Students Knowledge level of sustainability dynamics

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ABSTRACT

The paper examines the knowledge level of sustainability dynamics in a Federal Education University in Brazil. A survey with 360 respondents was conducted online with undergraduate and graduate students; the data was analyzed by quantitative research. The results show that students have few knowledge about world affairs but present higher levels of knowledge about local sustainable issues.

Keywords: Sustainability, Knowledge level, Quantitative analysis

INTRODUCTION

The discussion about the necessity for reform in undergraduate courses is not a Brazilian phenomenon; it is a global trend in American, European, and Asian schools which seek to develop new strategies for management practices that are appropriate to the current economic, social and technological context. (BROWN, 1999; WATLING et al.: 2003). School dynamics after the 2000s present a varied panorama in Brazil and abroad. Public and private schools coexist, big and small, transnational and also municipal. Business environments change constantly and organizations, mainly the ones in charge of forming professionals, try to adapt themselves. Business world changes demand changes in schools (FRIGA, 2003). Joel Poldony, Director of the Yale School of Management in 2007, claimed that in the last thirty years business changes occur in significant ways yet the schools did not. Nevertheless, the schools have begun to understand that "present business" is no longer an option, and that critical decisions should be made in order to reach the expected goals. (LORANGE, 2005; PFEFFER; FONG, 2004).

Sustainability in management education and business schools are a fairly recent phenomenon. Following several environmental, social and financial crises in recent years, which revealed the significant social and environmental effects of businesses and other organizations' practices, an increasing number of business academics and practitioners have begun considering

that sustainability issues are imperative to the survival of business and the society (GODEMANN ET. AL., 2011).

However, despite a broad consensus that education programs require change towards better preparation of students for the complexity they will face as professionals (Atwater et al. 2008), with praxis in mind, there is still uncertainty about how embedding sustainability in the curriculum can be achieved.

One preponderant issue is a base of the knowledge that students have about the content related to sustainability, before prescribing an adaptation formula of this content to existing curriculum, it is necessary to explore student's knowledge in vigor.

Brazilian Federal Universities have made efforts to conduct programs that encourage teaching sustainability, but these initiatives are still fragmented, isolated, and low. We often see similar initiatives, which are made in different units inside the same university, without communication between them. PRME, Principles for Responsible Management Education, from the United Nations is an international entity that schools can associate and follow the proposed principles.

This way, clarity in the necessity of investigation about how much students of federal schools know about sustainability for that this new formulations or consolidations of existent actions can be developed. As a guide to sustainability topics to be treated on this research we used the subject proposed by PRME created by Foundation for Sustainable Leadership (Kedge Business School) from France.

OBJECTIVES AND METHOD

The paper examines the knowledge level of college students about sustainability dynamics in a Federal Education University in Brazil based on Sustainability Literacy Test from the Kedge Business School.

Specifically, this study aims to: Increase the level of knowledge of undergraduate and graduate students of Federal University of Uberlandia based on the questionnaire Sustainability Literacy Test of Kedge Business School; France; Group the answers observed in dimensions by Factorial Analysis; Explore dependency relations between dimensions by Regression Analysis; Evidence the knowledge aspects of students of Federal University of Uberlandia about sustainability concepts.

The field research was conducted by a survey, containing 352 valid answers. The instrument adopted presents 8 variables of the study: 1. founding principles of sustainable development; 2. environmental trends and key figures of global local issues; 3. social trends and key figures of global local issues; 4.economy trends and key figures of global local issues; 5. organizational governance; 6. human rights and community involvement and development; 7. Environment; and 8. fair operating and labor practices and consumer issues.

Both factorial and regression analysis were used. The factorial analysis is in charge of grouping the variables in factors, in this work, in an exploratory way. The goal is to analyze in a combined way the intensity of the knowledge absorbed by students. On the other hand, regression analysis, according to Sykes (2013) is a statistical tool for the investigation of relationships between variables. In this case, it will be applied trying to find a correlation between the factors after factorial analysis application.

THEORY BACKGROUND

Education For Sustainanility

In our current society, there is a growing awareness on the need to build a sustainable future. The meaning of sustainability and their implied characteristics has been widely discussed, however there's no agreement among the scholars concerning its meaning, although the indispensable practices are supported by a more informed action and worried with the balance between environmental systems, economical and socials, in a planetary level. (FREIRE, 2007).

During the meeting of Rio 92, according to Jacobi (2003), the Treaty on Environmental Education for Sustainable Societies and Global Responsibility, which sets principles and an action plan for environmental educators, establishing a relation between public policy of environmental education and sustainability, was implemented. The author explains that the treaty highlights participatory processes in promoting the environment, toward to their recuperation, conservation and improvement, as well as to the improvement of the quality of life.

In order to reach environmental sustainability, Sachs (1993 apud ARAUJO; BIZZO, 2005, p. 2), points out that it is necessary to simultaneously consider some aspects, such as: socials, aiming to reduce distances between life patterns of social groups; economical, enabled by an allocation and efficient management of the resources, evaluated much more about macros social criteria than micro managerial and by regular flow of public and private investments; ecological, involving measures to reduce the consume of resources and residues production, measures to intensify researches, introduce clean technologies and saving resources and to define rules that allow a proper environmental protection; spatial, contemplating a more balanced setting of rural-urban issue; cultural, seeking endogenous conceptions of involvement that respect peculiarities of each ecosystem, of each culture and each place.

In this manner, explains Freire (2007, p. 145), sustainability requires that, "The individualism should be replaced by more solidary practices, implying, for that reason, an education for the values." Act number 9.795/99, 2nd Article, brings up that environmental education is an "essential and permanent component, and it should be present, in an articulated way, in all levels and modalities of the educational process, in formal and informal categories" (BRASIL, 1999).

However, it is believed that university is a privileged place, and that it can cooperate with the creation of a culture that stimulates practices, attitudes and positive behaviors related to environment (GUIMARÃES, TOMAZELLO, 2003).

There is a worry about environmental dimension and this is clear on Act nº 9.795/99, Article 11,

> Environmental Dimension should appear on curriculums of teachers' formation, in all levels and all subjects.
> Only Paragraph – Teachers in activity should have complementary formation on their acting areas, aiming to attend properly to fulfillment of principles and objectives National Policy of Environmental Education (BRASIL, 1999).

Teachers' formation aims not to require working with ideas, concepts, values, skills and attitudes that collaborate to a society environmentally responsible, without any previous formation or continuing education. (GUIMARÃES, TOMAZELLO, 2003).

This way, teachers want to develop, with their students, environmental formation, they need to [...] have on their initial formation and continuing learning situations that enable them to discuss and introduce environmental issues, in conformity with sustainability discourse. (ARAUJO; BIZZO, 2005, p. 3). Guimarães e Tomazello (2003) affirm that no matter the area of concentration, teachers must have a wide contact with environmental issues, allowing a

reflection about the subject and the possibility of appearing proposals of action on their practices at school.

However, to reach this purpose, something needs to be changed, "or in a curricular level, or in a practices level, being necessary for that, a transformation on our way of thinking and acting in school daily" (FREIRE, 2007, p. 143).Thus, environmental education is defined by Act nº 9.795/99, Article 1st as the processes whereby individuals and collectivity build social values, knowledge, skills, attitudes and competences toward environment conservation, common use property of the people, essential to a healthy quality of life and its sustainability (BRASIL, 1999).

For that reason it is necessary that environmental education highlights the environmental problems that comes from disorder and degradation of the quality of life on the cities and regions (JACOBI, 2003).

Guimarães e Tomazello (2003) believe that, initially, to break inertia of college structure, the subject Environmental Education (EE), as a guiding axis to the different subjects of the curriculum – transversal theme – or as an autonomous subject, could involve the elaboration/cooperation of projects inter/multi disciplinary, with the participation of many professors, working in a cooperative way.

Because of the complexity and dynamism of environmental issues, Araujo e Bizzo (2005) claim that to insert sustainability discourse on the educational process is fundamental that the model of teachers' formation be supported by reflection of his own practice, aiming to resolve its problems, including conceptual, and that the curriculum of the teacher to inseparable of students' curriculum, as well as their own formation.

Guimarães e Tomazello (2003) believe that there are no short term solutions to detain totally the degradation of the environment quality and quality of life on the planet, but there is no much time to action on this area and the contribution of education is the most waited, and is the most effective, according to the authors.

In this manner, Freire (2007) corroborates declaring that education for sustainability and the necessity of thinking on a different way demands the effort of all those people that are worried about youth future. According to the author social changes demand the adoption of measures on an educational system level preparing the future generation for the future challenges.

About PRME

Discussion about sustainability has been gaining strength since 1960 decade. For this reason organizations seek alternative ways to increase their contribution on environmental preservation and on the promotion of a more sustainable world. In this sense, higher education institutions have also adopted practices aiming to create college *campi* that are socially and environmentally responsible. (LAHAISE, POZZEBON, 2010).

The first attempt of institutionalization of these practices, in association with the Management Schools and United Nations, was done by Princípios para Educação Empresarial Responsável (PRME). The program was released in 2007 on the summit meeting *Global Compact Leaders in Geneva and today there are 571 signers, being 24 Brazilian institutions* (PRME, 2014). PRME development marks an important step toward a reevaluation of the activities developed at Businesses schools (BURCHELL et al., 2014).

The purpose of PRME comprehends a gradual and systemic change concerning Higher Education Institutions, containing three specific objectives: continuous improvement, the creation of a learning network and presentation of a general report to the interested parts. This report is a fundamental part of the process, once it allows Exchange of information and the exchange of effective practices between the participant institutions. (PRME, 2014).

According to Fiate et al. (2012, p.13), "stimulate and support, in a global level, education, investigation, innovation, and entrepreneurship in the area of responsible management", constitute the mission of UN initiative concerning 6 principles: (1) Purpose: development of students capacities for them to be future generators of sustainable value for the companies and society in general, and work on a sustainable and inclusive global economy; (2) Values: incorporation of values of global social responsibility about academic activities and curriculums, as well as that ones portrayed in international initiatives, as Global Pact of United Nations; (3) Method: creation of educational structures, materials, processes, and an environment that allows efficient learning experiences for a responsible leadership. (4) Research: general comprehension about the role, dynamic, organizations' impact on the creation of sustainable value, in social, environmental and economic dimensions; (5) Partnership: interaction between managers of private organizations in order to extend the general knowledge about their challenges in fulfillment of social environmental responsibilities, in addition to explore effective approaches of solution these challenges; (6) Dialogue: facilitation and support to the debate between educators, students, companies, government, consumers, media, civil society organizations, and others interested in sustainability and social responsibility that involves global critical issues.

Businesses Schools, when become a volunteer concerning the challenge of incorporate these principles; receive an engagement model offered by PRME to serve as a reference to the systematics necessary changes. So, schools should conform their strategic objectives and the mission to United Nation values incorporated on the six principles (FIATES et al., 2012).

It is believed that PRME can reduce the distance existent between academic discourse and sustainability practice in the majority of management schools spread around Brazil and the world. There are many debates and teaching about the importance of sustainable development inside the organizations, but few Management schools incorporate those practices on its management and teaching. (LAHAISE; POZZEBON, 2010).

Godemann et al. (2014) point that, although various studies attest that PRME adhesion promotes a bigger engagement of colleges and students in researches about sustainability and responsible management, there is still a lot to do: it is needed a clear policy about research strategies in sustainability area, an schedule focused on ethics and responsibility.

Studies comparing signatory and non-signatory schools of PRME, Burchell et al. (2014) identified that there is little evidence that the first had a significant process on development of responsible management on its curriculums in comparison to the second. According to the authors, the governance approach adopted by PRME doesn't produce, by itself, the type of change and development that was thought. However, being a signatory school can be a way that the institution can engender their organizational change.

RESULTS

For the analysis of the results was considered the use of multiple scales of indicators to define each variable, adopting, therefore, the average value of the answers. The total number of the complete answers of the questionnaire applied resulted in 352 respondents. The statistical analysis was achieved using the statistic software SPSS version 20. The values of the descriptive statistic of research data are disposed on the following table 1:

Table 1: Descriptive Statistics of Variables

Variables	Value Min.	Value Max.	Average	Standard Dev.	Asymmetry	Kurtosis
Founding Principles	9	9,1	5,125	1,717	0,071	-0,450
Environment trends	0	9,0	4,972	1,946	-0,236	-0,286
Social trends	0	8,3	4,077	1,878	-0,125	-0,289
Economy trends	0	10	5,637	2,030	-0,193	-0,440
Organizational Governance	0	10	3,371	3,531	0,558	-0,854
Human Rights Community Involvement Development	0	9	4,700	1,939	-0,073	-0,517
Environment	0	10	5,327	2,539	0,048	-0,888
Fair Operating Practices Labor Practices Consumer Issues.	0	10	4,977	2,079	0,153	-0,554

Source: Own elaboration

It is possible to observe through Table 1 that average of the variables is around 5,00 to 4,0 points in scale; in other words, it is below the maximum value of the scale score used on the questionnaire, indicating that the average of right answers it is not high, especially to the variable 'Organizational Governance'. The numbers presented in terms of Standard Deviation of the variables show that the answers changed in a certain way, and that the variables 'Environment' and 'Organizational Governance' are the ones that presented the most dispersion in comparison to the average, so, the answers were different. Asymmetry negative values indicate a subtle curve of data distribution on the right side of the normal curve, and the negative kurtosis demonstrates an elongated curve of data.

The Kolmogorov-Smirnov Normality test was the resource used to evaluate the distribution of the research data. According to the test, p-value of all variables generated a value below 5% (0,05), which indicates a rejection of a hypothesis of data normality. A Pearson correlation analysis was realized among the variables of the research. The results show that most of the values of coefficient R is under 0,7 (with statistic significance from 0,01 to 0,05), that indicates, according to Hair (2005) that the strength of the association among variables is from moderate to little, and there is few co-linearity among them.

The factorial exploratory analysis was achieved by using the method of rotation varimax, that resulted on the following coefficients of measures from the main measurement to be considered for this type of evaluation:

Table 2: Factorial Exploratory Analysis

Variables	Cargo Factorial 1	Cargo Factorial 2	H²	MSA	Factors
Founding Principles	0,802	0,169	0,672	0,851	1
Environment trends	0,560	0,378	0,456	0,891	1
Social trends	0,349	0,780	0,731	0,776	2
Economy trends	0,785	0,063	0,621	0,887	1
Organizational Governance	0,087	0,563	0,325	0,882	2
Human Rights Community Involvement Development	0,151	0,812	0,683	0,719	2
Environment	0,702	0,293	0,579	0,877	1
Fair Operating Practices Labor Practices Consumer Issues.	0,799	0,200	0,679	0,815	1

Source: Own Elaboration

Table 2 presents the indexes of factorial cargo resultants of the reduction process of the number of dimensions found, from a total of 8. We notice that, considering prerequisites of Hair et al (2009) for factorial analysis, only the variables Social Trends, Organizational Governance e Human Rights comprehend cargo above 0,5 for the second factor. The others variables are grouped on factor 1. The variance explained for both factors was 59,32%, close to the index defined as ideal for Hair et al. (2009), which is superior to 60%. This allows us to conclude that only two factors should be considered as representative of the data dimension.

According to Hair et al. (2009) the coefficient of communality of the variables presented on the research should be more than 0,5. In the table this index appears represented by coefficient H², where it is possible to perceive that two variables do not present value inside the minimum limit that is necessary. That means that both variables variable 'Organizational Governance' and 'Environment Trends' present a low estimation of variance shared with the other variables represented on the study.

The technique used for measurement of adjustment was Kaiser-Meyer-Olkin (KMO) test. The coefficient of measurement of adjustment of the sample normally varies from 0 to 1, in conformity with Hair et al. (2009), the biggest index better explained how much a variable can be measured without error by the other variables. It is perceived that most of the variables have values above 0,7 and that they can follow presuppose of adequacy of the sample, revealing that there is no necessity of elimination of some variable.

The reliability coefficient measured was 0,792; what attributes consistency among the measures of each variable, in an adequacy on scale.
For the reliability analysis was used Alpha of Cronbach test that allows to identify if how much the scale of the measure adopted is free of error, evaluating their consistency (HAIR ET AL., 2009).

Data Analysis

The descriptive statistics allows considering that some respondents did not reach an average value of the answer to certain questions, that is, the answer marked out by the respondent was wrong, since the minimum value was zero, which do not make available an average score. The scale adopted was based on a multiple scale that is a choice in what is considered an average value of right answers, by a combination of indicators of the variable evaluation, and so it is established a measure for evaluation. For some variables was reached the value of 10 points for some respondents, which means infer that exists a higher knowledge related to factors like corporative governance, economical trends, environment and labor operational practices and issues related to consume. However, when investigating the average value and standard deviation it is perceived a weak point in relation to the knowledge of most respondents in corporate governance, followed by the issues related to environment.

The lowest value of standard deviation found refers to the variable Founding Principles, which also represents and average superior than 5 points that make possible to evaluate that knowledge on fundamental issues in sustainability is higher than if it is compared to other variables of evaluation of the knowledge about the topic. It can be also analyzed that the access to information about trends in economy seems to be bigger among students, because the average of right answers for this variable was the biggest among all mensuration variable.

From the various statistic tests realized on the exploratory factorial analysis it is possible to consider that the sample was adequate to statistic significance purposes and that the scale reached a reliability coefficient. The factorials cargo indicates the presence of two factors, reinforced by octagonal rotation. The variables Founding Principles, Environment trends, Economy trends, Environment and Fair Operating Practices Labor Practices Consumer Issues are grouped on the factor 1 and the other are grouped on a second factor, according to the coefficients of its factorial cargo.

Thus, factor one that groups and reduces the 4 variables previously mentioned in an only factor was defined by Fundamental factors in Sustainability – Operations, environment and economy. And factor 2 that grouped issues related to governance and a social action was denominated of Social Factors, Human Development and Governance. Its notable that basic information and that ones that gather content of environment and economy are grouped in another factor, which leads us to comprehend that the understanding of environmental and economical issues are more similar than social issues and human development (humans rights and development). The governance issues were the less known by respondents, followed by social trend issues.

These considerations indicate that the knowledge of economical dimension, referring to sustainability is more known, and this way, may be the most publicized on the academic environment, and mainly, on business environment. The questionnaire elaborated by PRME does not treat cultural issues from Brazil, or body of knowledge that is discussed on the undergraduate courses of the target university. There is no program of environmental education or in sustainability effectively applied on the courses, in special to the environmental themes, social trends and corporate governance.

FINAL CONSIDERATIONS

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In general, the values obtained on the students' answers are low. This indicates that, in general, the level of knowledge about sustainability is below the expected average. Specifically, the areas where are more variation of the level of knowledge of the answers are "Environment' and 'Organizational Governance'. The results of factorial analysis indicate that the 8 variables could be grouped in 2 factors with pertinent factorial cargo: factor 1 represented the fundamental variables in sustainability like operations, environment and economy, and factor 2 representing social variables like human rights, human development an governance. The answers to the factor 1 are more homogeneous that the answers presented to factor 2. It has also presented a higher level of knowledge by students that factor 2. This way, we can consider that students have more knowledge about local factors (related to their parents) and also economical factors, being this one of the pillars of sustainability. Students dominate less sustainability issues associated to social dimension and global matters.

Finally, we can say that the demonstrated knowledge is fruit of teaching in other areas, related to its area of formation that relates to sustainability manners. Agronomy students know more about economic aspects and so successively. It is clear heterogeneity of knowledge that students have and there is a lack of initiative of teaching and a more coherent and extensive research for the university.

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