

# ENVIRONMENTAL CONSCIOUSNESS AMONG CIVIL ENGINEERING STUDENTS IN TIRUNELVELI DISTRICT

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**Abstract** *In recent years due to environmental concerns, the significance of ecological living has increased worldwide. It is a 3 main dimension: 1. Environmental 2. Economic and 3. Social. As future professionals we will have a direct impact on the environment via architectural planning and design. It is therefore crucial for interior architecture students to acquire sufficient knowledge with regard to sustainability, ecological design and construction in particular. In other words, it is of critical importance that architects hug ecological design and construction in their professional activities. Besides, future professionals, it is of serious importance for the interior design students, as individuals establishing future communities, to achieve environmentally responsive behaviour. In this study researcher is able to give some beneficial suggestion according to the Civil Engineering institute basics through analysis. Environmental Consciousness in this study is conducted among Civil Engineering Student of Tirunelveli District.*

**Keywords** *Green Building Awareness, Knowledge, Attitude and Environmental Consciousness*

## INTRODUCTION

Environmental awareness is an important determinant of eco-based lifestyles. Additionally, it is an important aspect among younger generations to adopt an environmentally responsible lifestyle. Environmental behavior leading an individual towards ecologically based living has several other determinants. In other words, simply an awareness or environmental attitudes constituting environmental worldview for instance, would not be sufficient for the process making the individual more faithful to act environmentally. Environmental education may not be effective to make the individuals more environmentally responsive. The effectiveness of green building education, several other dimensions such as values, beliefs, worldviews, motivations and even physical properties within the individuals' surrounding, must be evaluated. Though, the whole world is experiencing such as global warming and climate change etc., it is almost necessary for people to have a high level of environmental worldview and to behave as an ecologically responsive nation, particularly for younger generations.

## REVIEW OF LITERATURE

Leontev (2019) Stated in "Perception of future professionals of the construction industry of green building and architecture practices" that the concept of green building and architecture is developed. The main objectives of identifying the associated concepts of green building and architecture is to find out the development of the construction industry. The study attempts to calculate the perceptions of future graduate professionals in the construction of practices of green building and architecture.

Beyaz and Asilsoy (2019) Stated in "Knowledge of green buildings and environmental worldview among interior design students" that the participants did not show a high level of support either for environmental knowledge of the concept of green buildings, environmental world view or for environmental behaviours. A survey was conducted among 100 students who were randomly selected undergraduate students in Nicosia. In the first set, Many subjects were asked about their environmental awareness and knowledge about issues, with the concept of green buildings. When the results of the students' responses to this item were evaluated, the results exposed that 70% of the Students said 'yes', 30% indicated that they they have no awareness on sustainability.

Mu et al. (2019) in their study "Strategies for Sustainable Development of Green Buildings" data was collected from a questionnaire survey from 240 respondents. The Hypothesis were framed as 1. Hypothesis of the market development environment of GB. Hypotheses are the economic value of GB. 2. The Hypothesis of Structural Equation Modeling (SEM) technique is able to explore dynamic interactions and leading roles of driving factors (measures) for SDGB. The conclusions of this study analyzed the sustainable development of green buildings from four subsystems, including the market development environment of GB, economic value of GB, degree of social participation of GB and ecological value of GB. The internal motivating forces of SDGB are analysed and they constructed a well suited structural model for SDGB.

Murtagh, Roberts and Hind (2016) conducted a study titled "The relationship between motivations of architectural designers and environmentally sustainable construction

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design” to understand how personal motivations drive architectural designers to practice sustainable design in their work and whether non-environmental motivations can drive sustainable outcomes.

## GREEN BUILDING AND BUILDERS

Green Building is a systematic approach for the planning, design and (repair) construction of capital buildings. This is used as an integral part of the broader definition of sustainable developments, as it enhances the environment and reduces the negative effects of construction work. In addition, all commitments of resources, water and energy waste and pollutant emissions are turned into economic opportunities through the introduction of an environmentally friendly, safer and cost – effective project. The concept of green building gives a clear response to the urgent problems of health care, economics and environmental protection.

### Engineering Colleges which offer Civil Engineering Program in Tirunelveli District

Sr. No.	Engineering Colleges	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total	Samples
1	Einstein College of Engineering	13	11	24	18
2	Francis Xavier Engineering College	15	13	28	21
3	PSN College of Engineering and Technology	12	13	25	19
4	SCAD Engineering College	14	13	27	15
5	Government College of Engineering	12	13	25	19
6.	Thamirabharani Engineering College	10	14	24	11
7	V V College of Engineering	15	14	29	17
	Total			157	120

## CONCEPTUAL FRAMEWORK

### Hypothesis for Path Analysis

H01: Awareness has no impact on the Attitude of Civil Engineering students.

H02: Knowledge has no impact on the Attitude of Civil Engineering students.

H03: Attitude has no impact on the Environmental Consciousness.

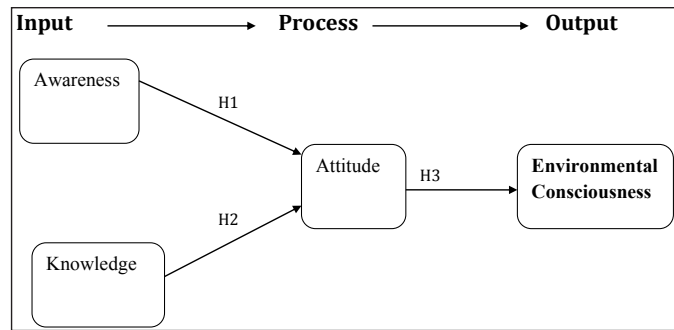


Fig. 1

## RESEARCH GAP

One of the study measure their environmental awareness and knowledge regarding a variety of issues, including the concept of green buildings, the level of their environmental worldview was assessed and the measured the participants’ environmental consciousness. This study, conducted undergraduate students in Nicosia.

In another one study UG students of architecture department are considered as respondents and the study was conducted in Near East University, Nicosia and survey was conducted for measuring environmental awareness and knowledge about both ‘biodiversity and nature conservation’ and ‘global warming and climate change’.

In this study, the researcher aims to measure Awareness, Knowledge, Attitude and Environmental Consciousness towards Environmental Consciousness among Civil engineering Students in Tirunelveli District.

## OBJECTIVES OF THE STUDY

- To study the demographic profile of Civil Engineering Students of Tirunelveli District.
- To identify the relationship between Awareness, Knowledge, Attitude and Environmental Consciousness of Civil Engineering Students of Tirunelveli District.
- To analyze the impact of Awareness, Knowledge, Attitude on Environmental Consciousness of Civil Engineering Students of Tirunelveli District.

## HYPOTHESIS

- H<sub>01</sub>: There is no influence of Demographic profile of Civil Engineering Student on Environmental Consciousness.
- H<sub>02</sub>: There is no influence of Awareness, Knowledge, Attitude and Environmental Consciousness variables of Civil Engineering Student on Environmental Consciousness.

## RESEARCH METHODOLOGY

The research design adopted for this study is Descriptive. In this study, the primary data were collected through structured questionnaire afresh and for the first time and thus happen to figure out original characteristics of Civil Engineering Students in Tirunelveli district. The secondary data for this study is collected through Books and Journals. The study has been conducted among 3<sup>rd</sup> and 4<sup>th</sup> year Civil Engineering Students in Tirunelveli District, by Google forms. Total number of population in the study is 157 Civil Engineering students in Tirunelveli district. The respondents were selected using the Census Survey. Researchers distributed 157 questionnaires, out of 122 were received and 2 questionnaires were invalid. Therefore the respondents' rate was 76.4%. The study is mainly based on primary data. The applicability of the finding of the study is limited to Tirunelveli District.

Percentage analysis, Weighted Average, One Way Anova, T-test, Linear Regression, Multiple Regression and Path Analysis (AMOS).

## DATA ANALYSES AND INTERPRETATION

### Demographic Profile of Civil Engineering Students of Tirunelveli District

Table 1

Sr. No.	Details	Options	No. of Respondents	Percentage
1.	Living Location	Rural	54	45.0
		Urban	36	30.0
		Semi-Urban	30	25.0
2.	Family Type	Joint family	80	66.7
		Nuclear Family	40	33.3
3.	Family Monthly Income	Upto 10,000	17	14.2
		10,001 - 20,000	30	25.0
		20,001 - 30,000	16	13.3
		30,001 - 40,000	17	14.2
		40001 – 50000	11	9.2
		50,001 and above	29	24.2
4.	Marital Status	Married	7	5.8
		Unmarried	113	94.2

### Interpretation

The above table shows the demographic profile of the respondents. Out of 120 respondents, 45% of the respondents are Living in Rural area, 66.70% of the respondents

live in Joint Family, 24.2% respondents have Family monthly income of 50,001 and above and 94.20% of the respondents are Unmarried.

## Spearman Correlation

The relationship between Awareness, Knowledge, Attitude and Environmental Consciousness Civil Engineering Students of Tirunelveli District.

H0: There is no Relation between level of Awareness, Knowledge, Attitude and Environmental Consciousness among Civil Engineering Students.

Table 2

Sr. No.	Relationship	R	P – Value
1.	Awareness and Attitude	.591**	0.000
2.	Knowledge and Attitude	.367**	0.000
3.	Attitude and Environmental Consciousness	.426**	0.000

Level of significance ( $p > 0.05$ ).

From the table shows the Spearman Correlation analysis showed that the value of correlation coefficient “r” is high for the relationship between Awareness and Attitude ( $r = .591$ ,  $\text{sig} = 0.000$ ), Attitude and Environmental Consciousness ( $r = .426$ ,  $\text{sig} = 0.000$ ) & Knowledge and Attitude ( $r = .367$ ,  $\text{sig} = 0.000$ ) These relationships are statistically significant at 5% level of significance with the P values of .000, .000, and .000. ( $p > 0.05$ ) P value shows that above latent variables relationships are high.

## Multiple Regression

The impact of Awareness, Knowledge and Attitude on Environmental Consciousness of Civil Engineering Students in Tirunelveli District.

H0: Awareness and Knowledge have No impact on the Attitude of Civil Engineering Students.

Table 3

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Model
1	.598 <sup>a</sup>	0.358	0.347	0.32131	1

a. Predictors: (Constant).

From the table shows the R value represents the simple correlation and is 0.598 which indicates the degree of correlation. The Adjusted R Square value 0.347 refers

that there is 35% influence of the independent variables of Awareness & Knowledge on the dependent factor of Attitude. Therefore, the Awareness & Knowledge is a good predictor to predict the Attitude.

ANOVA <sup>a</sup>						
Mode		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.731	2	3.365	32.598	.000 <sup>b</sup>
	Residual	12.079	117	0.103		
	Total	18.810	119			

P < 0.05.

a. Dependent Variable: Attitude.

b. Predictors: (Constant), Knowledge, Awareness.

The table reveals that the P value is .000<sup>b</sup>, Where P value is less than 0.05. The Null hypothesis is Rejected. Knowledge, Awareness and Attitude are statistically significant. It is a good fit for the data.

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.936	0.292		6.638	0.000
	Awareness	0.474	0.074	0.541	6.376	0.000 <sup>b</sup>
	Knowledge	0.074	0.061	0.102	1.205	0.231

The table clearly states that whenever there is a one point increase in the Awareness, there is a 0.541 point increase in the Attitude of the respondents when other independent variables are constant. Similarly, whenever there is a one point increase in the Knowledge there is a 0.102 increase in the Attitude of the respondents when other independent variables are constant. This Beta value is indicated. Standardized coefficient of Awareness and Attitude is higher when compared to Knowledge and Attitude. Among 2 variables Awareness has more impact on Attitude. Therefore, it is concluded that the predictor variable Awareness is actually contributing to Attitude.

### The Multiple Regression Equation as:

$$\text{Predicted (Attitude)} = 1.936 + (0.474 \times \text{Awareness}) + (0.074 \times \text{Knowledge})$$

### Linear Regression

H0: Attitude has no impact on the Environmental Consciousness of Civil Engineering Students.

**Table 4**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.426 <sup>a</sup>	0.181	0.174	0.48654

a. Predictors: (Constant), Attitude

From the table shows the R value represents the simple correlation and is 0.426 which indicates the degree of correlation. In this table 18.1% (R<sup>2</sup>) Value indicates total variation in the dependent variable, (Environmental Consciousness) that can be explained by the independent variables, (Attitude).

ANOVA <sup>a</sup>						
Mode		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.189	1	6.189	26.144	.000 <sup>b</sup>
	Residual	27.933	118	0.237		
	Total	34.122	119			

P > 0.05.

a. Dependent Variable: Environmental Consciousness.

b. Predictors: (Constant), Attitude.

From this table reveal that the P value is 0.000<sup>b</sup>, where P value is less than 0.05. The Null hypothesis are Rejected. Attitude and Environmental Consciousness are statistically significant. It is a good fit for the data.

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.823	0.480		3.799	0.000
	Attitude	0.574	0.112	0.426	5.113	0.000

Dependent Variable: Environmental Consciousness.

From this table, it can be interpreted that Attitude contributing to Environmental Consciousness is Significant with the P value of 0.000. Attitude has an impact on Environmental Consciousness. Whenever there is a one point increase in the Attitude, there is a 0.426 point increase in the Environmental Consciousness of the respondents. Therefore, it is concluded that the predictor variable Attitude is actually contributing to Environmental Consciousness.

The regression equation as:

$$\text{Predicted (Environmental Consciousness)} = 1.823 + 0.574 (\text{Attitude})$$

## Path Analysis (The Factors Driving Changes of Environmental Consciousness)

From the below Pathway whenever there is one unit increase in the awareness there is 0.47 units increase in the Attitude. Whenever there is one unit increase in the Attitude there are 0.57 units increase in the Environmental Consciousness.

H0: Awareness and Knowledge have no impact on the Attitude of Civil Engineering Students.

H0: Attitude has No impact on the Environmental Consciousness of Civil Engineering Students.

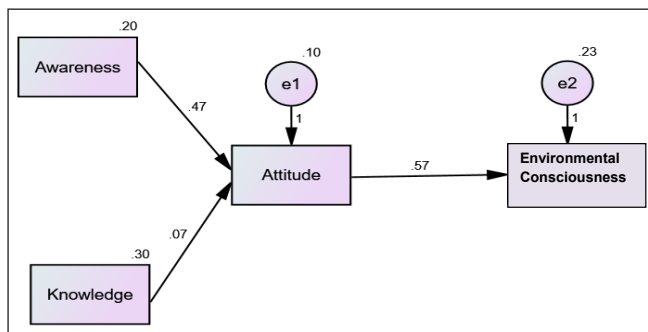


Fig. 2

The result of the model hypothesis verification.

Table 5

	Regression Weights					Result
	Relationship	Estimate	S.E.	C.R.	P	
H01	Attitude Awareness	.474	.064	7.371	***	Supported
H02	Attitude Knowledge	.074	.053	1.393	.164	Not Supported
H03	Environmental Consciousness Attitude	.574	.115	4.994	***	Supported

Note: S.E = standard error; C.R. = Critical Ratio; \*\*\* = p > 0.05 (Significant)  
Data Source: Amos Output.

From the Table 5, the result reveals that the Awareness influences the Attitude for about 47% and the Attitude impacts Environmental Consciousness for about 57%. These are statistically supported (p =\*\*\*).

The Null hypotheses for the paths have been failed.

Awareness has an impact on the Attitude of Civil Engineering Students and Attitude has an impact on the Environmental Consciousness of Civil Engineering Students.

From the finding, it is also understood that the Knowledge impacts Attitude for about 7% and the path is not significant at the 5% level of significance. Therefore, the null hypothesis is accepted. The path is not statistically supportive.

Knowledge has no impact on the Attitude of Civil Engineering Students.

## SUMMARY OF FINDINGS

- Out of 120 respondents, 45% of the respondents are living in Rural area, 66.70% of the respondents live in Joint Family, 24.2% respondents' Family monthly income is 50,001 and above and 94.20% of the respondents are unmarried.
- The value of correlation coefficient “r” is High between Awareness and Attitude among respondents (r =.591, sig = 0.000), Knowledge and Attitude (r =.367, sig = 0.000) & Attitude and Environmental Consciousness (r =.426, sig = 0.000).
- Adjusted R Square value 0.347 refers that there is 35% influence of the independent variables of Awareness & Knowledge on the dependent factor of Attitude. P value is .000<sup>b</sup> Knowledge, Awareness and Attitude are statistically significant. It is a good fit for the data. Among two variables Awareness has more impact on Attitude. Therefore, it is concluded that the predictor variable Awareness is actually contributing to Attitude. Predicted (Attitude) = 1.936 + (0.474 × Awareness) + (0.074 × Knowledge).
- 18.1% (R<sup>2</sup>) Value indicates total variation in the dependent variable, (Environmental Consciousness) which can be explained by the independent variables, (Attitude). The P value is 0.000<sup>b</sup> Attitude & Environmental Consciousness are statistically significant. It is a good fit for the data. The predictor variable Attitude is actually contributing to Environmental Consciousness. Predicted (Environmental Consciousness) = 1.823 + 0.574 (Attitude).
- Pathway is Attitude to Environmental Consciousness (p =\*\*\*) and Pathway is Awareness to Attitude (p =\*\*\*) reveals that relationship is Supported and Pathway is Knowledge to Attitude (P = 0.164) reveals that the relationship has been Not Supported.

## DISCUSSIONS

Suggestions for the Engineering Colleges:

- Civil Engineering departments can arrange workshops, seminars, quiz and assignments Related to Green Building certifications once in a month.

- Civil Engineering Students of Institutions can involve in green building activities in departments.
- Current curriculum of environmental education about Green Building concepts can be updated both with local and global environmental concepts.

Environmental Consciousness leads an individual towards ecologically based living and it has several other determinants. An awareness or environmental attitudes constitutes environmental worldview. An education system would have the power to increase the young generations' for becoming environmentally responsive. By providing a Green Building activity through education, Civil Engineers can provide proactive solutions to a growing global infrastructure.

From the research it has been concluded that there is a correlation between Awareness and Attitude, Knowledge and Attitude and Attitude and Environmental Consciousness among Civil Engineering Students. Among the 2 variables of Green Building Awareness more, importance is given to Attitude. It is very important to notice from the research that the Regression and Path analysis reveal that Attitude actually contributing more to the Environmental Consciousness when comparing to Knowledge and Awareness.

With regard to the Living location, a Significant mean difference among the respondents is towards Attitude. The High value of mean score of the living location of the respondents is Semi urban.

The Civil Engineering students could be given awareness through workshops, seminars, quiz, colloquiums and assignments related to Green Building certification courses once in a month, Green Building activities in the departments and global environmental better education with the updated Curriculum regarding Green Building could be given where there could be enormous increase on awareness regarding Green Building could be built up to support the sustainability of Indian Environment.

## REFERENCES

- Asilsoy, B., Laleci, S., Yildirim, S., Uzunoglu, K., & Özden, Ö. (2017). Environmental awareness and knowledge among architecture students in North Cyprus. *International Journal of Educational Sciences*, 19(2-3), 136-143.
- Beyaz, C., & Asilsoy, B. (2019). Knowledge of green buildings and environmental worldview among interior design students. *International Journal of Advanced and Applied Sciences*, 6(1), 29-36.
- Duggal, S. K. (2008). *Building materials* (3<sup>rd</sup> revised ed.). International Publishers.
- Chawla, D., & Sondhi, N. (2011). *Research methodology concepts and cases*. IMI-New Delhi: Vikas Publishing House Pvt Ltd.
- Grewal, D., & Levy, M. (2017). *Marketing* (3<sup>rd</sup> ed.). MC Graw Holl education.
- Leontev, M. (2019). Perception of future professionals of the construction industry of green building and architecture practices. In *E3S Web of Conferences* (vol. 135, p. 03049). EDP Sciences.
- Murtagh, N., Roberts, A., & Hind, R. (2016). The relationship between motivations of architectural designers and environmentally sustainable construction design. *Construction Management and Economics*, 34(1), 61-75.
- Teng, J., Mu, X., Wang, W., Xu, C., & Liu, W. (2019). Strategies for sustainable development of green buildings. *Sustainable Cities and Society*, 44, 215-226.
- United Nations Environment Programme (UNEP). 2011. Retrieved April 7, 2014, from [http://www.unep.org/greeneconomy/Portals/88/documents/ger/9.0\\_Buildings.pdf](http://www.unep.org/greeneconomy/Portals/88/documents/ger/9.0_Buildings.pdf)