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How Are Students' Pro-environmental Behaviors Formed? A Qualitative Content Analysis

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Abstract

Universities play an undeniable role in directing and explaining behavior patterns. This raises expectations from universities to institutionalize pro-environmental behaviors in their structure. It is so of crucial importance to identify factors affecting students' pro-environmental behaviors as the most important human resources at universities. Therefore, the purpose of this study was to identify factors affecting students' pro-environmental behaviors. The statistical population of this qualitative study was composed of agricultural students at Razi University, Kermanshah, Iran. According to the the research aim, the PRISMA flow-chart were used to refine and select the appropriate data. Data were analyzed by using NVivo10 software. Results show that students' pro-environmental behavior is affected by 10 factors, the most important ones being values and norms, experiences, social capital, knowledge and awareness, university infrastructure, organizational culture, curriculum contents, self-efficacy, and concerns over environmental degradation. Cluster analysis shows that organizational culture and individual values influence all other factors that underpin students' pro-environmental behaviors.

Keywords:
Content analysis, Pro-environmental behavior, Razi University, Values education

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INTRODUCTION

Local air pollution, a decline in global water levels, infiltration of chemical pollutants into groundwater, depletion of the ozone layer, climate change, and widespread destruction of aquatic organisms are the result of economization with no regard for sustainability (Handl, 2012). Therefore, many environmental challenges are rooted in human actions (Thondhlana & Latshwayo, 2018; Stickney, 2022) so researchers and policy-makers believe that these problems can be reduced by promoting pro-environmental behaviors (Weber et al., 2020; Jena & Behera, 2017; Bleys et al., 2017). The emergence of this idea in the 1960s and 1970s provoked interests in environmental studies in academic and scientific communities so that scientists in the fields of psychology, environment, agriculture, sociology, anthropology, and political science all initiated attempts to bring scientific knowledge into the environmental behavior researches (Shafiei & Maleksaeidi, 2020). In this regard, it has been revealed that educational instaurations, as well as educational programs, play an undeniable role in environmental sustainability through determining students' pro-environmental behaviors (Wals, 2014). Therefore, a better understanding of the factors determining the pro-environmental behaviors of individuals, particularly university students and graduates, is important since academic education aims to prepare students for important societal roles as researchers, professionals, and future decision-makers (Liu et al., 2018; Vicente-Molina et al., 2018; Valor et al., 2020). Accordingly, university graduates can influence environmental sustainability not only through their personal behavior but also as innovators and leaders in their professional roles when developing new products and services or by enhancing sustainability-oriented organizational, political, and societal transformations (Hermann & Bossle, 2020). On the other hand, education enhances individuals' awareness of the complexity and mutual interactions between different dimensions of sustainable development, such as physical, biological, social, economic, and cultural aspects (Zsóka et al., 2013). However, empirical studies (Leal Filho et al., 2015; Milutinović & Nikolić, 2014; Lee et al., 2013) have shown that university students and graduates, as well as universities themselves, face many challenges in relation to environmental protection issues and are still at early stages.

University leaders attempt to overcome these challenges by adopting different approaches such as education for sustainable development (ESD). However, such issues as the lack of awareness, the lack of interest in voluntary engagement in pro-environmental activities, university limitations in committing and supporting the processes, and the lack of collaboration among internal and external stakeholders still remain as obstacles to achieve environmental sustainability at higher education institutions (Ferrer-Balas et al., 2009; Leal Filho, 2009). Although ESD has enhanced students' knowledge and awareness about environmental issues, it is not sufficient to create substantial pro-environmental behavior since the process is affected by other factors such as individual values and behavioral intentions which both are also affected by environmental and situational factors (Dentoni & Bitzer, 2015; Sidiropoulos, 2014).

Values, personality types, motivations, objectives, interests, and intellectual foundation can stimulate our behaviors towards desires (Jamison et al., 2017; Alas, 2006). Therefore, environmental outcomes increasingly depend on the beliefs and values of society (Mascia et al., 2003). In this regard, the Norm-Belief-Value Theory (NBVT) of sustainable development emphasizes an indirect relationship between values and decisions for sustainability (Stern, 2000). The main idea of the theory is that values simultaneously affect individual's worldview and their initial beliefs related to environmental change and as a result, it will encourage individuals to engage in sustainability-oriented activities.

Therefore, researchers argue that individuals' interest and commitment to sustainable development issues are vital factors towards pro-environmental behaviors. This represents a new challenge to ESD at higher education institutions, in which not only is knowledge transfer essential to achieve sustainability-oriented behavior but it is also vital to teach sustainability-oriented values (Lukman et al., 2013).

The teaching of pro-environmental values requires strong support from educators and the university's top managers. In this regard, studies (Unger et al., 2012; Jang et al., 2017; Jans, 2021; Zhang et al., 2015) have indicated that the engagement of senior managers in executive projects has a positive and significant effect on outputs and quality of project implementation. Moreover, they improve the project execution process through instructions and strategy development. University communities can inherently do their duties, but their performance is increasingly dependent on managers' abilities to integrate the competencies of human resources with organizational resources and determine an effective strategy (Nuttavuthisit, 2010; Payne et al., 2008; Storbacka et al., 2016; Trumbull, 2006).

Human resource competencies are recognized as another factor influencing pro-environmental behavior. Bandura (1997; cited by Montano & Kasprzyk, 2015) argues that individual characteristics affect people's decision-making, action plan, level of effort, perseverance, and resilience. Humans choose what they are capable of doing and avoid what is beyond their abilities. According to self-efficacy theory, all processes of individuals' psychological and behavioral changes are influenced by the perception of personal abilities (Montano & Kasprzyk, 2015). Therefore, individual characteristics such as self-efficacy are fundamental elements of pro-environmental behaviors.

According to the literature review, it turns out that different factors, which are in a mutual interaction with one another, affect students' pro-environmental behaviors, but they have not yet been systematically identified and there is a research gap in this field, at least in Iran's universities. Therefore, this study aims to identify factors affecting students' pro-environmental behaviors. In fact, we attempt to answer the question as to how students' pro-environmental behaviors are formed.

METHODOLOGY

As the study provides a comprehensive perspective of factors that affect students' pro-environmental behaviors, it is an applied research. According to the study purpose, we adopted the Grounded Theory (GM) approach. GM is a method in naturalistic research that is primarily used to generate a theory. The researcher begins with a broad query in a particular topic area and then collects relevant information about the topic. As the action processes of data collection continue, each piece of information is reviewed, compared, and contrasted with other information. From this constant comparison process, commonalities and dissimilarities among categories of information become clear, and ultimately a theory that explains observations is inductively developed (Strauss & Corbin, 1990). Therefore, our reason to adopt GM was to provide a comprehensive understanding of the factors affecting students' pro-environmental behaviors and propose a logic theoretical framework related to the phenomena by using coding processes. In this case, the purposeful sampling method was used (in the interweaving phase) and the researchers selected the manuscripts that had the most conformity with the research title and its objects (Figure 1) (Bhattacherjee, 2012). In the second step, the researchers divided the manuscripts into different categories according to a special instruction, called "integration". In the third step, the researchers proceeded to construct one or more concepts about the subjects by using the coding process. Finally, the coded data were analyzed quantitatively or qualitatively to identify which themes have

the most repetition (Bhattacherjee, 2012). In order to implement content analysis, we used the Sandelowski and Barros seven-step method, which is composed of (1) the formulation of the research question, (2) a systematic review of the literature, (3) the search and selection of an appropriate article, (4) the extraction of text information, (5) the analysis of the qualitative findings, (6) quality control, and (7) the presentation of findings (Sandelowski & Barroso, 2007). Accurate implementation of these steps and triangulation of findings confirmed the study's reliability and validity.

Formulation of research question

The main question of the study was that what factors affect students' pro-environmental behaviors. On the other hand, how are students' pro-environmental behaviors formed?

Systematic review of literature and selection of an appropriate article

In this regard, we used the PRISMA flowchart (Siverns & Morgan, 2019) to refine and select related articles that were most consistent with the research title and questions (Figure 1). In selecting articles, we focused more on the studies that had been published in internationally credible journals. To analyze the reviewed studies, we used NVivo10 software to perform content analysis. By coding processes, we could extract the factors influencing pro-environmental behaviors in the academic environment. Some of the most important articles that were analyzed are presented in Table 1.

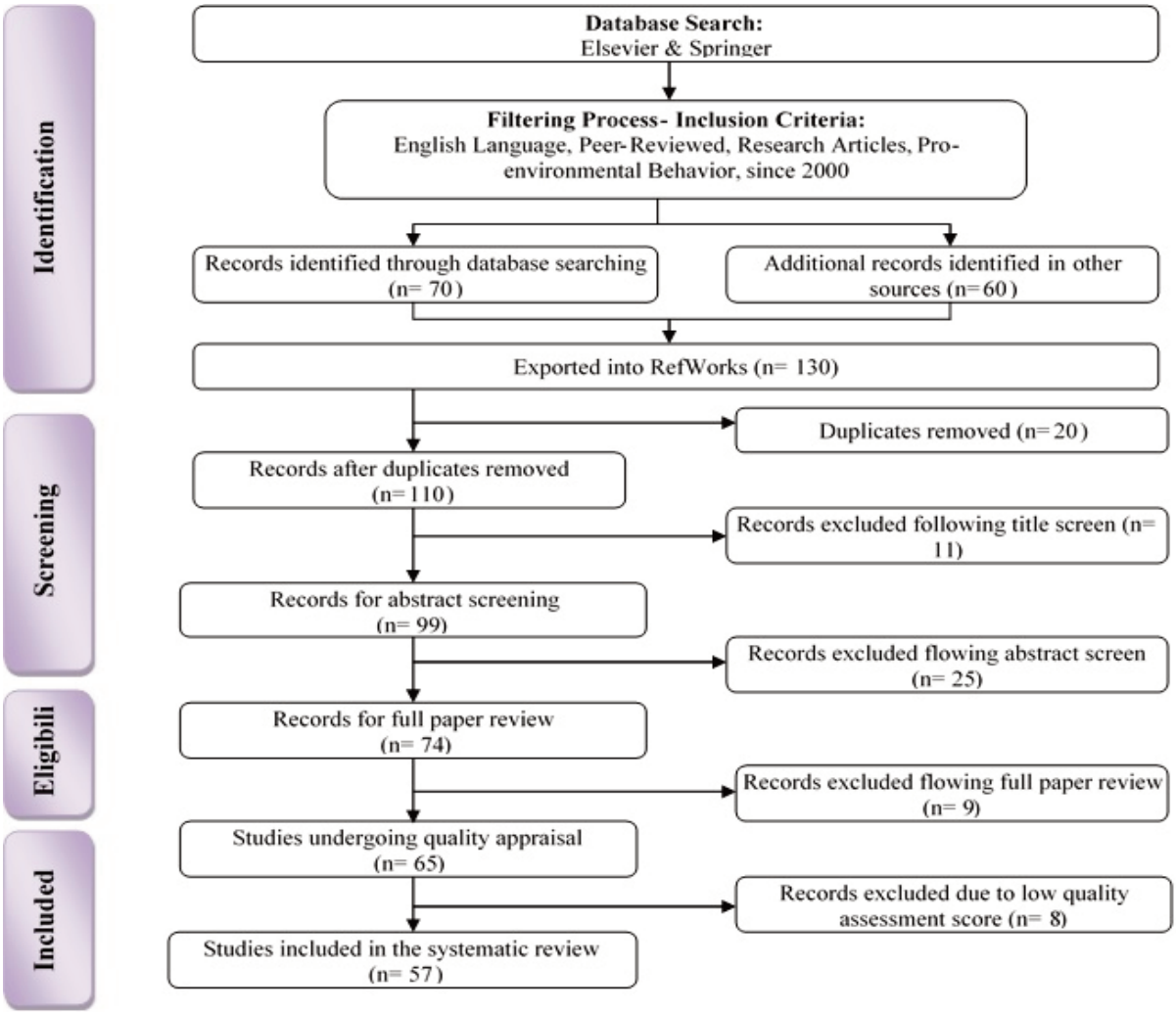

Figure 1. The PRISMA Flow-chart (Adapted from Siverns & Morgan, 2019)

Table 1
Some of the Most Important Articles that were Analyzed

Row	Authors and years	Title
1	Lozano et al., 2013	Declarations for sustainability in higher education: becoming better leaders, through addressing the university system
2	Ramos et al., 2015	Experiences from the implementation of sustainable developmentin higher education institutions: Environmental Managementfor Sustainable Universities
3	Abu-Goukh et al., 2013	Engineering Education for Sustainability and Economic Growth in Developing Countries (the Sudanese Case)
4	Vicente-Molina et al., 2013	Environmental knowledge and other variables affecting pro-environmental behavior: comparison of university students from emerging and advanced countries
5	Sidiropoulos, 2014	Education for sustainability in business education programs: a question of value
6	Mintz, Keren, & Tal, 2014	Sustainability in higher education courses: Multiple learning outcomes
7	Disterheft et al., 2015	Sustainable universities–a study of critical success factors for participatory approaches
8	Jorge et al., 2015	An approach to the implementation of sustainability practices inSpanish universities
9	Sammalisto et al., 2015	Implementation of sustainability in universities as perceived byfaculty and staff e a model from a Swedish university
10	Blok et al., 2015	Encouraging sustainability in the workplace: a survey onthe pro-environmental behaviour of university employees
11	Cebrián et al., 2015	Academic staff engagement in education for sustainable development
12	Krasny & Delia, 2015	Natural area stewardship as part of campus sustainability
13	Holm et al., 2015	Process framework for identifying sustainability aspects in universitycurricula and integrating education for sustainable development
14	Holm et al., 2015	Integrated management systems for enhancing education forsustainable development in universities: a memetic approach
15	Trencher et al., 2014	University partnerships for co-designing and co-producing urbansustainability
16	Leal Filho et al., 2018	The Role of Transformation in Learning and Education for Sustainability
17	Vicente-Molina et al., 2018	Does gender make a difference in pro-environmental behavior? The case of the Basque Country University students
18	Tolppanen & Kang, 2021	The effect of values on carbon footprint and attitudes towards pro-environmental behavior

RESULTS

Extraction of text information

In this stage, we continually reviewed the selected articles to extract information related to the study aims and codify them. During this process, due to the high volume of documents, as soon as a code was identified, we coded it by using the automatic command in the NVivo software environment. Generally, 968 reference codes were identified in this step as shown in Figure 2.

Analysis of qualitative findings

According to the grounded theory principles (Strauss & Corbin, 1990), in this stage, we used systematic procedures to code and interpret data. First, data were coded according to the research question by the open coding process. The coding process was not based on a predicted plan, but we used an Emic approach for the bottom-up theory construction. In the open coding stage, a total of 36 codes were extracted. Then, we performed axial coding by combining the codes derived

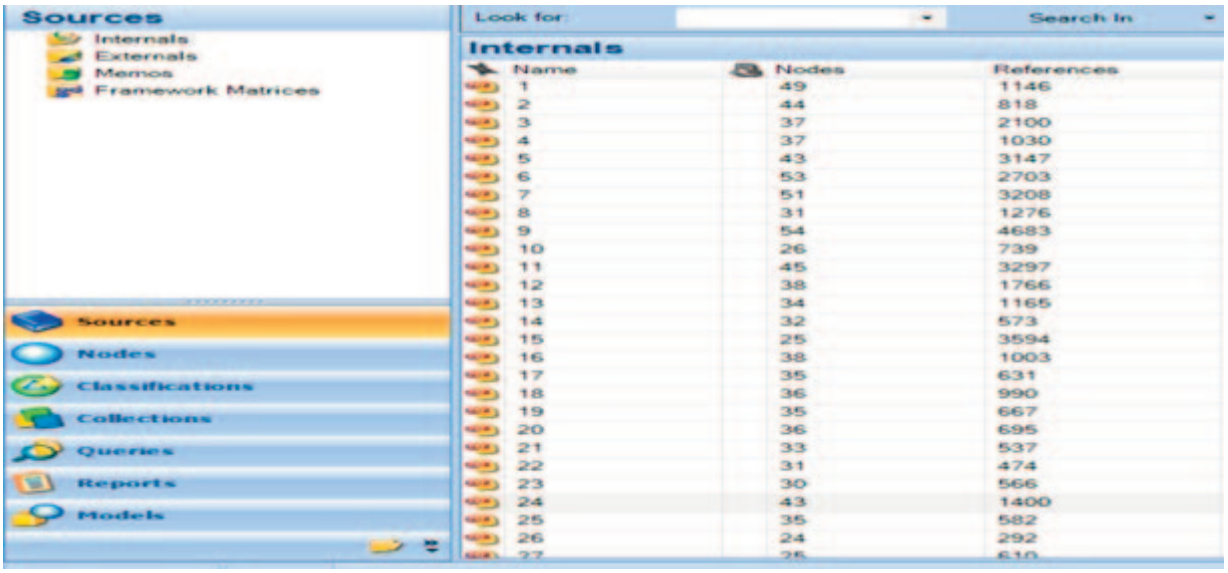

Figure 2. The Illustration of the Coding Process in the Software Environment

in the previous stage. Totally, 10 components affecting students' pro-environmental behaviors were identified in this process. The findings are shown in Figure 3.

To facilitate the axial coding process, cluster analysis was used in the NVivo software. Therefore, the identified components were classified into 10 factors according to their similarities and Pearson's correlation coefficient. As presented in Figure 4, most factors affecting students' pro-environmental behavior were influenced by individuals' values.

Quality control

Lincoln and Guba argue that validity and reliability in qualitative research are achieved when the research process is confirmed by testing items such as raw data, data summarization, and the noting process (Denzin & Lincoln, 2011). A panel of experts and Kappa index (0.748) confirmed the reliability of the framework. The validity of the study was confirmed by using of articles re-reading technique and systematic data analysis (Figure 5).

Findings presentation

In this stage, the findings of the previous steps are presented. After applying content analysis processes, factors affecting students' pro-environmental behavior were categorized into 10 factors and 36 sub-categories. After identifying the factors, we used a codes matrix to draw the relationship between them. These findings can be seen in Table 2.

CONCLUSION

Universities have an undeniable role in explaining and directing human behaviors. Therefore, society's expectations of universities have been increased to play a fundamental role in institutionalizing pro-environmental behaviors as a major dimension of sustainable development. Hence, universities have made extensive efforts to achieve this goal by applying educational courses, research programs, operational activities, interdisciplinary projects, and so on. Despite these efforts, evidence indicates that the programs have failed in changing students' pro-environmental behavior. The question here is what reasons are responsible for this failure despite the costs incurred for it. To answer this question, one must pay attention to the nature of human behavior. It should be noted that individuals' behaviors are affected by different factors and it is not a linear phenomenon. Therefore, to increase the efficacy of the academic programs towards institutionalizing pro-environmental behavior, it is essential to identify factors affecting the pro-environmental behaviors.

Nodes

Name	Sources	References
pro-environmental behavior	53	22655
Support	48	537
Supported by university managers	34	197
Financial support for environmental research	31	200
Government support for pro-environmental activities	35	140
Knowledge and awareness	52	963
Environmental knowledge	52	795
Awareness of environmental problems	35	168
Curriculum content	53	3316
Courses related to environmental issues	37	563
Conducting environmental research	52	1934
Teaching methods and reative learning	43	507
Educational condition	46	312
Students Self-efficacy	52	1396
Perceive of abilities	40	291
Creative thinking skills	41	124
Social skills	50	981
Social capital	48	462
Communication with other students	37	177
Social participation	26	153
Knowledge sharing	29	132

Figure 3. An Illustration of the Components and Factors Affecting Students' Pro-Environmental Behaviors in the Nvivo Software Environment

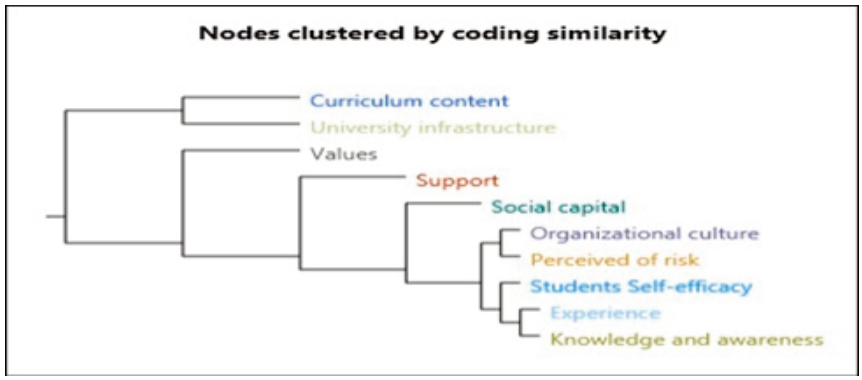

Figure 4. Nodes Clustered by Coding Similarity and Pearson's coefficient

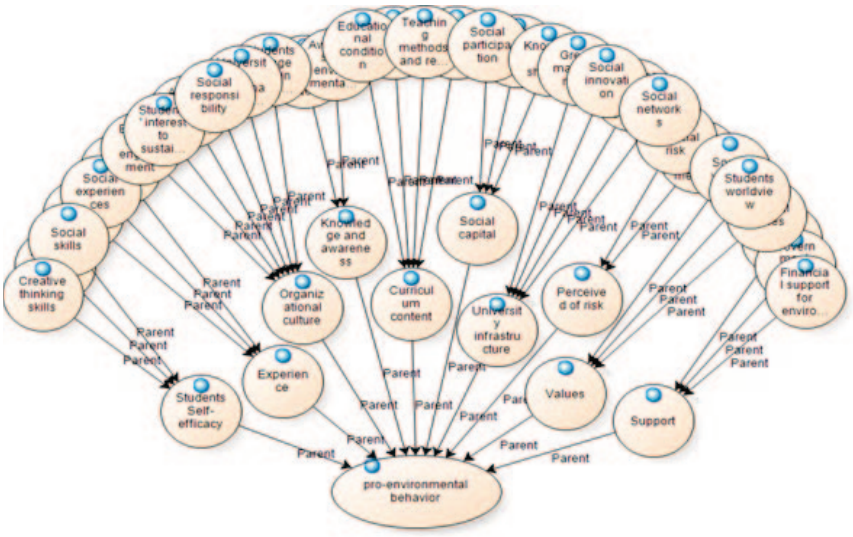

Fig. 5. Data Analysis and Coding Process (Parent Nodes and Those Children)

Table 2
The Factors Affecting Students' Pro-environmental Behaviors

	Factors	Categories	References Count	Number of referrals
1	Social capital	Social participation	26	153
		Knowledge sharing	29	132
		Communication with other students	37	177
2	Support	Financial support for environmental researches	31	200
		Supported by university managers	34	197
		Government support for pro-environmental behavior	35	140
3	University infrastructure	Social networks	33	157
		Green management	36	214
		Social innovation	39	218
		Existence of appropriate technology for environmental management	42	252
4	Knowledge and awareness	Awareness of environmental problems	35	168
		Environmental knowledge	52	795
5	Perceived of risk	Perceived risk of environmental degradation on human beings	49	421
		Perceived environmental risk	52	543
6	Organizational culture	Assessment and reporting	37	154
		Sustainable-oriented policy of the university	33	180
		Students' engagement in university policymaking	42	200
		Employment engagement in pro-environmental activity	40	251
		Students' interest in sustainability	32	273
		University's social responsibility	48	314
7	Student self-efficacy	Creative thinking skills	41	124
		Perception of abilities	40	291
		Social skills	50	981
8	Experience	Daily experience in the university environment	48	416
		Social experience	49	419
		Pro-environmental experience	51	1607
9	Curriculum content	Educational conditions	46	312
		Teaching method and active learning	43	507
		Courses relative to environmental issues	37	563
		Conductive environmental research	52	1934
10	Values	Personal values	38	590
		Social values	53	2076
		Students worldview	51	2861

Findings showed that students' values and social norms are the most important factors affecting their pro-environmental behavior. Students' pro-environmental values were categorized into two categories including personal values and social values. According to Schwartz's theory of values, personal values (e.g., economic values) are closely related to self-transcendence values (e.g., power, achievement, hedonism). These values affect students' pro-environmental behavior by motivating individuals to control the use of resources, setting and accomplishing energy efficiency goals, and enjoying sustainable behaviors in themselves. Moreover, students' pro-environmental behavior could be associated with benevolence (wanting to reduce environmental impacts on the local community) and universalism (avoiding global impacts on people and ecosystems). This finding indicates that different individuals may have very different motivations for tak-

ing on sustainability-oriented values and behaviors, and one person may be driven by multiple motives. According to the divergence values and social norms affecting students' pro-environmental behavior, university managers must consider students' main values in curriculum development. These findings are in accordance with Schwartz (2012), Zsóka et al (2013), Deveci (2015), Sténs et al (2016), and Jamison et al (2017) as they argued that individuals' values are a key element in dictating their behaviors including pro-environmental behavior.

Values can be transmitted through family traditions, academic education, history and literature, art, and media. Education reinforces students' environmental protection behaviors by transmitting values. Therefore, teaching environmental issues was recognized as one of the important factors affecting students' pro-environmental behaviors. Curricula, especially participatory courses, increase students' knowledge and abilities and stimulate them to engage in pro-environmental processes in different ways: 1) Collaborative activities provide students with direct experiences through interaction with their classmates; 2) they provide observational experiences for the students who engaged in these courses; and 3) students' abilities are verbally (socially) verified by educators, universities managers, and their friends and classmates. These findings are in agreement with Lukman et al. (2013) and Leal Filho (2018) as they argue that pro-environmental education affects students' pro-environmental behaviors.

Social networks and supporting policies of universities were other important factors influencing students' pro-environmental behavior. Social network affects individuals' values towards the protection of natural resources and the environment through presenting information about mutual relationships between unsustainable human activities and environmental degradation. Hence, individuals' values and awareness are important predictors of pro-environmental behavior. Therefore, the development of universities' communication infrastructures is recommended to increase students' pro-environmental values and behaviors. The development of information and communication technology (ICT) infrastructures provides opportunities for collaborative teaching and learning and web-based environmental education. These findings are consistent with Frow et al (2015) and Pattinson (2017) who stated that the development of physical and communicative structures through management has an important impact on the students' pro-environmental behaviors at the universities.

Finally, to increase students' pro-environmental behaviors, in addition to paying attention to the factors listed above, university managers should also consider (a) annual environmental sustainability assessment and report in the university, (b) students' engagement in university policymaking, (c) the university's social responsibility, (d) conducting pro-environmental research, (e) the use of creative teaching and learning techniques, (f) collaboration of students, (g) the facilitation of the university cooperation with local communities, and (h) the development of interdisciplinary collaborations.

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