SOCIAL REPRESENTATION OF SUSTAINABILITY IN CIVIL CONSTRUCTION AMONG COLLEGE STUDENTS

ELZA MARIA TECHIO[1]
JARDEL PEREIRA GONÇALVES[2]
POLIANA NERES COSTA[3]

Introduction

Issues concerning the environment and the impacts generated by human beings have gained ground in several discussions, both with regards to preservation and negative effects and to measures and practices aimed at improving and preserving the planet. However, people are still not able to achieve and legitimize a broader concept associating the impacts and implications of human actions in the environment to a social and economic perspective. Even with the rise of the new paradigm of sustainability, the debate is exclusively concerned with environmental issues as the centerpiece of the benefits provided by new practices and actions. Embedded in this environment are all human beings that depend on it for survival, well-being, quality of life, and health, i.e., a complex relationship between people and the environment.

For better understanding this new paradigm encompassing the relationship between human actions and nature, and their social and economic implications (including cultural aspects), it is necessary to explain the origin and dissemination of the concept of sustainability.

Sustainability as a subject matter was brought into prominence in 1972, with the Stockholm Declaration (a result of the United Nations Conference on the Human Environment, also known as the Stockholm Conference) (AGOYPYAN; JOHN, 2011). During the Conference there were drafted 26 "common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment" (UNITED NATIONS ORGANIZATION, 1972, p. 1). In this document, sustainable development and environmental preservation as a survival guarantee for present and future generations become the centerpiece and must be guaranteed

1. Doctor in Social Psychology (Universidad del Pais Vasco, Spain). Professor at the Psychology Institute (IPS). Federal University of Bahia (UFBA). E-mail: elzamt400@gmail.com.

2. Doctor in Civil Engineering. Professor at Escola Politécnica. Federal University of Bahia (UFBA). E-mail: jardelpg@ufba.br.

3. Psychology Major at Federal University of Bahia (UFBA). Fellow of the Permanecer Scholarship Program (UFBA). E-mail: poli9.psi@gmail.com

without resourcing to "*stopping* social and economic development", as noted in the following excerpt:

> To defend and improve the human environment for present and future generations has become an imperative goal for mankind – a goal to be pursued together with, and in harmony with, the established and fundamental goals of peace and of world-wide economic and social development. (UNITED NATIONS ORGANIZATION, 1972, p. 2).

With this declaration, in 1987, the topic became subject of discussion in the Brundtland Report, where the term sustainability was initially used to introduce the concept of sustainable development as the development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." (AGOPYAN; JOHN, 2011, p. 29). However, it was during the United Nations Conference on Environment and Development, also known as Rio-92, that the term gained ground and global emphasis. The result of this conference was an action plan titled Agenda 21, which enabled the creation of several agreements and programs aimed at raising global awareness so that all countries could carry out the requirements for sustainability. The central proposal of Agenda 21 is that all countries, regardless of their economic development, must share responsibility for the sustainability of the planet (AGOPYAN; JOHN, 2011).

Although the strong environmental impact of the civil construction industry is widely acknowledged, only in the 1990s the concept of "sustainability" began to be incorporated in its actions and concerns. It is estimated that the civil construction sector is responsible for around one third of the consumption of all natural resources in the world (TAIPALE, 2012). Since then, the concept of sustainability has been increasingly more prevalent in the civil construction sector because, as highlighted by Yemal, Teixeira, and Nääs (2011, p. 7), it is:

> One of the most important activities for social and economic development and, on the other hand, it still behaves as a great source of environmental impact, whether by the consumption of natural resources, by the modification of the landscape, or by the generation of waste.

In the 2000s, a new stage of sustainability in civil construction gains prominence with the discussion on sustainable constructions and systems of certifications of sustainable projects (Environmental Stamp), products of the so-called *Sustainable Building* conferences.

In this regard, different terms – such as ecological constructions, green constructions, constructions with environmental certification (Environmental Stamp), and more sustainable constructions – have been confusing society about the values or environmental practices of construction, and these terms deserve to be clarified. These terms are used as synonyms, even though they indicate constructions with different characteristics.

The traditional concept of ecology defines it as the science that studies the relationships between living beings and the ecosystem (environment or chemical and physical

conditions of the place where they live) (FERRI, 1979). The executive process of a construction has, of course, an impact on the ecosystem, by way of cleaning of the vegetation cover, dirt movement, use of natural resources, energy consumption, and CO^2 emission, among other things. Thus, no construction may be called ecological construction.

The term "green construction" arose from a market perception of an increasing collective concern with the preservation of the environment, inspired by the environmental crisis. In this sense, the concept of "green construction" arrived in the social field as a marketing strategy, marked by the call for preservation and the concern for the environment and, thus, guaranteeing a more sustainable economic progress.

The term "constructions with environmental certification (Environmental Stamp)" is associated with constructions that are subject to methodologies for the evaluation of environmental performance, that is, constructions that are subject to a set of criteria and goals aimed at raising environmental standards. These methodologies provide a set of norms and guidelines for good practice, in order to minimize the environmental impacts caused the construction, which must be partially or completely met so that a project may be certified as a more sustainable construction. Examples of these methodologies are the *Leadership in Energy and Environmental Design* (*LEED*) *and the Building Research Establishment Environmental Assessment Method* (*BREEAM*), among other methods specific to each country, such as *NABERS and GREEN STAR* in Australia, *GREEN GLOBES* in Canada, *Comprehensive Assessment System for Building Environmental Efficiency* (*CASBEE*) and *Haute Qualité Environnementale* (HQE) in France. In Brazil, there are the methodologies *Enviromental Quality Evaluation (Avaliação da Qualidade Ambiental (AQUA))* – adapted from HQE – and the Caixa Econômica Federal's *Blue House Stamp (Selo Casa Azul)*. A construction with an environmental certification may become a more competitive real state asset both when it comes to sales and when it comes to location (ABREU, 2012).

Despite contributing to the improvement of environmental aspects, systems for certification of projects are insufficient to lead to effective enhancements of the environmental performance of a building over the course of its lifetime, as they do not take into account, in an integrated form, aspects such as: environmental impacts since the selection of materials and constructions systems in the planning and designing phases; their lifetime performance with regards to energy consumption, durability and easiness of maintenance; and aspects related to disposal, reutilization and recycling of the developments once they are no longer useful.

The Technical Committee of the *International Organization for Standardization* (ISO/TC 59/SC3 N 459) defines the concept of a "sustainable construction" or a "sustainable building" as follows:

> A sustainable building is one that can moderately maintain or improve the quality of life and be harmonized with the climate, tradition, culture, and environment of a region, at the same time that it saves energy and resources, recycles materials, and reduces dangerous substances within the ability of local and global ecosystems, over the course of the building's lifetime. (ARAUJO, 2002, p.2).

From the research performed by Sobreira (2010) one may note that a great part of the "ecological constructions", "green constructions", and "constructions with environmental certification (Environmental Stamp)" is related to business and marketing interest in "eco-products", a process in which architecture is also included. For Sobreira (2010), entrepreneurs discovered that the marketing surrounding sustainable consumption could also be applied to architecture and as a guideline to consumers. As a result, it is possible to note, in the construction sector, the beginning of a process that started with the marketing of products in the mid 1980s: *greenwashing*, a term which refers to an strategy of increasing the sales and visibility of a product based on a false environmental or ecological image of the same. In this regard, "ecological constructions", "green constructions", and "constructions with environmental certification (Environmental Stamp)" are other forms of *greenwashing* in the civil construction sector which, consequently, affects people's representation of sustainability, the affections associated to green constructions and, as a result, the attitudes and actions of consumers.

This type of strategy addresses only one of the aspects of sustainability in civil construction and disregards the other cornerstones that should make up the concept: cultural, social, and economic. These aspects are taken into account in a "more sustainable construction".

Although there is no conceptual agreement regarding the terms "sustainability" and "sustainable development", different areas, such as Engineering, Economy, and Social Sciences, among others, try to establish a conceptual approximation and defend a broader analysis. The definitions seek to integrate the equitable growth of human conditions, the preservation of natural resources, and economic efficiency.

This perspective calls attention to the need of understanding sustainability in its environmental (atmosphere, land, water, energy etc.), economic (financial and macroeconomic performance, etc.), social (work and income, health, education, housing and safety), institutional and political (political capacity and effort to promote changes), cultural (values and beliefs), and psychological (attitudes and actions) dimensions, among others (PAULISTA; VARVAKIS; MONTIBELLER-FILHO, 2008).

In civil construction, the perspective of integration and conservation of the sustainability tripod (economic, social, and environmental dimensions) remains central. Although there are challenges to be faced, especially in relation to the "search for a balance between environmental protection, social justice and economic viability" (AGOPYAN; JOHN, 2011, p. 20), the greatest challenge of a sustainable development relates to the reduction of environmental impact, increasing social justice within an available budget.

Since some developers have limited themselves to the environmental dimension, inflating it only to add value and for market growth, with no real concern for sustainability and the surrounding impact, there are constraints in making the sustainability tripod viable. Developments launched with the sustainability *slogan* are not truly considered sustainable; they only use the concept of "green constructions" as a strategy to appeal to consumers and to provide a positive image of the company. According to Yemal, Teixeira, and Nääs (2011, p. 4):

> Sustainability is a philosophy that has encouraged the business world to search for environmental improvements that yield parallel economic benefits. It focuses on business opportunities and allows companies to become more environmentally responsible and more profitable. It boosts innovation and, therefore, growth and competiveness.

Thus, they ultimately target the economic dimension at the expense of the environmental and social dimensions. Even if both are benefited, the sustainability goal is in clash. However, one should not neglect the importance of the economic dimension as a stimulus for big companies and investors to engage in what we call sustainability.

In view of the above explanation, one may note that the term sustainability is complex and has several definitions. According to Acselrad (1999), there is still no consensus among the different concepts. It is possible to say that sustainability is such a broad multidimensional concept that it encompasses various aspects, such as economic development, environmental preservation, and social and psychological issues, and that it requires both preventive and corrective measures, as well as the control of present and future activities, in order to preserve and improve the quality of life of future generations (YEMAL; TEIXEIRA; NÄÄS, 2011). The pursuit of sustainable development is a crucial factor to be considered and studied to the extent that it seeks to achieve actions that may yield improvements in several social spheres.

Even with the multiple concepts of sustainability, it is necessary to establish a concept that allows the evaluation of the results achieved and the inclusion of important aspects that characterize what is considered sustainable (LINARES, 2012), so that procedures may be carried out and people start to see sustainability as a goal to be nurtured and which will yield present and future improvements.

By simplifying the understanding of the meanings assigned to sustainability, we may achieve more clarity with regard to which practices are sustainable and which ones are not. To achieve such clarity it is necessary to make some fundamental changes in the social sphere, particularly in the "way of thinking and in the way of living, producing, and consuming" (YEMAL; TEIXEIRA; NÄÄS, 2011, p. 2), acting in a meaningful way in the cultural and psychological spheres. According to Paulista, Varvakis, and Montibeller-Filho (2008, p. 185), "it is necessary to have a comprehensive perspective, supported by multidisciplinarity and capable of starting by including the relationship between the human being and himself, the other, and his environment".

However, before proposing psychosocial interventions that may contribute to the development of a more critical awareness of sustainability and more sustainable constructions, it is necessary to know the meanings and ideas that are socially shared. Meanings are relevant aspects for Social Psychology, a field that seeks to understand how individuals think, what they feel, and how they behave in society and, based on these meanings, to contribute to aligning pro-environmental actions and more sustainable practices.

Even though the topics of sustainability and sustainable behavior are discussed in and relevant to several areas of knowledge, there are very few studies focused on them, particularly regarding the practices carried out by people, companies, organizations, and

institutions in the collective realm. As noted by Souza and Pereira (2011, p. 35), "the world is going through a number of environmental problems and the man/nature relationship proposes, more and more, preventive actions for the purpose of mitigating such impacts".

Social representations and sustainability

In order to understand the meaning of sustainability and based on the idea that meanings are socially built, depend on social insertions, values, and social beliefs, and that they affect the ways of perceiving, feeling, and positioning ourselves in the world, we will use the theory of social representations.

According to Jodelet (2001), social representations are forms of practical knowledge geared towards communication and the comprehension of social context; such knowledge is socially elaborated and shared by the social subjects. Such systems of interpretation of reality, which guide relations and intra- and intergroup behaviors, affect information processing, identities, and social change. As a cognitive system (images, concepts, ideas, etc.), they are a product of the appropriation of external reality and a social and psychological elaboration of this reality (CABECINHA, 2004; JODELET, 2001).

Although the cognitive elements are emphasized in the analysis of social representations, they are not reduced to these elements; there are also affective and behavioral dimensions. The affective domain serves for the elaboration of strategies to protect the social identity, particularly when it is under threat, and the behavioral domain acts as a principle that guides actions, whether they are individual or collective (SPINK, 1993).

According to Jodelet (2001, p. 1), social representations are constructed because it is necessary "to adjust ourselves, to conduct ourselves, to physically or intellectually locating ourselves, and to identify and to solve problems". Besides being "complex phenomena that are always active and actuating in the social life", representations are "a socially elaborated and shared form of knowledge that has a practical goal and contributes to the construction of a reality that is common to society as a whole" (JODELET, 1989, p. 36), *i.e.*, a social construction of socially valued objects (SPINK, 1993).

Social representations are theories of the common sense, influenced by social, historic, and ideological contexts, by means of which social realities are interpreted, constructed, represented, and reclaimed by individuals or groups and reconstructed in the cognitive system, which are integrated to the already existing values and beliefs. According to Moscovici (2010, p. 21), social representations are:

> A system of values, ideas and practices with a twofold function; first, to establish an order which will enable individuals to orient themselves in their material and social world and to master it; and secondly to enable communication to take place among the members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their world and their individual and group history.

According to this author, social representations are intended to make the unfamiliar become familiar, it is a form of construction and sharing of knowledge "in which the subject (individual or group) acquires a capacity of definition, a function of identity, which is one of the ways representations express a symbolic value" (MOSCOVICI, 2010, p. 21). Social representations are always a product of interaction and for the purpose of social communication.

The constitutive process of social representations, which depends on knowledge, affections, and evaluations based on the relationship of the individual with society, is established from two fundamental cognitive processes: anchoring and objectification. Anchoring refers to the recognition of unfamiliar objects based on existing and functional categories available in the memory; it is the cognitive integration of the object to an existing thought. By integrating the unfamiliar, new knowledge, and events with the already familiarized system, the preexisting representations will be altered to some extent. The anchoring happens when a new object is incorporated into the preexisting system of categories.

Objectification refers to the process in which abstract concepts are materialized in a concrete and meaningful reality, turning images into words (MOSCOVICI, 2010). In the process of objectification, some types of information are favored at the expense of others, which are simplified and dissociated from their original context, besides being adjusted so that some become more important than others.

The structural approach of social representations or the Central Core Theory was suggested in 1976 by J. C. Abric, although it gained ground in the Theory of Social representations only in the 1990s (SÁ, 1996). According to this theory, representations are organized around central and peripheral contents.

The central core represents the non-negotiable part of the representation; it is more stable and inflexible. It is the element that guarantees continuity in unstable social contexts and that is in a constant process de development. Moreover, it is the central core that allows the realization of comparative studies of representations and provides meaning to representations (CHAVES; SILVA, 2013). It is important to note that the central elements are connected to the memory and history of a group, and they have a generating, organizing, and stabilizing function.

The peripheral elements are more flexible, more easily adapted to the transformations of the context, and accept changes with no deep alteration of the central representation. They answer to three functions: materialization of the representation; regulation or adaptation of the representation to a context; and defense and protection of the central core, taking contradictions into account (ABRIC, 1998).

The concept and the meaning of sustainability are subject to "the logic of practice; it is articulated to the desired social effects and practical functions that the discourse pretends to turn into objective reality" (ACSELRAD, 1999 p. 2). Therefore, the theory of social representations contributes, through the knowledge of representations, to the understanding of collective actions, market motivations for creation and deployment of more sustainable practices in civil construction and public policies that encourage more sustainable practices, etc. Such actions allow the social knowledge of more sustainable

practices or strategies which lead to the development of responsible, sustainable, and conscious consumption, concerned not only with the preservation of the environment, but also with social and economic development.

In a nutshell, by understanding people's knowledge and comprehension of what sustainability is, the meaning of sustainability, it is possible to understand the logic that follows sustainable practices and the level in which individuals are dealing with sustainability and identifying it.

In the specialized literature, there are few studies dedicated to the social representations of sustainability. This may be due to the diversity of definitions, hampering the production of a unanimous and broad representation of sustainability. One of the few studies published in Brazil was performed by Ramos and Kayamura (2009) with 78 students enrolled in higher education courses, regarding the representation of sustainability and the environment.

In this study, it was possible to note that the representation of sustainability is recognized by 28% of the participants in simplified and general terms, with no specific sense of the concept, as noted through the discourse of one of the participants: "Sustainability is related to actions that promote a sustainable, stable environment" (RAMOS; KAYAMURA, 2009, p. 5); and only 11,5% of the participants present a concept of sustainability inserted in a social, economic, and environmental scope, as may be noted in the sentence: "Sustainability consists of a set of actions aimed at minimizing the impact of consumption and production carried out by current society" (RAMOS; KAYAMURA, 2009, p. 6).

The study described above suggests that the majority of the participants had not built a clear representation of sustainability, and those who could define it would do so in general terms. Few associated sustainability to environmental, social, and economic issues. Such results suggest that the representation of the concept of sustainability, at the time of the study, was not yet clearly defined for that population.

A more recent study on the social representation of sustainability, performed by Matos *et al.* (2012) with 132 students of Administration of a public university, found that the representation of sustainability was devised around the environment. As noted, the naturalist perspective of the concept of sustainability remains, dissociated from its socioeconomic dimensions, which, in some ways, is in line with the previous research.

Based on these observations, one may think that the trouble in representing the concept of sustainability, or representing it only in the environmental domain, may be related to the fact that the concept is not part of the social context of the students, therefore it is not an object socially valued by the group (JODELET, 1989; SPINK, 1993). Such trouble and distancing between the common sense knowledge, in this case shared by college students, and the concept of sustainability supported by science, become more relevant when taking into account that the knowledge of college students should be closer to scientific knowledge.

It has been questioned if the difficulty in conceptualizing sustainability is associated with the affective and social distancing of the object being represented, and if such distancing could complicate the execution and acquisition of more sustainable practices. How could we increase people's interest in more sustainable practices and consumption

if they are cognitively and affectively distant from the social object and, therefore, from more sustainable actions and practices?

In light of this reality, and in an attempt to fill the gap of the lack of research on the people's understanding of sustainability, the present study has been developed from the perspective of Social Psychology based on the Theory of Social Representation.

The goal of this study was to understand and perform a comparative analysis of social representations of sustainability among college students enrolled in hard and soft sciences courses. Chiefly, to analyze if their social representations of sustainability were close to the concept of sustainability as found in the literature. Whereas hard sciences students (mostly from engineering courses) are more familiar with environmental issues, sustainability, and more sustainable civil construction, it is anticipated that they show a social representation closer to the scientific knowledge.

Moreover, this study encourages an interdisciplinary perspective of sustainability by seeking a broader view of the promotion of sustainability. Thus, understanding the meaning of sustainability is crucial to the extent that it offers indicators that shall serve as basis for potential psychosocial interventions.

Methodology

The present work refers to a qualitative and descriptive study that used an electronically available questionnaire, with use of the *EFS Survey* application, marketed by Global Park. The questionnaire was composed of free association of words, where "sustainability" was used as the guiding word, and of socio-demographic data (age, gender, course). Participants were required to write five words, in order of importance, upon reading of the word "Sustainability".

Among the subjects that took part in the study, 46 (41.4%) were students of Hard Sciences, notably students of Civil Engineering; from those, 60.9% (n=28) were female, with an average age of 25.4 years old (dp=7.95), ranging from 18 and 60 years old; also took part in the study 65 (58.6%) students of Soft and Social Sciences, the majority (75.4%) of which was female (n=49), with an average age of 23.8 years old (dp=6.17), ranging from 17 and 60 years old.

The word evocation test seeks to analyze the internal organization, the central and peripheral content of the social representations, and it can be seen as a good tool for identifying the content and meaning of the social representation.

The evocation test was analyzed using EVOC[i], a software for word analysis. Its methodology groups similar or identical words through associations of semantic meanings. The data is grouped according to the Evocation Order and Average Order of Importance, allowing the analysis of the impact of the hierarchizing effect in the configuration of the structural elements. For the indication of the words composing the central and peripheral cores, the words are subdivided according to their order of appearance and the means and weighted means are calculated. The results are shown in a four-quadrant structure, articulating the information according to the frequency and the mean of the Average Orders of Invocation (Quadrant 1). Using the criteria of frequency and average order

of evocation, the software lists the elements that will make up the Central Core, which essentially represents the social dimension, and the peripheral elements of the social representation, which relate to the immediate social context.

Quadrant 1 – Distribution of the Evocations as organized by Abric (2003)

1st quadrant *Central Core Zone* (high frequency and high importance)	**2nd quadrant** *First Periphery* (high frequency and low importance)
3rd quadrant *Contrast Zone* (low frequency and high importance)	**4th quadrant** *Second Periphery* (low frequency and low importance)

Source: Andrade (2001, p. 86).

In the interpretation of the quadrants, the word evocation order and the number of times the word was evoked are simultaneously considered. The first quadrant constitutes the central representation zone, representing the social dimension, and it will be formed by the most frequent words and an average of evocation order relatively low (high importance) (ABRIC, 2003). The second quadrant will be comprised of the words with high frequency, but with low importance, forming the peripheral zone of the representations; such elements have a strong influence on the social practices and on the evaluations of certain situations (LO MÔNACO; LHEUREUX, 2007). The third quadrant will be comprised of the words with low frequency and high importance, forming the contrast zone of the social representations. This zone is characterized by tensions with respect to stability and content. Therefore, it is an ambiguous situation and it suggests that the presence of these elements may indicate changes in the social representations (MINIBAS-POUSSARD, 2003). The upper-right quadrant and the lower-left quadrant represent transitional spaces between concrete reality and crystalized responses. The fourth quadrant constitutes the peripheral zone of the social representations, indicating the least characteristic elements; this quadrant is comprised of words with low frequency and low importance, thereby representing the most individual and least socially shared elements.

Results and discussions

After processing and analyzing the data, the occurrence of 421 evoked words has been observed; from these, 120 are different words; 79 words occurred only once; and 41 words occurred more than once. The value of 1.5 was used as a cut-off point for the average order (numbered from 1 to 5, 1 being the most important) and frequency thresholds between 5 and 10. The large spread of data may be explained by the non-homogenization

of the synonymous. Quadrant 2 represents the major elements of the social representation based on the analysis made with EVOC.

The EVOC software identified the 20 most frequent words, namely: environmental; environment; commitment; awareness; conservation; care; development; ecology; economy; energy; balance; future; surroundings; nature; preservation; recycling; resources; responsibility; social; and green. The software also allows identifying the process of co-occurrence between categories that may be related or that might belong to the same category of analysis. In this study, the words *surroundings* and *environment,* and *environment* and *preservation* showed high co-occurrence. The word *surroundings* was evoked 59 times along with the expression *environment*, and the words *environment* and *preservation* had close occurrence in 8 situations.

Quadrant 2 – Structural analysis of the social representations associated with sustainability

Frequency	Average order of importance of Evocation				
		Lower than 1.5		Higher than or Equal to 1.5	
	≥ 10	Environment	71 (1.197)	Awareness	13 (1.692)
		Surroundings	59 (1.203)	Development	10 (1.700)
		Nature	21 (1.476)	Economy	19 (1.579)
				Preservation	20 (1.550)
				Recycling	12 (1.583)
	<9	Ecology	8 (1,000)	Environmental	6 (1.667)
		Balance	6 (1,333)	Energy	6 (1.500)
		Future	7 (1,429)	Resource	5 (1.800)
				Responsibility	9 (1.88)
				Green	9 (1.778)

Source: Developed by the authors of the present paper.

On Quadrant 2 it is noted that the content of the central zone of the social representation of sustainability entails issues concerning *nature* and *the environment*. According to Abric (2003), these elements are more characteristic of the social representations than any other element, since these are the first and most frequent evoked elements.

The elements with high frequency and low importance (the last ones to be evoked) are in the first periphery: *awareness, development, economy, preservation,* and *recycling.* These elements complement the ideas organized in the central core, providing sense and meaning to the social representations shared by the groups and influencing social practices.

The elements with low frequency and high importance (the first to be evoked) are in the contrast zone; they are characterized by fluidity and have a larger possibility for change, represented by the expressions: *ecology, balance,* and *future*. According to Abric (2003), this quadrant may reveal the existence of a minor subtype of a different representation, as well as it can be solely a complementary element of the 1st periphery,

or it may even indicate changes in the sense of the social representation.

The elements with low frequency and low importance (high evocation order) are in the second or farthest periphery: *environment, energy, resources, responsibility,* and *green.* Such elements form the peripheral system of the social representation and are related to social practices and individual stance with respect to the object.

Together, the elements in the central core zone – namely *environment, surroundings,* and *nature* – represent a view of sustainability based on the preservation of the environment and of nature, not including the economic and social dimensions, which are viewed by scholars as relevant to the understanding of sustainability. These data suggest the efficiency of the *marketing* strategy of sustainability, associated particularly with green constructions or environmental stamps, for reaching their goal (sales) among potential consumers.

The idea that sustainability revolves around the environmental dimension is enhanced and explained by the peripheral zones content. Although the social representation of sustainability is centered on the environmental dimension, the social and economic dimensions are included in the peripheral zones, in particular the expressions *awareness, development, economy,* and *responsibility*. The terms *future* and *balance* are found in the contrast zone; these elements may indicate the existence of a minor subgroup which views sustainability as necessary for balance and for the future, suggesting changes in the sense of social representation.

According to Sá (2003), a structural analysis of the social representations, of the peripheral system, and of the central system must be performed as a whole. The results suggest that the prevailing dimension is the environmental one, and that the other dimensions of the sustainability tripod (economic and social dimensions) are represented only in the peripheral zones, making it clear that they are in a process of transition, able or not to be gradually incorporated in the central core of the social representation of sustainability. Sustainability and its dimensions are starting to become a part of the social context, expressing a symbolic value (MOSCOVICI, 2010). As suggested in the theory, the constitutive processes of the social representations (sustainability, in this case), the familiarization, and the transformation of something new into something familiar depend on knowledge, affections, and evaluations originated by interaction and social communication, influencing and guiding individual and collective actions (JODELET, 2001; MOSCOVICI, 2010; SPINK, 1993).

Moreover, the results are in line with previous studies, which also have found that the socially shared knowledge is especially associated with the environmental dimension of sustainability (MATOS *et al.*, 2012; RAMOS; KAYAMURA, 2009). However, our results indicate a movement of transformation of the representation of sustainability by including, albeit in the periphery, issues associated with awareness, responsibility, balance, and concern for the future.

This transformation may be explained as a consequence of sustainability as a practice with recent prominence that continues to be expanded and incorporated in the social field. As a young practice, it gained exposure particularly in the business sector, although it has also been incorporated in other areas. Indeed, "companies currently focus on the environmental issue with the understanding that, in this way, they become more

competitive and profitable, given that by improving their production process they save money." (YEMAL; TEIXEIRA; NÄÄS, 2011, p. 5).

On Quadrant 3, the terms (components of the representation generated by the EVOC software) were allocated according to the sustainability tripod.

Quadrant 3 – Allocation of categories associated with the dimensions of sustainability

Dimension of Sustainability	Associated categories
Environmental	Environment, surroundings, nature, preservation, recycling, environmental, ecology, energy, resources, green.
Economic	Development, economy.
Social	Awareness, responsibility, balance, future.

Source: Developed by the authors of the present paper.

It can be noted that the *environment* category shows more diversity of elements in comparison with the other categories, suggesting that this is the most prevalent idea or knowledge when sustainability is considered.

In view of the above, the findings become relevant, given that students of engineering, future workers of the civil construction industry, those in charge of planning, monitoring and execution of more sustainable projects, and students of other fields, potential consumers, express their understanding and meaning of sustainability.

It is possible to think that this central representation associated with the environmental dimension may be linked to attitudes and actions that are conducive to sustainability and more sustainable constructions. Furthermore, it could have an impact on the perception of sustainability in civil construction, the industry responsible for the highest level of consumption of raw-material and that has invested heavily in the "green constructions" denomination, which does not necessarily mean sustainable (TAIPALE, 2012). It is worth mentioning that the "green" movement ultimately reinforces the idea that the preservation of nature and of the environment is synonymous with sustainability and sustainable constructions, disregarding the impact of the project on the social and cultural lives, on the habits, and on the surrounding economy.

These results make us ponder on how to incorporate sustainability as a subject matter in the education of the students, and how the academic circles have been dealing with the concept. And how to increasingly create spaces that integrate and expand information on sustainability and more sustainable civil constructions, given that the permanence of the representation in the environmental dimension may legitimize life styles, attitudes, values, and actions associated with sustainability.

It is understood that the pursuit of a better understanding of sustainability is crucial to broaden its concept, including its social and economic dimensions, as well as the creation of public policies that encourage changes in all realms of the production chain, stimulating the creation of a new cultural and organizational mentality which points to sustainable development.

Final remarks

In this paper we presented a study on the social representation of sustainability among college students enrolled in hard and soft sciences courses. We expected the representation among students of engineering courses to be closer to the definition of sustainability found in the literature and present in the scientific discourse. Based on the structural approach of social representations, our assumption was not supported. Furthermore, the central elements of the representation revolved around the environmental issue, even though the social and economic dimensions were present in the peripheral zones.

Our results indicate that, differently from previous researches, the subjects of the present research demonstrated a different knowledge of sustainability, therefore dynamic and under construction. While represented in an unbalanced manner, the sustainability tripod was contemplated, with the presence of all dimensions.

In light of this reality, it is understood that we face a big challenge, particularly in the civil construction sector. It is necessary to establish, in society as a whole, a broad platform to discuss and raise awareness concerning the importance of development guided by public policies and sustainable practices. It is necessary to draw the attention of the civil construction industry to the importance of more sustainable constructions. Beyond companies, it is necessary to draw consumer's attention to the false idea that a sustainable construction is one concerned solely with the preservation of the environment, disregarding other indicators.

It is essential, therefore, to encourage cultural changes among consumers, civil construction professionals (engineers, architects, etc.), the civil construction industry, funders, and political actions. So that these changes may be achieved, it is necessary to broaden the studies on sustainability, along with the production of more and new information on the concept. We believe that the dissemination of new information and meanings may be incorporated into the existing representation of sustainability, somehow transforming it and, as a result, leading to evaluation and more sustainable practices. Thus, by broadening the debate and practices around the principles of sustainability, there is a likelihood of changes in the representations, as well as of behavioral changes.

Note

i Refer to the software guide for more information on the use of EVOC and for a description of each of its functions (VERGÉS, 2002).

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Submitted on: 09/04/2014
Accepted on: 06/07/2015
http://dx.doi.org/10.1590/1809-4422ASOC130991V1922016

SOCIAL REPRESENTATION OF SUSTAINABILITY IN CIVIL CONSTRUCTION AMONG COLLEGE STUDENTS

ELZA MARIA TECHIO
JARDEL PEREIRA GONÇALVES
POLIANA NERES COSTA

***Abstract*:** Environment issues and their relationship with man have encouraged discussions and actions to prevent negative effects on the environment. To have effective programs that encourage more sustainable actions in Construction, it is necessary to know what people think and know about sustainability, the meanings and socially shared ideas. This research was developed within an interdisciplinary approach involving social psychology and civil engineering and aims to identify the social representations of college students of engineering and humanities on sustainability. It is a descriptive study that used an electronic questionnaire and EVOC for data analysis. The results point to a social representation of sustainability associated with the environmental dimension: environment, environmental, and nature. The other two dimensions of the triple bottom line, economic and social, appear superficially as peripheral representations.

Keywords: Social representation. Sustainability. Sustainable construction.

Resumo: Questões relacionadas ao meio ambiente e sua relação com o homem têm incentivado discussões e ações voltadas à prevenção dos efeitos negativos sob o meio ambiente. Para ter programas efetivos que incentivem ações mais sustentáveis na Construção Civil, é preciso saber o que as pessoas pensam e sabem sobre sustentabilidade, os significados e ideias socialmente compartilhadas. Esta pesquisa foi desenvolvida dentro de uma abordagem interdisciplinar, envolvendo a psicologia social e a engenharia civil, e tem por objetivo identificar as representações sociais de estudantes universitários de engenharias e ciências humanas sobre a sustentabilidade. Estudo descritivo, que utilizou um questionário eletrônico e o EVOC para análise dos dados. Os resultados apontaram para uma representação social da sustentabilidade associada à dimensão ambiental: *ambiente*, *meio* e *natureza.* As outras duas dimensões do tripé da sustentabilidade, a econômica e a social, apareceram superficialmente como representações periféricas.

Palavras-chave: Representação social. Sustentabilidade. Construção civil sustentável.

Resumen: Cuestiones relacionadas con el medio ambiente y su relación con el hombre han alentado debates y acciones para prevenir los efectos negativos sobre el medio ambiente. Para desarrollar programas efectivos que promuevan acciones más sostenibles en la construcción se necesita saber lo que la gente piensa y saber acerca de la sostenibilidad, los significados y las ideas socialmente compartidas. Estudio interdisciplinar que envuelve la psicología social y la ingeniería civil, y tiene como objetivo identificar las representaciones sociales de los estudiantes universitarios de ingenierías y humanidades sobre la sostenibilidad. Estudio descriptivo, que utilizó un cuestionario electrónico, y el EVOC para el análisis de datos. Los resultados apuntan para la existencia de una representación social de la sostenibilidad asociada a la dimensión ambiental: medio ambiente y naturaleza. Las otras dos dimensiones del trípode de la sostenibilidad, la económica y la social, aparecen superficialmente como representaciones periféricas.

Palabras claves: Representación social. Sostenibilidad. Construcción sostenible.