Literacy and Demographic Characters: A critical study of respondents from the State of Maharashtra, India.

By

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Introduction

The term "environmental literacy" was used in its current context by Charles Roth in 1992 [1]. He went on to say that that citizens who were illiterate about the environment, could become environmentally literate, just as a person could become literate, in the sense of being able to read and write, through being educated. Environmental literacy is a difficult concept to define. While the concept of literacy generally revolves around knowledge, awareness and ability, EL has many more dimensions to it. Wolfe (2001)[2] defined Environmental literacy as "A basic understanding of the concepts and knowledge of the issues and information relevant to the health and sustainability of the environment". However, this definition appears to be incomplete as it emphasizes only on the information part and neglects the attitude and action part. Considering this, Disinger and Roth (2003)[3] gave a generally accepted definition of environmental literacy as "Environmental literacy (EL) is essentially the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore or improve the health of those systems". These scholars also explained environmental literacy components as environmental sensitivity, knowledge, skills, attitudes and values, personal investment and responsibility, and active involvement. In 2003, they stated that environmental literacy should increase individual's sensitivity, knowledge, skills, attitudes and values towards the environment.

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This definition encompasses three competencies of Environmental Literacy:

a) Ability to Perceive

b) Ability to Interpret

c) Ability to Act

Environmental literacy was defined as 'A person's ability and motivation to use critical thinking, problem solving, and decision-making skills to assess, make informed decisions about, and take responsible action toward resolving, an environmental issue (Marian Ahn Thorpe, 2004)[4]. Loubser, Swanepoel and Chacko (2001)[5], while measuring the EL of teachers claimed that "Environmental Literacy is the ability to be aware of one's environment. It enriches one with the knowledge to realize the imbalances and threats the environment faces and enables one to form positive attitudes towards it with the aim of developing skills to resolve and prevent environmental problems and urge to protect and improve the environment for the present and future generations by active participation." They concluded that Environmental Literacy is the capability for a contextual and detailed understanding of an environmental problem in order to enable analysis, synthesis, evaluation, and ultimately sound and informed decision making at a citizen's level. This means that "environmentally literate" people will have the knowledge, tools, and sensitivity to properly address an environmental problem in their professional capacity, and to routinely include the environment as one of the considerations in their work and daily living.

David Orr cites Garrett Hardin's definition of ecological literacy as "The ability to ask 'What then?'," and goes on to say that in addition to the ability to read and calculate (literacy and numeracy--both indoor activities of education); ecological literacy also implies an intimate knowledge of our landscapes, and an affinity for the living world. It is, too, a systemic view, "to see things in their wholeness" (Orr, David, 1992)[6].

Definition of Important Terms

Environmental Education: Environmental education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones. (UNESCO, 1977)[7]

Environmental Knowledge: Environmental knowledge includes all the cognitive understandings of the environment and its associated problems (Roth, 1992).

Environmental Attitudes: Attitude refers to set of values and feelings of concern for the environment and motivation for actively participating in environment improvement and protection (UNESCO, 1978)[8].

Environmental Sensitivity: Environmental sensitivity refers to a set of affective attributes which result in an individual viewing the environmental from an empathic perspective (Petersen, 1982).

Environmental Concern: Environmental concern refers to a sympathetic perspective toward the environment (Hungerford and Volk, 1990)[9].

North American Association for Environmental Education (NAAEE) [10] defined the commonly used terms for the assessment of environmental literacy as follows:

Competencies: Competencies are clusters of skills and abilities that may be called upon and expressed for a specific purpose. Measurement of competencies is the primary objective in large-scale assessments. They include the capacity to: Identify environmental issues, Ask relevant questions, Analyze environmental issues, Investigate environmental issues, Evaluate and make personal judgments about environmental issues, Use evidence and knowledge to defend positions and resolve issues, and Create and evaluate plans to resolve environmental issues.

The expression of a competency is influenced by and influences prior knowledge and dispositions.

Knowledge: Environmental literacy entails knowledge of physical and ecological systems; social, cultural and political systems; environmental issues; multiple solutions to environmental issues; and citizen participation and action strategies.

Dispositions: Dispositions are important determinants of behaviours related to the environment, both positive and negative. Learners' dispositions toward the environment are thought to influence their willingness to recognize and choose among value perspectives, as well as their motivation to participate in public deliberations about environmental issues. They include: sensitivity; attitudes, concern, and worldview; personal responsibility; self-efficacy/locus of control; and motivation and intentions.

Environmentally responsible behaviour: Competencies, knowledge, and dispositions enable and are expressed as behaviours, and environmentally responsible behaviour is the ultimate expression of environmental literacy. It describes the point at which competencies, knowledge, and dispositions are brought to bear within a particular context. Treating behaviour as a component of large scale environmental literacy assessments, however, is controversial, in part because it is more difficult to assess than the other components. Measures of behaviour tend, for obvious reasons, to rely heavily on self reports, which many researchers view as less reliable than other sorts of measures.

There are several ways of conceptualizing environmentally responsible behaviour, and measurement problems are associated with each. Two conceptualizations have been demonstrated to be useful in large-scale assessments and surveys: One includes five categories of citizen action: eco-management, persuasion, consumer/economic action, political action, and legal action. Another identifies four categories: environmental activism, non-activist behaviours in the public sphere, private sphere environmentalism, and other environmentally significant behaviour.

A third, newer conceptualization of behaviour, described as "***Action Competence***," focuses on: critical, integrative thinking as it relates to contextual decisions made as part of citizen participation; the development of personal competence and agency; and collective competence and capacity. A number of publications attest to the interest and attention this work is receiving among environmental education and natural resource researchers, and ways of using it in large scale assessments may be developed in the future.

Context: Environmental issues do not operate in a vacuum, but in a variety of physical, personal, social, and political contexts. In different contexts, people may have different

disagreements about and solutions for similar issues. Environmental literacy is also not stagnant over time, but should be thought of as dynamic, changing as personal beliefs, experience, behavioural sophistication, social influences, and environmental issues develop and evolve.

Measuring Environmental Literacy

United Nations Educational, Scientific, and Cultural Organization (UNESCO) has done considerable work in the understanding and measurement of Environmental Literacy. The United Nations Conference on the Human Environment met at Stockholm from 5 to 16 June 1972. The imperative goal of this conference was to defend and improve human environment for present and future generations, which would demand the acceptance of responsibility by individuals, local and national governments. After Stockholm Conference, the Belgrade Charter was written in Belgrade, Yugoslavia by UNESCO in 1975. Belgrade Charter stated new development approaches, which were explained in the Stockholm Conference and could improve the world's conditions but all of them were short-term solutions, unless the youth of the world received a new kind of education. Environmental education goals of the Belgrade Charter (1975)[11] were:

To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.

The environmental education objectives of the Belgrade Charter (1975) were stated as:

1. **Awareness**: to help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allied problems.

2. **Knowledge**: to help individuals and social groups acquire basic understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it.

3. **Attitude**: to help individuals and social groups acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement.

4. **Skills**: to help individuals and social groups acquire the skills for solving environmental problems.

5. **Evaluation ability**: to help individuals and social groups evaluate environmental measures and education programmes in terms of ecological, political, economic, social, esthetic and educational factors.

6. P**articipation**: to help individuals and social groups develop a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to solve those problems.

Two years after the Belgrade Charter, UNESCO and the United Nations Environment Programme held the Intergovernmental Conference on Environmental Education in Tbilisi, Republic of Georgia. The goals, objectives and principles of environmental education which were declared in this conference are still used by many environmental educators. The goals and objectives of environmental education of the Tbilisi Declarations (1977) were:

Awareness: to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge: to help social groups and individuals gain a variety of experiences in and acquire a basic understanding of the environment and its associated problems.

Attitudes: to help social groups and individuals acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection.

Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Action: to help provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

These five items were known as **"AKASA model",** which is still being used by many educators today.

Subsequently, many researchers and many organizations have designed different frameworks for measuring Environmental Literacy. These frameworks are summarized in the following table:

Frameworks for measuring Environmental Literacy

Sr. No	Name of the scholar(s) / Organization	Year	Parameters used for determining EL
1	Tuğce Varisli[12]	2009	Knowledge, Attitude, Sensitivity and Concern
2	Lára Jóhannsdóttir[13]	2009	Definition of terms, Participation in seminars offering sustainable or environmental themes, Knowledge of fifteen environmentally related terms, Demographics
3	Loubser, Swanepoel and Chacko	2001	Disposition, Awareness, Knowledge, Attitude and Participation
4	Ruth Lewis [14]	2008	Environmental Awareness, Personal Conduct Knowledge and True Environmental Literacy
5	NEETF[15]	2005	Environmental Awareness, Personal Conduct Knowledge and True Environmental Literacy.
6	NAAEE	2005	Competencies, Knowledge, Dispositions and Environmentally Responsible Behaviour
7	The Belgrade Charter by the United Nations Educational, Scientific, and Cultural Organization (UNESCO)	1975	Awareness, Knowledge, Attitude, Skills, Evaluation ability and Participation
8	UNESCO and The United Nation's Environmental	1977	Awareness, Knowledge, Attitude, Skills Action

	Programme		
9	Tuncer, G., Tekkaya, C., & Sungur, S.[16]	2006	Environmental Knowledge, Environmental Attitudes, Environmental uses and Environmental Concerns.
10	Marian Ahn Thorpe	2004	Knowledge, Critical Thinking Skills and Action
11	Elit Kutucu, Betul Ekiz and Huseyin Akkus [17]		Environmental Knowledge, Environmental Attitude, Environmental Use and Environmental Concern
12	Lay, Yoon-Fah; Khoo, Chwee-Hoon; Treagust, David F.; Chandrasegaran, A. L.[18]	2010	Ecological Knowledge, Clear Positions on Environmental Issues, Cognitive Skills to Analyze Environmental Problems and Behaviour Patterns
13	Bogon and Kromrey [19]	1996	Knowing Ecology, Being attitudinally predisposed towards the environment, Valuing responsible environmental behaviour, Participating in responsible environmental behaviour and Knowing politically action strategies

Based on the above studies, the scholar developed a model for the measurement of EL of consumers influenced by CrMkEI. For the sake of convenience, this model was called the **'BASKAP'** model. This model has the following dimensions:

a) Behaviour
b) Attitude
c) Sensitivity
d) Knowledge
e) Awareness

f) Participation

Environmental Literacy: Some findings

Study of EL all across the world has revealed some interesting observations. Tuğce Varisli (2009) found that students have positive attitude and high degrees of concern and sensitivity toward environment; however they have low to moderate levels of environmental knowledge. She also found that; a) there is significant effect of gender on students' environmental literacy regarding to concern, in favour of girls, b) there is a significant effect of parents' educational level on students' environmental literacy; c) there is a significant effect of mothers' work status on students' environmental literacy and d) there is not a significant effect of source of information about environment on students' environmental literacy.

Lára Jóhannsdóttir (June 2009) conducted a study of Environmental Literacy of Masters in Business Administration students at the University of Iceland. The goal of the research was to investigate environmental literacy of MBA and Masters Students registered in the programs of Human Resource Management, Marketing and international businesses, and Management and strategy within the Faculty of Business Administration at the University of Iceland. The main result of the research was that the Environmental Literacy of Business Administration students were limited. The majority of the students (85-90%) claim that they have not acquired such training. What came as a surprise was that 2.6-6% of the students did not know whether or not they had received environmental or sustainability education.

Loubser, Swanepoel and Chacko (2001) studied the EL of teachers in South Africa. One of the interesting finding of this study was teachers involved in the teaching of the Natural sciences appear, more 'environmentally knowledgeable' than teachers involved in some of the other learning areas, but do not have a significantly more positive attitude towards or intention to participate in environmental actions. On the other hand, those teachers who received training in environmental education do demonstrate a significantly higher level of awareness, attitude and participation intention than those teachers who did not receive such training.

A study carried out by The National Environmental Education and Training Foundation (USA) in 2005 discovered some very interesting findings. Some of them were:

1. Most Americans believe that they know more about the environment than they actually do.
2. Just 12% Americans could pass a basic quiz on awareness of energy topics
3. About 80% Americans are heavily influenced by incorrect or outdated environmental myths
4. What passes for Environmental Education in America is usually Environmental Information.
5. The public correctly answered an average of just 4.1of the 10 Energy questions; lower than they scored on General Knowledge questions.
6. The main difference between men and women from an educational perspective may be their knowledge of, and involvement in, science and technology.
7. Public tendencies to oversimplify complex issues can lead to incorrect, sometimes humorous misconceptions.
8. 120 Million Americans think that spray cans still have CFCs in them even though CFCs were banned in 1978.
9. The main cause of wildlife entanglement by far is abandoned fishing line. This fact is known by only 10% of the Americans.
10. Only 27% Americans know that most of the electricity produced in America is by burning Coal and other flammable material.
11. Formal education has a direct consistent positive effect on Environmental Literacy.
12. Evidence abounds that people respond positively on the environment when they know what to do.

Objective of the study:

The objective of this study was to measure the environmental literacy of the respondents and study the effect of their demographic characters on the same.

Hypothesis:

Demographic characters of the respondents have a statistically significant effect on the Environmental Literacy of the respondents

Research Methodology:

Number and Nature of questions used for the assessment of EL in the Main Study

Sr.No.	Parameter	No. of Questions	Nature of the question
1	Knowledge	11	Multiple Choice with options related to the environmental issues
2	Awareness	15	Multiple Choice with options related to the environmental issues
3	Sensitivity	11	Multiple Choice with options 'Strongly Agree, Agree, Neutral (Can't Say), Disagree and Strongly Disagree'
4	Behaviour	10	Same as above
5	Attitude	11	Same as above
6	Participation	11	Same as above
	Total	69	

The environmental literacy was calculated as follows:

1) The questions were separated according to Awareness (15 questions), Knowledge (11 questions), Attitude (11 questions), Participation (11 questions), Behaviour (10 questions), Sensitivity (11 questions) as shown above.
2) The responses were given scores as: Incorrect: 0 & Correct: 1 for parameters Awareness & Knowledge.
3) The responses were given scores as: strongly agree: 0.6, Agree: 0.4, Can't say: 0, Disagree: -0.4 & strongly disagree: -0.6 for parameters Attitude, Participation, Behaviour and Sensitivity.
4) The averages of responses are taken for each person over each section Awareness, Knowledge, Attitude, Participation, Behaviour and Sensitivity.

5) The environmental literacy was calculated by using weighted average of the above averages. The weights are as 10% for each section Awareness, Knowledge, Attitude, Sensitivity & 30% for each section Participation & Behaviour.
6) The mean value for environmental literacy was 0.26 with a standard deviation of 0.1614.
7) The outlier (environmentally illiterate person) was decided as the person who is falling below (mean – 2*standard deviation) i.e. - 0.0628 i.e. 0.
8) In the studied samples, 11 out of 183 respondents were found to be environmentally illiterate according to the research framework designed by the researcher.

Findings and Conclusion:

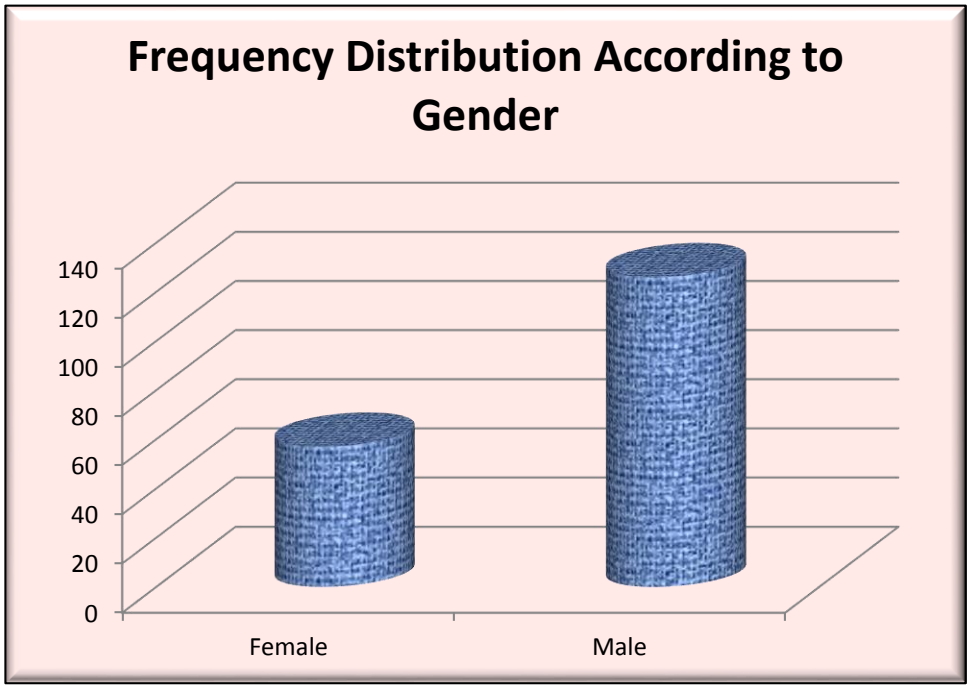
Frequency Distribution of the Samples

a) Gender

The frequency distribution of respondents according to gender along with its bar graph is as follows.

Table 4.5: Main Study -Frequency distribution of the respondents according to Gender

Gender	Frequency
Female	57
Male	126
Total	183



Summary:

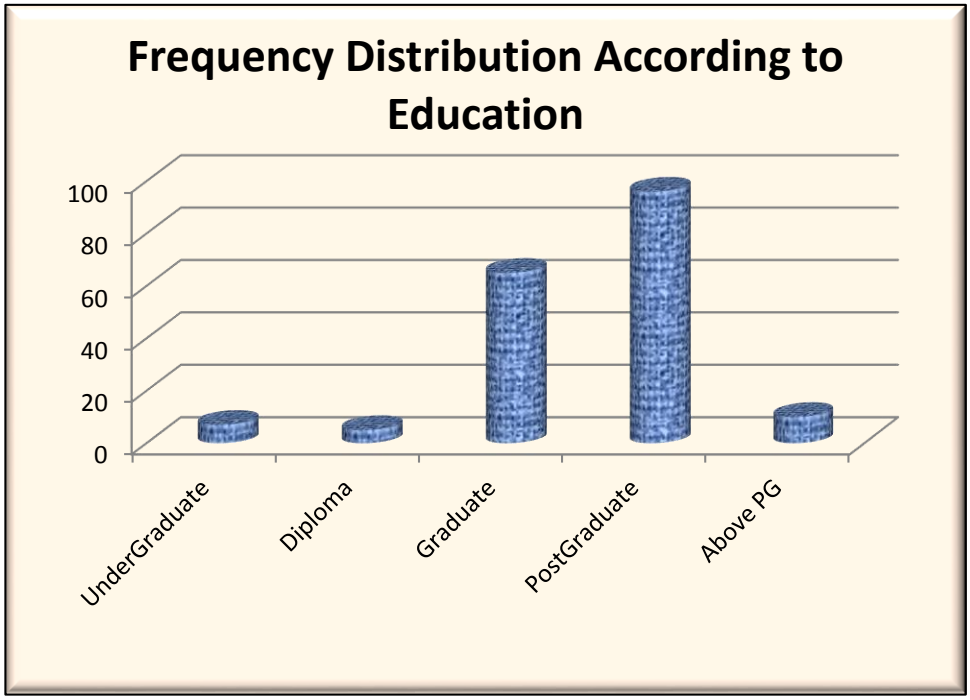
There are 31.15% Female respondents & 68.85% Male respondents involved in the Main Study.

b) Education

The frequency distribution of respondents according to education along with its bar graph is as follows.

Table 4.6: Frequency distribution of the respondents according to Education

Education	Frequency
Under Graduate	7
Diploma	5
Graduate	65
Post Graduate	96
Above PG	10
Total	183



Summary:

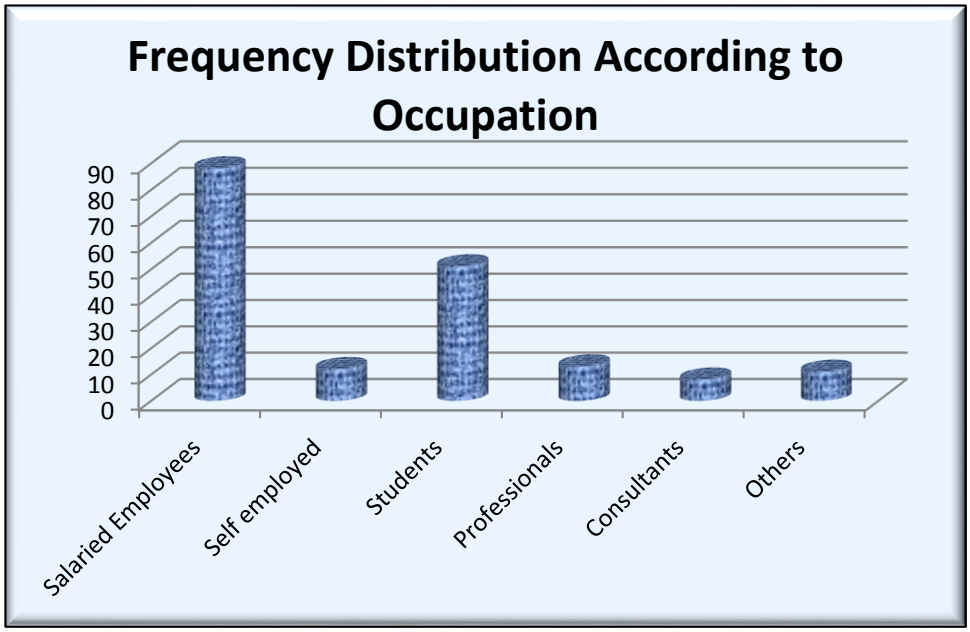
There are 3.83% 'Under Graduate' respondents, 2.73% 'Diploma' respondents, 35.52% 'Graduate' respondents, 52.46% 'Post Graduate' respondents, 5.46% 'Above Post Graduate' respondents involved in the study.

c) Occupation

The frequency distribution of respondents according to occupation along with its bar graph is as follows.

Table 4.7: Frequency distribution of respondents according to the Occupation

Occupation	Frequency
Salaried Employees	88
Self employed	12
Students	51
Professionals	13
Consultants	8
Others	11
Total	183



Summary:

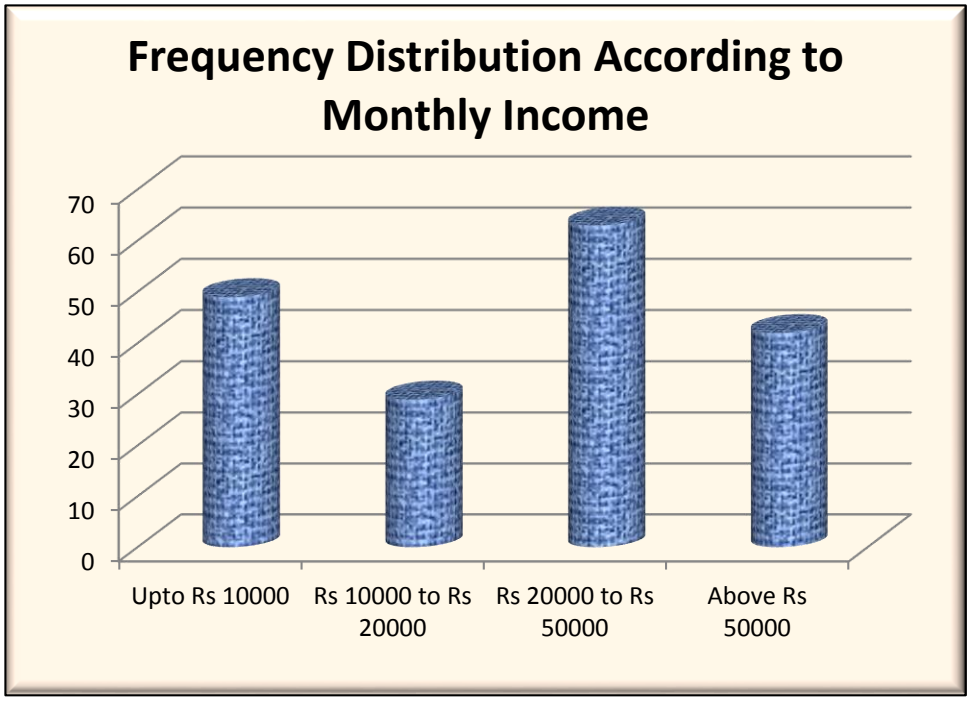
There are 48.09% 'Salaried Employees', 6.56% 'Self Employed', 27.87% 'Students', 7.10% 'Professionals', 4.37% 'Consultants' & 6.01% 'Others' involved in the study.

d) Monthly Income

The frequency distribution of respondents according to their monthly income along with its bar graph is as follows.

Table 4.8: Frequency distribution of respondents according to their Monthly Income

Monthly Income	Frequency
Upto Rs 10000	49
Rs 10000 to Rs 20000	29
Rs 20000 to Rs 50000	63
Above Rs 50000	42
Total	183



Summary:

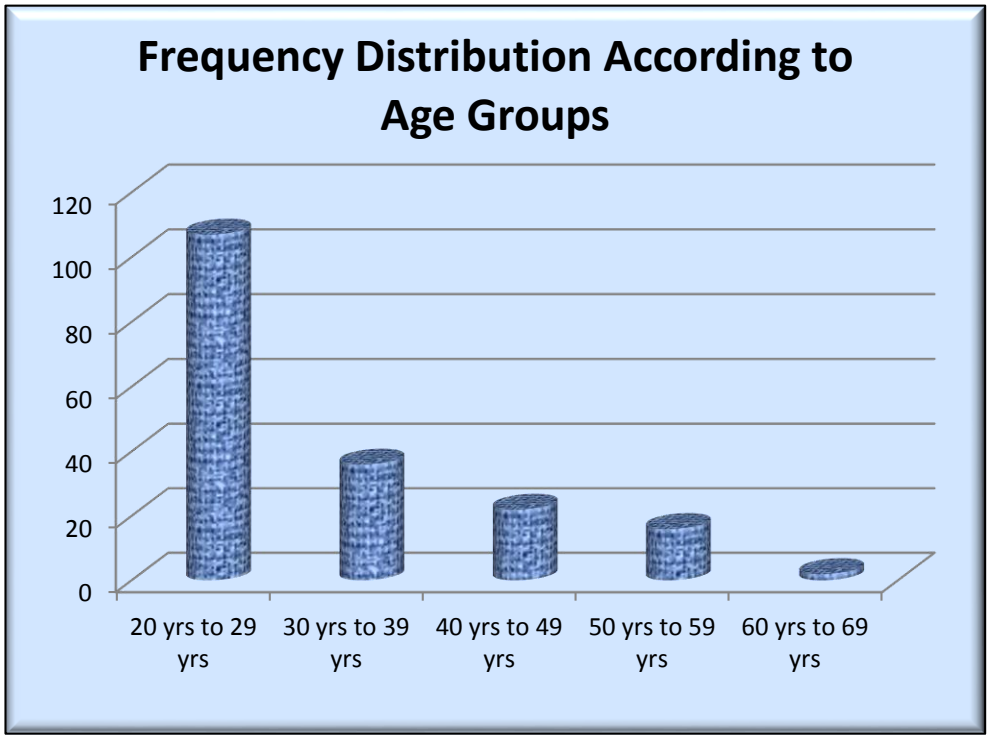
There are 26.78% respondents with monthly income 'Upto Rs 10000'; 15.85% respondents with monthly income 'Rs 10000 to Rs 20000'; 34.43% respondents with monthly income 'Rs 20000 to Rs 50000' & 22.95% respondents with monthly income 'Above Rs 50000'

e) Age

The frequency distribution of respondents according to their age groups along with its bar graph is as follows.

Table 4.9: Frequency distribution of the respondents according to their Age groups

Age Groups	Frequency
20 yrs to 29 yrs	107
30 yrs to 39 yrs	36
40 yrs to 49 yrs	22
50 yrs to 59 yrs	16
60 yrs to 69 yrs	2
Total	183



Summary:

There are 58.47% respondents from age group '20 yrs to 29 yrs'; 19.67% from age group '30 yrs to 39 yrs'; 12.02% from age group '40 yrs to 49 yrs'; 8.74% from age group '50 yrs to 59 yrs'; 1.09% from age group '60 yrs to 69 yrs'.

4.2.2 Assessing the Environmental Literacy of the Respondents

As stated above, this was done with the help of the BASKAP model which was modified over the BASKAPE model used during the Pilot Study. On the basis of the answers received, the environmental literacy was calculated using following steps:

1. The final questionnaire included 15 questions for the assessment of Awareness, 11 questions for the assessment of Knowledge, 11 questions for the assessment of Attitude, 11 questions for the assessment of Participation, 10 questions for the assessment of Behaviour and 11 questions for the assessment of Sensitivity.
2. The responses were weighted as; wrong: 0 & correct: 1 for parameters Awareness & Knowledge.

3. The responses were weighted as; strongly agree: 0.6, Agree: 0.4, Can't say: 0, Disagree: -0.4 & strongly disagree: -0.6 for parameters Attitude, Participation, Behaviour, Sensitivity.
4. The averages of responses were taken for each person over each section Awareness, Knowledge, Attitude, Participation, Behaviour and Sensitivity.
5. The environmental literacy was calculated by using weighted average of the above averages. The weights are as 10% for each section of Awareness, Knowledge, Attitude, Sensitivity and 30% for each section of Participation & Behaviour.
6. **The mean value for environmental literacy was 0.26 & standard deviation was 0.1614. (The values obtained during the Pilot Study were 0.32 & 0.1106 respectively)**
7. The outlier (environmentally illiterate person) was decided as the person who was having an environmental literacy of less than -0.0628 (mean – 2*standard deviation).
8. In the available sample, there are **11 out of 183** respondents found to be environmentally illiterate according to the standards used for the current research. Thus, a significant proportion of the respondents exhibited environmental literacy within the normal range.

Sr. No	Variable 2	P value	Whether the association is statistically significant	Inference
1	Age	0.0153	Statistically significant	EL of the respondents increased with their age.
2	Education	0.001	Statistically significant	EL of the respondents increased with their educational level.
3	Income	0.012	Statistically significant	EL of the respondents increased with their income.
4	Gender	0.621	Statistically not significant	EL of the respondents is not dependent on their gender
5	Occupation	0.055	Statistically marginally significant	EL of the respondents has marginal association with the occupation of the respondents

Discussion:

Environmental Literacy is an important parameter to be considered especially for designing cause-based marketing programmes on the basis of environmental issues. The current study shows that the EL of the respondents is statistically associated with the age, income, education and occupation of the studied respondents. One major observation of the study was there was no statistically significant association between the gender of the respondents and their EL. These observations could be used for developing strategies for EL based marketing models, and probably also for designing the CSR initiatives to be undertaken by an organization.

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