The relationship between the incorporation of sustainability in higher education and the student's behavior: self-reported sustainable behavior scale

Aline Bento Ambrósio Avelar and Milton Carlos Farina
Postgraduate Program in Administration at USCS – University of São Caetano do Sul, São Caetano do Sul, São Paulo, Brazil

Abstract

Purpose – This study aims to describe the development and validation of a scale that measures the self-reported sustainable behavior of students in higher education institutions (HEIs) regarding their knowledge on incorporating sustainability into education, research and outreach, mediated by the attitude toward the triple bottom line.

Design/methodology/approach – The scale was applied to students from HEIs, with a total of 759 valid cases and respondents from various countries. The technique used was structural equation modeling and multigroup analysis using the SmartPLS software.

Findings – Respondents' self-reported sustainable behavior scale was affected by their economic attitude and the knowledge about sustainability that they assimilated. However, the economic dimension received more attention from the participating students. Both for the total sample and for respondents older than the study average, environmental attitude and social attitude did not affect the self-reported sustainable behavior.

Research limitations/implications – The study's limitations can offer opportunities for future research, as more constructs should be inserted into the model to check the existence of differences in relation to self-reported sustainable behavior, such as beliefs in the affective dimension.

Practical implications – The practical implication is on the fact that HEIs can use the scale of self-reported sustainable behavior to evaluate the incorporation of sustainability in the students behavior. Thus, with appropriate guidelines, HEIs will be able to analyze the results looking for to achieve balance in the incorporation of sustainability in education, research and outreach in a transdisciplinary way, improving HEI program and preparing future decision-makers to collaborate for sustainable development.

Originality/value – The originality of the study is on the verification of the influence of sustainability teaching in higher institutions through self-reported sustainable behavior scale, based on the sustainable development goals in three dimensions – cognitive, affective and conative.

Keywords Sustainability, Higher Education, Sustainable Behavior, Structural Equation Modeling, Multigroup Analysis

Paper type Research paper

1. Introduction

There is a demand for higher education institutions (HEIs) to train responsible decision-makers who have the knowledge and skills necessary to put sustainability at the center of their activities to create value for businesses, society and the environment (Elkington, 1994, 1999; Gibson, 2001; Godemann *et al.*, 2014). In 2015, the United Nations (UN) proposed the 2030 Agenda, which was coordinated between governments, organizations, academia and civil society. This agenda outlines 17 sustainable

development goals (SDGs) for facing the biggest global challenges to sustainable development (UNITED NATIONS, 2015).

Exploration of the theme of sustainable development has significantly increased in approaches to higher education, with the aim of providing access to information, knowledge and the dissemination of best institutional practices by HEIs and organizations (Springett, 2005; Crespo et al., 2017; Weybrecht, 2017; Franco et al., 2019). It has been investigated not only in relation to planning, pedagogy, curricula and research but also in research on institutional practices (Larrán et al., 2016; Annan-Diab and Molinari, 2017; Fleacă et al., 2018; McCowan, 2016; Painter-Morland and Slegers, 2017).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has proposed guidelines so that HEIs and educators can foster an understanding of sustainable development, provide everyone with the opportunity to acquire knowledge, values and attitudes and encourage individual, group and social behavior in general (Nicolaides, 2006).

Michalos et al. (2012) and Biasutti and Frate (2016) measured the knowledge, attitudes of students in relation to sustainable development based on UNESCO (2006) studies. Gericke et al. (2019) developed and validated a scale that measures Sustainability Consciousness from Sweden aged 18–19 years old, based on cognitive, affective and conative dimensions. These three studies do not have indicators based on the SDGs and were not applied to higher education students. Thus, the present study identified gaps in the previous literature on self-reported sustainable behavior (SRSB) based on the SDGs from the cognitive, affective and conative dimensions.

Eagly and Chaiken (1993) classified self-reported behavior as the tendency for a respondent to engage in behavior for or against the attitude object. In the present study, the SRSB is understood as the tendency of the student to engage in behavior based on his or her environmental attitude, social attitude and economic attitude.

Higher education and more specifically management education has been accused of being obsessed with teaching a narrow capitalist ideology and of cultivating a short-term culture of making a profit, which is considered the goal of business (Beusch, 2014; Giacalone and Wargo, 2009). However, HEIs can contribute to the student's experience in higher education. It is necessary to understand how students' educational experiences influence their SRSB. The study aims to analyze the extent to which the SRSB of students in higher education is affected by knowledge and by the environmental, social and economic attitudes based on the dimensions of sustainability.

The justification for this study is the relevance of the fourth SDG, which concerns quality education and aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (UNITED NATIONS, 2015, p. 18). Furthermore, it is important that HEIs and their educators are responsible for generating knowledge that will be transferred to organizations and society. In addition, the study aims to meet UNESCO's recommendation for the development of more research, innovation, monitoring and evaluation to promote and prove the effectiveness of good practices to achieve sustainable development.

2. Literature review

In 1987, the Brundtland Commission defined sustainable development as development that "meets the needs of the present, without compromising the ability of future generations to meet their own needs" [World Commission on Environment and Development (WCED), 1987, p. 43]. One way to define sustainability is through the three-pillar model created by Elkington (1994), which categorizes sustainability according to social, environmental and economic factors and points out that "material gains are not sufficient measures or

preservers of human well-being" (Gibson, 2001, p. 7). Managers and students should consider the triple bottom line (TBL), this means social, environmental and economic.

Implementing SDGs in education, research and outreach in a transdisciplinary way present challenges (Annan-Diab and Molinari, 2017; Leal Filho *et al.*, 2019; McCowan, 2016). In addition, HEIs, through their educators and institutional actions, can make students aware of the need to engage with achieving sustainable development (Dyllick, 2015) by expanding their knowledge and engaging them with the sustainability theme (Kassel *et al.*, 2016; Leal Filho *et al.*, 2019).

The literature has already questioned the way in which sustainability is taught (Wilson and Thomas, 2012). The institutional promotion of studies on sustainability in HEIs (SHEIs) and the need to train teachers are important so that students can know the subject deeply in theory and engage with educational practices that consider sustainability in all areas (Findler *et al.*, 2019). This is expected to lead a change in students' behavior in relation to the sustainability theme.

Higher education has received harsh criticism regarding courses aimed at management, which have been considered as examples of teaching geared to short-term profit as the ultimate goal of organizations (Beusch, 2014; Giacalone and Wargo, 2009). In addition, HEIs have been accused of considering sustainability as a competitive advantage in the educational market and of using their commitment to sustainability as means to improve their image and attract students and teachers (Doherty *et al.*, 2015). However, education should be the strategy to promote sustainable development through the implementation of the SDGs in education, research and outreach (Avelar *et al.*, 2019). There is recognition that sustainability in higher education requires acting together within the environment and society, with a long-term and integrated vision based on the principles of human life and the world in which we live (Dyllick, 2015; Figge *et al.*, 2002; Leal Filho *et al.*, 2019).

Such awareness of the serious social, economic and environmental challenges can affect behavior, and this is, in turn, influenced by cognitive (knowledge) and emotional (attitude) pathways (Fredricks *et al.*, 2004; Kahu, 2013). Cognitive engagement refers to investment in learning and the preference for challenges, learning motivation, learning goals, self-regulation and planning (Appleton *et al.*, 2006; De Clercq *et al.*, 2013; Fredricks *et al.*, 2004). Academic engagement refers to behavior that achieves a minimal "threshold" level of learning, whereas cognitive engagement refers to an internal investment of cognitive energy to attain more than a minimal understanding of the course content (Zhoc *et al.*, 2018).

The present study searched for authors who investigated how sustainability can be inserted into education, research and outreach. It aims to measure the student's knowledge and the influence of this on their sustainable attitude. Thus, the three dimensions of sustainability are represented in the affective stage so that they can influence the sustainable behavior of students in higher education.

2.1 Knowledge

Hermes and Rimanoczy (2018) recommended an innovative pedagogical approach. Such innovative approaches collaborate for the development of the sustainability mindset, given that values, purposes and emotions provide a holistic and profound learning experience (Kassel *et al.*, 2016). This is a complex exercise, as the impacts materialize along complex paths, particularly in the area of research and education.

Sustainability needs to be taught through education, research and outreach. Annan-Diab and Molinari (2017) evaluated the curricula of HEIs to identify how to outline and implement the practice of responsible management and relate it to the SDGs. The results emphasize that the broad agenda of the SDGs must be assessed to identify how to relate the subjects of

disciplines to the SDGs. Kolb *et al.* (2017), in addition to evaluating the curricula of HEIs, proposed a conceptual model for incorporating the SDGs into the curriculum and research, giving rise to outreach partnerships through local, regional and international.

The cognitive dimension is paramount in the formation of attitudes (Ajzen, 1991) and the objective is to measure the student's knowledge about how sustainability is inserted in education, research and outreach. Therefore, the first hypothesis is:

H1. The student's knowledge about sustainability in education, research and outreach in HEIs positively affects the environmental attitude (*1a*), economic attitude (*1b*) and social attitude (*1c*).

The construct of SHEIs was developed from the literature to measure students' knowledge about how the theme sustainability is inserted in the HEI in which they study.

2.2 Attitude

The affective dimension represented by the attitude corresponds to the feelings, emotions and moods reflected mainly in attitude items since attitudes can be defined as a lasting positive or negative feeling about an object, person or issue (Fredricks *et al.*, 2004; Kahu, 2013; Zhoc *et al.*, 2018).

Michalos *et al.* (2012) measured the knowledge, attitudes and behavior of high school students in relation to sustainable development, with indicators formulated from UNESCO (2006) studies. Biasutti and Frate (2016) described the development and validation of a scale of attitudes toward sustainable development and indicated that future research should analyze the relationship between attitude and sustainable behavior. Gericke *et al.* (2019) developed and validated a scale that measures sustainable awareness. All three of these studies used UNESCO's (2006) three dimensions of sustainability.

Sustainable development is the result of harmonization between the social, environmental and economic pillars (Elkington, 1999). The environmental dimension refers to the awareness of resources, the fragility of the physical environment, how human activity and decisions affect it (UNESCO, 2006, 2015) and how material processing needs to be reduced to mitigate pressure on natural systems (Bartelmus, 2003). The economic dimension assesses the potential for economic growth based on the assessment of social consumption. The social dimension considers how democratic systems should offer an opportunity to express opinions, select governments, form a consensus and resolve differences (UNESCO, 2006, 2015).

A student's environmental and social attitudes can be reflected in his or her SRSB. The proposed model investigates the relationship between attitudes in which the social and the environmental depends on the economic (Elkington, 1994; Nonet *et al.*, 2016). Therefore, we propose the second and third hypotheses:

H2. Economic attitude positively influences the social attitude.

H3. Economic attitude positively influences the environmental attitude.

The constructs of social attitude (AS), environmental attitude (EnA) and economic attitudes (EcA) were developed from the aforementioned literature to measure attitude as a mediator of SRSB.

2.3 Behavior

The conative dimension in this research is represented by SRSB, which assesses the tendency of a respondent to engage in behavior for or against the object of attitude

(Eagly and Chaiken, 1993). The conative dimension is the action that derives from and results in the students' experiences with the three dimensions of sustainability.

The scales by Michalos *et al.* (2012), Biasutti and Frate (2016) and Olsson and Gericke (2016) do not consider the students' knowledge about the incorporation of sustainability in education, research and outreach that can influence attitudes and sustainable behavior. Moreover, these scales were proposed in a period prior to the SDGs. No scales based on the SDGs and relating to knowledge and attitude have been found to measure the SRSB of students in higher education.

HEIs and teachers must make use of UNESCO guidelines so that students have the opportunity to acquire the knowledge that influences their attitudes and, consequently, their behavior (Nicolaides, 2006). Inserting the SDGs into the educational practices and pedagogical proposals of HEIs can result in a change in attitudes and behavior (Annan-Diab and Molinari, 2017; Leal Filho *et al.*, 2019; McCowan, 2016). Therefore, our fourth hypothesis is:

H4. Environmental attitude (*4a*), economic attitude (*4b*) and social attitude (*4c*) positively affect students' self-reported sustainable behavior.

Educators who develop skills in sustainability can promote significant changes in sustainable behavior (Kassel *et al.*, 2016). Thus, higher education can collaborate in the dissemination of best practices in HEIs and organizations (Crespo *et al.*, 2017; Springett, 2005; Weybrecht, 2017). Students have the ability to learn and such learning can change behavior through the use of their past experiences (Leal Filho *et al.*, 2019). Given this, we propose our fifth hypothesis:

H5. Knowledge about sustainable education, research and outreach positively influence self-reported sustainable behavior.

The specification of the structural model (Figure 1) is based on theoretical foundations and the hypotheses indicated in this subsection. However, the indicators that make up each of the constructs have been defined and evaluated by experts on the subject.

The SRSB construct and model was developed in this study by the authors (Figure 1) from the aforementioned literature to analyze how the SRSB of higher education students is affected by knowledge and attitudes from education, research and outreach.

2.4 Age

Olsson and Gericke (2016) studied the sustainability awareness of sixth, ninth and 12th-year students in Sweden. They measured a reduction in sustainable awareness between the sixth and ninth years, with subsequent recovery in the 12th year. This indicates that the older the student, the greater the sustainability awareness. Wiernik *et al.* (2013) found a consistently positive relationship between increasing age and proenvironmental engagement among adults. Negev *et al.* (2008) found that younger students exhibit more environmentally friendly attitudes and behaviors than adolescents. An inverse relationship was also found by Otto and Kaiser (2014), who identified a positive relationship between increasing age and proenvironmental engagement among adults. Age is an important factor that should be included in investigations into the effects of environmental education and sustainability programs (Boeve-De Pauw and Van Petegem, 2013). Thus, we hypothesize:

H6. There is a homogeneity related to the age of the respondent students regarding self-reported sustainable behavior.
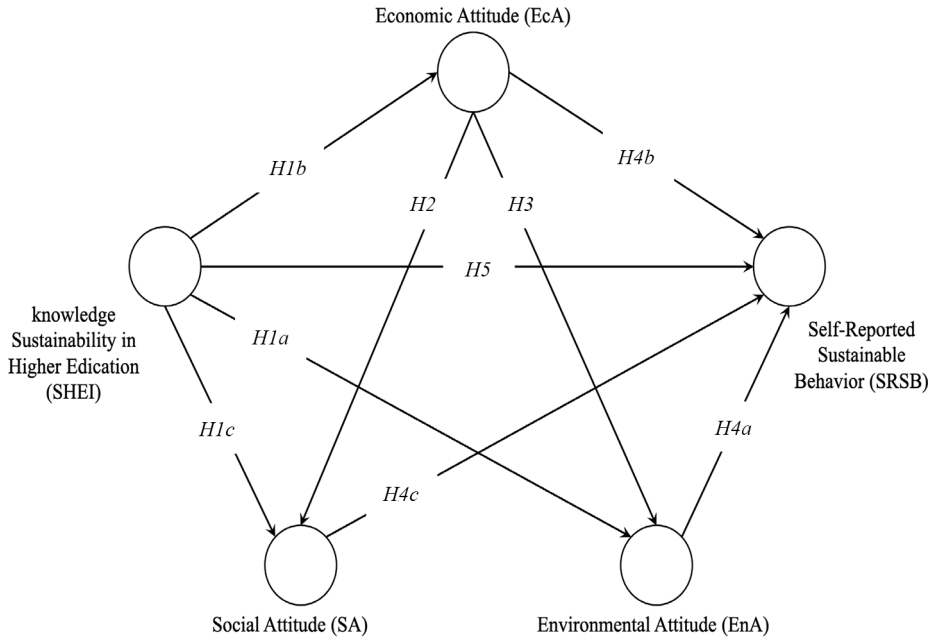
Figure 1.
Theoretical model

3. Methodology

3.1 Data collection and participants

The literature review made it possible to analyze questionnaires directly or indirectly relating to the research objective (Biasutti and Frate, 2016; Gericke *et al.*, 2019; Michalos *et al.*, 2012). The indicators proposed for the scales that make up the model are based on Kassel *et al.* (2016), Annan-Diab and Molinari (2017) and Kolb *et al.* (2017). The indicators were analyzed by nine specialists (five Brazilians, one American, one Australian and two Germans) in sustainability and experts in modeling structural equations. The specialists' analysis resulted in a questionnaire with 28 indicators with a semantic differential-type scale (0 = Strongly disagree; 10 = Strongly agree). The responses were collected through online research.

Several HEIs were invited and nine (six from Brazil and one each from Germany, the USA and Spain) accepted. Based on literature (Elkington, 1994, 1999; Gibson, 2001; Godemann *et al.*, 2014; Beusch, 2014; Giacalone and Wargo, 2009), the study chose to apply the survey in students of courses related to management, where was mentioned the gap to form future responsible decision-makers.

The collection instrument should be applied in person, as it was planned. However, due to the COVID-19 pandemic period, there was a need for the survey to be conducted online, using Google Forms. Thus, the collection instrument was applied by professors of management-related disciplines; at the end of a class online, the collection period was from September to November 2020. The scale was available in three languages: Portuguese, English and Spanish. Respondents were enrolled in management-related courses. All semesters were chosen because the subjects relating to sustainability were covered in different semesters in the HEIs.

The collection instrument was distributed to 772 respondents in business schools and universities that teach applied sciences. Missing responses and outliers were excluded (Hair *et al.*, 2016). Three attributes were collected: sex, age and nationality. The questionnaire was composed of the cognitive, affective and conative dimensions to measure SRSB. A total of 759 respondents were considered, with 60.7% (461) of respondents being female and 39.3% (297) male. The average age of respondents was 26 years, with a coefficient of variation of 32.33%; minimum age was 17 years and the maximum was 64 years.

The average of 26 is the result of the calculation of the arithmetic average of the respondents in the sample. The average refers to the age scores of respondents. The average was obtained by the summatory of age of each participant divided by the total number of participants.

Table 1 shows the nationality of the respondents. There was a concentration of respondents in Brazil, and it was not possible to conduct an analysis between countries.

Age was used as a categorical moderator, a nominal variable coded as a dummy to separate the groups in the multigroup analysis (MGA), namely, Age 01 and Age 02 (Figure 2). The Age 01 group was formed by respondents aged 17–26 years (508 students; 67%) and the Age 02 group consisted of those aged 27–64 years (222 students; 33%). The separation of groups Age 01 and Age 02 was defined by the average age (26 years) obtained from the sample and this procedure was carried out to check if it was a homogeneous sample in relation to age, based on Otto and Kaiser (2014), Boeve-De Pauw and Van Petegem (2013) and Negev *et al.* (2008).

The separation in two groups has the objective to identify the pattern of response in a group of ages with younger respondents (Age 01) with other entering in the maturity phase (Age 02). As mentioned in the literature, age could have an impact on the engagement with ecological behavior (Wiernik *et al.*, 2013).

3.2 Data analysis

Tests relating to convergent validity, discriminant validity and model reliability were performed, with parameters from Henseler *et al.* (2009), Fornell and Larcker (1981), Hair *et al.* (2016), Cohen (1998) and Chin (1998). The measurement model was outlined using the SmartPLS software, based on the proposed theoretical model.

The evaluation of the measurement model was based on empirical measures of the relationships between the indicators and the constructs (average variance extracted [AVE], composite reliability, discriminant validity and cross-loads). The evaluation of the structural model was based on empirical measures (*t*-test, R^2, f^2, Q^2 and path coefficient) (Hair *et al.*, 2016).

This study used structural equation modeling (SEM) with partial least squares estimation, through the use of the SmartPLS3 software, to evaluate the measurement model, evaluation of the structural model, mediation and moderation with categorical variable (MGA). Confirmatory factor analysis was performed to provide an assessment of

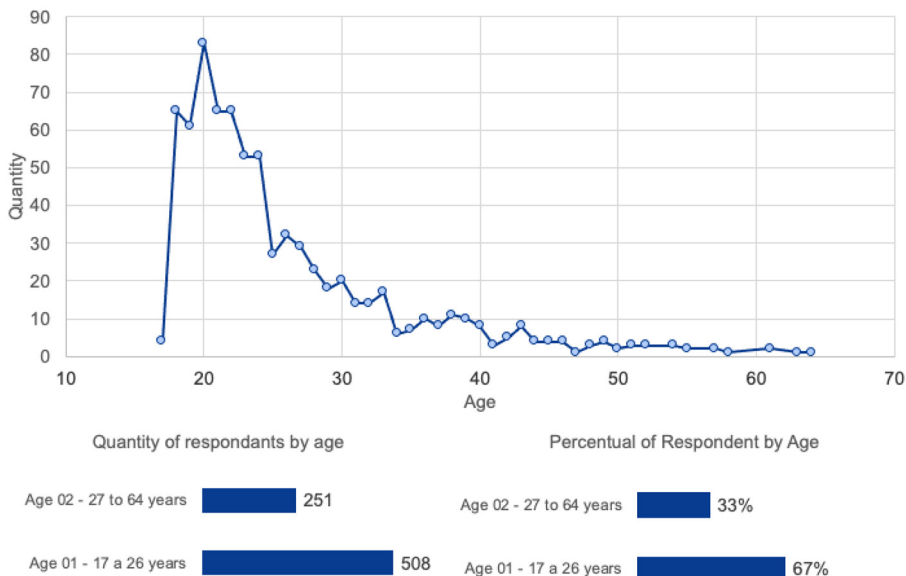| Country	Total	(%)
Brazil	603	79.45
USA	99	13.04
Germany	33	4.35
Spain	24	3.16
Total	*759*	*100*

Table 1.
Sample group by country

Figure 2.
Sample group by age range

convergent and discriminant validity, and SEM was then performed to provide path coefficients (Anderson and Gerbing, 1988). Convergent validity, discriminant validity and composite reliability were at the level of the latent variables. For discriminant validity, the diagonal values of the correlation matrix are the square roots of the AVE and must be greater than the values of its lines (Henseler *et al.*, 2009). Discriminant validity was verified by the analysis of the crossed-factor loads (Chin, 1998). Another way used to assess discriminant validity is to use the criteria suggested by Fornell and Larcker (1981) and Chin (1998), observing the correlations between the constructs both vertically and horizontally. Convergent validity is verified from the AVE, with the average variance having to be greater than 0.5 (Henseler *et al.*, 2009). Composite reliability checks the model's reliability and each construct must be greater than 0.7 (Hair *et al.*, 2016).

The quality of the adjusted model can be studied by means of Pearson's determination coefficients assessment (R^2), which explains the structural model from the variances of endogenous indicators (Cohen, 1998). The effect size (f^2) assists in the analysis of how much each indicator contributes to the model (Hair *et al.*, 2016). The path coefficient, on the other hand, has the function of evaluating causal relationships and must be interpreted in the light of theory (Hair *et al.*, 2016). The survey measured the respondents' knowledge, attitude and behavior in relation to sustainability based on the cognitive, affective and conative dimensions.

4. Results
The results are presented by descriptive statistics, SEM and MGA. The measurement model was outlined in SmartPLS based on the proposed theoretical model. The results are presented through convergent validity, discriminant validity, composite reliability and hypothesis testing. All factorial loads are above 0.6, thus meeting the criteria of Chin (1998) and Hair *et al.* (2016). This demonstrates that the model's constructs have good validity (see Table 2).

Constructs	1	2	3	4	5
1. EnA	0.733				
2. EcA	0.545	0.756			
3. SA	0.344	0.493	0.784		
4. SRSB	0.262	0.416	0.248	0.779	
5. SHEI	0.344	0.474	0.333	0.392	0.71
Composite reliability	0.776	0.8	0.761	0.861	0.858
Average variance extracted (AVE)	0.537	0.571	0.615	0.608	0.504

Note: EnA: environmental attitude, EcA: economic attitude, SA: social attitude, SRSB: self-reported sustainable behavior, SHEI: sustainability in higher education institutions; Diagonal values are the square root of AVE. As they are greater than the correlations between the values outside the diagonal, there is discriminant validity; All correlations are significant at 1%

Table 2.
Correlation matrix
between latent
variables ($n = 759$)

The AVE of all constructs is greater than 0.5, which meets the criteria of Henseler *et al.* (2009) and the composite reliability for each construct was greater than 0.61, which meets the criteria of Hair *et al.* (2016). Therefore, the convergent, discriminant and reliability validity are adequate (Fornell and Larcker, 1981; Hair *et al.*, 2016; Henseler *et al.*, 2009).

The discriminant validity indicates whether the constructs are independent of each other (Hair *et al.*, 2016) and the criterion of Fornell and Larcker (1981) compares the square root of the AVE values with the correlations of the constructs and this correlation must be greater than the correlation with any other construct. The correlations between the constructs are between 0.71 and 0.78; such values are understandable given that they are related to the sustainability theme. It is important to note that the correlations in Table 2 meet the criteria of Hair *et al.* (2016) and Fornell and Larcker (1981).

SRSB showed reliability of 0.861, with the AVE of 0.608 being higher than the criteria of Chin (1998) and Hair *et al.* (2016). Thus, the indicators are adequate in relation to the reliability of internal consistency, which indicates that the indicators do not present biases (Bido and Silva, 2019).

To verify the discriminant validity, Table 3 presents the values of the square roots of the strokes. These values were compared with Pearson's coefficients of determination, which meet the criteria of Fornell and Larcker (1981). The validation of the measurement model resulted in the exclusion of indicators. For the analysis of the hypotheses, the determination coefficients (R^2) and the student's t-test with the bootstrapping resources of the SmartPLS 3 software were used. The resulting model from the PLS algorithm has 18 indicators to measure SRSB (Table 3). Furthermore, it has data on the validity convergent and discriminant, so the cross-loads are presented.

The values in bold Table 3 refer to the factorial loads. These have higher values than the crossed loads, which are represented by the other values outside the diagonal. All crossed loads when analyzed vertically, are smaller than factorial loads (in bold), thus confirming the discriminant validity (Chin, 1998; Hair *et al.*, 2016).

Testing of hypotheses was performed using a resampling technique that used bootstrapping. Table 4 presents the results of the structural model for assessing multicollinearity, the relative importance of predictors and the explained variance of endogenous variables.

The relationships EnA $\rightarrow$ SRSB (0.690) and SA $\rightarrow$ SRSB (0.584) obtained values below 1.96 ($p > 5\%$; $t < 1.96$), so the *H4a* and *H4c* were rejected.

Indicator	EnA	EcA	SA	SRSB	SHEI
EnA01 – environmental protection and people's quality of life are directly linked	*0.741*	0.457	0.303	0.174	0.317
EnA02 – companies should do more for the environment	*0.777*	0.403	0.31	0.194	0.235
EnA03 – when companies interfere with the environment, they produce disastrous consequences	*0.677*	0.323	0.121	0.215	0.19
EcA01 – economic policies must increase sustainable production, even if it means spending more government resources	0.46	*0.737*	0.36	0.243	0.341
EcA02 – sustainable practices are essential for business	0.369	*0.748*	0.358	0.287	0.38
EcA03 – I prefer to work for a company that adopts sustainable practices	0.406	*0.782*	0.398	0.405	0.356
SA01 – society must further promote equal opportunities for all genders	0.262	0.394	*0.747*	0.11	0.251
SA02 – companies should do a lot more for society	0.278	0.383	*0.82*	0.268	0.272
SRSB01 – I closely observe what companies do to achieve the sustainable development goals in their practices	0.161	0.304	0.189	*0.774*	0.303
SRSB02 – I frequently talk to my fellow classmates about environmental subjects and issues	0.222	0.355	0.199	*0.766*	0.358
SRSB03 – I don't buy products/services from companies with a bad reputation for caring for the environment or on social issues	0.218	0.32	0.21	*0.806*	0.265
SRSB 04 – I don't buy products/services from companies that have a bad reputation for caring for their stakeholders (e.g. employees, suppliers, customers)	0.213	0.311	0.173	*0.771*	0.287
SHEI01 – I have knowledge regarding the importance of incorporating the sustainable development goals (UN) in the curriculum of my course	0.257	0.325	0.287	0.232	*0.725*
SHEI02 – sustainability, in the educational institution in which I study, is treated in more than two disciplines	0.114	0.262	0.122	0.329	*0.649*
SHEI03 – I have knowledge regarding the importance of incorporating the sustainable development goals (UN) in the research carried out by the educational institution in which I study	0.254	0.301	0.222	0.261	*0.768*
SHEI04 – I have knowledge regarding the importance of incorporating the sustainable development goals (UN) in outreach developed by the educational institution in which I study	0.317	0.42	0.279	0.282	*0.816*
SHEI05 – the information given by my professors influences the development of my sustainability mindset	0.28	0.366	0.269	0.268	*0.659*
SHEI06 – the educational institution in which I study promotes sustainability projects, with an educational character, with society	0.201	0.314	0.206	0.317	*0.623*

Table 3.
Factor loadings on each dimension of the scale (cross-loading) (n = 759)

Notes: EnA: environmental attitude, EcA: economic attitude, SA: social attitude, SRSB: self-reported sustainable behavior, SHEI: sustainability in higher education institutions; All factor loads are significant at 1%

As for the importance of the predictors, Cohen (1998) indicated the effect size, where $f^2 = 0.02$ is a small effect, $f^2 = 0.15$ is a medium effect and $f^2 = 0.35$ is a large effect. Thus, EnA in SRSB (*H2a*) has a small effect and the rest have medium effects.

The explanatory variance of the endogenous variables can be assessed using the adjusted R^2 value. Cohen (1998) established gradations for R^2: $R^2 = 2\%$ is small; $R^2 = 13\%$ is medium and $R^2 = 26\%$ is large. The model showed EA with the highest percentage of R^2, with 30.4% (large) and the lowest percentage was from SRSB, with 22% (average).

The MGA by age considered Age 01 with 508 cases and Age 02 with 251 cases. The criterion for separating the groups was the average age, with the Age 01 group consisting of respondents aged from 17 to 26 years (67%) and the Age 02 group formed by respondents aged 27 to 64 years (33%). The execution of the MGA was through permutation, as it contains the measurement invariance of composite models (MICOM) test to assess the invariance of the measurement model.

The Age 01 and Age 02 groups with their respective indicators do not have the same factorial loads. However, content validity and the use of the scale in future studies were privileged. Moreover, the difference is relatively small. Table 5, taken from MICOM, shows a correlation between scores equal to one, as there is a comparison of these in the Age 01 and Age 02 groups (Bido and Silva, 2019).

Table 6 shows the outputs from SmartPLS using the permutation function (Calculate > Permutation > Signatory and Nonsingular Groups > Start Calculation). It indicates that

Structural path	Hypotheses	VIF	f^2	Structural coefficient	Standard error	*t*-value	*p*-value
SHEI → EnA	*H1a*(+)	1.3	0.014	0.111	0.040	2.77	0.006
SHEI → EcA	*H1b*(+)	1.0	0.290	0.474	0.034	14.13	0.000
SHEI → SA	*H1c*(+)	1.3	0.017	0.128	0.042	3.07	0.002
SHEI → SRSB	*H5*(+)	1.3	0.059	0.247	0.040	6.15	0.000
EnA → SRSB	*H4a*(+)	1.5	0.000	0.018	0.045	0.40	0.690
EcA → EnA	*H3*(+)	1.3	0.271	0.492	0.032	15.52	0.000
EcA → SA	*H2*(+)	1.3	0.195	0.432	0.042	10.35	0.000
EcA → SRSB	*H4b*(+)	1.8	0.054	0.278	0.048	5.83	0.000
SA → SRSB	*H4c*(+)	1.4	0.000	0.022	0.040	0.55	0.584

Notes: EnA: environmental attitude, EcA: economic attitude, SA: social attitude, SRSB: self-reported sustainable behavior, SHEI: sustainability in higher education institutions; f^2 = size of Cohen's (1998) effect, VIF: variance inflation factor; *P*-values are estimated by bootstrapping with 5,000 repetitions

Table 4. Evaluation of structural model

Constructs	Original correlation	Permutation correlation	5.0%	Permutation *p*-values
EnA	1.0	1.0	1.0	0.178
EcA	1.0	1.0	1.0	0.061
SA	1.0	1.0	1.0	0.407
SRSB	1.0	1.0	1.0	0.017
SHEI	1.0	1.0	1.0	0.365

Notes: EnA: environmental attitude, EcA: economic attitude, SA: social attitude, SRSB: self-reported sustainable behavior, SHEI: sustainability in higher education institutions
Source: Results generated by SmartPLS

Table 5. MICOM for MGA of Age 01 and Age 02

Structural path	Hypotheses	Age 01	Age 02	t-value Age 01	t-value Age 02	p-value Age 01	p-value Age 02
EnA → SRSB	H4a(+)	0.035	0.060	14,853	7,994	0.000	0.000
EcA → EnA	H3(+)	0.043	0.088	12,042	2,351	0.000	0.019
EcA → SA	H2(+)	0.059	0.072	4,620	3,718	0.000	0.000
EcA → SRSB	H4b(+)	0.057	0.074	0.788	1,778	0.431	0.076
SA → SRSB	H4c(+)	0.050	0.076	0.781	0.817	0.435	0.414
SHEI → EnA	H1a(+)	0.048	0.069	3163	0.233	0.002	0.816
SHEI → EcA	H1b(+)	0.038	0.062	12,729	7,438	0.000	0.000
SHEI → SA	H1c(+)	0.045	0.080	2,820	1,612	0.005	0.107
SHEI → RSB	H5(+)	0.049	0.067	5,404	3,428	0.000	0.001

Table 6.
Multigroups for Age
01 and Age 02 from
SmartPLS results

Notes: EnA: environmental attitude, EcA: economic attitude, SA: social attitude, SRSB: self-reported sustainable behavior, SHEI: sustainability in higher education institutions. *P*-values estimated by bootstrapping with 5,000 repetitions

there are significant differences between the analyzed relationships. However, the MGA made it possible to identify that these differences occur for Age 01 and Age 02.

The MGA identified that, as in the structural model, the relationships of EnA → SRSB and SA → SRSB obtained values below 1.96 ($p > 5\%$; $t < 1.96$), so *H4a* and *H4c* were rejected for the Age 01 and Age 02 groups. However, *H1a* and *H1c* obtained significant values for Age 01 but not for the Age 02 group. Thus, it becomes possible to affirm that there is a difference in sustainable behavior between age groups since the groups are statistically different in the affective stage, more specifically in relation to social attitude and environmental attitude.

5. Discussion

In the present study results, students' knowledge about how sustainability is incorporated into education, research and outreach in the HEIs (SHEI) in which they study positively influences EnA (*H1a*), EcA (*H1b*) and SA (*H1c*). Therefore, the respondent students recognized that the HEI at which they were studying incorporated sustainability in education, research and outreach in a multidisciplinary way. Similar results were previously observed on other studies that approached the incorporation of SHEI (Annan-Diab and Molinari, 2017; Crespo *et al.*, 2017; Fleacă *et al.*, 2018; Kolb *et al.*, 2017; Leal Filho *et al.*, 2019; Weybrecht, 2017).

Another important point as finding of the present study is that approaching the sustainability theme in a transdisciplinary way requires a joint action between educators, managers of HEIs and students to evaluate curricula to identify how to implement and outline responsible management practices and relate them to the SDGs. These results have direct relationship to discussions from the authors Kolb *et al.* (2017) and Annan-Diab and Molinari (2017). It is important to note that authors such as Crespo *et al.* (2017) and McCowan (2016) have argued that student behavior can change through their experience in higher education.

Another important result of the present study was the recognition by the respondent students that their teachers' information on sustainability influenced the sustainability mindset. This result is aligned with previous other study that have the same approach (Kassel *et al.*, 2016).

The theoretical model has six hypotheses, two of which were not supported statistically: *H4a* ("Environmental attitude positively affects the self-reported behavior of students") and *H4c* ("Social attitude positively affects the self-reported sustainable behavior of students"). The rejection of *H4a* and *H4c* indicates that economic attitude is the one that (most) influenced the behavior of students participating in the research. This can be justified by the fact that the students were on courses related to management. Thus, HEIs must act to balance the relationships between dimensions to achieve sustainable development. These results from the present study share and reinforce the studies discussions from the authors Elkington (1994) and Nicolaides (2006).

However, the confirmation of *H4b* ("Economic attitude positively affects students' self-reported sustainable behavior") demonstrates that the economic dimension, which is directly related to economic growth based on the efficient use of natural resources and social justice, received more attention from respondents when compared to the other dimensions. This result of the present study has similarity to the study discussion by Findler *et al.* (2019), that evidence of similar behavior.

Nonet *et al.* (2016) argued that higher education has thus far often been centered purely on economic factors, so it has to include the social and environmental aspects. So, based on results obtained in the present study, the recommendation is that students on management-related courses need to assimilate, acquire, transform and exploit TBL to influence sustainable attitude and behavior, as the consumer or investor seeks information on whether a company is socially responsible and environmentally sustainable. This recommendation and approach were also observed by Elkington (1994).

Furthermore, as mentioned in the previous literature, students' behavior can change through experience in HEI and learning programs. This represents the importance of HEI having a strategy to include the sustainability in a transdisciplinary way to achieve the expectation to form more responsible future decision-makers, allowing them to be aware of the relevance of placing sustainability at the center of the organization's activities. This can achieve a balance between the dimensions of sustainability to arise sustainable development and placing education at the center of the strategy to promote sustainable development and also reinforces the SDGs.

Educators are in positions of strong influence and reach, and they have the opportunity, skills and perspectives to become accelerators of change, but they need support from the educational institutions at which they work to do so. Authors like Kassel *et al.* (2016) and Nicolaides (2006) reinforce this point of view, aligned with the results of the present research.

In addition, based on the result of the present research, it is evident that HEIs need to address sustainability not only in planning, pedagogy, curricula and research but also in institutional practices. Moreover, this evidence was also explored from diverse literature like Annan-Diab and Molinari (2017), Crespo *et al.* (2017), Fleacă *et al.* (2018), Kolb *et al.* (2017), Leal Filho *et al.* (2019), Painter-Morland and Slegers (2017) and Weybrecht (2017).

How to approach sustainability is open to question, according to the literature, although there is a need to train teachers so that they can engage in the subject and teach through theory and, above all, adopt educational practices that consider sustainability in all dimensions (Findler *et al.*, 2019; Wilson and Thomas, 2012).

The results identifying differences in relation to the age of the respondents corroborate studies that demonstrate the effects of age on the implementation of environmental and/or sustainability programs. Authors like Negev *et al.* (2008), Olsson and Gericke (2016), Otto and Kaiser (2014) and Wiernik *et al.* (2013) have similar findings highlighted. Finally, our results show that younger respondents self-reported better sustainable behavior than

did older respondents. As a comparison, Wiernik *et al.* (2013) found a positive relationship between increasing age and proenvironmental engagement among adults and Olsson and Gericke (2016) found a positive relationship between increasing age and sustainable awareness.

6. Conclusions

HEIs, by working together with educators, provide access to information and knowledge about sustainability, which allows future decision-makers in an organization to be aware of the relevance of placing sustainability at the center of the organization's activities and thus to achieve a balance between the dimensions of sustainability to achieve sustainable development.

It is challenging for HEIs to insert the SDGs in education, research and outreach in a transdisciplinary way that achieves a balance between the three dimensions of sustainability. HEIs and educators seek in their educational practices to be centered on the criticality of the students and to encourage students to be protagonists during their formal higher education experiences. The approach should be based on pedagogical proposals that focus on the criticality of the subjects, with a view to changing or at least promoting sustainable behavior.

The search for sustainable behavior cannot be understood only as of the rational management of environmental, economic and social issues. The results have implications for research, policy and the practice of sustainability education. HEIs and their educators have the opportunity to foster student responsibility for accelerating the process of sustainable development and to reinforce their own role of becoming student drivers and leaders of the systemic change that is so necessary.

The students in the analyzed sample who were between 17 and 26 years old had social attitudes, and environmental attitudes positively affected by the content addressed in sustainability in education, research and outreach in the HEIs in which they were studying. However, this was not the case for those students who were between 27 and 64 years old. Thus, applying the age attribute in MGA by the approach to sustainability in education, research and outreach in higher education, the result demonstrates the relevance to consider the age of students as a point to attention once HEIs that accepted to participate in the survey have similar and relevant initiatives on sustainability.

HEIs need to foster actions, projects and programs that engage their educators to share experiences, insights and theories and that create a support network for teaching-learning research with a single objective: to accelerate the move toward a sustainable planet. This study indicates that educators are responsible for influencing the sustainability mindset through the incorporation of a systematic approach to understanding that goes beyond technical knowledge.

As a conclusion, the present study considers that the following evidences are relevant points that can support HEIs to achieve the balance of implementation of sustainability in their programs:

- placing education at the center of the strategy to promote sustainable development also reinforces the SDGs;
- the faculty is the main driver of sustainability in an HEI;
- HEIs and their educators have responsibility for accelerating the process of sustainable development in students;
- age of student is a point to attention in the approach to sustainability in education, research and outreach; and

- teaching staff are responsible for influencing the sustainability mindset and need institutional support based on teacher training for this purpose.

This research makes a practical contribution because it can be used as a tool to support HEIs aiming to analyze the SRSB of their students to direct program planning and foster the formation of future decision-makers in organizations. This study also contributes to understanding how knowledge, mediated by the TBL attitudes, influences the self-reported behavior of higher education students in HEIs. Furthermore, it promotes discussion about how to improve the insertion of sustainability in education, research and outreach in a transdisciplinary way, at the same time as generating a better connection with the performance in the management of organizations. In addition, the study fills the research gaps observed both in theory and in practice on student's sustainable behavior based on the SDGs and which impacts on guidelines in HEIs and educators in incorporating sustainability education, research and outreach in a transdisciplinary way.

A limitation of this study is that it did not analyze educational practices on sustainability and the context in which sustainability was inserted in education, research and outreach of the researched HEIs. Another limitation is that more constructs must be inserted in the model to verify whether there are differences in relation to SRSB, such as beliefs in the affective stage. Regarding nationalities of the students, there was a concentration of respondents in Brazil, and it was not possible to conduct an analysis between countries that was another limitation of the study. Furthermore, MGA was used in an exploratory way to assess differences between groups. The study is a "photo" of the moment; that is, it is necessary to measure the evolution of students from their experiences in higher education. Thus, for future studies, applying the SRSB scale at the beginning and end of short-, medium- and long-term courses, modules and courses is recommended.

References

Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211, doi: 10.1016/0749-5978(91)90020-T.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, p. 411, doi: 10.1037/0033-2909.103.3.411.

Annan-Diab, F. and Molinari, C. (2017), "Interdisciplinarity: practical approach to advancing education for sustainability and for the sustainable development goals", *The International Journal of Management Education*, Vol. 15 No. 2, pp. 73-83, doi: 10.1016/j.ijme.2017.03.006.

Appleton, J.J., Christenson, S.L., Kim, D. and Reschly, A.L. (2006), "Measuring cognitive and psychological engagement: validation of the student engagement instrument", *Journal of School Psychology*, Vol. 44 No. 5, pp. 427-445, doi: 10.1016/j.jsp.2006.04.002.

Avelar, A.B.A., Silva-Oliveira, K.D. and Silva Pereira, R. (2019), "Education for advancing the implementation of the sustainable development goals: a systematic approach", *The International Journal of Management Education*, Vol. 17 No. 3, p. 100322, doi: 10.1108/IJSHE-09-2020-0350.

Bartelmus, P. (2003), "Dematerialization and capital maintenance: two sides of the sustainability coin", *Ecological Economics*, Vol. 46 No. 1, pp. 61-81, doi: 10.1016/S0921-8009(03)00078-8.

Beusch, P. (2014), "Towards sustainable capitalism in the development of higher education business school curricula and management", *International Journal of Educational Management*, Vol. 28 No. 5, pp. 523-545, doi: 10.1108/IJEM-12-2012-0132.

Biasutti, M. and Frate, S. (2016), "A validity and reliability study of the attitudes toward sustainable development scale", *Environmental Education Research*, Vol. 23 No. 2, pp. 214-230, doi: 10.1080/13504622.2016.1146660.

Bido, D.S. and Silva, D. (2019), "SmartPLS 3: especificação, estimação avaliação e relato", *Administração: Ensino e Pesquisa*, Vol. 20 No. 2, pp. 1-31, doi: 10.13058/raep.2019.v20n2.1545.

Boeve-De Pauw, J. and Van Petegem, P. (2013), "The effect of Flemish eco-schools on student environmental knowledge, attitudes and affect", *International Journal of Science Education*, Vol. 33 No. 11, pp. 1513-1538, doi: 10.1080/09500693.2010.540725.

Chin, W.W. (1998), "The partial least squares approach for structural equation modeling", in Marcoulides, G.A. (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates, Hillsdale, NJ, pp. 295-336.

Cohen, J. (1998), *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed., Lawrence Erlbaum Associates, Hillsdale, New York, NY.

Crespo, B., Míguez-Álvarez, C., Arce, M.E., Cuevas, M. and Míguez, J.L. (2017), "The sustainable development goals: an experience on higher education", *Sustainability*, Vol. 9 No. 8, p. 1353, doi: 10.3390/su9081353.

De Clercq, M., Galand, B. and Frenay, M. (2013), "Chicken or the egg: longitudinal analysis of the causal dilemma between goal orientation, self-regulation and cognitive processing strategies in higher education", *Studies in Educational Evaluation*, Vol. 39 No. 1, pp. 4-13, doi: 10.1016/j.stueduc.2012.10.003.

Doherty, B., Meehan, J. and Richards, A. (2015), "The business case and barriers for responsible management education in business schools", *Journal of Management Development*, Vol. 34 No. 1, pp. 34-60, doi: 10.1108/JMD-06-2013-0082.

Dyllick, T. (2015), "Responsible management education for a sustainable world: the challenges for business schools", *Journal of Management Development*, Vol. 34 No. 1, pp. 16-33, doi: 10.1108/02621711311318337.

Eagly, A.H. and Chaiken, S. (1993), *The Psychology of Attitudes*, Harcourt Brace Jovanovich College Publishers.

Elkington, J. (1994), "Towards the sustainable corporation: win-win-win business strategies for sustainable development", *California Management Review*, Vol. 36 No. 2, pp. 90-100, doi: 10.2307/41165746.

Elkington, J. (1999), "Partnerships from Cannibals with Forks: The Triple Bottom Line of 21st-century Business", *Environmental Quality Management*, Vol. 8.1, pp. 37-51.

Figge, F., Hahn, T., Schaltegger, S. and Wagner, M. (2002), "The sustainability balanced scorecard: linking sustainability management to business strategy", *Business Strategy and the Environment*, Vol. 11 No. 5, pp. 269-284, doi: 10.1002/bse.339.

Findler, F., Schönherr, N., Lozano, R. and Stacherl, B. (2019), "Assessing the impacts of higher education institutions on sustainable development: an analysis of tools and indicators", *Sustainability*, Vol. 11 No. 1, p. 59, doi: 10.3390/su11010059.

Fleacă, E., Fleacă, B. and Maiduc, S. (2018), "Aligning strategy with sustainable development goals (SDGs): process scoping diagram for entrepreneurial higher education institutions (HEIs)", *Sustainability*, Vol. 10 No. 4, p. 1032, doi: 10.3390/su10041032.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50, doi: 10.1177/002224378101800104.

Franco, I., Saito, O., Vaughter, P., Whereat, J., Kanie, N. and Takemoto, K. (2019), "Higher education for sustainable development: actioning the global goals in policy, curriculum and practice", *Sustainability Science*, Vol. 14 No. 6, pp. 1621-1642, doi: 10.1007/s11625-018-0628-4.

Fredricks, J.A., Blumenfeld, P.C. and Paris, A.H. (2004), "School engagement: potential of the concept, state of the evidence", *Review of Educational Research*, Vol. 74 No. 1, pp. 59-109, doi: 10.3102/00346543074001059.

Gericke, N., Boeve-de Pauw, J., Berglund, T. and Olsson, D. (2019), "The sustainability consciousness questionnaire: the theoretical development and empirical validation of an evaluation instrument for stakeholders working with sustainable development", *Sustainable Development*, Vol. 27 No. 1, pp. 35-49, doi: 10.1002/sd.1859.

Giacalone, R. and Wargo, D. (2009), "The roots of the global financial crisis are in our business schools", *Journal of Business Ethics and Education*, Vol. 6, pp. 1-24, doi: 10.5840/jbee200969.

Gibson, R.B. (2001), *Specification of Sustainability-Based Environmental Assessment Decision Criteria and Implications for Determining "Significance" in Environmental Assessment*, Canadian Environmental Assessment Agency, Ottawa.

Godemann, J., Bebbington, J., Herzig, C. and Moon, J. (2014), "Higher education and sustainable development", *Accounting, Auditing and Accountability Journal*, Vol. 27 No. 2, pp. 218-233, doi: 10.1108/AAAJ-12-2013-1553.

Hair, J.F. Jr., Hult, G.T.M., Ringle, C.M. and Sarstedt, M.A. (2016), *Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed., Sage [e-book], Thousand Oaks, CA.

Henseler, J., Ringle, C.M. and Sinkovics, R.R. (2009), "The use of partial least squares path modeling in international marketing", *Advances in International Marketing*, Vol. 20, pp. 277-319, doi: 10.1108/S1474-7979(2009)0000020014.

Hermes, J. and Rimanoczy, I. (2018), "Deep learning for a sustainability mindset", *The International Journal of Management Education*, Vol. 16 No. 3, pp. 460-467, doi: 10.1016/j.ijme.2018.08.001.

Kahu, E.R. (2013), "Framing student engagement in higher education", *Studies in Higher Education*, Vol. 38 No. 5, pp. 758-773, doi: 10.1080/03075079.2011.598505.

Kassel, K., Rimanoczy, I. and Mitchell, S.F. (2016), "The sustainable mindset: connecting being, thinking and doing in management education", *Academy of Management Proceedings*, Vol. 2016 No. 1, p. 16659, doi: 10.5465/ambpp.2016.16659abstract.

Kolb, M., Fröhlich, L. and Schmidpeter, R. (2017), "Implementing sustainability as the new normal: responsible management education – from a private business school's perspective", *The International Journal of Management Education*, Vol. 15 No. 2, pp. 280-292, doi: 10.1016/j.ijme.2017.03.009.

Larrán, M., Herrera, J. and Andrades, F.J. (2016), "Measuring the linkage between strategies on sustainability and institutional forces: an empirical study of Spanish universities", *Journal of Environmental Planning and Management*, Vol. 59 No. 6, pp. 967-992, doi: 10.1080/09640568.2015.1050485.

Leal Filho, W., Shiel, C., Paço, A., Mifsud, M., Ávila, L.V., Brandli, L.L. and Caeiro, S. (2019), "Sustainable development goals and sustainability teaching at universities: falling behind or getting ahead of the pack?", *Journal of Cleaner Production*, Vol. 232, pp. 285-294, doi: 10.1016/j.jclepro.2019.05.309Get.

McCowan, T. (2016), "Universities and the post-2015 development agenda: an analytical framework", *Higher Education*, Vol. 72 No. 4, pp. 505-523, doi: 10.1007/s10734-016-0035-7.

Michalos, A.C., Creech, H., Swayze, N., Kahlke, P.M., Buckler, C. and Rempel, K. (2012), "Measuring knowledge, attitudes and behaviours concerning sustainable development among tenth grade students in Manitoba", *Social Indicators Research*, Vol. 106 No. 2, pp. 213-238, doi: 10.1007/s11205-011-9809-6.

Negev, M., Sagy, G., Garb, Y., Salzberg, A. and Tal, A. (2008), "Evaluating the environmental literacy of Israeli elementary and high school students", *The Journal of Environmental Education*, Vol. 39 No. 2, pp. 3-20, doi: 10.3200/JOEE.39.2.3-20.

Nicolaides, A. (2006), "The implementation of environmental management towards sustainable universities and education for sustainable development as an ethical imperative", *International Journal of Sustainability in Higher Education*, Vol. 7 No. 4, pp. 414-424, doi: 10.1108/14676370610702217.

Nonet, G., Kassel, K. and Meijs, L. (2016), "Understanding responsible management: emerging themes and variations from European business school programs", *Journal of Business Ethics*, Vol. 139 No. 4, pp. 717-736, doi: 10.1007/s10551-016-3149-z.

Olsson, D. and Gericke, N. (2016), "The adolescent dip in students' sustainability consciousness: implications for education for sustainable development", *The Journal of Environmental Education*, Vol. 47 No. 1, pp. 35-51, doi: 10.1080/00958964.2015.1075464.

Otto, S. and Kaiser, F.G. (2014), "Ecological behavior across the lifespan: why environmentalism increases as people grow older", *Journal of Environmental Psychology*, Vol. 40, pp. 331-338, doi: 10.1016/j.jenvp.2014.08.004.

Painter-Morland, M. and Slegers, R. (2017), "Strengthening 'giving voice to values' in business schools by reconsidering the 'invisible hand' metaphor", *Journal of Business Ethics*, Vol. 147 No. 4, pp. 807-819, doi: 10.1007/s10551-017-3506-6.

Springett, D. (2005), "Education for sustainability in the business studies curriculum: a call for a critical agenda", *Business Strategy and the Environment*, Vol. 14 No. 3, pp. 146-159, doi: 10.1002/bse.447.

UNESCO (2006), "United Nations decade of education for sustainable development 2005-2014: draft international implementation scheme", UNESCO, Paris, available at; https://unesdoc.unesco.org/ark:/48223/pf0000139023 (accessed 16 April 2020).

UNESCO (2015), "Shaping the future we want: UN decade of education for sustainable development (2005–2014)", Final Report, UNESCO, Paris, available at; https://unesdoc.unesco.org/ark:/48223/pf0000230171 (accessed 16 April 2020).

UNITED NATIONS (2015), "Transforming our world: the 2030 agenda for sustainable development", available at: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf (accessed 16 April 2020).

Weybrecht, G. (2017), "From challenge to opportunity: management education's crucial role in sustainability and the sustainable development goals – an overview and framework", *The International Journal of Management Education*, Vol. 15 No. 2, pp. 84-92, doi: 10.1016/j.ijme.2017.02.008.

Wiernik, B.M., Ones, D.S. and Dilchert, S. (2013), "Age and environmental sustainability: a meta-analysis", *Journal of Managerial Psychology*, Vol. 28 Nos 7/8, pp. 826-856, doi: 10.1108/JMP-07-2013-0221.

Wilson, D.C. and Thomas, H. (2012), "The legitimacy of the business of business schools: what's the future?", *Journal of Management Development*, Vol. 31 No. 4, pp. 368-376, doi: 10.1108/02621711211219040.

World Commission on Environment and Development (WCED) (1987), *Our Common Future: The United Nations World Commission on Environment and Development*, Oxford University Press, Oxford.

Zhoc, K.C., Webster, B.J., King, R.B., Li, J.C. and Chung, T.S. (2018), "Higher education student engagement scale (HESES): development and psychometric evidence", *Research in Higher Education*, Vol. 60 No. 2, pp. 219-244, doi: 10.1007/s11162-018-9510-6.

Further reading

Borges, J.C., Ferreira, T.C., De Oliveira, M.S.B., Macini, N. and Caldana, A.C.F. (2017), "Hidden curriculum in student organizations: learning, practice, socialization and responsible management in a business school", *The International Journal of Management Education*, Vol. 15 No. 2, pp. 153-161, doi: 10.1016/j.ijme.2017.02.011.

About the authors

Aline Bento Ambrósio Avelar, PhD Professor of the Postgraduate Program in Business Administration at the Municipal University of São Caetano do Sul (PPGA – USCS). Google Scholar: https://scholar.google.com/citations?user=7gXN78kAAAAJ&hl=en, Aline Bento has a PhD, and master's degree in Business Administration and specialization in Tax Law Public Administration and Tribute Law from the University of Sao Caetano do Sul in Brazil. Her bachelor's degree is in economics from the University of Londrina. Dr Bento's research focus is on sustainability in higher education, corporate social responsibility (CSR) and engagement in higher education, with papers published in international journals and conferences. Dr Bento has more than 15 years' experience as a university professor for undergraduate, graduate and MBA courses (Brazil and Colombia), as an Economist, Market Analyst in Corporations and Consultancies. She is also a member at LEAP (PRME Working Group on the Sustainability Mindset, United Nations); and Guest Speaker (SDG Facilitator) at Hult University since 2020. Aline Bento Ambrósio Avelar is the corresponding author and can be contacted at: aline.avelar@online.uscs.edu.br

Milton Carlos Farina is a Professor of the Postgraduate Program in Business Administration at the Municipal University of São Caetano do Sul (PPGA – USCS) since 2010 and of the undergraduate courses at the same institution. Google Scholar: https://scholar.google.com/citations?user=JXcRqpMAAAAJ&hl=ja. Doctorate in Administration Faculty of Economics, Administration and Accounting, University of São Paulo (2009) – FEA-USP. Master in Business Administration from Fundação Getulio Vargas – SP (2002) – EAESP – FGV. Research Line – Organizational Networks and Innovation. Topics of interest: industrial and commercial clusters, innovation networks, value co-creation, electronic waste disposal, reverse logistics, green IT, principles for sustainable education, sustainable management and social network analysis.