

Leadership Development in Youth as Future Stakeholders of Green Building for Global Ecological Sustainability

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Abstract

The human activities are causing an irreversible damage to the global environment. The cumulative effects of the degradation of the Earth's natural environment have increased the scale of the sustainable development challenge enormously. Tremendous rate of real estate development across the globe is imposing immense pressure on the environment and its natural resources. Construction industry is growing rapidly all over the world. Buildings have impact on the environment in a number of ways over their lifecycle, which range from the excavation of construction sites to the materials used in construction. The construction and operation of buildings require significant input of energy, water and raw materials. Buildings are also responsible for considerable quantities of waste and emissions, including greenhouse gases. Hence, there is a need to design and construct a green building which minimizes the adverse impact on the environment and the health of its users. People are unaware of Green building concept, and unconvinced of its advantages. To convince present building owners and future stakeholders – the "youth" - about the benefits of Green buildings, it is necessary to make them understand the advantages of green buildings. Today's youth are tomorrow's stakeholders and caretakers of the future environment. They will give due consideration to the environmental conditions while constructing/buying their own house. Educated and aware youth about green building through their leadership can influence people to strive willingly for the global environment sustainability. Therefore it is essential to find out the level of knowledge of the youth on several aspects of green buildings and to enhance it. Hence, a research was undertaken to develop an educational programme on various aspects of green buildings, to expose the selected youth to the programme and assess their pre and post knowledge regarding Green buildings. The data were gathered through questionnaire on a sample of 84 youth from department of Family and Community Resource Management, The Maharaja Sayajirao University of Baroda selected through convenient sampling. The educational programme developed in audio visual and print media highlighted aspects viz. site selection, water efficiency, energy efficiency, materials and resources and indoor environmental quality. It was duly validated by the experts. The respondents were required to fill up the questionnaire containing knowledge scale before and after their exposure to the educational programme. The Paired t-test value was found highly significant. This indicated the enhancement in the level of knowledge of the youth regarding Green buildings. Youth as a leader can inspire with their vision regarding green building. The educational programme developed can be used to enhance knowledge regarding green building for various stakeholders who in turn, would become leaders and change agent to the cause of global ecological sustainability.

Keywords: Green building, youth, leadership, ecological sustainability, leadership, future stakeholder

Introduction

As technology matured and grew more sophisticated, so did man's ability to exploit it. The structures that humans built became more technologically advanced and less reliant on the natural elements of the world. Builders and designers slowly started adopting new ideas that were neither indigenous nor sustainable. With the advent of advanced heating and air conditioning systems in the 20th century, it became relatively easy

to alter the internal environments rather than adapt to the natural one that surrounded the human beings.¹

The construction industry poses a major challenge to the environment. Buildings have impact on the environment in a number of ways, which range from the excavation of construction sites to the materials used in construction. The construction and operation of buildings, they require significant input of energy, water and raw materials. Buildings are also responsible for considerable quantities of waste and emissions, including greenhouse gases. As per manual by GRIHA (2010), globally, buildings are responsible for at least 40% of the energy use. An estimated 42% of the global water consumption and 50 % of the global consumption of raw materials are consumed by buildings when taking into account the manufacture, construction and the operational period of the buildings. In addition, building activities contribute an estimated 50% of the world's air pollution, 42% of its greenhouse gases, 50% of all water pollution, 48% of all solid wastes and 50% of all CFCs (Chlorofluorocarbons) to the environment. Extensive urbanization is leading cause of environmental degradation. Vegetation and tree cover give way to urban areas with large expanses of pavements, buildings, and other structures, thus eliminating cooling provided by the vegetation. Urban heat island impact gives rise to increased temperatures.

The world is now slowly realizing the importance of environmental conservation. In the later part of the twentieth century 'Go Green' philosophy has been developed. Building construction sector is no exception to this. The construction industry also has shown considerable awareness towards preserving the ecological balance through various green practices. Awareness is being translated into practices and eco-friendly real estate projects, products and services are emerging faster than ever (Chopra, 2008).

Green housing or eco-friendly homes are the integrated approach towards minimising the adverse effects of construction and its operation on the environment and promoting healthier living for people (Times of India, 2014). This concern has led to the development of "Green Buildings". Green buildings are designed and constructed to maximize the whole lifecycle performance and conserve resources (Devi and Lakshmi, 2010). The green building emphasizes reduction of environmental impacts through a holistic approach to land and building uses and construction strategies (Roy and Gupta, 2008).

Accelerating youth action towards "Greener Future", it is necessary to motivate the future stakeholders so that through their leadership can influence others to buy or construct a building with green features for the global environment sustainability. Hence the present research was conducted with the objectives firstly, to find out the level of knowledge of the youth regarding various aspects of green building, secondly to develop an educational programme on aspects of green building and thirdly to enhance the knowledge of the youth

through an educational Programme prepared for the purpose.

Objectives of the study

1. To find out the level of knowledge of the youth regarding various aspects of green building.
2. To develop an educational programme on aspects of green building.
3. To enhance the knowledge of the youth through an educational Programme prepared for the purpose.

Review of Literature

Green building awareness survey (2007) aimed to find out the consumer interest and awareness of green building in Washington State on a sample of 268 respondents (Northwest-16%, Southwest-40%, Central-10% and Eastern-35%). Data indicated that Energy Star was the most recognized of all of the residential green home certification programs. Interviewee consistently said that green building was more environmentally friendly than conventional buildings (78%) and used less waste. Majority of the respondents understand that green buildings are at least somewhat more energy efficient than non-green certified buildings (74%). Only 53% of respondents indicated that they believed green homes to conserve water than conventional buildings. Additionally 31% respondents indicated that they didn't know whether green homes had water conservation benefits. Majority of the respondents appeared to understand that utility costs of green certified buildings were less than those of non-green buildings. One half of the respondents indicated that they thought green buildings were more energy efficient, yet only 36% indicated that utility costs were much less. Respondents didn't know whether or not green buildings were constructed with higher quality materials than non-green buildings (31%).

Shenzhen Fountain Corporation in (2008) conducted a survey on Green Building Awareness and Sustainability, Changsha, Hunan Province. Survey was conducted on a sample of 374 respondents of city of Changsha, China. With a large percentage of respondents (18.38%) in the real estate industry, a fairly high level of awareness of Green buildings could be witnessed within the sample. Majority of the respondents were familiar with the China Green label Program (58.29%). Majority of the respondents associated environmental friendliness with Green buildings. The vast majority of the respondents perceived Green buildings to be much more energy efficient than non-green buildings (67.3%). Utilities and maintenance cost in Green buildings was perceived to be much lower by 35.77% of the respondents. The vast majority of respondents (68.33%) perceive a green building to be built to much higher quality standards than a non-green building. Over 45% of the respondents think that Green building has a much higher resale value compared to non-green building. More than one half of the respondents think that a green building can conserve much more water than a non-green building. Nearly 30% of the respondents would not be willing to pay any additional premiums for Green homes.

Fleming (2009) in a survey National real Estate Investor on Doubling down on Green comprising developers, corporate real estate executives and city and country government officials. The findings showed an overwhelming majority of developers (88%) and corporate executives (86%) indicated that they consider green design to be as important or more important. Survey findings also showed that more state and local governments (56%) would consider using performance contracts to improve energy efficiency in their facilities. Only 34% of the respondents said that the federal stimulus influenced their decisions. A majority of the developers believed that green requirements will eventually become part of required building codes. Developers and corporate respondents indicated that they have taken advantage of few government incentives. Nearly 23% of the developers reported that they have taken advantage of tax incentives, 16% said they have taken advantage of rebates and discounts on environmental products and 9% have taken advantage of grants, tax incentives (16%), rebates and discounts (11%), and permit zone fee reduction (5%). Almost 85% of corporate executives and 76% of developers said that they are at least familiar with the U.S. Green Building Council's LEED program. A slightly lower percentage of government officials (59%) are familiar with LEED. A majority of both corporate and developer respondents report that they believe LEED to be an effective system for energy savings and environmentally friendly buildings.

Conte and Yepes (2012) had conducted a study on Green Buildings: Analysis of State of Knowledge with the aim to analyse the state of knowledge up-to-date. It was found that there was lot of information available on Green Buildings. It was also concluded that everyday, more people, groups, associations, governments, countries are interested in joining the "Green Movement", mainly aware of the importance it has on the environment and also helped by the economic benefits that are available and the prestige and recognition that this brings. United States was the country with more papers published and this could be attributed to the fact that LEED Rating Systems is the most internationally recognized certification rating system, developed by US Green Building Council. To implement the energy savings measures is necessary to use materials, devices, green technology and other aspects. The initial cost increment in green building is the most common barriers. The energy efficiency is the most interest topic to researchers, because involve in a directly or indirectly way others green building aspects (design, materials, water saving, cost).

Rashid, et. al. (2012) conducted a study to investigate the mechanism for the effects of environmental design features of a green building on occupants' environmental awareness and organizational image. The data were collected from 175 occupants of the Leadership in Energy and Environmental Design (LEED)-certified green building using a questionnaire instrument. The finding of the study suggested that the occupants certainly

appreciated the environmental design features of the buildings. These environmental design features also made the occupants more environment conscious, even though these features did not help improve their assessment of organizational image. The study found no evidence for direct relationships between the occupant's assessments of individual workspace and departmental space features and their assessments of environmental awareness and organizational image. The study, however, found some evidence for indirect relationships showing that the occupant's assessments of individual workspace and departmental space features had affected their satisfaction with individual workspaces and the building, which affected the occupants' assessment of environmental awareness and organizational image.

Campwala (2013) conducted a descriptive research on NET Zero buildings with a sample of 20 architects and 20 civil engineers of Vadodara city selected through purposive sampling technique through a questionnaire. The findings revealed that a little more than one-half of civil engineers had moderate extent of awareness whereas majority of the architects had moderate extent of awareness regarding net zero buildings. It was found that out of the two categories civil engineers were more aware about net zero building. For the present research study the investigator had mainly focused on the design of the net zero building with the solar panels and the materials. The designing was done using AutoCAD software.

Methodology

The research design for the present research was descriptive. The 84 youth from department of Family and Community Resource Management, Institute of Hotel Management and Catering Technology and Honors Degree programme in Interior Designing, The Maharaja Sayajirao University of Baroda were selected through convenient sampling method. The tool to collect data was a questionnaire which contained questions to elicit required background information. It also contained Likert type knowledge scale regarding green building having statements related to meaning and different aspects of green building (site selection, water efficiency, energy efficiency, materials and indoor environment quality). The respondents were asked to state whether they "Agree" or "Disagree" or were undecided about the statements. The scores from 3 through 1 were ascribed to the positive statement responses. The scores were reversed in case of negative statements. An educational programme on audio-visual and print media was developed on various aspects of Green building in English as well as Hindi language. It was subjected to establishment of validity and reliability. The tool prepared and educational programme were validated from panel of 11 experts from different departments, faculty and the Universities, practicing architects, interior designers and civil engineers. For the educational programme the experts were asked to indicate the content clarity, relevance, topics covered, quality of visuals, sound quality and over all presentation. The reliability

coefficient derived for the knowledge scale was 0.909. The respondents were required to fill up the questionnaire containing knowledge scale before and after their exposure to the educational programme.

Major Findings

The major findings of the study are reported broadly under the heads of background information, knowledge of the respondents regarding Green Buildings and educational programme. The term 'youth' and 'respondents' are used interchangeably in the present study.

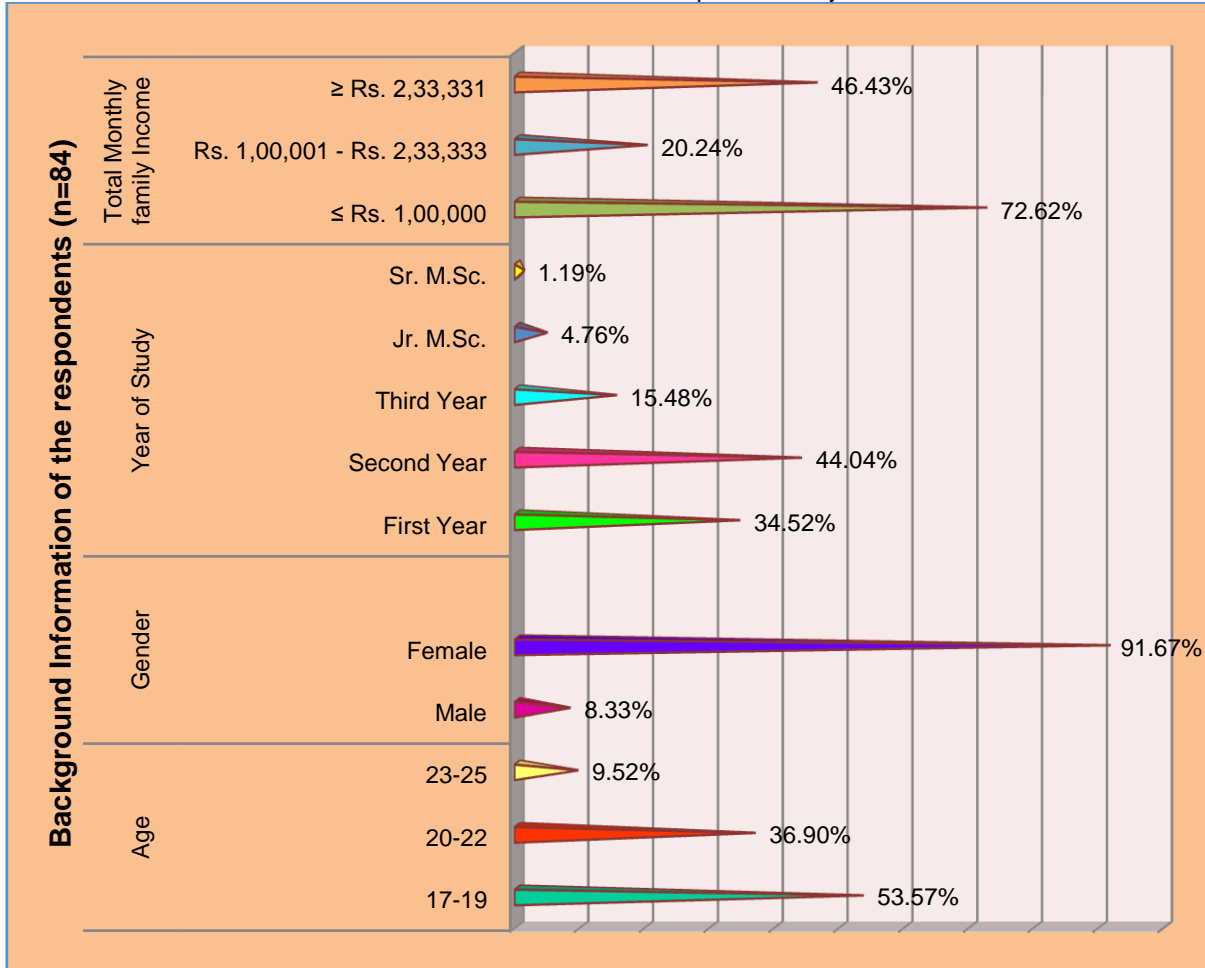


Figure 1: Percentage Distribution of Respondents According to Their Background Information

Background Information of the Youth: The age of the respondents ranged from 17 to 25 years with a mean age of 19.821 years. More than one half of the respondents belonged to the age group of 17 to 19 years (Fig. 1). Majority of the respondents were female. Less than one half of the respondents were

studying in second year while a little more than one third was first year youth. Majority of the respondents had total monthly income less than and equal to Rs. 1,00,000 while less than one half had total monthly income more than and equal to Rs. 2,33,331.

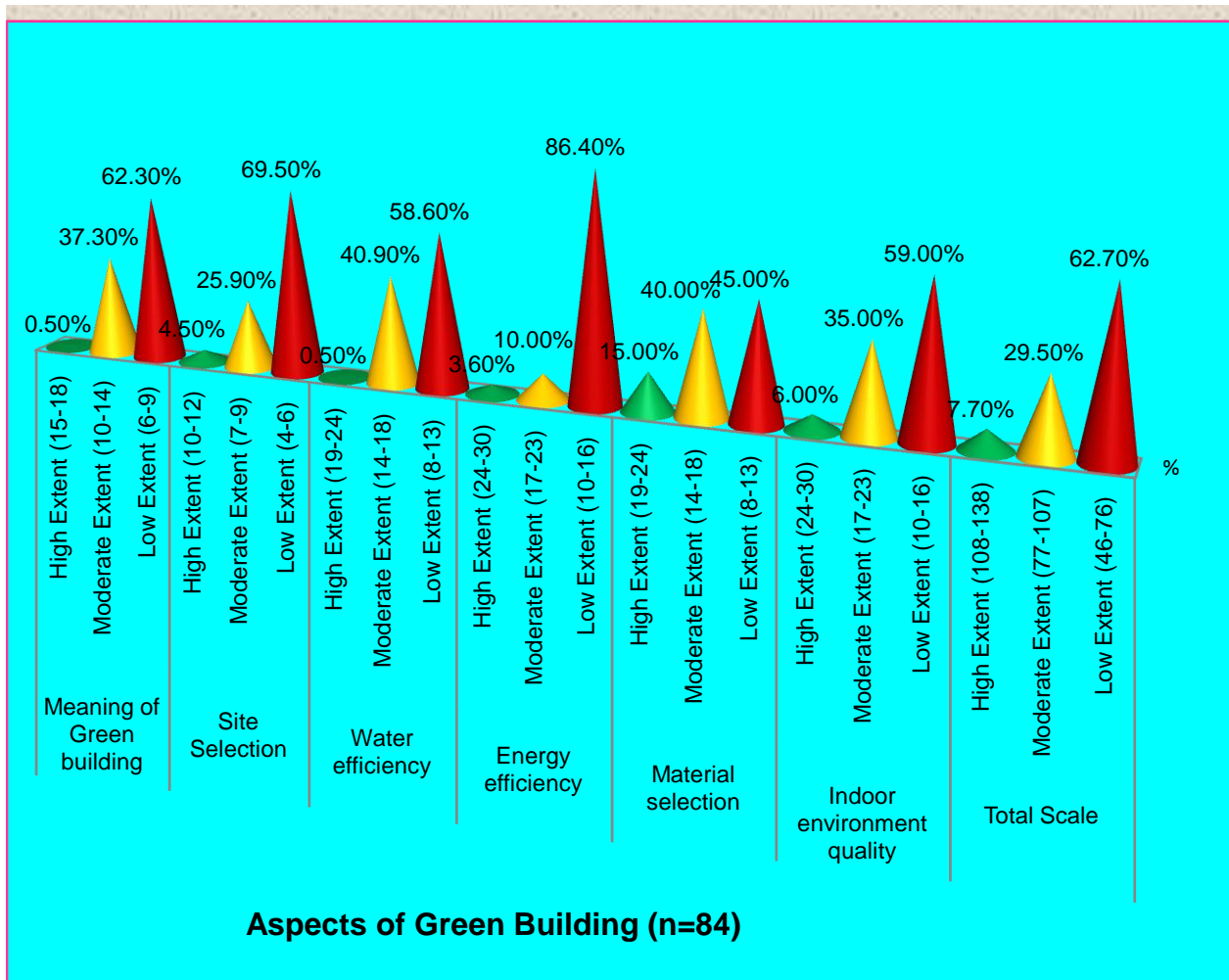


Figure 2: Percentage distribution of respondents according to extent of their knowledge on various aspects of Green Building

The data revealed that less than three fourth of the respondents had low extent of knowledge regarding meaning of green buildings. Majority of the respondents had low extent of knowledge regarding site selection and energy efficiency in green buildings.

environment quality in green buildings. On a total scale, less than three fourth of the respondents had low extent of knowledge on various aspects of green buildings (Fig. 2).

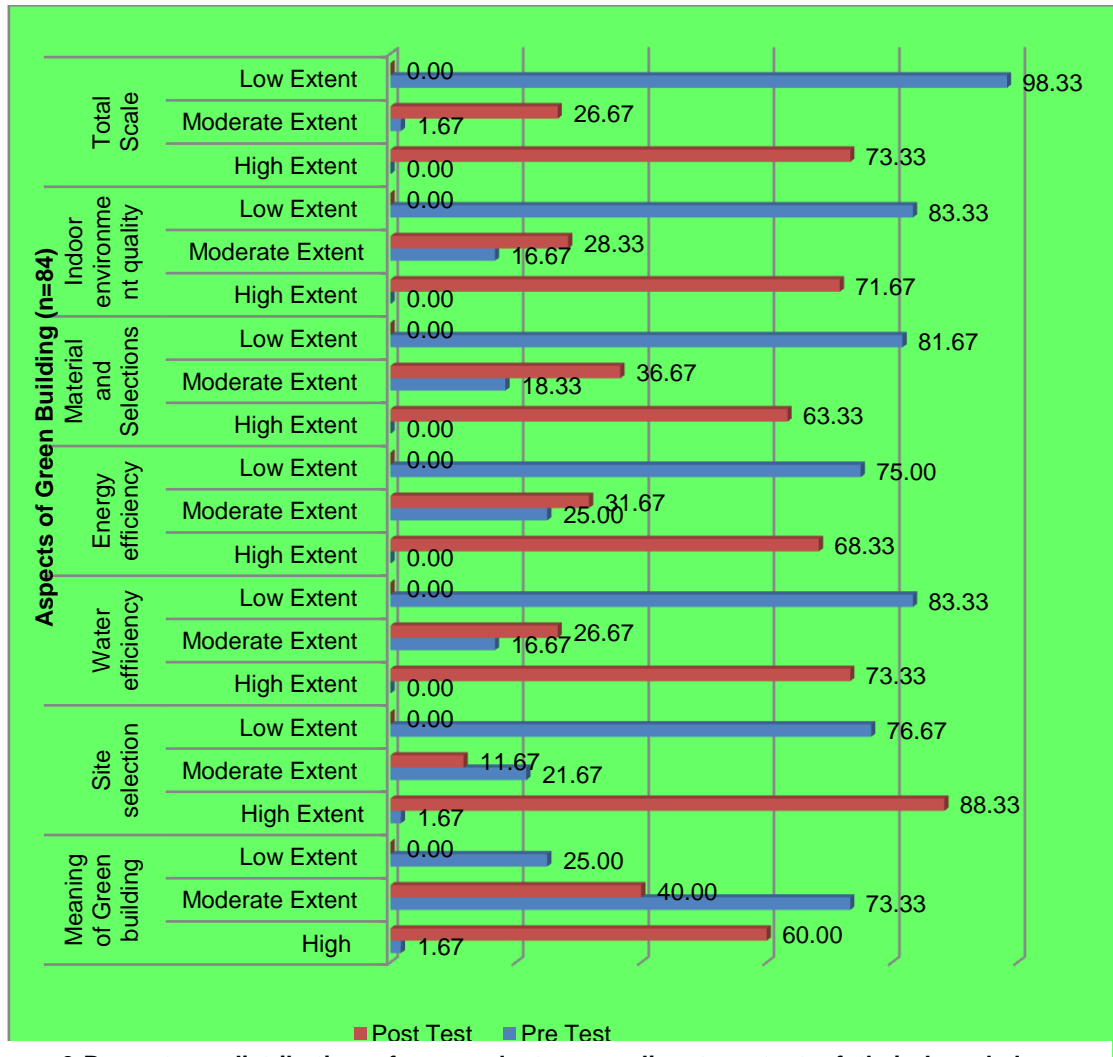


Figure 3:Percentage distribution of respondents according to extent of their knowledge on various aspects of Green Building before and after the administration of the educational programme

Extent of Knowledge of the respondents regarding Green Buildings before and after the administration of the Educational Programme

It was found that after the administration of an educational program there were no low scores for

all the aspect of Green Buildings. On the total scale, it was found that majority of the respondents' knowledge regarding various aspects of green building increased after the administration of an educational program (Fig.3).

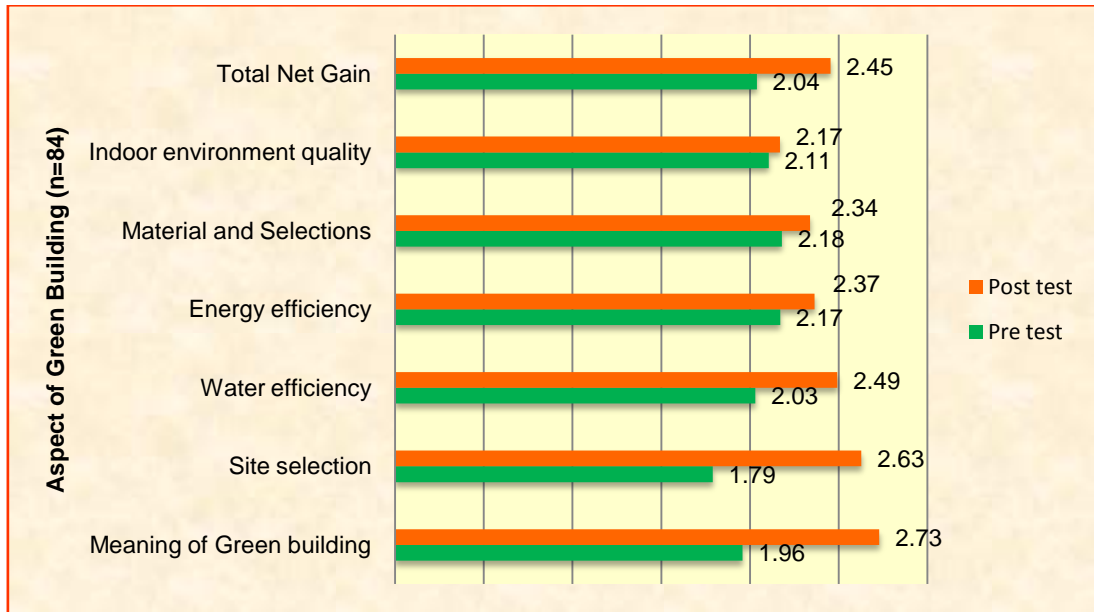


Figure 4: Weighted mean for the extent of knowledge on various aspects of Green Building before and after the administration of the educational programme

Weighted mean for extent of knowledge on various aspects of Green Building before and after the administration of the educational programme

It was observed that for almost all the aspects related to green building, the extent of

knowledge was found high after the administration of an educational program. Overall knowledge related to various aspects of green building had increased from 2.04 in pre test to 2.45 in post test (Fig. 4). Total net gain in the knowledge regarding various aspects of green buildings was of 0.41.

Administration of an Educational Programme



Introduction about the Educational Programme



Explaining the process of filling the Knowledge scale



Exposure to the Educational Programme





Exposure to the educational programme

Testing of Hypotheses

A number of hypotheses were formulated on the basis of objectives of the study. For the purpose of statistical analysis, the hypotheses were formulated in the null form. The results are presented here.

Ho1

There exists no relationship between the extent of knowledge of the youth regarding various aspects of Green Building and their age and monthly family income.

Co-efficient of Correlation was computed to test this hypothesis.

Table 1 : Co-efficient of Correlation showing relationship between the selected variable.

	Selected variables	n	r-value	Level of Significance
1.	Extent of knowledge of youth regarding various aspects of Green Building	84	0.159	0.05
	Age of the youth			
2.	Extent of knowledge of youth regarding various aspects of Green Building	84	-0.087	*N.S.
	Monthly Family Income			

*N.S.=Not Significant

A positive relationship was found between the extent of knowledge of the home owners regarding various aspects of Green Building and their age (Table- 1). Hence, the null hypothesis was rejected. It could be concluded that the extent of knowledge of the home owners regarding various aspects of green building increased with the increasing age.

Ho2

There exists no difference in the extent of knowledge of the youth regarding various aspects of Green Building before and after the exposure to the educational programme on Green Building.

Paired t-test was computed to find out the difference in the extent of knowledge of the home owners regarding Green buildings before and after the

administration of educational program on Green buildings.

Table 2: Paired t-test showing the difference in extent of knowledge of the youth regarding Green Buildings in pre and post test

	Selected variables	n	r-value	df	Level of Significance
1.	Before administration of educational programme	84	25.047	83	0.01
	After administration of educational Programme				

Results of paired t test indicated that there was a significant difference in the knowledge of the youth regarding Green buildings before and after the administration of the educational program (Table-2). Thus, the null hypothesis was rejected and it could be concluded that the knowledge of the home owners increased significantly after the exposure to the educational program prepared on Green buildings. This proved a high efficacy of the educational program.

Conclusion

The study was conducted on the 84 youth selected through convenient sampling comprising of females having mean age of 19.69 years, studying in second year revealed that majority of them had low extent of knowledge regarding Green buildings. It was found that majority of the respondents' knowledge regarding various aspects of green building increased after the administration of an educational program. Total net gain in the knowledge regarding various aspects of green buildings was of 0.41. The Paired t-test value was found highly significant. This indicated the enhancement in the level of knowledge of the youth regarding Green buildings. Thus, it could be concluded that the enhancement of knowledge of the respondents established the efficacy of the educational program prepared for the purpose. This educational program can be used widely on various

stakeholders to make them aware about the concept of Green Buildings.

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