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STRATEGIC THINKING AND MENTAL MODELS: SOME IMPLICATIONS FOR THE TEACHING-LEARNING PROCESS

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Abstract.

In this ever more rapidly changing world, successful executives apply their strategic thinking (ST) competence in recognizing the passing market opportunities for developing competitive advantage. ST competence is related to neurocognitive functioning - the mental models (MM) can be Operational (OMM) or Strategic (SMM), which are more conducive to ST. Developing ST is (or should be) one purpose of the Strategic Management syllabus for Production Engineering/Administration undergraduates. But ST development remains a gap. Teacher complaints about students' difficulty dealing with strategic issues ("They can memorize and connect numbers in formulas!") and a preference for operational disciplines focused on the present – the OMM preference instead of the SMM. This paper discusses the ST-SMM, and its teaching-learning process relationships, presents survey results of undergraduate MM, and analyzes the SMM incidence. It concludes that MM may be one of the causes of students' difficulty with the ST demands and proposes alternatives for its development.

Keywords: Mental Models, Strategic Thinking, Teaching-Learning Process.

PENSAMENTO ESTRATÉGICO E MODELOS MENTAIS: ALGUMAS IMPLICAÇÕES PARA O PROCESSO DE ENSINO-APRENDIZAGEM

Resumo

Neste mundo em constante mudança, executivos bem-sucedidos aplicam sua competência em pensamento estratégico (PE) para reconhecer as oportunidades passageiras do mercado para desenvolver vantagem competitiva. A competência em PE está relacionada ao funcionamento neurocognitivo - os modelos mentais (MM) podem ser Operacionais (OMM) ou Estratégicos (SMM), que são mais propícios ao PE. Desenvolver PE é (ou deveria ser) um propósito do programa de Gestão Estratégica para graduandos em Engenharia de Produção/Administração. Mas o desenvolvimento de PE continua sendo uma lacuna. Reclamações de professores sobre a dificuldade dos alunos em lidar com questões estratégicas ("Eles conseguem memorizar e conectar números em fórmulas!") e uma preferência por disciplinas operacionais focadas no presente - a preferência OMM em vez do SMM. Este artigo discute o PE-SMM e suas relações de processo de ensino-aprendizagem, apresenta resultados de pesquisa de MM de graduação e analisa a incidência de SMM. Conclui que o MM pode ser uma das causas da dificuldade dos alunos com as demandas do ST e propõe alternativas para seu desenvolvimento.

Palavras-chave: Modelos Mentais, Pensamento Estratégico, Processo Ensino-Aprendizagem.

1. INTRODUCTION

In this world environment of ever more rapid and disruptive changes, where complex decisions must be taken in a short period of time and the face of an overwhelming mass of information, successful executives apply their strategic competence to guide their thinking to recognize market opportunities and threats that go unnoticed by most other professionals (Ward, 2004; Cunningham et al., 2002; Goldman; Scott, 2015) so that they can develop and maintain structural or operational competitive advantage. (Bressan, Toledo, 2013). It can be seen that the generation of jobs in STEM and managerial areas is changing especially due to new technologies and that future graduates will need skills beyond those that used to be sufficient (Felder; Bent, 2016). Considering that the aim of these courses has been almost exclusively to equip students with the analytical skills needed to solve problems in a changing world of work, a significant number of companies have argued that most of the functions developed today can or will be carried out better and cheaper through new technologies or outsourced to skilled workers in developing countries (Pink, 2006). Graduates with differentiated competencies, such as the ST competency, will continue to be more valued because they will enable companies to stay ahead of the technological development curve and because, as holistic and multidisciplinary thinkers, they will be able to recognize opportunities in the global economy and formulate strategies to capitalize on them (Felder, & Bent, 2016). This highlights and reinforces the importance of competence for ST.

Thus, the objective of this work was to analyze the thinking models – operational (OT) and strategic (ST)– the mental models (MM) and the relationship between them, and answer the following questions: do undergraduate students from the researched institutions have the essential characteristics necessary for strategic thinking? What are these characteristics' implications for the teaching-learning process? The underlying proposition is that there is no difference between Spanish and Brazilian respondents. To do so, it addresses the characterization of the thinking models and ST, defines Mental Models (MM) and their relationship with the ST and with the learning-teaching process; it presents the methodology for surveying the MM, and analyzes the data found among Brazilians and Spaniards students to discuss and compare the relationship between the MM and competence for the ST and its relationship with the teaching-learning process. Finally, it presents considerations on the development of the strategic mental model.

2. THINKING MODELS: OPERATIONAL (OT) AND STRATEGIC (ST)

Faced with opportunities and threats in the business environment, organizations will respond according to the thinking model preferred by their executives, especially by CEOs: operational (OT) or strategic thinking (ST). Contrasting the assumptions underlying the traditional approach to OT and the assumptions supporting the ST can be of value for clarifying the difference between them.

Operational Thinking (OT) tends to approach the future as something predictable that can be described in detail (Liedtka, 1998), which enables the formulation of long-term plans and the determination of roles related to the plan implementation. In this case, the necessary information is obtained through the financial and management reports for preparing plans to be disseminated to the lower management levels for implementation. To ensure plan implementation and results, the OT will favor a reliable measurement system, assuming that organizations can accurately and quickly

measure and monitor the key variables of the strategic management process.

Companies that prefer OT for facing challenges and opportunities require their managers to adopt actions that favor the refinement and improvement of their products and services through improvements and incremental innovations (Kyrton, 1984; Miles, et al. 1978; Souto, 2015), privileging refinement, selection, production, efficiency, selection, implementation and execution through the use of its skills and technologies. Managers who have a preference for the OT tend to focus on operational results (cost x profit), keeping a more internal focus on the efficiency of operations, concentrating on tasks completed on the "factory floor", and an emphasis on the customer focus and the relationship with the market. They seek to develop and master operational skills within a formal hierarchical structure, with well-defined norms and procedures and under a conservative culture, valuing low-risk decisions and complying with norms, presenting a leadership style that values hierarchy, refinement, and efficiency in the production process and performance (Laureiro-Martinez et al., 2015; O'Reilly; Tushman, 2008; Yigit; Beharan, 2013; Bressan; Toledo, 2013), aiming to optimize their operational skills to ensure results.

On the other hand, a preference for the Strategic Thinking (ST) model leads to strategic choices that are linked to prospecting and designing a future that can be disruptive about the present, thus leading to disengagement and destruction of the usual way of activities that have ensured the company's operational success (creative destruction - Schumpeter, 1942) providing opportunities and conditions for experimentation, flexibility, discovery, and innovation (Goldman; Scott; Follman. 2015)

As such, these leaders tend to focus on innovation and business expansion while maintaining a more external focus on the effectiveness of operations and emphasizing the customer's focus (resolving customer pain points or delivering new satisfactions). They seek the development and/or enhancement of entrepreneurial skills, in an open and flexible hierarchical structure, in a culture that values taking risks with defined objectives, speed, flexibility, and experimentation, often going beyond norms and procedures, presenting a style of leadership that values autonomy and self-drive (O'Reilly; Tushman, 2008; Yigit; Beharan, 2013, Bressan; Toledo, 2013) (Table 1).

From the above, one may say that the (traditional) OT assumes that the challenge of formulating the strategic direction is primarily analytical. ST sees strategies, changes, opportunities, and threats as inextricably linked and assumes that finding new strategic options and successfully implementing them is a process that is more difficult, complex, and holistic in nature. On the one hand, for the OT the purpose of the strategic planning process is the creation of the strategic plan which is its main objective. On the other hand, strategic thinking sees the planning process itself as a critical, dynamic, and value-adding element.

Given these considerations, it can be inferred that the ST challenges the assumptions of traditional operational planning regarding the role of strategic management, how it should be planned and implemented, and who should be involved in the process. Because of this, the competence to think strategically has been increasingly valued and sought by executives as a success requirement both for company leaders and for them in their businesses. But what characterizes strategic thinking?

Table 1. Comparison of the focus of operational x strategic thinking

Managerial Action Focus	Operational Thinking (OT)	Strategic Thinking (ST)
Strategic intent	Cost, profit	Innovation, growth
Market relationship	Focus on the Customer	Customer 'focus
Critical tasks	Operations, efficiency, Incremental innovation	New products/ markets, disruptive innovation
Focus of Skills	Operational	Entrepreneurial
Structure	Formal, mechanistic	Adaptive, integrative
Reward Controls	Margins, Productivity	Milestones, Growth
Culture	Efficiency, conservative – low-risk decisions, controlled quality	Risk-taking, speed, flexibility, experimentation
Leadership style	Authoritative top-down leadership style	Visionary, involved. Values autonomy and self-driving

Source: Adapted from O'Reilly; Tushman (2008); Yigit (2013); Bressan; Toledo (2013)

2.1. STRATEGIC THINKING (ST)

Strategic Thinking (ST) can be related to the ability to collect and process a large amount of information and, from this mass, select what is significant to make effective strategic decisions. ST is the ability to consider the importance and priorities across different goals and criteria, trends, and relative possibilities, but not the certainty, correlation, and imprecise patterns between elements rather than exact cause-effect relationships (Liedtka, 1988). Davis (1992, p. 710) defines ST as

> The ability to understand the global scene – past, present, and future – for defining possibilities and alternatives, associated with the capability to consider, simultaneously, a long range of factors inside and outside the organization in the problem-solving decision-making, and action implementation. It is related to the capability for identifying strategic opportunities for the business success by considering a broad range of inside-outside factors for defining critical and high return strategies and for defining priority for the efforts according to defined strategies, in a way that decisions and taking actions have an adjusted focus to the critical strategies of the business

From these considerations, it appears that the ST goes beyond issues of time, and space and encompasses resources to offer creative, innovative, and disruptive solutions to common and complex problems faced in the competitive arena (Mintzberg, 1989; Zahra; Nambisan, 2012). As such, ST has a future orientation considering the strategic horizon of each industry. It is a systemic and integrative approach focused on the future that allows the construction and consideration of different scenarios (Liedtka, 1998; Abraham, 2005), resulting from the conjunction of distinct visions and forces that give meaning to assumptions and predictions about future business environments.

In this sense, the ST requires reconciling contradictory hypotheses about the future, dealing with ambiguities and which, as it is systemic, implies establishing links between different and even antagonistic elements (Zahra; Nambisan, 2012).

Associated with disruptive innovation and revolutionary transitions (Barnett; Berland, 1999; Chussil, 2005), the ST extrapolates the understanding of the routine to understand the main broad system, the connection, and interdependence of the components and the functioning of the total system (Liedtka, 1998). The ST brings about the interconnection of ideas and a look at new possibilities, which makes it intelligently opportunistic. It involves the opposition of well-articulated strategies to channel the organization's efforts in the face of the risk of losing the ability to see different strategies more appropriate to the changing business environment. So, a question that arises is: how to identify competence for Strategic Thinking? An alternative that has shown promise is the assessment through mental models defined as the standard mode of neurocognitive functioning of a person.

3. MENTAL MODELS (MM)

There are several approaches for determining Mental Models (MM) (Taggart, 1988) from physiological indicators (fMRI), psychological types (Jung, 2016), and practical tests (Bressan; Toledo, 2013). The approach adopted in this work was that of MM derived from psychological types (Jung, 2016) and the MBTI (Myers; Myers, 2010) and temperaments (Keirsey; Bates, 1984) which are reported to have a wide range of applications in business as in career and managerial development and allow assessing the predisposition to ST. This choice is justified because, from the perspective of cognition, the proposition of MM as a psychological representation of real, hypothetical, and imaginary situations (Daniel; Daniel, 2018), despite enabling the description and prediction of the purpose, function, and state of a system, does not address demands regarding problem-solving, decision making, and ST (Carrington; Combe; Mumford, 2019).

Based on Jung (2017), Keirsey, and Bates (1984) and research data on neuro-functional functioning – fMRI (Laureiro-Martínez, Brusoni, Canessa, Zollo, 2013: Spagnol et al., 2015), we decided to define MM as a person's default mode of neurocognitive functioning (Bressan, 2018). MM is inferred from psychological types (Routamaa; Brandt, & Uusi-Kakkuri, 2016) and temperaments (Keirsey; Bates, 1984; Bachert, Wechsler, Machado, 2016). Different MMs result in different perception patterns, choices, and strategic decisions (Zahra, Korri, & Yu, 2005) and ways to deal with the challenges of the business environment (Magzan, 2012). They are tools for describing, understanding, and explaining how one perceives, processes information, and uses it for decision-making. They are constant patterns of automatic activation in the interaction with the environment. MMs are a description of the standard and habitual mode of mental and cognitive activity, resulting from the combination of the pattern of perception (*perception*) with the way of organization and use of the content (*lifestyle*) and with the decision-making mode (*decision-making*) (Haas; Hunziker, 2014; Pearman; Lombardo; Eichinger, 2008; Spagnol; Campos; Bressan; Li, 2015).

3.1 Perception

Perception, an irrational mental function (Jung, 2016), makes it possible to collect, select, organize, interpret, and represent the information received through different environments (Myers, McCaulley, Most,1995; Tieger & Barron-Tieger, 2014; Routamaa et al., 2017). There are two modes of perception: concrete (**C**) and global (**G**) (Jung, 2016). The concrete mode of perception occurs through the five sense organs; its focus is on the concrete world and tangible reality, which leads people to develop greater confidence in experiences. Global perception is a mode of perception characterized by collecting abstract and conceptual data. It is an indirect perception,

usually unconscious, through which the person arrives at perception without the intervention of the sense organs. It enables people to make leaps from the past or present to future possibilities and to understand complex connections between various phenomena (Keirsey; Bates, 1984; Silva, 1992; Myers, et al., 1995; Tieger; Baron-Tieger, 1998; Pearman, Lombardo, Eicheringer., 2006; Luiz, 2011).

3.2 Decision-making

The decision-making process is a rational mental function; it involves the evaluation of perceived information (Jung, 2016) as a basis for a decision. Decisions can be made in logical mode (**L**), where logic is used as a basis for decision-making, establishing a logical and conceptual connection between perceived facts, leading to impersonal judgments and appreciations, and using validity and rationality as criteria for decision-making. The value-based mode (**V**) denotes a preference for making judgments based on values. These judgments denote the preference for decisions based on the meaning, effectiveness, and importance of things for people, leading to compassion, the search for empathy, and the desire for harmony in the social environment (Keirsey; Bates, 1978; Pearman et al., 2006; Myers; Myers, 2010; Routamaa et al., 2016; Bressan, 2018)

3.3 Lifestyle

It refers to the mode of interaction with the outside world or preferred way of living. There are two lifestyles: the planned (**P**) style indicates a preference for living under current social standards, for planning and executing the plan and for stability, and the Improvised style (I): it indicates a preference for living according to the here-and-now situations, with easy adjustment to accidental and unexpected and circumstantial changes, and preference for a more spontaneous life (Myers et al., 1995; Felder; Bent, 2016; Harrington; Loffredo, 2010).

From the combination of these mental functions, it appears that there are differences in how subjects perceive the environment and use what is perceived, make choices, and make decisions. From the definition of the mode of perception, one may define two mental models (Bressan, 2018): the Strategic Mental Model (SMM) and the Operational Mental Model (OMM). The MMs can be further unfolded as a function of what happens after perception. The OMM, after perception, will use the perceived information in life and work in two ways: planned way – resulting in the **implementing** OMM (**CP**), or in an improvised way - resulting in the **pragmatic** OMM (**CI**). In the case of SMM, the next step, after perception, will be to use the information to make decisions: logically or rationally **Strategist** (**GL**) SMM, or based on values - **Energizing** (**GV**) SMM (Figure 1 / Table 1).

4. MENTAL MODELS AND THE LEARNING-TEACHING PROCESS

Each mental model demonstrates distinct preferences in the learning-teaching process. Students classified as Operational Mental Model (OMM) tend to prefer learning hard facts and data. They are attentive to detail and like to solve problems by well-established methods. OMM is good at memorizing facts and names and doing practical application work. Utilitarian and careful in carrying out work, they prefer disciplines, contents, and problems connected to the real world and practical reality. Dealing with abstract and theoretical material is difficult for OMM, and they tend to find strategic issues irrelevant. They prefer classes and disciplines for dealing mainly with memorizing and applying formulas to solve problems. Students with OMM live within current paradigms, and it is difficult for them to perceive any situation otherwise.

Students with SMM avoid subjects that involve memorization and routine calculations. They like to solve new and complex problems and innovate. They find it easy to understand new concepts and work with ideas, theories, abstractions, and mathematical formulations (Felder; Brent 2016).

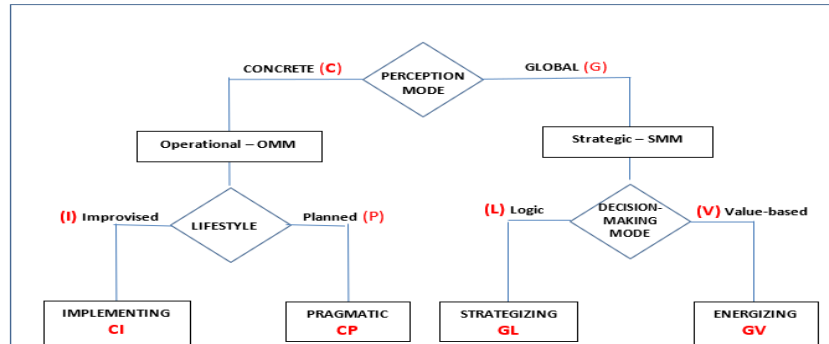Figure 1. Mental Models Diagram for respondents' classification

Table 1. Synthetic description of Mental Models

MENTAL MODELS	TYPE
Operational mental model (OMM): is characterized by a focus on operation and on the search for precision, reliability, efficiency, prudence, discipline and compliance, showing preference for the creation of plans and drawing satisfaction from their fulfillment. Is quick to make decisions and, once a decision is made, it no longer worries him/her. Rarely challenges the rules, norms and policies, unless with the strong and explicit support of his/her superiors.	**Implementing** OMM: prefers it when things have been decided, in an orderly and well-planned manner; likes to make plans and carry them out; is guided by traditionalism, stabilization and consolidation, working with a sense of responsibility, loyalty and assiduity. Contribution: timely production.
	Pragmatic OMM: uses what has been perceived in an improvised way. Problem solver, dealer, firefighter, disdains planning and favors the present moment. **Contribution:** dealing effectively and quickly with the unusual and the unexpected.
Strategic mental model (SMM): low adherence to standards; capable of an innovative approach to problems. Likes identifying and finding solutions to complex problems. Focused on future possibilities. Is a visionary. Takes control in situations with low structure. Self-confident in his/her propositions and ideas. Applies him/herself to transform or create new systems. Next step: use of information in decision making based on logics and rationality – Strategizing – or on values – Energizing.	**Strategizing** SMM: tends to make decisions based on objective and logical analyses, and in an impersonal way. As a visionary, architect of systems and consultant, he/she works with creativity and logic. Contribution: strategies and analyses.
	Energizing SMM: tends to decide based on values and considering people's possibilities, interests and desires. Is a catalyzer and communicative. Contribution: something personal or special insight into possibilities.

Source: Bressan et al. (2020).

The differences between mental models require differentiated attention and planning to suit their preferences. However, when you address mental models MM subtypes, it is possible to establish even more specific differences that are relevant to the learning-teaching process.

Implementing (CP) (OMM) collects handy and realistic data (Hirsh; Kummerow, 1993) focused on the "here and now" demonstrating confidence in facts, in previous experience, and the information provided by their senses and in proven data which they prefer to organize and structure (Tieger et al., 2014). They learn step by step, demonstrate a preference for organized classes, and value established rules and compliance with the institution and people.

They show great respect for teacher authority and appreciate teachers who have

everything planned and stick the planned. They value stability, order, cooperation, consistency, and reliability and are serious, hard-working students. They value all this with a definite focus: what they need to meet the demands of disciplines today, without much concern for the future (Kroeger; Thuessen, 2009). They prefer subjects and contents where rules, assessment, and rewards are well defined (Tieger; Baron; Tieger, 2014; Kroeger; Thuessen, 1992).

Pragmatists (**CI**) (OMM) are practical and realistic. They focus on what they can see, hear, feel, taste and touch and believe in everything measurable; they learn through active involvement in meeting current needs. Poly-interested, they prefer subjects taught more flexibly, dealing with issues of present reality (here and now), and open to new ways of dealing with it. Tend to be responsive and spontaneous and enjoy dynamic lessons. They appreciate academic situations where they can be active and feel free to act on their impulses. They prefer to deal with subjects requiring focus and actions in the here and now, valuing competence and challenging activities, looking for the easiest way to do things, assuming risks, and improvising, if necessary, always on practical and actual problems. (Tieger et al., 2014: Kroeger; Thuessen, 1992, looking for pleasure in what they do.

Energizers (GV) (SMM) can theorize and intellectualize all things and focus on possibilities for people. They are interested in the meaning, purpose, or raison d'être of disciplines, relationships, and the many alternatives. Idealists act and make decisions based on their values and tend to be involved in causes oriented toward human interest, such as counseling, social causes, and peace movements. Their main concern is to be in harmony with themselves and with others. They value authenticity and integrity in relationships with colleagues and professors, focusing on people's development potential, thereby obtaining great satisfaction. Excellent communicators, they are catalysts for positive change. They are optimist, assertive, and idealist and use their natural ability to understand and connect with people. Empathetic, they know how to stimulate the best in other people and create conditions to generate motivation to perform their best in the academic activities. They are skilled in conflict resolution and facilitators of teamwork. Charismatic and inspiring, they know how to generate enthusiasm for their ideas. A good discipline is personally meaningful; it enables harmony in the classroom, is taught democratically, and encourages a high degree of participation.

Strategists (**GL**) (SMM) are characterized by global perception, making abstractions with a focus on possibilities, and filtering them objectively. They can theorize and reason mathematically and logically. Autonomous, they seek to develop competence in all areas, like acquiring new knowledge, setting high standards for themselves, and demanding the same standard from others. Naturally curious and creative, they can see many sides to the same problem. They are excellent for visualizing possibilities, understanding complexities, and developing innovative solutions to actual or hypothetical complex issues. When studying a subject, they like to use their abilities to see the possibilities, make connections, and analyze them logically to solve complex problems. They have a global vision and enjoy planning, strategizing, and linking the now with the desired future. Skilled at understanding complex and theoretical ideas, they are good at deducing principles and trends. They can speak clearly and precisely. They like to challenge themselves and others and are able to accept constructive criticism without taking it personally. These students are generally reliable, insightful, witty, and imaginative. They prefer an educational environment with autonomy, variety, full and abundant intellectual stimulation, and opportunities for creating new and disruptive ideas and projects (Shen, et.al. 2007)

5. THE SURVEY WITH UNDERGRADUATE STUDENTS

Once defined what Strategic Thinking is and its MM relationship and implications for the teaching-learning process, the next step was to survey the students' MMs attending the undergraduate program from the two universities involved in the project.

5.1 Methodology

This work is exploratory research with an intentional sample. The objective was to verify the occurrence of dissimilarities in the mental models of Spanish and Brazilian undergraduates. For this study, the independent variable is the country of origin and the dependent variable is the MM index. For data collection, we decided to use the Personal Inclination Questionnaire (QIP), developed by Silva (1990) in studying preferences and vocational choices in undergraduate courses at USP (a field survey with 1,258 students in the fourth and fifth years of eighteen courses at USP).

Drawing on The Keirsey Temperament Sorter (Keirsey & Bates, 1984), the questionnaire (public domain) provides a useful measure of temperaments and mental models by looking at psychological functions that all people use at different life times (Silva, 1992). Silva reports that qualitative and quantitative testing, conducted during the development of the QIP suggested the questionnaire had good content validity and adherence to population (e.g.: Semantic analysis, in-depth interview, Cronback Alpha, Kolmogorov-Smirnov test. ANOVA). QIP provides a valid measure of the variables used to identify the MMs. The QIP adapted, validated, and translated to Spanish, was applied to undergraduates. In the Brazilian university, 135 students answered QIP. In Spain, 80 answered the QIP [1] online, and 70 [2] face-to-face, totaling 150 respondents.

The evaluation of the demographic variables of Brazilians and Spaniards indicated a very similar socio-academic profile, a requirement for comparing the results obtained in both countries. For analyzing the investigated variables, we created indices for the factors, which made it possible to extract data to define the MM of the evaluated individuals. The influence of the country of origin on the indexes for identified MM was investigated using ANOVA. We applied the Principal Component Analysis to validate the questionnaire and verify whether the information collected by the defined indices represents most of the variance of the responses.

5.2 Results

For the ANOVA, the country of origin was an independent variable (VI), and the index values were calculated to indicate the MM as a dependent variable (DV). The ANOVA provided the opportunity to obtain data on the result of the comparison between the two samples. Data indicates that the country of origin does not significantly affect (moderate effect) the MM (Table 2). The proposition verified by the ANOVA was the equality of the sample means (Dancey; Reidy, 2014) by estimating the F statistic, which indicates the degree of similarity or difference between the samples.

Table 2. Means and variances of collected data

	Brazilian	Spanish
Respondents (n)	135	150
Dimensions	Mean (Variance)	Mean (Variance)
Perception Mode	1,59 (,85)	1,30 (,42)
Decision-making Mode	1,59 (1,17)	1,18 (,41)
Life Style	1,79 (1,49)	1,28 (,84)

Source: Prepared by the author

The critical value of the F statistic for the ANOVA performed is 3.87, and the defined significance value of 0.05. The results indicate that, for the component factors of the MM, the underlying proposition that there is no difference between Spanish and Brazilian respondents (*null hypothesis*) was rejected.

According to the results, it is possible to conclude that the country of origin and the environment in which the students are located have a moderate effect on the mental model, that is, on the Mental Model factors (Table 3). From this it can be deduced that there is a probability that the country of origin and the environment of the individuals may have some influence on the identified MMs, indicating a difference in the preferred learning-teaching process.

Table 3. ANOVA Results

	F	Probability	Critical Value - F	A
Perception Mode	9,78	0,0020		
Decision-making Mode	14,98	0,00014	3,87	,05
Life style	15,60	0,000099		

Source: Elaborated by the author

The data indicate the percentage differences between Brazilian and Spanish students, which makes it possible to verify the relative influence of the country of origin on the MM and its component factors (Table 4). Despite these differences, both Brazilian and Spanish students showed a stronger tendency toward the Operational Mental Model (OMM), and it is more pronounced among Brazilian students (OMM = Implementers + Pragmatics = 68.88%; SMM = Strategist + Energizer = 31.12%) than in the case of Spanish students, who have a mild balance between OMM (OMM = Implementers + Pragmatics = 54.67%; SMM (Strategist + Energizer = 45.33%)

Table 4. Percentages of respondents' mental models

Dimensions	Brazil (%)	Espanha (%)
Implementer	58,52	38,00
Pragmatic	10,37	16,67
Strategist	10,37	30,00
Energizer	20,74	15,33

Operational Mental Model	68,88	54,67
Strategic Mental Model	31,11	45,33

Source: Elaborated by the author

5.3 Analysis of Results

The data make it possible to perceive the effect of the country of origin on the MM and their references in learning-teaching situations. OMM is preferred among Brazilians and Spaniards, being much more notable among Brazilian students (OMM: 68.88% of Brazilians Implementer = 58.52% + pragmatic = 10.37%; 54.67% among Spaniards: Implementer = 38.00 + Pragmatic = 16.67) who showed a mild balance between the OMM and the SMM. These data support the proposition that Brazilians are more comfortable with operational rather than strategic disciplines than Spaniards. Less frequent, SMM has a lower incidence among Brazilians (31.11% - Strategist = 10.37% + Energizer = 20.74%) than among Spaniards (45.33% - Strategist = 30.00% + Energizer = 15.33%), indicative of a greater predisposition to ST among Spaniards than Brazilians, but without preponderance.

These data indicate that it is likely that most of those assessed – classified as OMM (68.88% – Brazilians / 54.67% – Spaniards), not receiving appropriate training for the development of the SMM will present difficulties in dealing with strategic issues (and probably in STEAM (Felder; Brent 2016)). They will consider the strategic issues, many times, as something unimportant and that "as theoretical" these things do not produce practical results, thus leaving them out of their interest. By analyzing these data under the light of academic implications, one may conclude that most students should carry out development actions if they wish to succeed in executive positions in companies that demand competence for the ST.

The results indicate that the difficulties reported by students and teachers may result from the OMM preferences, meaning, by definition, a reduced predisposition for ST, more pronounced among Brazilians, being an indicator of the need to include activities aimed at the development of students' SMM.

6. CONCLUSION

This study indicated a low occurrence of SMM more conducive to Strategic Thinking among students and the predominance of OMM, more focused on issues related to the here and now, which gives students a practical and operational sense of discipline. This OMM occurrence may be the reason for neglecting strategic subjects, considering them very theoretical and useless. This relatively SMM-low incidence may explain the perceived students' difficulties in dealing with this strategic issue. It also indicates the need to foresee, in undergraduate courses, at least in the assessed ones, activities aimed at developing ST skills required for effective performance in executive positions. The adequacy of didactic planning to the MM of most students can lead these students to a high level of comfort and others to dissatisfaction and lack of interest. When addressing the students' OMM, the teacher can generate a disinterest in the SMM students. However, it is necessary to consider that, due to their characteristics, it is more likely that an SMM student will have an easier time dealing with practical issues than an OMM when dealing with strategic issues. The higher incidence of OMM and the demands for adapting to changes in living conditions and work requirements that value the ST, require activities in the teaching-learning process that allow these students to put into action their process of developing skills for the ST. By developing

the competence of the ST, this student becomes an active generator of information and knowledge and, as a consequence, a more autonomous human being with a more flexible mindset and ceases to be a repeater or reproducer of information (Dweck; Yeager, 2019; Felder: Bent, 2016).

One of the first steps that teachers, planners and academic directors must take is to understand the characteristics of each of the mental models, their needs, and their characteristic ways of learning (Murphy, Eduljee, Croteau, Parkman, 2020) and to know their own mental model. It must be borne in mind that these students have ingrained assumptions and paradigms and find it very difficult to perceive any problem differently. When planning and working in this way, it is necessary to bear in mind that what is being sought is the modification of students' paradigms and mindsets (Dweck, 2019). This can cause discomfort in these students and comfort is the key.

Because of this, students must feel comfortable dealing with these activities and problems, as discomfort will bring less effectiveness in learning. Working towards this development requires facing the risk of failure and recognizing that taking risks is a different and threatening experience for OMMs. As, in general, these students do not have experience with this type of class and exercises, at least initially, they may feel uncomfortable and may not feel pleasure in them. It is necessary to be aware of the need for psychological security and take care of it. If teachers do not consider the discomfort produced by performing these exercises, students may show reactions such as anger, aggression, and frustration (Felder; Brent, 2016). Carrying out activities and tasks that create opportunities to improve ST competence demands an environment where the OMM students feel protected from failure. They must feel the teachers' invitation to explore other ways of thinking (SMM) are based on compassion and care rather than aggression, depreciation, into an unwanted intrusion, as it can sometimes seem that way. The feeling of sympathy, care, and security occurs through personal relationships and trust (Feuerstein; Falik, 2010). This relationship is worthwhile and rewarding. It makes it possible for the minds of these students to stop being passive, accepting without questioning and just reproducing content; rekindle curiosity, willingness to try new ideas, create combinations, and observe from different perspectives, that is, thinking strategically. All of this must be carried out, as technology, economics, work requirements, and what we know and will need to know are increasingly more complex, which will demand this capacity for the ST to solve problems, create new solutions, innovate, and undertake.

Therefore, one should plan classes taking into account the students' MM, but plan activities and provide the necessary assistance so that they can develop their capacity for ST. Another recommendation refers to the need to explain your reasoning step-by-step (metacognition) so that it can serve as a model so that students, based on it, can experiment and manage to move in that direction. However, when doing this, that is, planning and developing activities for the development of this capacity, teachers must consider that the development of these competencies is not only possible but is a laborious and arduous process, as it tends to remove students from their comfort areas in terms of their personal preferences. This discomfort can be roughly compared to the difficulty a right-handed person has in writing with their left hand.

The contribution of this work is the presentation of the MMs as a way to understand the differences in students' learning styles. Another is the proposal of some clues for the development of the SMM. As SMM development results, students' strategic competence can be expanded and, consequently, their performance when dealing with the strategic issues of the Strategic Management discipline. The major fragility of the results is the definition of a convenience sample for the research, which makes it

impossible to generalize the results. In this way, the expectation is that new studies may prove this relationship and develop methodologies and instruments that enable the effective development of strategic competence. The challenge is enormous and is launched.

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