



## Effect of Gender on Environmental Awareness of Post-graduate Students

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### Authors' contributions

*This work was carried out in collaboration between all authors. Author KS designed the study, wrote the protocol and supervised the work. Author SRM assisted in the scoring and computer work. Authors DJ and NO managed the analyses of the study using statistical tests and helped in the preparation of first draft. All authors read and approved the final manuscript.*

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### ABSTRACT

**Aims:** It was aimed in the present study to explore the effect of gender on environmental awareness of the post-graduate students. When education diversity was controlled to be science and social-science the environmental awareness was expected to be influenced by the gender of individuals.

**Study Design:** In order to test the above objective the present study used comparative analyses in respect of the gender taking the subjects from science and social-science discipline represented from different areas.

**Place and Duration of Study:** Place of the study was the post-graduate students selected from Karnatak and Bangalore Universities of Karnataka State, duration of the study was between February 2011 to July 2012.

**Methodology:** The students of science discipline pursuing their 3<sup>rd</sup> semester of course in Botany, Chemistry, Geography, Geology, Applied Genetics, Physics and Zoology in Karnatak and Bangalore Universities were included in the study. However, in the Bangalore University the

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environmental science students were added to the science discipline as the course is offered in the university. The students included for the social-science discipline were from 3<sup>rd</sup> semester courses of Economics, History, Political Science, Social Work and Sociology. On the subjects the environmental awareness test developed by Jha (1998) was administered in group and the responses were obtained by the subjects.

**Sample:** The included total subjects for the study were 605 post-graduate students comprising from science and social-science discipline. The age range of the students was between 22 to 24 years. For the obtained data after calculating mean and SD for the groups, 't' analyses was carried out to find significant difference between the groups.

**Results:** Statistical results using the 't' test revealed no significant difference between the male and the female students of both science and social-science students of Karnatak University (Dharwad Science Male mean 50.54 (SD 11.15)/Female mean 51.41 (SD 08.15), 't' 0.54, p>0.05. Dharwad Social-Science Male mean 51.02 (SD 09.07)/Female mean 51.68 (SD 07.34), 't' 0.51, p>0.05). The study also did not find significant difference between the male and the female science students of Bangalore university. However, there was difference between the social-science students in relation to their gender, the awareness results favouring the females (Bangalore Science Male mean 49.75 (SD 11.73)/Female mean 53.97, (SD 07.37), 't' 2.26, p<0.05. Bangalore Social-Science Male mean 51.41(SD 07.83)/Female mean 51.98 (SD 07.15), 't' 0.51, p>0.05).

**Conclusion:** It was evidenced in the present study that gender has no significant effect on environmental awareness of the post-graduate students. Out of the four comparative analyses, in three the results are in accordance with the hypothesis and in one comparative analysis it was found that the females have higher environmental awareness. This implies that gender significance study on effect of environmental awareness needs further careful verification with control of other variables.

*Keywords: Gender; science/social-science education and environmental awareness.*

## 1. INTRODUCTION

One aspect which needs immediate attention of human folk is environmental deterioration. Based on its seriousness, environmental issues have been declared as important social problem. Every country irrespective of their socio-cultural and economic status has taken the issue as very serious and they are constructing strategies for sustainable development. Though sustainability and sustainable development have many definitions, the most popular of these is: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [1].

Maloney and Ward [2] point out that the environmental crisis is the result of maladaptive behaviour of man, which is the root of environmental problems. Environmental issues have become a matter of great concern for all and are also evident from the fact that many reports such as UN Conference on the Human Environment, Stockholm Report 1972, Belgrade Charter 1975, Tbilisi Report 1977 and Agenda 21 of Rio Declaration 1992 etc., on these issues have frequently come up in the last 30 years [3]. In this regard, education is obviously a potent

weapon and panacea of all evils that can do wonders, and specifically environmental education can serve that function [4,5], hence, Ramsey and Rickson [6] argue that both environmental knowledge and attitudes are important for changing human actions.

Madsen [7] opined that knowledge, beliefs and commitment are necessary components when addressing environmental concerns. It is likely that environmental education specialist demonstrated higher levels of experience with a commitment to environmental issues resulting in higher levels of awareness, knowledge and attitude. These results suggest positive implications in terms of curriculum implementation and knowledge, and attitude directly related to the process of teaching [8]. Research on university levels environmental classes has consistently found positive value changes in students at the inclusion of the course [9,10].

Traditional education has role of transforming existing knowledge of society to individuals and also to promote young people's competencies for critically analyzing and reflecting the environmental awareness. Various researchers have tried to measure the effectiveness of in-

classroom environmental education taking place [11-17]. It is realized that education is the only one of the factor contributing to learning and thinking in a cognitive learning process, which motivates people's attitude and knowledge concerning the environmental issues [18].

The relationship between gender and the environment begins in its most overt way in the 1970s in the establishment of what is now referred to as ecofeminism. First coined by Francoise d'Eaubonne in 1974 [19], ecofeminism captured the gendered potential of primarily women to bring about ecological revolution to ensure the survival of planet Earth. Like most western radical feminist discourse, however, ecofeminism fell into the trap of assuming monolithically, that women, by their very biological definition, are closer to nature than men, and that this relationship somehow, was a source of their empowerment and of environmental liberation. Ecofeminists like King and Spretnak, as quoted in Diamond and Orenstein [20] argue that women are associated with nature primarily because of their reproductive functions. This close relationship with nature and its cycles, ecofeminists argue, gives women a "special way of knowing and conceiving the world, which is in opposition to dominant patriarchal views [21].

Environmental awareness is an interdisciplinary subject drawing relevant attention and concern from various fields. It is a way of creating knowledge, understanding, values, attitudes, skills, abilities and awareness among individuals and social groups toward the environment and environment protection.

## 2. REVIEW OF LITERATURE

Generally, research has shown that women are more likely to hold environmental beliefs than men [22-25]. One explanation of women's environmental attitudes posits that men have more knowledge of issues related to environmental risks and that, generally, people who have such knowledge are less likely to be concerned about these types of risks [26]. A meta-analysis by Davidson and Freudenburg [27] illustrate, however, that women are more concerned about environmental hazards "not because they know less but because they care more". An explanation for this finding is that women are traditionally the caretakers and nurturers in society. Because of their role in child bearing and child rearing, women are believed to

be closer to nature and, thus, more inclined toward protective attitudes about the environment [28-30].

Szagon and Pavlov [31] found that German and Russian girls had higher levels of environmental awareness than boys. Study in Australia revealed that girls exhibited greater environmental responsibility than did boys when socioeconomic levels were held constant [32]. Women also perceive various hazards as more likely than do men [33]. Women have been estimated to make up 60 to 80 percent of membership in mainstream environmental organizations and even higher percentages in grass roots movements [34].

A few researchers like Rou [35], Tripathi [36] revealed that boy students had better environmental awareness than girl students. Whereas Shahnawaj's [37] study showed girl students had better environmental awareness than boy students. However, researchers like Shobeiri [38], Rout and Agarwal [39] reported that sex had no impact on environmental awareness of students. Sundararajan and Rajashekar [40] compared the environmental awareness of higher secondary students with respect to boys/girls. The results of the study revealed that the environmental awareness of the higher secondary students in Tamilnadu has not been influenced by their sex. Wouters [41] explored the gender differences in forest practices and environmental awareness of men and women in northwestern Thailand and acknowledged that both men and women were aware of the environmental changes, which were due to increased expectations and needs of the people of the region.

Patel and Patel [42] examined the environmental awareness of school teachers and found that male teachers with long school experience are, in urban areas are, more aware about the environmental issues. In another study Patel [43] concluded that male teachers had higher environmental awareness than their counterparts. On the contrary, the results of the study by Pradhan [44], Vipinder Nagra [45], Shaila [46] showed no significant difference between male and female teachers with regard to their environmental awareness. However, the studies conducted by Patel and Patel [42], Sabhlok [47], Chan [48], Patel [43], Shobeiri et al. [49] and Larjani and Yeshodhara [50] indicate that gender do have significant influence on environmental awareness of school teachers.

Within the backdrop of above assumptions and research findings the present project aimed to study the effect of gender on environmental awareness when the educational courses were held constant.

### **3. METHODOLOGY**

#### **3.1 Objectives**

To study the effect of gender on environmental awareness of the post-graduate students when their education was controlled for science and social-science discipline.

#### **3.2 Hypothesis**

1. When educational course is controlled for science and social-science discipline female respondents have significantly higher level of environmental awareness than male respondents.

#### **3.3 Study Area**

The area selected for the present study was Karnatak and Bangalore University located in Dharwad and Bangalore cities respectively. Dharwad is class II city of Karnataka State, India, which is located 490 km North West from Bangalore, the capital of Karnataka and the IT hub of India.

#### **3.4 Study Sample**

The total sample size of the study comprised of 605 post-graduate students, selected from post-graduate science and social-science courses. The sample characteristics and the selection are as below.

##### **3.4.1 Dharwad sample**

A total of 316 students from Karnatak University were included in the sample group studying in the third semester of their post-graduate social-science courses of Economics, History, Political Science, Social Work and Sociology. Similarly, the students from post-graduate science courses of Botany, Chemistry, Geography, Geology, Applied Genetics, Physics and Zoology were included in the present study.

##### **3.4.2 Bangalore sample**

Remaining 289 students were selected from Bangalore University studying in the third semester of their post-graduate social-science courses of Economics, History, Political Science, Social Work and Sociology, and post-graduate science courses of Geography, Geology, Environmental Science, Applied Genetics, Physics and Zoology.

The departments were matched for both Karnatak and Bangalore University sample groups. However, in the Bangalore sample group the students of Environmental Science course were included since the course is offered in Bangalore University. Whereas the students of Botany and Chemistry courses could not be included in the Bangalore sample group as they were on study tour during the time of data collection.

#### **3.5 Rationale of the Study**

The rationale of study is that in our society, especially in India, females take significant role in nurturing, caring of children and family, because of such tendencies they have great concern for environment in terms of higher awareness than males.

#### **3.6 Data**

The data used for the analysis were obtained from primary sources of administering the environmental awareness test through group administration. However, care was taken not to educate them about any of the issues since it may affect their responses favourably. The subjects responded self-marking the choices given for each of the statements.

#### **3.7 Tools**

##### **3.7.1 Environmental awareness ability measure**

The information on environmental awareness of the subjects was collected using the above scale developed by Jha [51]. This test consists of 51 items including 43 positive and 8 negative items. It measures extent and degree of awareness on dimensions of environment such as causes of pollution, conservation of soil, forest, air, energy, and conservation of human health, wild life and animal husbandry.

The scale has two response options i.e., agree and disagree. Each agreed response was awarded a score of one and each disagree response was awarded a score of zero. But the negative items were scored inversely. Thus, on the total scale possible raw scores range between 0 to 51.

Three indices of reliability were determined by the test author. Split-half reliability was found to be 0.61, secondly, it was calculated by K/R method and was found to be 0.84 and thirdly it was determined by test-retest methods, it ranged from 0.74 and 0.71 respectively after three and six months respectively. Thus the environmental awareness ability measure bears an adequate degree of reliability.

To determine validity of the environmental awareness ability measure co-efficient of co-relation between the scores of present scale and environmental awareness scale of Tarniji was computed by the test author. The co-efficient of co-relation was found to be 0.83. The scale has face and content validity.

### 3.8 Statistical Techniques

After scoring the data, the raw scores were converted into standard scores using 16.0 version of SPSS, subsequently, the mean and SD were calculated. The scores were subjected to 't' test analysis.

## 4. RESULTS AND DISCUSSION

Socio-demographic factors have a limited importance as individual determinants of environmentalism. However, in few of the cases where these may act as significant predictors of environmental awareness. Hence the present study made an attempt to study the effect of gender on environmental awareness of the post-graduate students.

Table 1 presents environmental awareness results of the science and social-science

students of Dharwad region in relation to gender. The male and female students of science and social-science courses did not differ significantly in their environmental awareness (Science: Males' Mean 50.54 & Females' Mean 51.41, Social Science: Males' Mean 51.02 & Females' Mean 51.68, and 't' values 0.54 & 0.51 and  $p > 0.05$  respectively). While controlling education for science and social-science courses there was no significant effect of gender on environmental awareness. The above results imply that when the education level and diversity held constant the gender has no significant effect on environmental awareness.

The first part of the Table 2 shows the results of science students of Bangalore sample group in relation to gender. The female students have higher mean scores of 53.97 than the male students (Mean 49.75). The obtained 't' value for the mean difference is 2.26, which is significant at 0.05 level of confidence. The present findings reveal that the females have higher level of environmental awareness than the males. However, the second part of the above table reveals no significant difference between the social-science students (Male Mean=51.41 & Female Mean=51.98 respectively, t value 0.51,  $p < 0.05$ ) on environmental awareness.

Surveys often find strong interest in environmentalism among the women and a gender gap in environmental awareness. However, the present project unravels similar level of environmental awareness among the male and the female students of science and social-science courses. But among the students of science courses of Bangalore metro city the female students have significantly higher environmental awareness. Out of the four comparative analyses of students in relation to gender, we could find a significant difference only in one analyses, remaining results conclusively suggest that the education level minimizes the effect of gender on environmental awareness.

**Table 1. Means, standard deviations and 't' values of the Dharwad sample group in relation to gender on environmental awareness**

Variable	Dharwad sample group (total n=316)						
	Science courses (n=144)			Social-science courses (n=172)			
	Male (n=52)	Female (n=92)	't' value	Male (n=96)	Female (n=76)	't' value	
Environmental awareness	Mean	50.54	51.41	0.54	51.02	51.68	0.51
	SD	11.15	08.15		09.07	07.34	

**Table 2. Means, standard deviations and 't' values of the Bangalore sample group in relation to gender on environmental awareness**

Variable	Bangalore sample group (total n=289)						
	Science courses (n=105)			Social-science courses (n=184)			
	Male (n=40)	Female (n=65)	't' value	Male (n=88)	Female (n=96)	't' value	
Environmental awareness	Mean	49.75	53.97	2.26*	51.41	51.98	0.51
	SD	11.73	07.37		07.83	07.15	

\* = Significant at 0.05 level

The present finding is in line with some of the earlier studies, for example, Morgil et al. [52] noted that though computer-assisted teaching increased the level of information of both female and male students concerning the subject of the environment, in the pre-test a significant difference between males and females was not observed. Other researchers also did not find a significant difference in environmental awareness between women and men [53-58].

Few of the earlier studies have supported for the hypothesis of gender effect on environmental awareness, awareness results favouring the females. However, the present study provides strong evidence that when educational courses are controlled for science and social-science the effect of gender on environmental awareness of the individuals is found to be weaker.

## 5. CONCLUSION

It emerged from the study that when the educational courses are held constant the gender had no significant effect on environmental awareness. The hypothesis of results favouring the female in environmental awareness has been disproved. The results suggests for further analogy and testing to assume effect of gender on environmental awareness with other factors in the consideration. The findings point to a need for education to increase environmental awareness rather than relying merely on the assumption that environmental awareness is product of gender.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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