Original Paper

The role of place attachment in defining a relationship between green awareness, conservation commitment and environmental responsible behavior of university students in India

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Keywords: conservation commitment; environmental responsible behaviour; green awareness; place attachment.

Abstract. *This study focuses particularly on Indian university students and tries to explore the role of place attachment in defining the relationship between Green Awareness, Conservation Commitment, and Environmental Responsible Behavior. The data was collected from the top ten awarded universities in the field of following green and sustainable practices by the government of India. A total of 352 valid questionnaires were obtained and further analyzed. The results offer an insight into how green awareness among students can positively influence their conservation commitment, leading to adopting environmental responsible behaviour, while place attachment moderates the overall relationship.*

1. Introduction

This paper explores the role of place attachment in defining the relationship between Green Awareness, Conservation Commitment (CC), and Environmental Responsible Behavior (ERB). Green Awareness (GA) is "knowledge among the people about the environment, key relationships and issues foremost to environmental impacts, an appreciation of the 'whole systems', and joint responsibilities necessary for sustainable development" (Chelliah, Atteyat and Huoy, 2017, p.44). Conservation Commitment (CC) "refers to perceived feelings of obligation toward the environment, so those people who personally have lot more commitment towards the environment are more likely to engage in environmental responsible behavior in comparison to the people with no such commitment" (Stern, 2000; Davis et al., 2011, p.261). Environmentally Responsible Behavior (ERB) refers to "any action, individual or group, directed toward remediation of environmental issues/problems" (Sivek and Hungerford, 1990, p.38). Place attachment is a psychological attachment with the natural world which can lead to the long-term orientation toward ERB (Sun et al., 2022: Davis and Green, 2009).

Our study starts from the recognition that there is an increasingly urgent need to define sustainable development goals and green initiatives (Mohideen et al., 2021) and education has an unquestionably essential role to play in this (Vladimirova

and Le Blanc, 2016). Universities are a source of knowledge and innovation for society and increasingly work towards educating global citizens in terms of sustainable practices (Purcell et al., 2019). UNWTO (2022) is providing partnership opportunities to the educational institutions to strengthen their commitment to the 2030 Agenda for Sustainable Development Goals and promote awareness of green practices among students.

At one level, in the context of campus sustainability, government and policymakers are, for example, guiding institutions in the direction of adopting environment-friendly energy systems, especially after the outbreak of COVID-19 (Tian et al., 2022). At the same time, since there is a strong correlation between notions of sustainable development and human behaviors (Ari and Yilmaz, 2017; Blok et al., 2015), universities can be seen as dynamic places to encourage and research student's environment responsible behavior through the linking of motivation, involvement, beliefs, personal norms, and values. Therefore, several researchers have applied different theories to study of these factors amongst students (Akhtar et al., 2021), and focus on sets of behaviors practiced by individuals that are undertaken by taking calculated actions directed to promoting positive changes in the environment (Carmi et al., 2015).

In promoting environmental responsible behavior, colleges, universities, and training centers play a vital role where young generations can be more easily led towards individual behavioral change (Massaro et al., 2018; Ting and Cheng, 2017). Universities play an important role in the promotion of environmental sustainability and university activities impact on the environment in both direct and indirect ways, for example, as regards matters concerned with usage of electricity, waste generation, material consumption, enormous movement of people, and transport on campus (Akhtar et al., 2021). Campus sustainability can only be possible and achieved effectively with the active involvement of students (Zamora-Polo et al., 2019). According to El-Jardali (2018), "universities are responsible for training and shaping the future leaders of sustainable development" (p. 4).

In the context of education, pro-environmental shifts are taken into consideration by many organizations because of their sustainability goals and the implications of these for student enrolment (Žalėnienė and Pereira, 2021). Students may wish to develop sustainable environmental behavior by engaging in environmental education (Blok et al., 2015). GA is a significant part of learning because it creates commitment among individuals to save the planet and making it healthy and a good place to live for future generations (Kousar et al., 2022). ERB consists of such aspects as energy conservation, waste avoidance, recycling,

green mobility and transportation, green consumerism, and environmentally friendly social behaviors (Kaiser and Wilson, 2004). According to Ling-Yee (1997), CC leads to environmental responsible behavior). Smith-Sebasto and D'Costa (1995) suggested dividing ERB into civic, educational, financial, legal, physical, and persuasion actions.

To motivate educational institutions in India, the All-India Council for Technical Education launched an "award for clean and smart campus" for all institutions including polytechnics, approved colleges, and universities (AICTE, 2020). However, the success of such an initiative cannot be achieved by the efforts of the management authorities of universities only, but also requires the support of students as well (Ribeiro et al., 2019). In this respect, the current research is conducted to analyze the factors that promote behaviors of students that contribute to conserving the environment and maintaining the university's natural ecosystem.

Students' food-related environmental views and behaviors (Arvai, 2015), electronic environmental knowledge (Zareie and Navimipour, 2016), intention and loyalty toward green products (Yu et al., 2017), and the interplay between gender differences and ERB (Vicente-Molina et al., 2018) have been explored in many studies (Meng and Trudel, 2017). However, there is no research available that could explain the factors that determine students' ERB. To promote sustainable development, it is important to ensure that everybody is aware, conscious, educated, and compliant (Mensah, 2019). To understand this behavioral pattern, we targeted the top ten universities that in 2019 successfully achieved the "Swachhata Ranking Awards by the Ministry of Human Resource Development (MHRD) (Ministry of Education, 2019), as this may help us understand the universities' role in achieving sustainable development in campuses.

2. Defining the research focuses

Even while recognizing the importance of ERB, as Ertz et al. (2016) demonstrate, there are some factors including time, cost, and effort which may impede individuals practicing it. Sometimes individual beliefs, motives, and commitment to the environment are influenced by their desire to be ecologically friendly (Khare, 2015). This responsible behavior is more likely to be adopted by highly educated individuals with thoughtful environmental knowledge and motivation (Chakraborty et al., 2017). Factors like environmental commitment (Han and Hyun 2017), pro-environmental lifestyle (Suki, 2016), self-efficacy

(Kim et al., 2016), and GA (Ari and Yilmaz, 2017; Mishal et al., 2017; Nazir and Pedretti, 2015) also determine the ERB of people (Chakraborty et al., 2017).

2.1 The relationship between green awareness and conservation commitment

Many studies look at community engagement for the environment, particularly focusing on students in educational institutions. The relationship between knowledge, attitudes, and green awareness among students pursuing higher education are studied for how these factors shape their behavior towards environmental protection (Mei et al., 2016). Particularly in developing nations like Malaysia young people are found to be aware of the environmental problems in their country (Abd Rahim et al., 2012). Young adults are found to be the age group that is more aware, concerned, and educated about the problems of the environment and even capable of addressing environmental-related issues and environmental sustainability challenges of the future (Ojala, 2012).

GA stimulates assuming responsible citizenship behavior to face and attempt to solve various environmental issues and problems through attitudes, values, and the necessary skills (Sadati, 2014; Sengupta et al., 2010). Those people who act in a more environmentally friendly way are those who always try to relate environmental problems to their behavior, taking responsibility on their shoulders (Van Der Werff et al., 2013). It means that when individuals are aware of the consequences of their behavior, they feel responsible for their actions (Sogin and Pallak, 1976) and are more likely to become committed to environmental conservation ((Juvan and Dolnicar, 2014).

Awareness helps individuals weigh the costs and benefits of their actions toward the environment, making them adopt and remain committed to such conservation practice (Steg, 2009). In this respect, our first research focus is on the extent to which GA has a positive impact on the CC of university students.

2.2 The relationship between conservation commitment and environmental responsible behavior

Universities are indeed playing an important role by introducing programs to encourage and increase the students' knowledge and attention to recycling (Dicle, Iil and Safiye, 2010). Some scholars have found a correlation between CC and ERB. Hojnik et al. (2020) have demonstrated that consumers' environmental commitment has a positive impact on green purchase intentions, thus leading to green consumerism (an actual purchase or environmentally friendly behavior). CC has also been shown to have an influence in promoting household recycling (Katzev and Pardini, 1987). It is argued that ERB needs to be encouraged by

political action and education to promote recycling practices, green consumption, and community activism (Chiu et al. 2014; Thapa, 2010). An educational and promotional program highlighting the benefits and importance of environmental conservation and practice adoption encourages students to participate in the initiatives (Barata, Castro and Martins-Loução, 2017). However, the effectiveness of programs can only be measured in terms of the student's practice in implementing recycling practices. Rahman and Reynolds (2016) and Han and Hyun (2016) have argued that individuals' readiness to do what is necessary for the sake of the environment depends on their development of environmental commitment.

A commitment to the environment includes practices that demonstrate ecologically conscious behavior (Goldman et al., 2006) and Cialdini (2003) has described the role of persuasive communication in this respect. These practices include all the activities which have minimum impact on the environment like recycling, conserving water, saving electricity, and using public transportations or riding bikes or even walking, properly handling and disposing of non-recyclable waste, or using less paper when printing (Bissing-Olson et al., 2016; Vaske and Kobrin, 2001; Vaidyanathan and Aggarwal, 2005). Moreover, "commitment is considered to emerge from structural interdependence with the environment" (Davis, Le and Coy, 2011, p.263). An individual's pursuit of environmental sustainability, readiness to forgo personal satisfaction, reduction of resource waste, use of environmentally friendly new products, and support of governmental adaption policies are all examples of ways in which CC becomes ERB (Yu et al., 2019; Iwata, 2001). In this respect, our second research focusis on the extent to which CC is positively related to ERB in Indian university students.

2.3 The moderating role of Place Attachment

The most common connotation of PA involves a sense of bonding and linking with a specific place and shows a sensation of feeling and identification a person has with a particular place (Zhang et al., 2014). It is basically concerned with the ties that form between humans and physical places and can be characterized by ambiguity (Hernandez et al., 2014; Williams and Stewart, 1998). Some terms like sense of place, topophilia, insideness, and community sentiment have been associated with the concept of PA (Halliwell et al., 2021). PA involves a cluster of emotional bonds between individuals, communities, and their daily life settings (Brown, Smith and Assaker 2016) and is sometimes associated with terms such as "belonging" or "sense of belonging" to a place (Baskin et al., 2010; Freeman

et al., 2007), including attachment students have with a university or school (France et al., 2010).

The degree of attachment that individuals have to a place will increase with their active participation in, tie with, and feeling of belongingness to that place. Environmental factors and personal conceptual models combine to make up attachment to academic settings (Moghisi, Mokhtari and Heidari, 2015). Moreover, the quality of a place stems from the amount and level of the activities, and the ratio of activity costs to benefits (Lin, Chen and Filieri 2017). PA can be seen as a chain based on links between individuals and a meaningful environment (Giuliani, 2003). It is argued that creating an emotional connection to a location through a series of activities there will strengthen relationships and commitments between students and nature (Cownie, 2019) and influence their behavior towards the environment (Vorkinn and Riese, 2001).

Cheng and Wu (2015) found that strong attachment of an individual to a place led to positive ERB. Kyle et al. (2014) argued that individuals' different ways of connecting with different places creates a particular environmental identity. Devine-Wright (2009 suggests that the cognitive connection of the individual with nature impacts on PA. Studies by Anton and Lawrence (2016) and Kyle et al. (2005) demonstrate that individuals' way of connecting to a place affect their willingness to protect that place. A feeling of belonging for a particular place creates and develops a deeper sense of emotional commitment to the environment (Lee, 2011).

For the purposes of our study, PA is seen as related to both the place (the universities studied) and the community (the university students in our study), which it hosts and with which an individual may identify to a greater or lesser extent (Atta-Owusu and Fitjar, 2022; Fitjar, 2010). Some studies have shown that when individuals feel a robust bond to a socio-physical environment, the chances they will enact pro-environmental behaviors increase (Brown, Smith and Assaker, 2016; Zhang et al., 2014). In this respect, our third research focus is on the extent to which PA moderates the relationship between CC and ERB in Indian university students.

3. The research methodology

3.1 Sample area and sample size

Out of 48 universities, we selected the top 10 (UGC approved) awarded with Swachhata Ranking Awards by the Ministry of Human Resource Development (MHRD) in 2019 (Ministry of Education, 2019) as sample areas.

These include Koneru Lakshmaiah Education Foundation (Guntur); OP Jindal Global University (Sonipat); Symbiosis International University (Pune); Manipal University (Jaipur); Siksha 'O' Anusandhan (Odisha); OP Jindal University (Chhattisgarh); Chitkara University (Solan); Jyoti Vidyapeeth Women's University (Jaipur); Dr. D.Y. Patil Vidyapeeth (Pune) and Reva University, (Bangalore). To ensure an adequate representation of the student population, data from various areas of India were collected online (Chaturvedi, 2021).

A preliminary survey was conducted with 20 doctoral candidates and two professors from selected institutes, before the collection of the final data, and small changes were made to the questionnaire based on their feedback. Since the final survey was aimed at exploring the role of university attachment in determining the overall ERB of students, final year students, especially those pursuing master's degree courses, were chosen as more likely to possess more knowledge and skills than undergraduates (O'Donnell et al., 2009). Another reason for selecting these students was that they could be supposed to be highly attached, since according to Anton and Lawrence (2014), attachment to any area or place increases with prolonged living in and visiting a place. The purposive sampling technique for research was adopted (Richardson, 2010).

Kline (2015) and Harrell (2015) state that 10–15 responses can be collected for each variable, while Osborne (2015) recommends using larger sample sizes for more accurate results. So, we distributed about 500 questionnaires, and 382 of them were returned. Only 352 responses were deemed reliable for further analysis.

Since the respondents selected were students, questions on professional education were not considered as suitable items for analysis. The 352 respondents were equally divided between male and female. Most of the students were within the age group of 21-30 (149 in nos.) whereas 133 were within the age group of 31-40 and only 70 were only above 41. The data was collected from January to May 2022.

3.2 Measurement scale

A survey questionnaire was created to obtain data on sample characteristics, including age, gender, and household income of students from the targeted areas. It included various scales that were adapted from earlier studies (Table 1). A five-point Likert scale technique was applied (considering 1 as highly disagree and 5 as highly agree). Accordingly, GA was measured using 6 items (Chen and Tsai; 2016; Dutcher et al., 2007; Liu et al., 2009); CC was measured using 3 items (Lee et al., 2011); ERB was measured using 5 items (Chiu et al., 2014; Thapa, 1999; Su et al., 2018); and PA (Universities) was measured using 4 items (Confente and Scarpi, 2021; Kaplanidou et al., 2012).

The psychometric properties of the research scale were examined using SPSS 22.0. Utilizing Exploratory Factor Analysis and the reliability check, the data structure was established. Following the desired value of more than 0.70, a satisfactory Cronbach alpha or reliability coefficient value verified the internal consistency of the scale items (Hair et al., 2014). Further construct validity was ensured by determining the convergent and discriminant validity.

3.3 Data analysis and interpretation

A satisfactory Cronbach alpha (α) or reliability coefficient value (ranging between 0.798 and 0.920) confirmed the internal consistency of the scale items by meeting the recommended value of more than 0.70 (Considine, Botti and Thomas, 2005). The convergent validity and discriminant validity were ascertained to ensure construct validity. Convergent validity was determined using the factor loadings, the average variance extracted (AVE), and composite reliability (CR). The observed variables with factor loadings less than 0.60 were omitted from the data analysis (Table 1).

	Loading	**Mean**	**SD**
Green Awareness (Cronbach α = 0.79; AVE = 2.0; CR = 0.930)			
I am used to telling my friend about environmental protection	0.79	4.57	0.63
I am aware of activities ad products that are environmental friendly and less polluting	0.70	4.52	0.50
I report to authorities about any mishandling of the environmental regulation	0.81	4.24	0.71
I try my best to follow the 3R' reduce, reuse, and recycle in daily life	0.69	4.55	0.64

Conservation Commitment (Cronbach α = 0.83; AVE = 1.82; CR = 0.923)			
I am willing to volunteer for groups that help the environment (clean surrounding, water usage and waste reduction etc.)	0.74	4.75	0.50
I actively participate in environmental assessment workshops and initiatives in the university to report green practices	0.73	4.71	0.48
I donate money to initiatives specially carry out for the conservation of the environment like planting trees	0.67	4.50	0.61
I vote for the candidate whose views support environmental protection	0.77	4.65	0.52
Place Attachment (University attachment) (Cronbach α = 0.80; AVE = 1.68; CR = 0.912)			
I feel this university means a lot for me	0.62	4.42	0.51
I feel this university is a part of me	0.73	4.61	0.54
I feel very attached to this university	0.62	4.53	0.55
I enjoy being in this university more than any other place	0.87	4.46	0.55
Environmental Responsible Behavior (Cronbach α = 0.78; AVE = 2.33; CR = 0.926)			
I carpool or utilize the mass transit system to commute within and outside the institute	0.72	4.56	0.59
I insist students have a pro-environmental policy	0.80	4.35	0.81
I purchase a product packed in a recycle or reusable containers only	0.77	4.41	0.53

Table 1. Constructs loading and statistical measures

Comparative estimates of the square root of the AVE for each construct (Table 2) were used to demonstrate the discriminant validity of the constructs, which outperformed correlation for selected constructs for research (Hilkenmeier et al., 2020). Additionally, none of the correlation estimates between the components were higher than 0.70, which can display the possibility of multicollinearity in the present study (Hair et al., 2019; Hair et al., 2015). Also, results for discriminant validity confirm the validity of the constructs for further hypotheses testing.

	GA	CC	PA	ERB
GA	**1.41**			
GPA	.542	**1.34**		
PA	.631	.619	**1.29**	
ERB	.506	.467	.515	**1.52**

Table 2. Discriminant validity of constructs

As far as the descriptive analysis of the constructs is concerned, in terms of GA it was observed that participants not only strongly agreed to tell their friends about environmental protection (Mean= 4.57; S.D=0.63), but also follows 3R' reduce, reuse, and recycle practice in their daily life (Mean=4.55; S.D=0.64). In terms of CC, students' were found highly willing to volunteer for groups that help the environment (Mean=4.75; S.D=0.50) followed by the agreement on participation in workshops and initiatives in the university/institute to report green practices (Mean=4.71; S.D=0.48) (table1). As regards students' PA to their university/institute, it was observed that they strongly feel their university/institute as a significant part of their life (Mean=4.61; S.D=0.54) and they are highly attached to their institute/university (Mean=4.53; S.D=0.55). Similarly while analyzing the their ERB, it emerges that students carpool or utilize the mass transit system to commute within and outside the institute (Mean=4.56; S.D=0.59), and purchase a product packed in a recycle or reusable containers only (Mean=4.41; S.D=0.53) (Table 1).

3.4 Evaluating the research focuses

The structural model was evaluated to see if the relationships considered by the three research focuses were confirmed. The structural model revealed a good fit in accordance with the given threshold criteria given by Hair et al. (2015) where $\chi 2 = 1.501$; GFI = 0.99; AGFI = 0.96; CFI = 0.99; IFI = 0.96; TLI = 0.99; Relative Normed Fit Index (RNFI) = 0.97; RMSEA = 0.051 and SRMR = 0.076 (Hair et al., 2019). At first, we tested and applied the SEM technique without using any moderator. It was found that GA has a significant and positive influence on CC ($\beta = 0.711$; $t = 5.411$; $p = 0.000$). These results confirm the research conducted by Ofori and Kien (2004) explaining that awareness acts as a determinant for commitment (Goldman, Yavetz and Pe'er, 2006).

Moreover, the CC amongst students was identified as having a significant and positive impact on their ERB ($\beta = 0.528$; $t = 2.563$; $p = 0.000$). These results are in line with the results of the research conducted by Lee (2011); Cheng and Wu (2015).

Finally, we tested the moderating influence of PA as a moderator between CC and ERB. The SEM analysis depicted a significant model fit summary (χ 2 = 1.062; IFI = 0.98; TLI = 0.99; CFI = 0.99; SRMR= 0.06 and RMSEA = 0.035), thereby confirming the moderating influence of PA in the tested model. CC has a significant relationship with ERB amongst students who are attached to their university of school ($\beta = 0.681$; $t = 2.136$; $p < 0.00$). These results are again in line with the threshold criteria given by Hair et al. (2015), thereby confirming that university/institute PA moderates the relationship between CC and ERB in Indian students (Lee, 2011; Chiu, Lee and Chen, 2014).

4. Conclusions

Several aspects are correlated with ERB, such as knowledge of action strategies, knowledge of issues, sense of responsibility, locus of control, and verbal commitment (Hines, Hungerford, and Tomera, 1987), and some actions are there to measure the level of ERB, such as civil action, educational awareness, institutional support, and policy initiatives (Smith-Sebasto and D'Costa, 1995). This research suggests that students today are aware and are more inclined to conserve the environment and underlines the importance of institutes and authorities acting to increase awareness about environmental needs and requirements.

Our results show that GA exerts a significant influence on students' CC, specifically in the context of how the university environment leads them to adopt ERB (Monroe, 2003). According to Cottrell and Graefe (1997), it is the individual's environmental concern, commitment, and ecological knowledge that demonstrate ERB (Chiu et al., 2014). The moderation effect of university/institute's attachment amongst the students emphasizes its importance amongst the various constructs undertaken for determining ERB (Lee, 2011; Chiu et al., 2014). The targeted institutes and universities can serve as an example, encouraging ERB amongst the students and promote green practices implications at ground level. If PA significantly predicts ERB (Halpenny, 2010), then institutes and universities should base all forms of environmental education on encouraging PA as an essential prerequisite for promoting successful outcomes.

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