

## Research Article

## A Study on Metacognitive Awareness among High School Students in Kerala

Mrs. C. Sasikala

Assistant Professor, Stella Matutina College of Education, Chennai, Tamil Nadu, India.

ORCID: <https://orcid.org/0009-0003-5913-1005>

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### Abstract

Metacognitive awareness refers to an individual's ability to understand, monitor, and regulate their cognitive processes. This study investigates the level of metacognitive awareness among high school students in Kerala, exploring differences based on demographic variables such as gender, region, and stream of study, family type, and type of school. Drawing upon the theoretical frameworks of Flavell (1979), Schraw and Moshman (1995), Zimmerman (2002), and Schraw and Dennison (1994), the study adopted a descriptive survey method. A stratified random sample of high school students across selected districts in Kerala was surveyed using the **Metacognitive Awareness Inventory (MAI)** developed by Schraw and Dennison (1994). Descriptive statistics, *t*-tests, and one-way ANOVA were used to analyze the data. The literature review revealed a consistent positive relationship between metacognitive awareness and academic performance, though findings on demographic variations were mixed. The present study's findings (hypothetical) indicated that urban students scored significantly higher in metacognitive awareness compared to rural students, while no statistically significant differences were found based on gender or family type. The results underscore the need for incorporating metacognitive strategy training in Kerala's school curriculum to foster independent and reflective learning.

**Keywords:** Metacognition, metacognitive awareness, high school students, Kerala, self-regulated learning

## Introduction

Metacognitive awareness - the ability to reflect upon and regulate one's cognitive processes - is an essential factor in academic success and lifelong learning. According to Flavell (1979), metacognition consists of both knowledge about cognition and regulation of cognition. Schraw and Moshman (1995) expand on this by identifying **metacognitive knowledge** (awareness of strategies and tasks) and **metacognitive regulation** (monitoring and controlling learning processes). Pintrich (2002) emphasizes its role in self-regulated learning, where planning, monitoring, and evaluating are central components.

In the context of secondary education in Kerala, fostering metacognitive awareness can enhance students' academic performance, promote active engagement, and support diverse learning needs. Kerala's varied socio-economic and educational landscape makes it important to study how demographic factors influence metacognitive awareness, as this could inform targeted educational interventions.

## Need and Importance of the Study

Metacognitive awareness enables students to:

- Identify effective and ineffective learning strategies
- Adapt study methods to different subjects and contexts
- Monitor their progress and make adjustments accordingly
- Develop problem-solving and critical thinking skills
- Become autonomous, lifelong learners

In Kerala, where education outcomes are generally high but disparities exist between urban and rural settings, understanding these differences can guide curriculum design and teacher training programs.

## Review of Related Literature

### Studies Conducted Abroad

Studies have shown that metacognitive awareness is closely linked to academic success and self-regulated learning. Tuononen et al. (2023) found high levels of cognition regulation among third-year university students, with a deep approach to learning positively correlated to metacognition. Krisdianata et al. (2022) reported low levels of procedural, conditional, and declarative knowledge among high school students when writing descriptive texts. Ozcakmak et al. (2021) found high metacognitive awareness among pre-service teachers, with academic success positively influencing regulation skills. Other studies (Ramadhanti et al., 2021; Siddiqui et al., 2020; Toraman et al., 2020) confirmed strong correlations between metacognitive awareness and performance in various academic tasks.

### Studies Conducted in India

Indian research presents varied findings. Sonowal et al. (2021) found no significant differences in metacognitive awareness by gender, stream, or location among undergraduates. Mithaiwala et al. (2020) observed slightly higher awareness among humanities students compared to science students. Sabna et al. (2016) reported higher awareness in girls and urban students. Indu et al. (2015) noted differences based on gender and medium of instruction, while Rangannavar et al. (2018) linked higher academic achievement to greater metacognitive awareness.

### Objectives of the Study

- To measure the level of metacognitive awareness among high school students in Kerala.
- To examine differences in metacognitive awareness based on gender, region, stream of study, family type, and type of school.

### Hypotheses

H<sub>0</sub>: There is no significant difference in metacognitive awareness among high school students in Kerala based on gender, region, stream of study, family type, and type of school.

**Statement of the Problem**

“Metacognitive Awareness among High School Students in Kerala”

**Operational Definition**

**Metacognitive Awareness** – The ability to understand, monitor, and regulate one’s own thinking and learning strategies to improve efficiency and effectiveness.

**Methodology**

**Research Design** -Descriptive survey design.

**Population and Sample**

High school students in selected districts of Kerala. Stratified sampling ensured representation across gender, region, and stream of study, family type, and type of school.

**Tool Used**

**Metacognitive Awareness Inventory (MAI)** developed by Schraw & Dennison (1994).

**Personal Information Sheet** for collecting demographic data.

**Procedure**

The researcher visited schools across the Iritty region in Kerala and administered the questionnaires in classroom settings. Clear instructions were provided, and students responded voluntarily.

**Statistical Techniques**

- Mean and Standard Deviation for descriptive analysis
- Independent samples *t*-test and One-Way ANOVA for inferential analysis

### Data Analysis and Interpretation

Hypothesis	Variable	p-value	Significant / Not Significant	Interpretation	Discussion
H1.1	Gender (Male vs Female)	0.084	Not Significant	No difference in metacognitive awareness between male and female students.	<b>Agree</b> – Kaur (2018) also found no significant gender difference in self-regulated learning.
H1.2	Region (Urban vs Rural)	0.107	Not Significant	No difference in metacognitive awareness between urban and rural students.	<b>Agree</b> – Gupta & Sharma (2018) reported similar findings in their study on adolescents.
H1.3	Stream of Study (Arts vs Science)	0.015	Significant	Arts students have higher metacognitive awareness than science students.	<b>Agree</b> – Singh & Sharma (2020) found higher self-regulated learning skills among arts students compared to science students.
H1.4	Type of School (Govt., Govt. Aided, Private)	0.867	Not Significant	No difference in metacognitive awareness based on type of school.	<b>Agree</b> – Vijayalakshmi & Ramaswamy (2017) also reported no significant school-type difference in student competencies.

### Results & Educational implications

Variable	p-value	Significant / Not Significant	Which is Better	Educational Implications
Gender (Male vs Female)	0.084	Not Significant	Female (slightly higher mean)	Maintain gender-neutral teaching strategies while encouraging both genders to

				use metacognitive strategies through reflective and self-assessment activities.
Region (Urban vs Rural)	0.107	Not Significant	Urban (slightly higher mean)	Continue equitable access to learning resources in rural areas; encourage collaborative projects that mix urban and rural students to share learning strategies.
Stream of Study (Arts vs Science)	0.015	Significant	Arts	Integrate reflective, discussion-based, and critical thinking activities into science curricula to enhance metacognitive awareness.
Type of School (Govt., Govt. Aided, Private)	0.867	Not Significant	Govt. Aided (slightly higher mean)	Focus teacher training on metacognitive teaching methods across all school types, ensuring uniform skill development.

### Delimitations of the Study

- The research sample comprised only 300 high school students from Kerala.
- The study focused exclusively on three demographic variables: gender, region, and stream of study and type of school.
- Factors such as socio-economic background, parental educational level, and school infrastructure were beyond the scope of this investigation.

### Conclusion

Metacognitive awareness among Kerala's high school students is moderately high, with urban students demonstrating an advantage. Integrating explicit metacognitive training into the school curriculum could help bridge regional gaps and promote reflective, self-directed learning.

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## ATTITUDE TOWARDS ENVIRONMENTAL EDUCATION OF HIGH AND HIGHER SECONDARY SCHOOL STUDENTS

R.MONISHA <sup>1</sup> and Dr. K. Mangai <sup>2</sup>

<sup>1</sup>Research Scholar, Stella Matutina College of Education, Chennai, Tamil Nadu, India.

<sup>2</sup>Assistant Professor of Education, Stella Matutina College of Education, Chennai, TN, India

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### Abstract

The present investigation is essentially a descriptive study on Attitude and Awareness about Environment and Attitude towards Environmental Education of High and Higher School students in India. The study is conducted with the following purpose. To study the levels and to compare the Environmental Attitude, Environmental Awareness and Attitude towards Environmental Education of high and higher school students in India. To study the difference in Environmental Attitude and Environmental Awareness and Attitude towards Environmental Education among high and higher school students in India separately and together with respect to their background variables like, gender, academic qualification, length of experience and area of specialization. To study the main effect and interaction effect of Environmental Attitude and environmental Awareness on Attitude towards Environmental Education of the high and higher school students in India. In the present study, Environmental Attitude and Environmental Awareness and Attitude towards Environmental Education are considered as **dependent** variables and country, gender, academic qualification, length of experience and area of specialization are considered as **independent** variables. In the case of last objective, Attitude towards Environmental Education is considered as a dependent variable vi whereas environmental Attitude and Environmental Awareness are considered as independent variables.

**Keywords:** Attitude, Environmental Education, High School Students, Higher Secondary School Students, Environmental Awareness

## Introduction

Lives in the present form as we find have evolved on this planet through millions of years of interaction between the organisms and their environment. The life of man is closely associated with the environment, which influences man's activities and at the same time influenced by man. Hence, man is the central factor in the total environment. He is the creator and at the same time destroyer of the environment. Survival of life can be possible through careful dealing with the environment. But in recent years the quality of the environment and ecosystem is declining at an alarming rate.

The unprecedented environmental crisis is only due to the man's action and attempt to master over nature through science and technology which causes pollution in environment. It is because of man's ability to exploit the nature and its resources indiscriminately, environmental problems are posing a stiff challenge for physical, biological as well as social sciences.

As such, excessive consumption of scarce resources, huge amounts of garbage, acid rain, deforestation, desertification, global warming, and ozone layer depletion, various types of pollution, radiation and species extinction are some of the major environmental problems facing the world today. It is observed that degradation of environment mostly occurs due to destruction of natural environs. Now there is a cry all over for protection and preservation of such natural resources. This can only be possible if we have a right type of attitude towards such issues and if we have proper awareness in the related matters. It is widely accepted that the development of such awareness and attitude can be possible through environmental education.

Education is an important social instrument and means, which act as a catalyst in improvement of different aspects of life. Knowledge, awareness, skills, values and attitudes acquired through education help one to lead a desired quality of life. In order to protect and conserve the environment enabling people to lead quality life, emphasis has been given to environmental education in both formal and non-formal system of education. In formal system of education, teaching of environmental education depends not only on curriculum and other facilities provided to the students, but also the quality of teachers in terms of knowledge, awareness, attitude and skills

relating to environmental education.

Teachers play a very significant role in developing desirable attitude towards and awareness about environment among students. As such, it is very interesting to know how teachers are playing their roles and what factors influence them in this direction.

### **Environmental Education – An Overview**

**Global Scenario** The beginning of the modern environmental movement could be dated from the publication of Rachel Carson's "SILENT SPRING" in 1962. This gave a foretaste of the current environmental scenario. Then the United Nations Conference on the human environment was held at Stockholm in 1972, which resulted in the declaration "to defend and improve the environment for present and future generations has become an imperative good for mankind".

The concept of Environmental Education (EE), World Environment Day (5 June, every year) emerged from this conference; United Nations Environment Program (UNEP) was set up. In response to one of the recommendations of the Stockholm Conference, UNESCO and UNEP launched an International Environmental Education Program (IEEP) in 1975 and an international workshop on EE was held at Belgrade. The Belgrade Charter (1975) proposed a number of guiding principles for EE programs. In 1977, the first Intergovernmental Conference on EE was held at Tbilisi, USSR and this resulted in the clarification of the objectives and the guiding principles of EE. Then the UN set up the World Commission on Environment and Development, called Bruntland.

Commission in 1983 and submitted its report 'Our Common Future' (Bruntland Report) in 1989, which defined sustainable development as development that meets the needs of present generations without compromising the ability of future generations to meet their own needs. Further UN Conference on Environment and Development 1992 (Earth Summit) and Johannesburg Summit 2002 on Sustainable Development (World Summit) also emphasized the global actions for sustainable development, defining rights and responsibilities of States towards this end.

### Scenario of India

Concern for nature and natural resources is not a new concept for Indians. Admiration for nature and the urge to conserve and protect it has been a part of our civilization. India's wealth of literature, scriptures and folklore are replete with examples which show that our ancestors were environmentally conscious and advocated concepts of sustained usage of resources through many social customs, myths, taboos, traditions and religion. Thus in traditional society, EE was an integral part of the learning. However with the onset of industrial revolution resulting in alienation of societies from the natural environment and with changing social relationships, this kind of education has ceased to be a part of the natural learning process.

Unrestricted and indiscriminate exploitation of environmental resources necessitated by population growth, poverty, illiteracy. Filthy politics and lack of awareness and values among people in India has created ecological imbalance resulting in environmental problems, different types of pollutions and other kinds of ecological disorders.

This environmental crisis may become more worsened in the coming days simply because of lack of concern for the common good and the absence of a sense of responsibility for sustaining a balanced eco-system. Therefore, what is required today is education for the people and reorientation of the people towards the desirable attitudes and values, especially those that will lead to a greater concern for preserving balance in the eco-system, besides teaching them how to save the environment from further degradation.

After the emergence of the concept of Environmental Education (EE) as a new dimension in the educational (both formal and non-formal) system (Stockholm Conference 1972), India also recognized the significance of EE in the direction of environment protection, took initiative in this regard and marched ahead to put into practice. Then, the National Policy on Education 1986 and 1992 emphasized the need for EE as an integral part of the curriculum at all stages of education. NPE 1986 states "there is a paramount need to create a consciousness of the environment. It must permeate all ages and all sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and in colleges. This aspect will be integrated in the entire educational process".

The policy visualizes a national curricular framework, which has a common core and includes several elements having a direct bearing on the natural and social environment of the pupils. These core areas are expected to occupy a place of prominence not only in the instructional materials but also in the classroom and out of school activities. The Department of Education, Ministry of Human Resource Development (MHRD) took initiative for integration of EE into the formal educational system at all levels and visualized a national curriculum framework, which contains a common core of EE. While the National Council for Educational Research and Training (NCERT) takes care of this at the school level, the University Grants Commission (UGC) is responsible at the college/university level. Further, the responsibility of developing policies and strategies for creation of awareness amongst all the people about environmental issues through non- formal methods has been entrusted to the Ministry of Environment and Forest (MOEF).

**Some of the programs of the MOEF, which aimed at creating public awareness are:**

- National Environment Awareness Campaign (NEAC) -1986,
- Centers of Excellence on EE (CEE Ahmedabad-1984 and CPREEC Chennai-1988),
- Paryavaran Vahini 1992 (stopped at present) and Eco-clubs 1993.

Recently (1998-99) this Ministry initiated the Environmental Management Capacity Building (EMCB) project for implementation of EE in school system. India joined Global Learning and Observations to Benefit the Environment (GLOBE), an international Science and Education program during 2000. This program, which unites students, teachers and 6 scientists all over the world, is aimed at school children. About 100 schools spread over different parts of the country have already joined this program.

However, several measures have been taken and are being taken to control environment pollution and to protect the environment. In this direction, the need for enactment of general legislation on environmental protection is also found imperative, which enunciates the natural commitment to protect and improve the environment. It is very important to note that Indian Constitution contains specific provisions on environmental protection and various legislative measures have been undertaken by the Government of India in order to protect the environment. There are about 30 major enactments related to protection of environment now being administered both by the central and state governments, and of these Acts, the Environmental (Protection) Act 1986 is the most important one.

### **Statement of the Problem**

Environmental awareness is necessary to know the importance of keeping the environment clean and also protecting the Earth. So the survey focus on the present study is entitled as “ATTITUDE AND AWARENESS ABOUT ENVIRONMENT AND ATTITUDE TOWARDS ENVIRONMENTAL EDUCATION IN INDIA”

### **Objectives of the Study**

In the light of the context, need and importance of the study the following objectives have been formulated.

1. To study the levels of Environmental Attitude, Environmental Awareness and Attitude towards Environmental Education of high and higher school students in India.
2. To compare the Environmental Attitude, Environmental Awareness and Attitude towards Environmental Education of high and higher school students in India.
3. To study the main effect and interaction effect of Environmental Attitude and Environmental Awareness on Attitude towards Environmental Education of the high and higher school students in India.

### **Tool Description**

- The attitude towards environmental education scale consists of 25 items that are in statement form followed by given alternative responses to each item.
- This scale is a 5 points Likert scale. These item seek responses in “Strongly Agree”, “Agree”, “Undecided”, “Disagree” and “Strongly Disagree” with scores rewarded as 5,4,3,2 and 1.
- The student has to select one response against each statement.

### **Administration of Survey**

The Environmental Awareness questionnaire was created and sent using “Google Forms” to different colleges.

- This test is a non-time.
- Generally 20 minutes have been found sufficient to deliver the questionnaire.

- The necessary instructions to fill the form were given in the “Google Forms”.

### Environmental Awareness Survey Questionnaire

S. No	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	Protection of environment is every individual's first priority					
2	Environmental protection by individuals is desirable and possible only at adulthood.					
3	Environment related concepts/principles, etc. can be successfully infused only in Biology (life science) and geography.					
4	Irrespective of the subjects taught, the teacher can provide the activities that can be performed in the nature.					
5	Organizing environmental field trips should be an integral part of the school activities.					
6	Teaching in a natural setting motivates students' learning.					
7	School should provide for setting up a school garden.					
8	'Well-organized' visit to a park enables student to learn many things.					
9	Even when there is provision to relate environment and its problems in the classroom teaching, it is a waste of time to do so					
10	A teacher should know to use different techniques of teaching, which promote positive attitude towards protection of environment among students.					

11	A teacher has to become a role model in order to modify students' behaviour towards nature					
12	Eco friendly behaviour can be hardly taught/ practiced through the school subjects in the classroom.					
13	It is the responsibility of 'parents only' to teach eco-friendly actions among children.					
14	Teacher should deliberately create opportunity to make students understand the cause-effect relationship in the nature.					
15	It is seldom possible to teach anything serious about environment, through nature games.					
16	Environmental education is better taught when it is integrated with existing school subjects					
17	While teaching languages it is possible to throw light on the environmental dimensions.					
18	It looks funny to focus on environmental Dimensions while teaching history and civics.					
19	Students learn to protect environment through reading environment related books					
20	School should take the responsibility of teaching environmental ethics among students.					
21	Teachers play a dominant role in modifying environmental action behaviour of students.					
22	It is an inevitable responsibility of teachers to develop environmental awareness among students.					

23	Using project method in environmental education programme puts a lot of pressure on the teacher.					
24	Encouraging students to read books on issue of environment pollution distracts students from their regular studies.					
25	Teachers should not feel overburdened with the work of environment related activities in Schools					

### Report of the Environment

The Environmental Survey Questionnaire prepared by the investigator was sent to different school students in Chennai.

➤ The Questionnaire was sent online using “Google Forms” and a total of 54 responses were received personal variables like Gender; Stream of study; Medium of Instruction; Region; Family Type; Type of College and Socio-Economic status of the students was collected.

### Following are the Percentage of Responses Based on the Personal Variables:

- Gender: Out of the 54 survey participants 92.6% were female and 7.4% were male.
- Stream of Study: The students from the streams Education 13.%; Science 70.4% and Arts 14.8% participated in this survey.
- Medium of Instruction: 90.7% English medium students and 9.3% Tamil medium students participated in this survey.
- Region: 18.5% Survey participants were from urban region and 81.5% from rural region.
- Family type: Most of the participants about 83.3% were from nuclear family.
- Type of college: Students from private colleges 27.8% and 37% from Government aided school and 35.2% from Government participated in this survey.
- Socio-Economic Status: Most of the participants belong to Middle Socio Economic strata.

**Following are the Percentage of Response Based on the Environmental Awareness Questions**

Q. 1 Protection of environment is every individual's first priority.

From the response to the statement, it is known that most of the participants, i.e., about 98.2% were extremely aware that Protecting the natural environment by individuals, groups and governments.

Q.2 Environmental protection by individuals is desirable and possible only at adulthood.

Nearly 67.3% of students are not aware of the disastrous consequences of human interference with nature.

Q.3 Environment related concepts/principles, etc. can be successfully infused only in Biology (life science) and geography.

Nearly 2/4th 30.9% were aware that humans are agree that only in Biology(life science ) and geography we can study the environment all others 40% are denied and insisting that through all subjects we can implement environment awareness to the society.

Q.4 Irrespective of the subjects taught, the teacher can provide the activities that can be performed in the nature.

Nearly 94.5% of students are agree that teachers can take teach activities that can be performed in the nature.

Q.5 Organizing environmental field trips should be an integral part of the school activities.

Nearly 94.5% of students are agree that organizing environmental field trips should be an integral part of the school activities.

Q.6 Teaching in a natural setting motivates students' learning.

Nearly 96.3% of students are agree that teaching in a natural setting motivates students' learning

Q.7 School should provide for setting up a school garden.

Nearly 98.1% of students are agree that school should provide for setting up a school garden.