviews.

In 2017, the ESCI (BOYATZIS, 2007) was used for measuring the improvement of students emotional and social competencies since this a test that is available online in Portuguese, and it meets the research standards for psychometric tests. Due to the time commitment required to answer the survey, the students just had to complete the assessment twice, once before the first and then after the last class of the course. Because the ESCI is a multi-rater test, the comparison between the perception of improvement on emotional and social competencies by the students and their evaluation by others provided additional insights about the students' improvement on emotional and social intelligence competencies. The assessment was provided by Hay Group, which is the institution that manages the ESCI assessment tool and was completed online by the students and their selected raters at www.surveys.haygroup.com.

The ESCI assess how consistently an individual demonstrates 68 specific behaviors against a five-point scale frequency range (never, rarely, sometimes, often, and consistently). The results are presented for the self-assessment as well as for the assessment by at least two other raters. The "others" score for each competency is the average of each rater perspective considering that raters' surveys are accepted if they respond at least 75% of the survey items.

As part of the agreement with the Hay Group, the researcher, and all the students had to sign a non-disclosure confidentiality agreement to protect the individuals' identities and avoid ethical concerns. The researcher also agreed to not reproduce the ESCI for inclusion in the research publication and do not provide individual feedback to students based on the assessment results. The ATTACHMENT 1 shows the conditional use agreement signed with Hay Group. The ATTACHMENT 2 displays a sample of a research non-disclosure confidentiality agreement for using the assessment tool.

The structure and content of the course were relatively similar to the 2016 edition of the course with just a few exceptions. APPENDIX B shows the syllabus of the course of 2017 and the related competencies developed in each class. The changes in the course planning are presented as follow.

The first class started with an individual introduction of each student. The introduction activity was particularly important for the group because some students from different groups did not know each other and it allowed the student to participate more in the first class. A brief introduction of the fields of conversation (SCHARMER, 2009) was also presented in addition

to the content presented in 2016 to explore competencies related to social awareness and relationships management.

In the second class, the integrated conceptual framework for authentic leader and follower development presented in Figure 6 was introduced to explain how emotional and social intelligence competencies can be developed through formative experiences such as life-learning opportunities and planned trigger. This explanation aimed to reinforce the need for running personal experiments including implementing the action plans and documenting the results achieved when practicing a new behavior or ritual.

The third class of the course had the same content and activities from the previous year.

The fourth class included a discussion about techniques for creating positive habits according to the model presented by Duhigg (2012). This additional content aimed to support students on creating an action plan for implementing and maintaining a new behavior associated with self-management skills with a higher chance of success.

In the last class of 2017, the Generator tool was adapted into a card game which allowed the students to make the same analysis from 2016 but in a more dynamic and fun way. Similarly to the Generator tool, the card game consisted of a process for (a) clarifying a vision for the organization; (b) assessing the positive and negative characteristics of the organization using the model presented in Figure 4; (c) selecting positive practices from a set of cards based on more than one hundred example of practices adopted by other companies; (d) choosing three practices that can be applied to re-invent the organization; and (e) adapting the practice and determining the action steps for implementing the selected practices in organizations. The students worked in small groups with other members or their extracurricular groups to complete this activity.

4.2.2 Results and analysis

The ESCI self-assessment survey was completed by 21 at the start and 11 at the end of the leadership development course of 2017. Also, 18 students were evaluated by others at the start of the course and 12 students were evaluated by others at the end of the course. Ten students had both the self-assessment and the assessment by others completed in both applications of the survey. Two reasons can explain the reduction in the number of assessments completed before and after the class: (a) four students gave up the course because they couldn’t conciliate the course dates with their other duties and (b) the students had to complete the ESCI

assessment at home which evolved inviting other raters and make sure they completed the survey with valid data.

The data collected from the ESCI Survey presented some issues for the consistency of the analysis here presented. First, the sample of data for comparing the results at the begin and the end of the course (10 students) was too small which can lead to higher variances based on individual responses. Second, some students were evaluated by different raters at the start and the end of the course, which can lead to different responses based on the existing relationship between the students and the raters. Third, some students were evaluated by other students that were also participating in the course while others invited external raters.

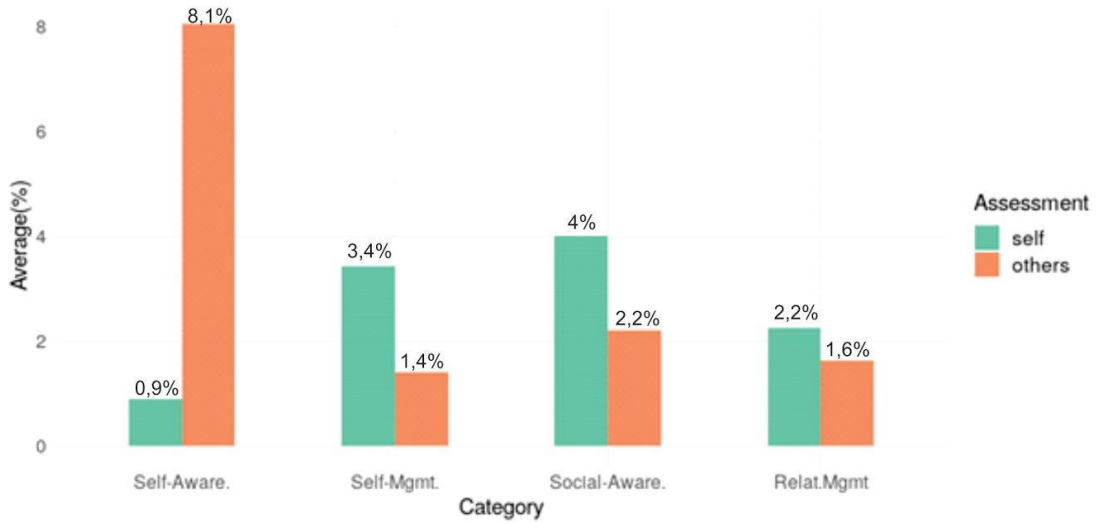
The graph in Figure 11 shows the percentage of students who improved their scores in each category of the survey according to their self-assessment and the assessment by others. The results of the self-assessments show that 50% of students improved their score in self-awareness, 40% of students improved their score in self-management, 70% of students improved their score in social awareness, and 70% of students improved their score in relationship management. The results of the assessments by others show that 50% of students improved their score in self-awareness, 70% of students improved their score in self-management, 70% of students improved their score in social awareness, and 80% of students improved their score in relationship management. The category self-management presented the largest difference between the self-assessment and the assessment by others while the other categories presented similar results. The percentage of students who improved self-awareness and self-management on the self-assessment decreased in comparison with the results from 2016 while the results for the other categories were similar.

Figure 11 – Percentage of students who have reported improvement by category (2017)

Source: created by the author

The graph in Figure 12 shows the average improvement of the scores in each category of the survey according to their self-assessment and the assessment by others. The results of the self-assessments show 0.9% improvement in self-awareness, 3.4 % improvement in self-management, 4% improvement in social awareness and 2.2% improvement in relationship management. The results of the assessments by others show 8.1% improvement in self-awareness, 1.4 % improvement in self-management, 2.2% improvement in social awareness, and 1.6% improvement in relationship management. The category self-awareness presented the largest difference between the self-assessment and the assessment by others while relationship management presented the lowest gap. Self-awareness also presented the main difference between the self-assessment in 2017, when it was the category with the smallest average improvement, compared with the self-assessment in 2016, when it was the category with the largest improvement. Like the self-assessment in 2016, self-management remained the category with the lowest improvement. Finally, it is important to notice that the difference in improvement percentage might be related to the difference in the scale of the assessments used in 2016 and 2017.

Figure 12 – Average improvement by category (2017)



Source: created by the author

Regardless of the issues with the sample data collected in 2017, the non-parametric test Wilcoxon Signed Ranked Test was conducted to assess if the leadership development program can contribute to an improvement on the student's perceived emotional and social intelligence competencies and an improvement on the student's emotional and social intelligence competencies perceived by others. Again, the test was considered two hypotheses:

H0 = The averages are the same. That is, there is no significant difference between samples (Null Hypothesis).

H1 = The average on the samples are different. That is, there is a significant difference between samples (Alternative Hypothesis).

Again in 2017, the data demonstrated an overall improvement in all categories of social and emotional intelligence competencies. Therefore, if the null hypothesis is rejected for any category, that is a significant indicator that there was a significant improvement in that category. A significance level of 5% was adopted. Table 6 shows the Wilcoxon Signed Ranked Test of the students ESCI self-assessment and the students ESCI assessment by others.

Table 6 – Wilcoxon Signed Ranked Test of ESCI (2017) by category

Category	**P Value – 2017 Self-assessment**	**Result Self-assessment**	**P Value – 2017 Others**	**Result Others**
Self-awareness	0.4165	H0 Not Rejected	0.0210*	H0 Rejected*
Self-management	0.0568**	H0 Rejected**	0.2461	H0 Not Rejected
Social awareness	0.0611**	H0 Rejected**	0.1537	H0 Not Rejected
Relationship management	0.3231	H0 Not Rejected	0.3611	H0 Not Rejected

*sig<0.05
**sig<0.1
Source: created by the author

The Table 6 shows that the null hypothesis was rejected only for self-management and social awareness on the self-assessment with a P value lower than a significance level of 0.1 and only for the self-awareness on the assessment by others with a P value lower than a significance level of 0.05. The difference between the results of the self-assessment and the raters assessment can indicate an incompatibility on the perception of the development of emotional and social intelligence competencies by the students and by their raters. In contradiction to the assessment applied in the previous year, self-awareness was the categories with the highest P value on the self-assessment. On the assessment by others, social awareness was the second category with the lowest P Value followed by self-management and relationship management, which presented the highest P value in the assessment by others.

Although the results might be biased by the issues previously presented, they show significant improvement in some categories of emotional and social intelligence competencies. In addition to the ESCI results, the qualitative in-class observations provided information for a better analysis of the iteration.

During the individual presentation in the first class, students shared their goals with the course, which contributed to a reflection about what they thought they needed to improve to become better leaders. It also allowed the students to participate more in the first class and to meet their classmates. The students delivered 14 reports with reflections about the action plans they created in this class.

The observations in the second class were consistent with observations from 2016. Based on the comments from 2016, the students were again asked to form small groups with other members of their extracurricular group for the feedback exercise. The students delivered 12 reports with reflections about the action plans they created in this class.

The observations in the third class were also consistent with observations from 2016. Because the students appeared to be distracted after the content discussion, a 5-minutes guided meditation was proposed by the instructor before the self-visioning exercise even though it was not initially planned. The mediation helped the students to calm down and focus on themselves during the remaining activities proposed in class. The students delivered five reports with reflections about the action plans they created in this class.

On the fourth class, most students again agreed that mental games exercises provide a good demonstration of how unconsciously mental factors can influence biased judgment and cognitive mistakes. Table 7 shows the general results and Table 8 shows the specific results of the energy management survey. Only 40% of the students presented an energy management deficit in 2016 compared to 69% in 2017. In special, in 2017 a much higher percentage of students reported having excellent or reasonable energy management skills related to mental energy (50% compared to 21% in 2016) and spiritual energy (60% compared with 37% in 2016). This result might be explained by the difference in the extracurricular groups' profiles since the groups that participated in the 2017 edition of the course have a strong sense of purpose related to making a positive difference to others and the world and a less formal organizational structure. Students delivered seven reports in total with reflections about the action plans they created to improve their energy management skills and how they plan to turn the action into a habit.

Table 7 – General results of energy management survey in 2017

General Results	# of Students	% of students
0 – 3: Excellent energy management skills	0	0%
4 – 6: Reasonable energy management skills	6	60%
7 – 10: Significant energy management deficits	3	30%
11 – 16: A full-fledged energy management crisis	1	10%

Source: based on Schwartz and McCarthy (2007)

Table 8 – Specific results of energy management survey in 2017 by category

Body Energy	# of Students	% of students
0: Excellent energy management skills	1	10%
1: Strong energy management skills	2	20%
2: Significant deficits	3	30%
3: Poor energy management skills	1	10%
4: A full-fledged energy crisis	3	30%
Emotional Energy	**# of Students**	**% of students**
0: Excellent energy management skills	0	0%
1: Strong energy management skills	3	30%
2: Significant deficits	3	30%
3: Poor energy management skills	2	20%
4: A full-fledged energy crisis	2	20%
Mental Energy	**# of Students**	**% of students**
0: Excellent energy management skills	1	10%
1: Strong energy management skills	4	40%
2: Significant deficits	2	20%
3: Poor energy management skills	1	10%
4: A full-fledged energy crisis	2	20%
Spiritual Energy	**# of Students**	**% of students**
0: Excellent energy management skills	3	30%
1: Strong energy management skills	3	30%
2: Significant deficits	2	20%
3: Poor energy management skills	1	10%
4: A full-fledged energy crisis	1	10%

Source: based on Schwartz and McCarthy (2007)

In the last class, the students formed three groups where two groups were made of members of the extracurricular group with the most students in the class, and the other was a mix of the students from the other extracurricular group. The extracurricular group represented by most of the students in the third group was selected as the object of analysis in the exercise

even though some of the students were not members. The first and second group analysis of positive and negative characteristics of the extracurricular group demonstrated strengths and weakness related to characteristics of a clan and adhocracy cultures. The first group selected permissiveness and indecisiveness as the weaknesses that should be improved so the organization could be more objective in getting results and grow. The practice suggested by this group consisted of two immersion days one with all members of the extracurricular group and one with members of the community to discuss the organization mission, values, and specific goals and create a shared organizational purpose statement. The second group selected confusion as the weakness that should be improved so the organization could reduce time wasted, enhance clarity about individuals` responsibilities, finish more projects, and improve decision making. The practice suggested by this group consisted of creating some criteria for selecting new projects and implementing a gamified process with a system of points and rewards for controlling members` deliverables. The third group analysis of positive and negative characteristics of the extracurricular group demonstrated strengths and weakness related to adhocracy culture, which can be explained by the fact that the group had just recently been created and still did not have formal processes in place. This group selected chaos and confusion as the weaknesses that should be improved so the organization could make decisions faster and act to implement creative ideas. The practice suggested by this group consisted of an online shared document to capture ideas and a monthly meeting to discuss these ideas and plan how they can be implemented.

Lastly, the emotional and social intelligence competencies data, the in-class observations, and the comments of the students were considered for the final proposal of the leadership development. The interventions also provided insights and considerations for the use of assessments of emotional and social intelligence competencies for evaluating leadership development.

5 LEADERSHIP DEVELOPMENT PROGRAM PROPOSAL

The leadership development program was designed to help engineering students to understand and practice concepts related to leadership and self-management, practice exercises for understanding and developing self-awareness, self-management, empathy, motivation, and other competencies considered crucial for leaders, and learn how to act to generate a positive impact on organizations and in the world. The suggested syllabus for future iterations of the leadership development program as well as the details of each class is presented as follows.

General Specifications

The leadership development program is delivered through five biweekly classes which require 30 hours of dedication including 10 hours in-class and 20 hours of homework exercises.

Specific Goals

The proposed leadership development aims to help students to:

a) learn how they can run experiments for trying new behaviors;
b) understand the influence of emotional and social intelligence competencies on leadership performance;
c) gain clarity about their goals, values, and beliefs;
d) learn how to control impulses and manage their energy to avoid biased judgment and enhance self-control;
e) build positive practices for the organizational environment where they are engaged.

Infrastructure

The program requires a classroom with share tables where students can gather together during the group and pairs exercises. Also, students should have access to a computer or mobile device with access to the internet for the completion of the emotional and social intelligence competencies assessment and submission of action plans and reports.

Pre-requisites

The participants of the course should be, preferentially, students that work on the same teams or projects, for example, members of extracurricular, participants in research groups, or other students that share the same organizational challenges and goals as a group.

Course Content

1st Class – The Fundamental State of Leadership

Before class:

a) Mandatory reading: Kotter (2001) and Quinn (2005);
b) Supplementary reading: Scharmer (2009);
c) Complete emotional and social intelligence competencies assessment (ESCI) online.

In-class:

a) Concepts discussion (group):

- Difference between leadership and management (KOTTER, 2001);
- The Fundamental State of Leadership (QUINN, 2005; QUINN; QUINN, 2009);
- Fields of conversation (SCHARMER, 2009).

Related competencies: emotional self-awareness, achievement orientation, adaptability, emotional self-control, empathy, and influence.

b) Register on the website www.liftexchange.com (Individual)
c) Breakthrough action plan (individual): create first action plan considering the concepts presented in class. Apply the Fundamental State of Leadership questions to a specific event or challenge faced in the next weeks, for example, an important meeting or conversation, a presentation, or a job interview.

Related competencies: emotional self-awareness, achievement orientation, adaptability, emotional self-control, empathy, and influence.

After class: submit an action plan report.

2nd Class – Emotional and social intelligence

Before class:

a) Mandatory reading: Goleman, Boyatzis, and McKee (2001);
b) Supplementary reading: Goleman (1998) and Goleman (2000).

In-class:

a) Concepts discussion (group):

- Understanding competencies related to emotional and social intelligence (GOLEMAN, 1998; BOYATZIS, 2009);
- Development of emotional and social intelligence (GOLEMAN; BOYATZIS; MCKEE, 2001);

- Effect of Emotional and Social Intelligence on the Organizational climate and work relationships (GOLEMAN, 2000).

Related competencies: emotional self-awareness, empathy, and organizational awareness.

b) Eye-contact exercise (pairs): during a few minutes establish eye contact and observe emotions and feeling. Share experience with classmates;

Related competencies: emotional self-awareness and empathy.

c) Self-visioning exercise (individual): write down whom you want to be in 8 years from now. Trigger questions include: What are you going to be doing? Where are you going to be living? How are you going to be feeling?;

Related competencies: emotional self-awareness and achievement orientation.

d) Feedback exercise (Group): work in small groups and provide feedback to each other as a method for enhancing self-awareness. Trigger questions include: How do you evaluate my humor? How do you evaluate my performance in the extracurricular group? How do you assess the impact of my performance and humor on other people? What aspects of emotional and social intelligence should I try to improve? The students should observe their posture while receiving feedback (e.g., do not cross arms);

Related competencies: emotional self-awareness, achievement orientation, emotional self-control, coach and mentor, and empathy.

e) Breakthrough action plan (Individual): create action plan considering the vision for whom you want to be and the comments received about who you are now. Decide about one new behavior that you can try to implement to improve your emotional or social intelligence, for example, meditate daily, take a few minutes per day to show appreciation to others, spend some time daily or weekly to reflect if planned your actions are compatible with your long-term goals and values.

Related competencies: emotional self-awareness, achievement orientation, emotional self-control, coach and mentor, and empathy.

After class: submit an action plan report.

3rd Class – Purpose and self-awareness

Before class:

a) Mandatory reading: Christensen (2010);
b) Supplementary reading: Friedman (2008).

In-class:

a) Concepts discussion (Group):

- Importance of purpose and self-awareness to achieving career happiness, build trustworthy relationships and act with integrity (CHRISTENSEN, 2010). Trigger questions include: How can I be happy in my career? How can I be sure that my relationship with my Family is an enduring source of happiness? How can I live my life with integrity? / How can I stay out of jail?

Related competencies: emotional self-awareness, achievement orientation, emotional self-control.

b) Guided Meditation: conduct a short guided meditation. Students should close their eyes and focus on their breathing;

Related competencies: emotional self-awareness and emotional self-control.

c) Purpose statement exercise (Individual): write down purpose statement considering questions like what do you like to do? What drives you in life? What do you do when nobody is watching? What is your dream?;

Related competencies: emotional self-awareness and positive outlook.

d) Goals setting exercise (Individual): write down goals for all life domains including work, home, community, and self. Reflect if there is tension between goals in different domains of life (FRIEDMAN, 2008);

Related competencies: emotional self-awareness and positive outlook.

e) Self-limiting beliefs identification exercise (Individual): write down what is holding you from reaching your goals in each domain of life;

Related competencies: emotional self-awareness.

f) Letting go exercise (Individual): recognize emotion related to self-liming beliefs and practice letting those beliefs go away. Hold an object (e.g., a pen or a rubber) and pretend the object is one of the identified self-limiting belief. Observe emotion related to holding the object and then let the object fall to the ground. Again, observe

emotions after letting the object go. Discuss the analogy between the object and self-limiting beliefs with classmates;

Related competencies: emotional self-awareness.

g) Breakthrough Action Plan (Individual): create action plan considering individual purpose statement and the goals for each life domain. Try a new ritual capable of improving satisfaction and performance in more than one life domain (work, home, community, and self) at the same time. Also, the desired results should be seen as positive by the people involved.

Related competencies: emotional self-awareness and positive outlook.

After class: submit an action plan report.

4th Class – Self-control and managing yourself

Before class:

a) Mandatory reading: Hallowell (2007) and Schwartz and McCarthy (2007)

b) Supplementary reading: Kahneman (2011) and Duhigg (2012)

In-class:

a) Concepts Discussion (Group):

- The definition of self-control (BAUMEISTER; VOHS; TIEE, 2007). Discuss the reasons why we make decisions and take actions that are not aligned with our long-term goals and values;
- Definition of ego depletion (BAUMEISTER; et al., 1998);
- Effect of increasing availability of information in our day on distractions and burn out (HALLOWELL, 2005);
- The impact of energy management on self-control (SCHWARTZ; MCCARTHY, 2007);
- The relationship between ego depleting and biased judgment and how it can be avoided (KAHNEMAN, 2011);
- The habit loop and techniques for creating positive habits (DUHIGG, 2012).

Related competencies: emotional self-control, adaptability.

b) Mental Games Exercises (the bat and ball cost exercise and the invisible gorilla experiment);

Related competencies: emotional self-awareness and emotional self-control

c) Energy management assessment - Are you headed for an energy crisis?: assess energy management skills and determine what areas need improvement among physical, emotional, mental, and spiritual energy (SCHWARTZ; MCCARTHY, 2007);

Related competencies: emotional self-awareness, emotional self-control, and inspirational leadership.

d) Breakthrough Action Plan (Individual): Create action plan considering the experiments' examples from the article "Be a Better Leader, Have a Richer Life" (SCHWARTZ; MCCARTHY, 2007) and the results from the energy management questionnaire.

Related competencies: emotional self-control, inspirational leadership, and adaptability.
After class: submit an action plan report.

5th Class – Building Positive Organizations

Before class:

a) Supplementary reading: Quinn (2015).

In-class:

a) Concepts Discussion (Group):

- Mental models and how they can influence the beliefs about the organizational culture (CAMERON; QUINN, 2011; QUINN, 2015).

Related competencies: Organizational awareness and conflict management

b) Positive Organization Generator Exercise (Group): Complete steps by step process for generating positive organizational practices for the extracurricular group. The process includes: (a) Clarify Vision for Organizational; (b) Assess the positive and negative characteristics of the organization from Figure 5 (QUINN, 2015); (c) Read through and rate one hundred example of practices adopted by other companies for creating a sense of purpose; nurturing authentic conversations; seeing possibilities; embracing the common good, and trusting the emergent future (QUINN, 2015, p. 120-132); (d) Choose three practices that can be applied to re-invent the

organization, in this case, the extracurricular group; and (e) Adapt practice and determine how they will be implemented in the organization. A card game or other gamification methods can be used to make this exercise more fun and collaborative. Deliver an action plan for implementing the positive practice in the organization.

Related competencies: organizational awareness, conflict management, influence, inspirational leadership, and teamwork.

After class: complete emotional and social intelligence competencies assessment (ESCI) online to assess students' development during the course.

Evaluation method:

Participation is the main criteria for evaluating the students in the course. The final grade of the students is the average of the percentage of exercises delivered in each class. The completion of the ESCI assessment can also be included in the calculation of students' grades to increase students' participation in the evaluation of the course and their individual development. To successfully pass the course, students should have at least 85% of attendance and score at least 7 out of 10 points on the course grade. The minimum requirements to pass the course may vary depending on the institution where the course is conducted.

The content of the suggested leadership development course is strongly grounded in developing emotional and social self-awareness due to many self-reflection activities included in all classes except the last one. The course also allows the opportunity for practicing new behaviors, especially through the breakthrough action plans and reports. These new behaviors if made into habits have the potential to provide an improvement on self-management competencies in the long term. The last class of the course allowed the students to practice competencies related to social awareness and relationship management. Though, in a longer program, more activities to develop relationship management competencies would be desired. Some elements of social skill training such as the ones used at the PRODIP (Interpersonal Professional Development Program) introduced by Lopes et al. (2015) could be applied for the better development of relationship management competencies through interactive interpersonal activities.

The ESCI assessment can be used for evaluating specific behavioral changes related observed students emotional and social competencies before and after the course. The assessment by others provides a better indication of competencies development since it takes

into consideration behaviors that are observed in practice instead of self-perception. It is important to emphasize that in order to better evaluate the program based on the ESCI assessment, it is important that a bigger sample size of the students complete the assessment at the beginning and the end of the course. Also, the evaluation of the students by raters could include more than two raters for better consistency, and the same raters should be invited for both applications of the assessment. Finally, a control group with members of the same extracurricular groups do not participate in the course could provide additional insights into the analysis for the identification of changes occasionated by external factors.

6 CONCLUSION AND DISCUSSION

The development and test of the leadership program through action research allowed the researcher to learn from practice and to evolve the syllabus of the course and the method for evaluating the program. It also offered a unique opportunity to contribute to students' leadership development and potentially prepare them to assume leadership positions in their future jobs. Lastly, the learning from the action research contributed to the growth of the author as a researcher and for a better understanding of how similar researches can be conducted in the future.

The leadership development program for engineering students presents one solution for improving engineering students' leadership abilities regarding emotional and social competencies. Therefore, this study achieved its main objective which was developing an experiential leadership development program for engineering undergraduate. Programs such as the one suggested in this study have the potential to develop competencies associated with emotional and social intelligence that are considered essential for the success of technical professionals in leadership positions in addition to the cognitive intelligence competencies that are widely developed in engineering curriculums.

Although the survey for the evaluation of emotional and social intelligence competencies led to results with statistical significance in 2016, many valid arguments were presented for the improvement of the analysis. The results of the 2017 ESCI survey did not provide data to validated to support the observation from 2016 that the program leads to an improvement in all emotional and social intelligence competencies categories even though the results might have been compromised by the issues previously presented. For example, a control group can be used in future research to reduce the influence of external factors in the students' evaluation of emotional and social competencies.

Additionally, the improvement of the competencies throughout the program does not mean that the students had a real improvement on their emotional and social intelligence competencies. It only shows that they had a perception of improvement by themselves and by others. This effect can be minimized by evaluating the frequency of observed behaviors, which is the case of the ESCI assessment, instead of competencies strengths, which is the case of the assessment created by the author for the 2016 edition of the course.

The improvement of students emotional and social intelligence competencies during the period of the program, regardless of the evaluation method, does not mean that the students will

be able to sustain results in the long term. To evaluate sustainable leadership competencies during the period of the program, regardless of the evaluation method, does not mean that the performance resulted from the positive leadership development program, a posterior evaluation of the students' competencies is necessary. One possible solution for future research is applying the assessment three months after the end of the program along with follow-up qualitative interviews. The improvement of the evaluation method will allow for a better understanding of the impact of the program on leaders and their organizations.

Moreover, the improvement in emotional and social intelligence competencies are important but do not necessarily mean an improvement in leadership performance. Emotional and social intelligence is a mean for better leadership, but not an end. Subsequently, the evaluation of other organizational and individual performance indicators, such as the impact on organizational climate, would be valid to further assess the results of the leadership program on the leaders and their organizations.

Learning how to perform the experiential approach for leadership development is more important than the results of individual actions. People should learn how to develop the capacity of continuously learning how to become better leaders. In future programs, it would be valid to stress the need for continuously testing new behaviors and learn from experiences even after the program ends.

The method for implementing positive practice in the extracurricular groups also need improvements. It would be important to access if the positive practices suggested in the last lecture of the leadership program are implemented in the extracurricular group. That is important because it is the actual implementation of the suggested practices that can lead to change in the organization. Therefore, more time to discuss the practices and to evaluate the execution would be necessary.

Further iterations of the leadership program should consider the learning presented in this study. Although the program might evolve as a result of future learning, it is expected that the proposed leadership program development can significantly contribute to improving the students potential to become better leaders, face challenges in their future jobs, and become a positive influence in every aspect of their lives. It can also potentially help students to deal with anxiety resulted from having to conciliate a heavily loaded technical engineering curriculum with other personal duties and goals. Finally, engineering students that are trained in leadership will be better suited to achieve superior work performance, to develop a better quality of life, and to cope with the rapidly changing environments of today's society. It is expected that the

proposed leadership development will contribute to the individual growth of engineering students and to prepare them to make a positive difference in the world as future leaders.

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APPENDIX A – Syllabus of leadership development program (2016)

São Carlos School of Engineering – University of São Paulo

Course: Leadership Development (2016 edition)

Credit Hours: 30 hours* (10h in-class and 20h of homework)

* divided into five biweekly classes

GENERAL GOALS

a) Understand and practice concepts related to leadership and managing yourself;
b) Practice exercises for understanding and developing self-awareness, self-management, empathy, motivation, and other competencies considered crucial for leaders;
c) Learn how to act to generate a positive impact on organizations and in the world.

INFRASTRUCTURE

a) Classroom with share tables and projector for slides.
b) Students should have access to a computer with internet access (at home or the University).

COURSE CONTENT

1st Class – The fundamental state of leadership

a) Concepts discussion (group);
   - Difference between leadership and management;
   - The Fundamental State of Leadership.

Related competencies: emotional self-awareness, achievement orientation, adaptability, emotional self-control, empathy, and influence.

b) Register on the website www.liftexchange.com (individual);

c) Breakthrough Action Plan (individual).

Related competencies: emotional self-awareness, achievement orientation, adaptability, emotional self-control, empathy, and influence.

References:

KOTTER, J. P. What Leaders Really Do. **Harvard Business Review**, December 2001. 3-12.

QUINN, R. E. Moments of Greatness. **Harvard Business Review**, July-August 2005. 75-83.

QUINN, R. W.; QUINN, R. E. Lift: Becoming a Positive Force in Any Situation. 1st. ed. San Francisco: Berret-Koehler Publishers, Inc., 2009.

2nd Class – Emotional and social intelligence

a) Concepts discussion (group);
   - Competencies related to Emotional and Social Intelligence
   - Effect of Emotional and Social Intelligence on the Organizational climate and on work relationships

Related competencies: emotional self-awareness, empathy, and organizational awareness.

b) Eye-contact Exercise (pairs);

Related competencies: emotional self-awareness and empathy.

c) Self-visioning exercise (individual);

Related competencies: emotional self-awareness and achievement orientation.

d) Feedback exercise (group);

Related competencies: emotional self-awareness, achievement orientation, emotional self-control, coach and mentor, and empathy.

e) Breakthrough Action Plan (individual).

Related competencies: emotional self-awareness, achievement orientation, emotional self-control, coach and mentor, and empathy.

References:

GOLEMAN, D. What Makes a Leader?. **Harvard Business Review**, November-December 1998. 93-102.

GOLEMAN, D. Leadership that gets results. **Harvard Business Review**, March-April 2000. 78-90.

GOLEMAN, D.; BOYATZIS, R. E.; MCKEE, A. Primal Leadership: The Hidden Driver of Great Performance. **Harvard Business Review**, December 2001. 43-51.

3rd Class – Purpose and self-awareness

a) Concepts Discussion (group);
   - Importance of purpose and self-awareness to achieving career happiness, build trustworthy relationships and act with integrity.

Related competencies: emotional self-awareness, achievement orientation, emotional self-control.

b) Purpose Statement Exercise (individual);

Related competencies: emotional self-awareness and positive outlook.

c) Goals setting exercise (individual);

Related competencies: emotional self-awareness and positive outlook.

d) Self-limiting beliefs identification exercise (individual);

Related competencies: emotional self-awareness.

e) Letting go exercise (individual);

Related competencies: emotional self-awareness.

f) Breakthrough Action Plan (individual).

Related competencies: emotional self-awareness and positive outlook

References:

CHRISTENSEN, C. M. How Will You Measure Your Life? **Harvard Business Review**, July-August 2010. 46-51.

FRIEDMAN, S. D. Be a Better Leader, Have a Richer Life. **Harvard Business Review**, April 2008.

4th Class – Self-control and managing yourself

a) Concepts Discussion (group)
- Definition of self-control
- Definition of ego depletion
- Effect of increasing availability of information in our day on distractions and burn out
- The impact of energy management on self-control.
- The relationship between ego depleting and biased judgment and how it can be avoided.

Related competencies: emotional self-control.

b) Mental Games Exercises (the bat and ball cost exercise and the invisible gorilla experiment)

Related competencies: emotional self-awareness and emotional self-control.

c) Energy management assessment (Are you headed for an energy crisis?)

Related competencies: emotional self-awareness, emotional self-control, and inspirational leadership.

d) Breakthrough Action Plan (Individual)

Related competencies: emotional self-control, inspirational leadership, and adaptability.

References:

BAUMEISTER, R. F. et al. Ego Depletion: Is the Active Self a Limited Resource. **Journal of Personality and Social Psychology**, v. 74, n. 5, p. 1252-1265, 1998.

BAUMEISTER, R. F.; VOHS, K. D.; TIEE, D. M. The Strength Model of Self-Control. **Current Directions in Psychological Science**, v. 16, n. 6, p. 351-355, 2007.

HALLOWELL, E. Overloaded Circuits: Why Smart People Underperform, January 2005. 55 – 56.

KAHNEMAN, D. **Thinking Fast and Slow**. 1st. ed. New York: Farrar, Straus and Giroux, 2011.

SCHWARTZ, T. The Productivity Paradox: How Sony Pictures Gets More Out of People by Demanding Less. **Harvard Business Review**, 88, n. 6, June 2010. 64-69.

5th Class – Positive Organizations

a) Concepts Discussion (Group)
- Mental models and how they can influence the beliefs about the organizational culture.

Related competencies: organizational awareness and conflict management.

b) Positive Organization Generator Exercise (Group)

Related competencies: organizational awareness, conflict management, influence, inspirational leadership, and teamwork.

References:

CAMERON, K. S.; QUINN, R. E. **Diagnosing and Changing Organization Culture:** Based on the Competing Values Framework. Third Edition. ed. San Francisco: Jossey-Bass, 2011.

QUINN, R. E. **The Positive Organization:** Breaking Free from Conventional Cultures, Constraints, and Beliefs. Oakland: Berrett-Koehler Publishers, Inc., 2015

EVALUATION METHOD

Participation is the main criteria for evaluating the students in the course. The final grade of the students is the average of the percentage of exercises delivered in each class. To successfully pass the course, students should have at least 85% of attendance and score at least 7 out of 10 on the course grade.

APPENDIX B – Syllabus of leadership development program (2017)

São Carlos School of Engineering – University of São Paulo

Course: Leadership Development (2016 edition)

Credit Hours: 30 hours* (10h in-class and 20h of homework)

* divided into five biweekly classes

GENERAL GOALS

a) Understand and practice concepts related to leadership and managing yourself;
b) Practice exercises for understanding and developing self-awareness, self-management, empathy, motivation, and other competencies considered crucial for leaders;
c) Learn how to act to generate a positive impact on organizations and in the world.

INFRASTRUCTURE

a) Classroom with share tables and projector for slides.
b) Students should have access to a computer with internet access (at home or at the University).

COURSE CONTENT

1st Class – The fundamental state of leadership

a) Concepts discussion (group);
   - Difference between leadership and management;
   - The Fundamental State of Leadership;
   - Fields of conversation[13].

Related competencies: emotional self-awareness, achievement orientation, adaptability, emotional self-control, empathy, and influence.

b) Register on the website www.liftexchange.com (individual);

[13] Concept added in the 2017 edition of the leadership development program

c) Breakthrough Action Plan (individual).

Related competencies: Emotional self-awareness, achievement orientation, adaptability, emotional self-control, empathy, and influence.

References:

KOTTER, J. P. What Leaders Really Do. **Harvard Business Review**, December 2001. 3-12.

QUINN, R. E. Moments of Greatness. **Harvard Business Review**, July-August 2005. 75-83.

QUINN, R. W.; QUINN, R. E. Lift: Becoming a Positive Force in Any Situation. 1st. ed. San Francisco: Berret-Koehler Publishers, Inc., 2009.

SCHARMER, C. O. Theory U: Leading form the future as it emerges. 1st. ed. San Francisco: Berrett-Hoehler Publisher, Inc., 2009. ISBN 978-1-57675-763-5.

2nd Class – Emotional and social intelligence

a) Concepts discussion (group);
   - Competencies related to Emotional and Social Intelligence;
   - Development of emotional and social intelligence competencies[14];
   - Effect of Emotional and Social Intelligence on the Organizational climate and work relationships.

Related competencies: emotional self-awareness, empathy, and organizational awareness.

b) Eye-contact Exercise (pairs);

Related competencies: emotional self-awareness and empathy.

c) Self-visioning exercise (individual);

Related competencies: emotional self-awareness and achievement orientation.

d) Feedback exercise (group);

Related competencies: emotional self-awareness, achievement orientation, emotional self-control, coach and mentor, and empathy.

e) Breakthrough Action Plan (individual);

Related competencies: emotional self-awareness, achievement orientation, emotional self-control, coach and mentor, and empathy.

[14] Concept added in the 2017 edition of the leadership development program

References:

GOLEMAN, D. What Makes a Leader?. **Harvard Business Review**, November-December 1998. 93-102.

GOLEMAN, D. Leadership that gets results. **Harvard Business Review**, March-April 2000. 78-90.

GOLEMAN, D.; BOYATZIS, R. E.; MCKEE, A. Primal Leadership: The Hidden Driver of Great Performance. **Harvard Business Review**, December 2001. 43-51.

3rd Class – Purpose and self-awareness

a) Concepts Discussion (group);
   - Importance of purpose and self-awareness to achieving career happiness, build trustworthy relationships and act with integrity.

Related competencies: emotional self-awareness, achievement orientation, and emotional self-control.

b) Purpose Statement Exercise (individual);

Related competencies: emotional self-awareness and positive outlook.

c) Goals setting exercise (individual);

Related competencies: emotional self-awareness and positive outlook.

d) Self-limiting beliefs identification exercise (individual);

Related competencies: emotional self-awareness.

e) Letting go exercise (individual);

Related competencies: emotional self-awareness.

f) Breakthrough Action Plan (individual).

Related competencies: emotional self-awareness and positive outlook.

References:

CHRISTENSEN, C. M. How Will You Measure Your Life? **Harvard Business Review**, July-August 2010. 46-51.

FRIEDMAN, S. D. Be a Better Leader, Have a Richer Life. **Harvard Business Review**, April 2008.

4th Class – Self-control and managing yourself

a) Concepts Discussion (group);
   - Definition of self-control;
   - Definition of ego depletion;
   - Effect of increasing availability of information in our day on distractions and burn out;
   - The impact of energy management on self-control;
   - The relationship between ego depleting and biased judgment and how it can be avoided;
   - The habit loop.

Related competencies: Emotional self-control.

b) Mental Games Exercises (the bat and ball cost exercise and the invisible gorilla experiment);

Related competencies: emotional self-awareness, emotional self-control, and adaptability.

c) Energy management assessment (Are you headed for an energy crisis?);

Related competencies: emotional self-awareness, emotional self-control, and inspirational leadership.

d) Breakthrough Action Plan (Individual).[15]

Related competencies: emotional self-control, inspirational leadership, and adaptability.

References:

BAUMEISTER, R. F. et al. Ego Depletion: Is the Active Self a Limited Resource. **Journal of Personality and Social Psychology**, v. 74, n. 5, p. 1252-1265, 1998.

BAUMEISTER, R. F.; VOHS, K. D.; TIEE, D. M. The Strength Model of Self-Control. **Current Directions in Psychological Science**, v. 16, n. 6, p. 351-355, 2007.

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[15] The additional content presented in this class was taken into consideration for the creation of the action plan.

5th Class – Positive Organizations

a) Concepts Discussion (Group);

- Mental models and how they can influence the beliefs about the organizational culture.

Related competencies: organizational awareness and conflict management.

b) Positive Organization Generator Exercise (Group)[16].

Related competencies: organizational awareness, conflict management, influence, inspirational leadership, and teamwork.

References:

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EVALUATION METHOD

Participation is the main criteria for evaluating the students in the course. The final grade of the students is the average of the percentage of exercises delivered in each class. To successfully pass the course, Students should have at least 85% of attendance and score at least 7 out of 10 on the course grade.

[16] The positive organization generator exercise was adapted into a card game for the 2017 edition of the course

ATTACHMENT 1 – ESCI conditional use agreement

HayGroup®

ESCI Conditional Use Agreement

For good and valuable consideration, the receipt and legal sufficiency of which are hereby acknowledged, I hereby agree that the permission granted to me by Hay Group, Inc., to receive and utilize, without charge, the Emotional and Social Competency Inventory (ESCI) is subject to the following conditions, all of which I hereby accept and acknowledge:

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5. I will not provide individual feedback to participants.
6. HAY GROUP WILL NOT BE DEEMED TO HAVE MADE ANY REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, IN CONNECTION WITH THE ESCI, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
7. My rights under this Agreement are non-transferable and non-exclusive and will be limited to a period of two (2) years from the date of this Agreement.
8. Hay Group may immediately terminate this Agreement by giving written notice to me in the event that I breach any of its terms or conditions.
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10. This Agreement may not be assigned by me without the prior written consent of Hay Group. Any attempted assignment shall be void.

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11. Failure by Hay Group to enforce any provisions of this Agreement will not be deemed a waiver of such provision or any subsequent violation of the Agreement by me.

12. This is the entire agreement with Hay Group pertaining to my receipt and use of the ESCI, and only a written amendment signed by an authorized representative of Hay Group can modify this agreement.

Signature Print Name Date

ATTACHMENT 2 – Sample of research participation non-disclosure confidentiality agreement

Non-disclosure confidentiality agreement

I hereby declare that I agree in participating on the Emotional and Social Competency Inventory (ESCI) as part of the leadership development program offered at [Name of the institution] that will happen on [date of course]. I understand that the assessment will be used in a research program by [name of the researcher] for evaluating and improving the methodology used in the program. I also agree that the results of the assessments can be used in research publications including thesis, dissertation, journals, conference proceedings, and periodicals.

I understand that my participation involves completion of a 360° assessment before and after the course the course. Data from this assessment will be collected confidentially by a third-party survey vendor and results will be provided only to myself as the researcher. In addition, I declare that I am aware that I will have to invite other people that have worked with me to evaluate me through the ESCI assessment tool and that I will not have access to the individual submissions and results generated in the system.

Finally, I declare to be aware that no one else will have access to the data in any way and that the results will be analyzed in aggregate for the research study, and no names will be associated in any way with the data findings.

_____ _____

Student Name Researcher Name