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## COMPARISON OF ECO CONSCIOUSNESS AMONG STUDENT TEACHERS

Aneeta George\*  
Dr Jaya Jaise\*\*

### Abstract

*Eco Consciousness refers to responsible decision-making with a positive impact on the Environment and that adds to Sustainability. It is an understanding of one's interdependence on and connection to all other living things. Eco-consciousness is not simply the awareness or knowledge of the Environment. It includes knowledge, attitude and behaviour simultaneously. This study was intended to find the Eco Consciousness among Student Teachers at the Primary and Secondary Levels. The first objective of the study was to find the distribution of scores on Eco Consciousness among Student Teachers at the Primary Level and Secondary Levels. The second and third objectives were to compare Eco Consciousness among Student Teachers with regard to the Gender and Occupational Status of Mothers. The fourth objective was to compare Eco-Consciousness among Student Teachers at the Primary Level and Secondary Level. Descriptive Survey Method was used for the Study. The study was conducted on a sample of 105 Student Teachers at the Primary and Secondary Levels. The investigator adopted the tool 'Eco Consciousness Scale' constructed and standardised by Josephine Joseph and Jayasree P. (2016) for the data collection. The study revealed that Eco Consciousness among Male and Female Student Teachers and Student Teachers with Working and Non-Working Mothers differ significantly. It is also found that Student Teachers at the Primary and Secondary Levels do not differ significantly in the Eco Consciousness.*

**Keywords:** *Eco Consciousness, student teachers, primary level, secondary level, gender, occupational status of mother, Education for Sustainable Development, Nature Deficit Disorder.*

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## Introduction

United Nations former Secretary-General in his address to the High-Level Event on Climate Change in 2007 remarked, “We hold the future in our hands. Together, we must ensure that our grandchildren will not have to ask why we failed to do the right thing, and let them suffer the consequences” (Ki-moon, 2007, para 18). With a vision of enabling a more sustainable and just society for all, the United Nations declared 2005–2014 as the Decade of Education for Sustainable Development (DESD). It wanted to include sustainable development practices and principles into every aspect of education and learning to encourage changes in knowledge, values and attitudes (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2014).

As the United Nations Educational, Scientific and Cultural Organization [UNESCO] (2021) said, we need to change the way we connect with nature, live, produce, and consume if we aim to save the earth. Learners must be equipped through education to comprehend the current situation and influence the future. So it is fundamental to integrate Education for Sustainable Development in all education programmes. As a result, UNESCO has set a new goal: by 2025, environmental education will be a required subject in all nations’ curricula to guarantee that everyone has the knowledge, skills, values, and attitudes necessary to bring about positive change and safeguard the future of our planet.

Eco Consciousness refers to responsible decision-making with a positive impact on the Environment and that adds

to Sustainability. It is an understanding of one’s interdependence on and connection to all other living things. As environmental issues are recognized as the most serious global issues affecting current society one of the top priorities of the modern educational system is to be given for the development of an ecological consciousness that can harmonize a person’s connection with his or her biosocial environment.

Teachers have a significant role in fostering Environmental Education in future citizens (Álvarez-García, et al., 2015). The search for strategies and means to foster environmental consciousness among children and safeguard the environment should be the top priority for a modern teacher. The prospective teachers or the student teachers should be trained to impart Environmental Education by developing Eco Consciousness among them.

## Need and Significance

Technology is advancing at a breakneck speed. People are now leading a busy life and they are in the middle of electronic gadgets. Our children are also not spending time outdoors (White, 2004). They lack contact with nature and are called as the ‘childhood of imprisonment’ (White, 2004). In recent years the screen time of children has increased due to many reasons. “Screen time was not an add-on to their day, it became the core of their day” (The Economic Times, 2022, para. 7). According to The Economic Times, anxiety, stress, depression, sleep issues, eating disorders and many other physical, mental and behavioural problems are now observable in children due to increased screen time (The Economic Times, 2022).

A new term Nature-Deficit Disorder was introduced by Richard Louv in 2005 in his book ‘Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder’ (Louv, 2005). “It is the concept that human beings, especially children, are spending less time outdoors than they have in the past, and the belief that this change results in a wide range of behavioural problems” (“Nature Deficit Disorder,” 2023, para 1). Hence there is a need to develop Eco Consciousness among Children.

Eco-consciousness is not simply the awareness or knowledge of the Environment. It includes knowledge, attitude and behaviour simultaneously. Instead of simply increasing one’s understanding of ecology and sustainability, eco-consciousness refers to an entirely new way of thinking, perceiving, experiencing, and interacting with the natural world. It is an attitude. To be considered ecologically conscious, one must have a great respect for the natural world and everything that resides therein. This expression is frequently used to describe how a person’s psyche interacts with and perceives nature. Ecological consciousness is employed in these circumstances to control a person’s cognitive, ethical, and emotional traits. Such individuals swiftly and effectively rewrite your information and have a strong connection to and interest in all elements of the natural world! (Toombs, 2023).

The United Nations (UN) Conference on the Human Environment, which was held in Stockholm in 1972, is seen as a turning point in the development of Environmental Education (EE). In 1987, The World Commission on Environment and Development (WCED), in the report ‘Our Common Future’, mentioned the

value of education in modifying people’s attitudes.

Teachers have an important role in engaging children with Nature. Teachers can motivate the students and inculcate Environmental concerns in children. Eco Consciousness is to be first inculcated in student teachers so that they can inspire the next generation when they enter into the profession. A study conducted by Larijani (2010) revealed that a moderate level of environmental awareness is seen in teachers. Also, female teachers exceed male teachers in their Environmental Awareness. Environmental Awareness is also influenced by the educational qualification of the mother (Indupalli et.al, 2015). The present study was intended to find the Eco eco-consciousness among Student Teachers. The study also compares the Eco Consciousness among Student Teachers at the Primary and Secondary Levels and also with regard to the Gender and Occupational Status of Mothers.

### Objectives

1. The investigator formulated the following objectives for the present study.
2. To find the distribution of scores on Eco Consciousness among Student Teachers.
3. To compare the Eco Consciousness among Student Teachers with regard to Gender.
4. To compare the Eco Consciousness among Student Teachers with regard to the Occupational Status of Mothers.
5. To compare the Eco Consciousness among Student Teachers at the Primary and Secondary Levels.



## Hypotheses

The investigator formulated the following hypotheses for the present study.

1. There is a significant difference in Eco Consciousness among Male and Female Student Teachers.
2. There is a significant difference in Eco Consciousness among Student Teachers with Working and Non-Working Mothers’.
3. There is a significant difference in Eco Consciousness among Student Teachers at the Primary and Secondary Levels.

Table 1

Final Breakup of the Sample

Sl.No.	Category	Sub Category	Number	Total
	Gender	Male	45	105
		Female	60	
	Occupational Status of Mother	Working	51	105
		Non-Working	54	
	Level	Primary	53	105
		Secondary	52	

## Tool

The investigator adopted the tool ‘Eco Consciousness Scale’ constructed and standardised by Josephine Joseph and Jayasree P. (2016) for the data collection. The reliability of the scale was found to be 0.859 when Cronbach’s Alpha method was used. There are 40 items in the tool with 20 positive and 20 negative items. The items of the tool were in the form of statements. Each statement has five alternatives namely, Strongly Agree, Agree, Not Decided, Disagree and Strongly Disagree. The respondents can choose any one alternative.

## Methodology

It includes the method, sample and tool used for the study.

### Method

Descriptive Survey Method was used for the present study.

### Sample

The study was conducted on a sample of 105 Student Teachers at the Primary and Secondary Levels. The final breakup of the sample is given in Table 1.

For positive items 5,4,3,2 and 1 scores are given for the alternatives Strongly Agree, Agree, Not Decided, Disagree and Strongly Disagree respectively. For negative items, the scores are in reverse order.

### Analysis

The analysis of data was done using the computer software *Jamovi* (Version 2.2). The investigator used Descriptive Statistics such as Mean, Median, Standard Deviation Maximum Score, Minimum Score, Shapiro-Wilk W and Shapiro-Wilk p and Inferential Statistics two-tailed *t-test* for the large



independent sample for the analysis of data. The objective-wise analysis of the data is given below.

**Objective 1: Descriptive Analysis of the Scores on Eco Consciousness among Student Teachers**

The Descriptive analysis of the Scores on Eco Consciousness among Student Teachers is given in Table 2

*Table 2  
Descriptive Analysis of the Scores on Eco Consciousness among Student Teachers*

Descriptive Statistics	Values
N	105
Missing	0
Mean	148
Median	148
Standard deviation	14.4
Minimum	119
Maximum	186
Shapiro-Wilk W	0.980
Shapiro-Wilk p	0.123

From Table 2, the investigator observes that the Mean and Median are equal (148). Shapiro-Wilk W and p values 0.980 and 0.123 show that the scores are normally distributed. Table 3, shows the distribution of scores on Eco Consciousness among Student Teachers.

The investigator presented the Frequency Distribution of the Scores on Eco Consciousness among Student Teachers in Table 3.

*Table 3  
Frequency Distribution of the Scores on Eco Consciousness among Student Teachers*

Class Interval	Frequency	Percentage
110 - 120	1	0.95
120 - 130	10	9.52
130 - 140	21	20
140 - 150	22	20.95
150 - 160	21	20
160 - 170	23	21.90
170 - 180	6	5.7
180 - 190	1	0.95
<b>Total</b>	<b>105</b>	<b>100</b>

From Table 3, the investigator observes that the distribution of scores on Eco Consciousness for a sample of 105 Student Teachers falls between 110 and 190 and it is normally distributed among the sample taken. The minimum score of the tool ‘Eco Consciousness Scale’ was 40 and the maximum score was 200. Most of the Student Teachers possessed above-average Eco Consciousness.

**Objective 2: Comparison of Eco Consciousness among Student Teachers with regard to Gender**

The investigator formulated the second objective as ‘To compare the Eco Consciousness among Student Teachers about Gender’. For the analysis of the data, the investigator has formulated the null hypothesis as,

$H_{01}$ : There is no significant difference in the Means of Scores on Eco Consciousness among Student Teachers with regard to Gender.

The table value ( $t$ -value) is 1.96 at a 0.05 level of significance with degrees of freedom 103 ( $N=105$ ). The result of the analysis is presented in Table 4.

*Table 4*

*Result of the Test of Significance of difference between Means of Scores on Eco Consciousness among Student Teachers with regard to Gender*

Category	Sub-Category	Number	Mean	SD	df	t-value	p-value
Gender	Male	45	145	14.3	103	-2.15	0.034*
	Female	60	151	14			

\*  $p < 0.05$  is significant at 0.05 level

From Table 4, the investigator observes that the obtained  $t$ -value of the Means of Scores on Eco Consciousness among Student Teachers with regard to Gender is 2.15 and the obtained  $p$ -value is 0.034.

The obtained  $t$ -value of 2.15 is greater than the table value 1.96 and the  $p$ -value 0.034 is less than 0.05. The Means of Scores on Eco Consciousness among Student Teachers differ significantly with regard to Gender at 0.05 level of significance. So, the null hypothesis is not accepted and the research hypothesis 'there is a significant difference in Eco Consciousness among Male and Female Student Teachers' is accepted.

Hence, the investigator concluded that Male and Female Student Teachers differ significantly in their Eco Consciousness. Female Student Teachers possess significantly higher Eco Consciousness than Male Student Teachers.

### **Objective 3: Comparison of Eco Consciousness among Student Teachers with regard to Occupational Status of Mother**

The investigator formulated the third objective as 'To compare the Eco Consciousness among Student Teachers with regard to Occupational Status of Mothers'. For the analysis of the data, the investigator has formulated the null hypothesis as,

$H_{02}$ : There is no significant difference in the Means of Scores on Eco Consciousness among Student Teachers with regard to the Occupational Status of mothers.

The table value ( $t$ -value) is 1.96 at a 0.05 level of significance with degrees of freedom 103 ( $N=105$ ). The result of the analysis is presented in Table 5.

Table 5

Result of the Test of Significance of difference between Means of Scores on Eco Consciousness among Student Teachers with regard to Occupational Status of Mother

Category	Sub-Category	Number	Mean	SD	df	t- value	p-value
Occupational Status of Mother	Working	51	151	14.6	103	2.15	0.034*
	Non-Working	54	145	13.7			

\*  $p < 0.05$  is significant at 0.05 level

From Table 5, the investigator observes that the obtained  $t$ -value of the Means of Scores on Eco Consciousness among Student Teachers with regard to the Occupational Status of the Mother is 2.15 and the obtained  $p$ -value is 0.034.

The obtained  $t$ -value of 2.15 is greater than the table value 1.96 and the  $p$ -value 0.034 is less than 0.05. The Means of Scores on Eco Consciousness among Student Teachers differ significantly with regard to the Occupational Status of Mother at 0.05 level of significance. So, the null hypothesis is not accepted and the research hypothesis 'there is a significant difference in Eco Consciousness among Student Teachers with Working and Non-Working Mothers' is accepted.

Hence, the investigator concluded that Student Teachers with Working and Non-Working Mothers differ significantly in their Eco Consciousness. Student Teachers

Table 6

Result of the Test of Significance of Difference between Means of Scores on Eco Consciousness among Student Teachers at Primary and Secondary Level'

Category	Sub-Category	Number	Mean	SD	df	t- value	p-value
Level	Primary	53	147	14.1	103	-1.26	0.212*
	Secondary	52	150	14.6			

\*  $p > 0.05$  is not significant at a 0.05 level

with Working Mothers possess significantly higher Eco Consciousness than Student Teachers with Non-Working Mothers.

#### Objective 4: Comparison of Eco Consciousness among Student Teachers at Primary and Secondary Level

The investigator formulated the objective for the analysis as 'To compare the Eco Consciousness among Student Teachers at Primary and Secondary Level'. For the analysis of the data, the investigator has formulated the null hypothesis as,

$H_{03}$ : There is no significant difference in the Means of Scores on Eco Consciousness among Student Teachers at the Primary and Secondary Levels. The table value ( $t$ -value) is 1.96 at a 0.05 level of significance with degrees of freedom 103 ( $N= 105$ ). The result of the analysis is presented in Table 6.

From Table 6, the investigator observes that the obtained  $t$ -value of the Means of Scores on Eco Consciousness among Student Teachers at Primary and Secondary Levels is 1.26 and the obtained  $p$ -value is 0.212.

The obtained  $t$ -value 1.26 is less than the table value 1.96 and the  $p$ -value 0.212 is greater than 0.05. Hence, the Means of Scores on Eco Consciousness among Student Teachers at the Primary and Secondary Levels do not differ significantly at the 0.05 level of significance. So, the null hypothesis is accepted and the research hypothesis 'there is a significant difference in Eco Consciousness among Student Teachers at Primary and Secondary Level' is not accepted.

Therefore, the investigator concluded that Student Teachers at the Primary and Secondary Levels do not show significant differences in Eco Consciousness. That is, Student Teachers at the Primary and Secondary Levels are similar in Eco Consciousness.

## Findings

The major findings of the study are,

1. The scores on Eco Consciousness among Student Teachers for the sample taken are normally distributed.
2. Male and Female Student Teachers differ significantly in their Eco Consciousness.
3. Female Student Teachers possess significantly higher Eco Consciousness than Male Student Teachers.
4. Student Teachers with Working and Non-Working Mothers differ significantly in their Eco Consciousness.

5. Student Teachers with Working Mothers possess significantly higher Consciousness than Student Teachers with Non-Working Mothers.
6. Student Teachers at the Primary and Secondary Levels do not differ significantly in Eco Consciousness.

## Educational Implications

- The scores on Eco Consciousness are distributed around the average score, so Educators can include activities and programmes to enhance Environmental Awareness, Environmental Attitude and Eco-friendly Behaviour among Student Teachers.
- Nature Club activities can be increased to enhance Eco Consciousness.
- Female Student Teachers showed a significantly higher Eco Consciousness than their Male counterparts. Educators can find out the reasons for the difference and take necessary steps to increase Male Student Teachers' Eco Consciousness.
- Student Teachers with Working Mothers possess significantly higher Consciousness than Student Teachers with Non-Working Mothers. The findings can motivate both students and their families especially mothers, working and non-working.

## Conclusions

This study was an earnest attempt to find the Eco eco-consciousness among Student Teachers at Primary and Secondary Levels. The study revealed that Eco Consciousness among Male and Female Student Teachers and Student Teachers with Working and Non-Working Mothers differ significantly. It is also found that Student Teachers at the

Primary and Secondary Levels do not differ significantly in the Eco Consciousness. Eco Consciousness among the student teachers can be enhanced so that they can influence and inspire the next generations for a sustainable future.

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## SELF-REGULATION AMONG TAMIL LINGUISTIC MINORITY STUDENTS

Sruthi S.\*

Dr Seema Menon K.P.\*\*

### Abstract

*In a diverse educational context, linguistic minority students often encounter unique challenges that can significantly impact their academic performance and overall well-being. For linguistic minority students, self-regulation assumes heightened importance due to the potential disparities they face in language proficiency, cultural integration, and access to educational resources. The research employed a survey method, utilising a simple random sampling technique to select participants within the Palakkad district. The findings revealed that female students exhibited higher self-regulation compared to their male students. Additionally, rural Tamil linguistic minority students in the Palakkad district demonstrated higher self-regulation when contrasted with their urban peers. Moreover, Tamil linguistic minority students attending government schools displayed higher self-regulation compared to those enrolled in aided schools.*

**Keywords:** *Self-regulation, Tamil linguistic minority students*

### Introduction

In today's globalised world, education stands as a crucial pillar for personal growth and societal advancement. Amidst diverse linguistic communities, a student's ability to effectively self-regulate their learning experiences plays a pivotal role in both academic success and overall development. Palakkad district, located in

the southern state, of Kerala, India, boasts a rich culture, including a significant Tamil linguistic minority population. As educational institutions strive to ensure equitable opportunities for all students, comprehending the self-regulation practices of this minority group becomes imperative. The concept of self-regulation encompasses

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a spectrum of cognitive, metacognitive, and motivational processes that individuals employ to set goals, monitor progress, and adapt strategies to achieve desired outcomes. For Tamil linguistic minority students in the Palakkad district, self-regulation takes on unique significance due to the linguistic diversity prevalent in the educational context.

Self-regulation is a crucial skill that plays a vital role in the academic and personal development of students, including those belonging to Tamil linguistic minority communities. In a multicultural educational context, it is essential to understand the unique challenges faced by these students and explore strategies to foster their self-regulation abilities effectively. Self-regulation encompasses the ability to control and manage one's thoughts, emotions, and behaviours to achieve goals and adapt to different situations. Barry J. Zimmerman's work on self-regulation offers valuable insights into how students can actively manage their learning processes. Zimmerman defines self-regulation as "the self-generated thoughts, feelings, and actions that are planned and adapted to the attainment of personal goals" (Zimmerman, 2000). Zimmerman's theoretical framework emphasises three key components of self-regulation: forethought, performance control, and self-reflection (Zimmerman, 1998).

In the forethought phase, students set goals, develop strategies, and establish expectations for their learning. This involves assessing their capabilities, understanding the task requirements, and creating plans to achieve desired outcomes. During the performance control phase, students engage in the actual execution

of their learning strategies. They monitor their progress, make adjustments when necessary, and regulate their cognitive and motivational processes to stay focused and on track. This phase requires self-awareness, self-control, and the ability to overcome challenges and distractions. The self-reflection phase allows students to evaluate their performance, reflect on their learning experiences, and make necessary adjustments for future endeavours. Self-reflection involves analysing strengths and weaknesses, identifying areas for improvement, and developing strategies to enhance future performance.

According to the research conducted by Dr R. Malini from the Department of Psychology at Bharathiar University, she states, "The development of self-regulation skills is particularly important for Tamil linguistic minority students who face cultural and linguistic barriers in the education system" (Malini, 2018). It is crucial to acknowledge the impact of cultural and linguistic differences on self-regulation among these students, as highlighted by Dr. Malini's study. By promoting self-regulation skills among Tamil linguistic minority students, educators can empower them to effectively manage their emotions, set achievable goals, and make informed decisions. As noted by Dr. S. Thiruchelvam, a professor of Education at the University of Jaffna, "Self-regulation skills enable Tamil linguistic minority students to navigate the complexities of bicultural identities and bridge the gap between their Tamil heritage and the larger societal context" (Thiruchelvam, 2019).

Zimmerman's theoretical framework emphasises the importance of metacognitive processes, such as self-evaluation and self-

reflection, in promoting self-regulation among students. By actively engaging in these processes, Tamil linguistic minority students can enhance their learning outcomes and overcome potential barriers they may face due to cultural or linguistic differences. Zimmerman's theoretical perspectives of self-regulation offer valuable insights into how Tamil linguistic minority students can actively manage their learning processes. By understanding the components of self-regulation and promoting metacognitive processes, educators can empower these students to take control of their learning, set goals, and achieve academic success.

### **Review of Related Studies**

According to Farley and Kim-Spoon (2015), they investigated the relationship between parenting and adolescent self-regulation. The study included 220 adolescents, and the researchers used the Child Monitoring Scale, a brief self-control scale, and the Kirby Monetary Choice Questionnaire to collect data. The results from the structural equation modelling indicated that higher parental knowledge was associated with higher levels of adolescent behavioural self-control. Furthermore, it was found that higher levels of behavioural self-control were linked to better academic performance.

Jouhari, Haghani, and Changiz (2015) conducted a study investigating factors influencing self-regulated learning in medical students. A sample of 560 students from Isfahan University was purposely selected, and data was gathered through semi-structured interviews. Content analysis was applied to the collected information, revealing that self-regulated

learning was enhanced by a supportive family environment and emotional support.

In a study by Kumari and Chamundeswari (2015), the association between academic achievement in 300 students and parental involvement, as well as self-regulated learning, was explored. Parental involvement and self-regulated learning scales were utilised, and data analysis involved descriptive statistics, t-tests, analysis of variance, and correlation. The findings indicated a positive and significant correlation between self-regulated learning and parental involvement. The study further suggested that students from central board schools exhibited better self-regulated learning than those in state and matriculation board schools at the higher secondary level. Additionally, the research examined gender differences, revealing whether girls displayed better parental involvement, self-regulated learning, and academic performance compared to boys.

Ariani (2016) investigated the association of motivational beliefs among undergraduate business students in Indonesia with self-regulated learning. A sample of 257 students participated, and responses were collected using Motivated Strategies for Learning questionnaires and internal mentoring or supervision questionnaires. Data analysis included descriptive statistics, correlation, and regression analysis. The findings indicated positive relationships between self-efficacy, intrinsic goal orientation, and self-regulated learning, while test anxiety showed a negative relation. Additionally, the study concluded that self-efficacy and internal goal orientation significantly influenced self-regulated learning, but test anxiety did

not impact self-regulated learning.

Daniel, Wang, and Berthelsen (2016) conducted a study on the relationship of academic achievement with parent involvement and self-regulated learning in 2616 Australian children. Family socio-economic status, language background, cognitive competence, child gender, and parental involvement (home and community-based activity) were controlled. Structural modelling analysis was used for data analysis. It was reported that the association of school-based parental involvement with children's reading achievement was mediated by children's self-regulated learning behaviours. Results further suggested that parental involvement had an indirect relationship with higher children's numeracy achievement through children's self-regulation behaviour.

Pourasghar, Rezakiamanesh, Sarmadi, and Zare (2016) examined the predictive model of academic performance of distance education students based on self-regulation strategies and motivational beliefs. A sample of 280 undergraduate students was selected, and the Motivated Strategies for Learning questionnaire was administered. Correlation and path analysis were conducted. Results depicted that self-efficacy, goal orientation, and task value were positively associated with self-regulated learning. The study concluded that self-regulated learning, self-efficacy, goal orientation, and task value had a mediated effect on academic performance.

Priti Patel (2020) researched the effect of self-regulated learning strategies on the achievement and metacognitive skills of upper primary school students. Thirty students were selected for both the experimental and control groups,

employing a randomised experimental control group post-test as the experimental design. The Self-Regulated Learning Strategies scale was used to measure the self-regulated strategies of 8th-grade students. The results found that embedding self-regulated learning strategies in content learning activities helped students become more proficient at guiding their learning.

## **Definition of Key Terms**

### **Self-regulation**

Self-regulation refers to regulating one's behaviour without the intervention of external forces or self-control by the learner. In the present study, Self-regulation means the extent to which a student can regulate his or her thinking, motivation and behaviour, yet it is not the self which regulates itself directly.

### **Tamil linguistic minority students**

Linguistic minorities are groups of people whose mother tongue is different from the principal language of the State. In this study, Tamil Linguistic Minority students are Students whose mother tongue is Tamil, and who reside in Kerala.

### **Objectives of the study**

The objectives of the study are:

- To find out the levels of self-regulation among Tamil linguistic minority students of Palakkad district.
- To find out whether there exists any significant difference in the mean scores of self-regulation among Tamil linguistic minority students concerning gender
- To find out whether there exists any significant difference in the mean scores of self-regulations among

Tamil linguistic minority students with respect to locale.

- To find out whether there exists any significant difference in the mean scores of self-regulation among Tamil linguistic minority students with respect to the type of management

### Hypotheses of the study

- Tamil linguistic minority students possess average levels of self-regulation
- There exists no significant difference in the mean scores of self-regulation among Tamil linguistic minority students with respect to gender
- There exists no significant difference in the mean scores of self-regulation among Tamil linguistic minority students with respect to locale
- There exists no significant difference in the mean scores of self-regulation among Tamil linguistic minority students with respect to type of management

### Methodology

The survey method was used for the research.

### Sample

The sample consisted of 60 Tamil linguistic minority students.

### The tool used for Investigation

The investigator used the Self-regulation scale (Developed and standardised by Brown, Miller & Lawendowski,1999) for assessing the self-regulation of Tamil linguistic minority students of Palakkad district.

### Statistical Techniques

To find out the difference in Self-regulation of Tamil linguistic minority students, Descriptive statistics and t-tests were used.

### Analysis and interpretation

#### 1. To find out the different levels of self-regulation among Tamil linguistic minority students of Palakkad district

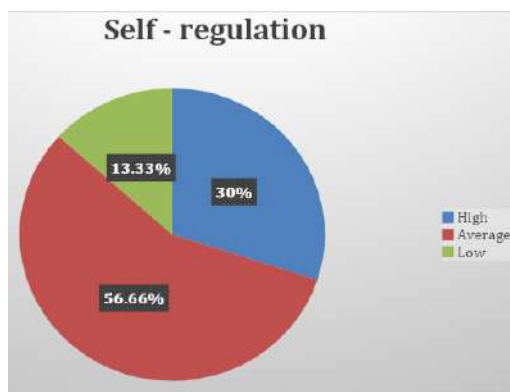
Classification of Tamil linguistic minority students of Palakkad district according to their self-regulation is given in Table 1. The table also contains the number and percentage of Tamil linguistic minority students of Palakkad district with different levels of self-regulation.

Table 1

Data and results of self-regulation for the total sample

Variable	Category	Sample Size	%
Self-regulation	High	18	30
	Average	34	56.66
	Low	8	13.33

Figure 1: Pie chart showing the percentage of different levels of Self-regulation



From the above table, it is evident that 30% of Tamil linguistic minority students of Palakkad district possess a high level of self-regulation, 56.66% possess an average level of self-regulation and 13.33% possess

a low level of self-regulation. Thus, the study points out the need for improving self-regulation in Tamil linguistic minority students of Palakkad district.

**2.1 To find out the significant difference in self-regulation among Tamil linguistic minority students of Palakkad district with respect to Gender**

Table 2

The data and results of the test show the difference between the mean scores of self-regulation among boys and girls students of Tamil linguistic minorities of Palakkad district.

Gender	N	Mean	SD	t-value	Result
Boy	34	164.32	44.35	2.19	Significant**
Girls	26	188.96	41.33		

\*\*Significant at 0.05 level of significance

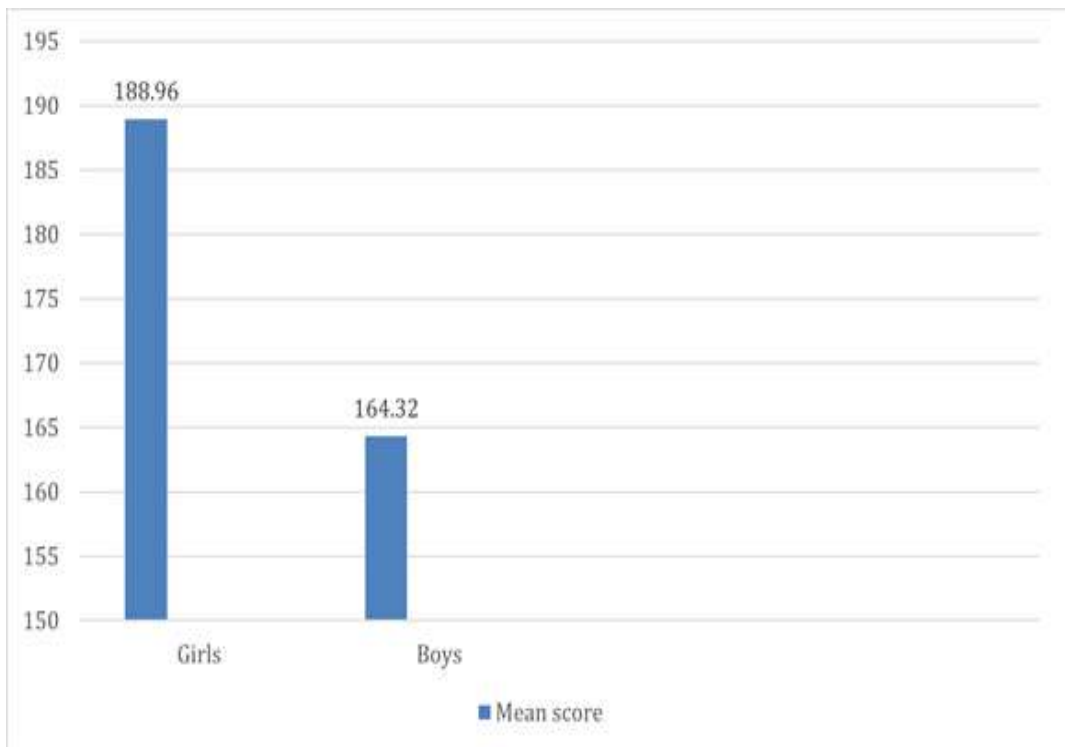


Figure 2: Bar chart showing mean scores of Self-regulation among Tamil linguistic students with respect to gender.

As shown in Table 2, a significant difference was found between the mean scores of Self-regulation among Tamil linguistic minority students with respect to gender. The mean scores of the self-regulation of girls and boys are 188.96 and 164.32 and the Standard deviations are 41.33 and 44.35 respectively. It is clear from Table 1 that Girls have a higher

self-regulation than boys. When the self-regulation of boys and girl students of Tamil linguistic minority is compared the 't' value obtained is 2.19. Since the 't' value is greater than the table value at 0.05 level of significance, the mean difference between boys' and girls' students of Tamil linguistic minority was found to be significant. So, the alternative hypothesis is not accepted.

**2.2 To find out the significant difference in self-regulation among Tamil linguistic minority students of Palakkad district with respect to locale**

Table 3

The data and results of the test show the difference between the mean scores of self-regulation among Tamil linguistic minority students of Palakkad district with respect to locale

Locale	N	Mean	SD	t-value	Result
Rural	35	179.96	46.55	2.47	Significant**
Urban	25	151.72	38.89		

\*\*Significant at 0.05 level of significance

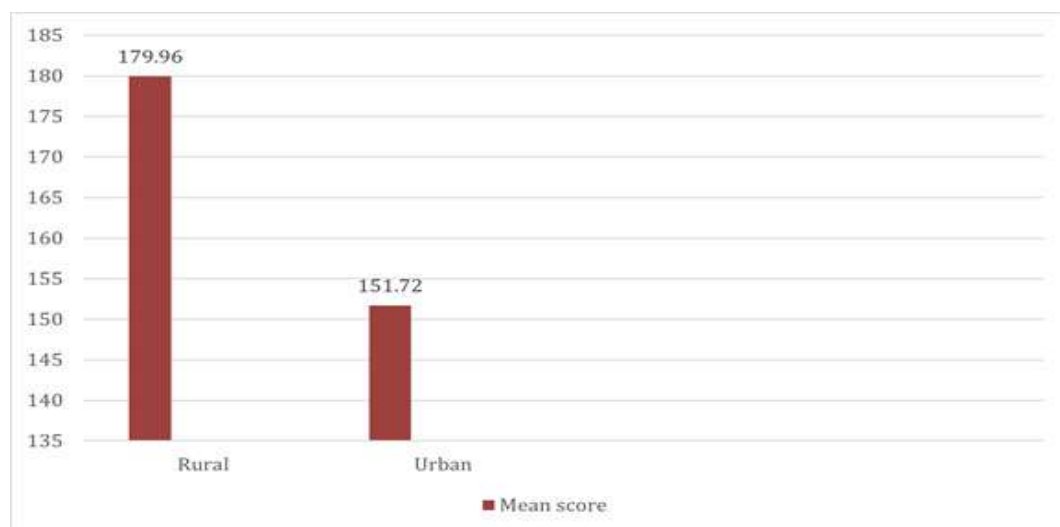


Figure 3: Bar chart showing mean scores of Self-regulation among Tamil linguistic students with respect to locale.

As shown in Table 3, a significant difference was found between the mean scores of self-regulation among Tamil linguistic minority students with respect to locale. The mean scores of the self-regulation of rural and urban students are 179.96 and 151.72 and the Standard deviations are 46.55 and 38.89 respectively. It is clear from Table 2 that rural students have a higher self-regulation than urban

students. When the self-regulation of rural and urban students of Tamil linguistic minority is compared the ‘t value obtained is 2.47. Since the ‘t value is greater than the table value at 0.05 level of significance, the mean difference between rural and urban students of Tamil linguistic minority was found to be significant. So, the alternative hypothesis is not accepted.

**2.3 To find out the significant difference in self-regulation among Tamil linguistic minority students of Palakkad district with respect to the type of management**

Table 4

The data and results of the test show the difference between the mean scores of self-regulation among Tamil linguistic minority students of Palakkad district with respect to the type of management

Type of Management	N	Mean	SD	t-value	Result
Government	34	175.52	41.07	2.18	Significant**
Aided	26	153.69	34.47		

\*\*Significant at 0.05 level of significance

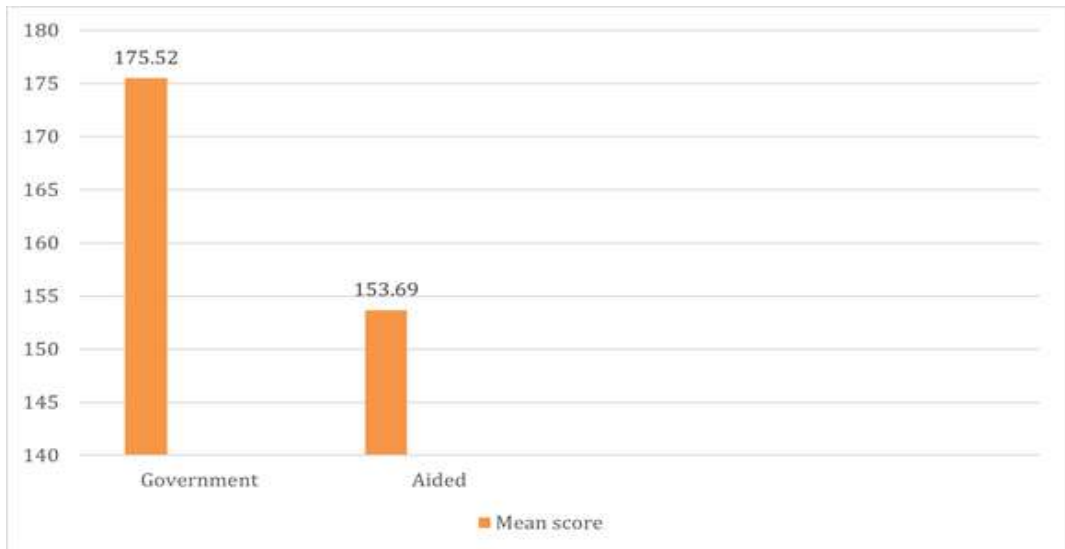


Figure 4: Bar chart showing mean scores of Self-regulation among Tamil linguistic students with respect to Type of Management.



As shown in Table 4, a significant difference was found between the mean scores of self-regulation among Tamil linguistic minority students with respect to Type of management. The mean scores of the self-regulation of Government and Aided are 175.52 and 153.69 and the Standard deviations are 41.07 and 34.47 respectively. It is clear from Table 3 that Government school students have a higher self-regulation than aided school students. When the self-regulation of Government and Aided school students of Tamil linguistic minority is compared the 't value obtained is 2.18. Since the 't value is greater than the table value at 0.05 level of significance, the mean difference between Government and Aided school students of Tamil linguistic minority was found to be significant. So, the alternative hypothesis is not accepted.

### Major findings of the study

- The result shows that most of the students have an average level of Self-regulation.
- Self-regulation of Tamil linguistic minority girls is higher than that of boys within the same linguistic minority.
- Self-regulation of rural Tamil linguistic minority students is higher than that of urban students within the same linguistic minority.
- Self-regulation of government school Tamil linguistic minority students is higher than that of aided school students within the same linguistic minority.

### Conclusion

The results revealed that there is a significant difference in the self-regulation of Tamil linguistic minority students of Palakkad district with respect to gender. Girl students possess better self-regulation

as compared to boy students. It may be the reason that girls have better regulation of their thinking, behaviour and motivation. It was found that there is a significant difference in the self-regulation of Tamil linguistic minority students of Palakkad district with respect to locale. Rural Tamil linguistic minority students of Palakkad district have better self-regulation than urban Tamil linguistic minority students of Palakkad district. Rural area students have a better understanding of their thinking and behaviour. Their parents or grandparents help them to realise their character. The result shows that there is a significant difference in the self-regulation of Tamil linguistic minority students of Palakkad district with respect to Type of management. Government school Tamil linguistic minority students possess better self-regulation as compared to aided school students. Government school students have more freedom to think and behave properly. Therefore, the self-regulation of Tamil linguistic minority students can be improved by planning and devising proper techniques and educational strategies and effective design and implementation of curriculum.

### Educational implications

- Tamil linguistic minority Students of Palakkad district should be motivated to enhance self-regulation by conducting workshops or curricular and co-curricular activities or training programs by school authorities and state government.
- Teachers should employ the latest technology/ recent trends which help the Tami linguistic minority students to develop self-regulation.

- Students should seek help from teachers and friends to enhance their self-regulation.
- Teachers should organise different activities in the school to motivate their students for self-regulation.
- Parents should provide a healthy environment at home to develop their study habits and involve themselves in homework to make them confident in learning.

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## LOGICAL-MATHEMATICAL INTELLIGENCE AMONG SECONDARY SCHOOL STUDENTS

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Mrs. Pushpa George\*\*

### Abstract

*The present investigation is an attempt to study the Logical-Mathematical Intelligence among Secondary school students with special reference to Gender, and Locale. For this, the investigator used the Descriptive Survey Method. The sample includes Four Hundred and Eighteen Secondary School Students studying in Standard Eight and Nine in the Kottayam District of Kerala State. The investigator administered the tool to 208 boys and 210 girls. Of them, 204 were from Urban area schools and 214 were from Rural area Schools. The tool used for the study is the 'Logical-Mathematical Intelligence Test' constructed by the investigator. For the analysis of data, the investigator used the Test of significance of the difference between Means. The Stratified Random Sampling Technique was used for selecting the sample giving due representation to Gender and Locale. The findings of the study revealed that the majority of Secondary School Students' Logical-Mathematical Intelligence is Average. Logical-mathematical intelligence among boys and girls does not differ significantly. Logical-Mathematical Intelligence does not differ among Secondary School Students studying in Urban and Rural Schools.*

**Keywords;** Logical-Mathematical Intelligence, Secondary School Students, Gender, Locale.

### Introduction

Education is what differentiates us from other living beings on earth. It makes man the smartest creature on earth. It empowers

humans and prepares them to face life's challenges efficiently. Education is the most powerful means which can be used to change the world. Above all, education

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enhances the self-confidence of a person and makes him certain of things in life.

Mathematics is the study of measurements, numbers, and space, which is one of the first sciences that humans work to develop because of its great importance and benefit. Mathematics helps us understand the world and provides an effective way of building mental discipline. It encourages logical reasoning, critical thinking, creative thinking, abstract and spatial thinking, problem-solving ability, and even effective communication skills. Logical Mathematical Intelligence may be defined as the ability to appreciate and calculate the effect of actions upon objects or ideas and the relationship among them.

The present study aims to find out Logical-Mathematical Intelligence among Secondary school students with special regard to Gender and Locale.

### **Need and Significance of the Study**

Mathematics is taught at schools from elementary to high school levels. Mathematics learning is expected to develop students' various Mathematical Skills. Mathematics is regarded as the mother of all sciences. If the students are to function effectively at this time of extraordinary and accelerating global changes, they must understand Mathematics and be able to use Mathematics in their entire lives. Those who understand and are proficient in Mathematics have significantly enhanced opportunities and options.

The most dominant intelligence in Mathematics learning is Logical-Mathematical Intelligence because it can be developed through every topic of Mathematics learning. It is an ability to process numbers and logic which involves

the ability to process words and numbers, use logical thinking and analysis, find a suitable formula, and do a scientific exploration.

The present study is an attempt to identify students' Logical Mathematical Intelligence. With the help of this study, people can be more aware of the importance of Logical Mathematical Intelligence.

### **Objectives of the Study**

The major objectives of the study are the following;

1. To find the Logical Mathematical Intelligence among Secondary School Students.
2. To compare the Logical-Mathematical Intelligence among Secondary School Students with regard to Gender
3. To compare the Logical-Mathematical Intelligence among Secondary School Students with regard to Locale

### **Methodology**

The present investigation is an attempt to study Logical-Mathematical Intelligence among Secondary School Students with regard to Gender and Locale. Descriptive Survey Method was used for the study. The investigator surveyed the sample consisting of Four Hundred and Eighteen Secondary School Students of Standard Eight and Nine of Kottayam District of Kerala State. The investigator administered the tool to 208 Boys and 210 Girls. Of them, 204 were from Urban area Schools, and 214 were from Rural area Schools. The tool used for the study is the 'Logical-Mathematical Intelligence Test' constructed by the investigator. The Stratified Random Sampling Technique was used for selecting the sample giving due representation to

the Gender and Locale. For the analysis of data, the investigator used an appropriate statistical technique namely the Test of Significance of the difference between Means.

## Analysis and Interpretation

### Distribution of Scores on Logical-Mathematical Intelligence among Secondary School Students

The investigator used Descriptive Statistics namely Frequency Distribution, Mean, Standard Deviation, and graphical representation Histogram, Pie Diagram for the analysis of the data about this objective.

The investigator presents the Frequency Distribution of the Scores on Logical-Mathematical Intelligence among Secondary School Students in Table 1.

*Table 1*

*Frequency Distribution of the Scores on Logical-Mathematical Intelligence among Secondary School Students*

Class Interval	Frequency	Percentage
2-4	1	0.24
4-6	6	1.44
6-8	26	6.22
8-10	48	11.48
10-12	61	14.59
12-14	95	22.73
14-16	105	25.12
16-18	52	12.44
18-20	24	5.74
Total	418	100

From Table 1, the investigator observes that out of the 418 Secondary School Students, one student or 0.25 per cent of the students got scores between two and six. Six students or 1.44 percent got scores between four and six. 26 students, or 6.22 percent got scores between six and eight. The scores of 48 students, or 11.48 percent of students were between eight and 10. 61 students or 14.59 percent got scores between 10 and 12. 95 students or 22.73 percent got scores between 12 and 14. 105 students or 25.12 percent got scores between 14 and 16. 52 students or 12.44 percent got scores between 16 and 18. The scores of 24 students or 5.74 percent of students were between 18 and 20.

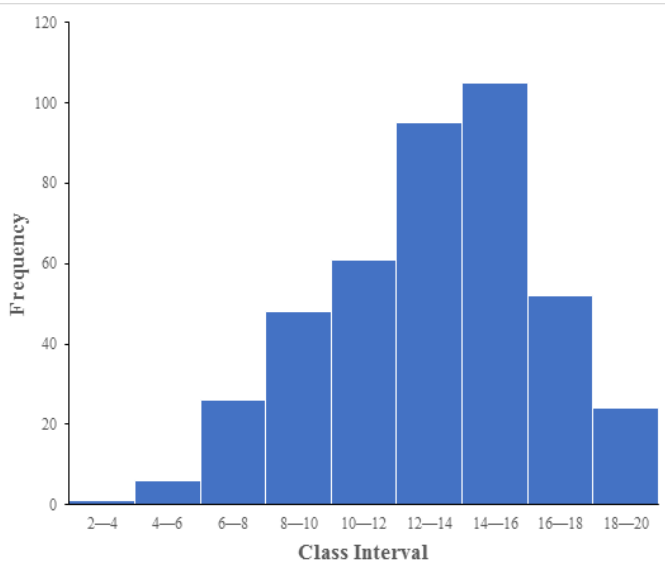
From the above Table, the investigator interpreted that the distribution of scores on Logical-Mathematical Intelligence for a sample of 418 Secondary School Students falls between 2 to 20.

From Table 1, the investigator concluded that out of 418 Secondary School Students, 25.12 per cent of the students fall in class intervals 14 and 16.

Figure 1 represents the Histogram of the Frequency Distribution of the scores on Logical-Mathematical Intelligence among Secondary School Students.

Figure 1

Histogram of the Frequency Distribution of the Scores on Logical-Mathematical Intelligence among Secondary School Students.



From Figure 1, the investigator observes that the highest number of frequencies falls in the class interval 14 and 16. The lowest number of frequencies falls in the class interval 2 and 4.

The Descriptive statistics employed for the distribution of the scores on Logical-Mathematical Intelligence among Secondary School Students are presented in Table 2.

Table 2

Variable, Number (N), Mean (M), Standard Deviation (SD), Maximum Score, and Minimum Score of Logical-Mathematical Intelligence among Secondary School Students

Variable	Number	Mean	Standard Deviation	Minimum Score	Maximum Score
Logical-Mathematical Intelligence	418	12.53	3.3	2	19

From Table 2, the investigator observes that the Mean and Standard Deviation of the scores on Logical Mathematical Intelligence are 12.53 and 3.3 respectively. Maximum and the Minimum scores obtained are 19 and two respectively.

From Table 2, the investigator interpreted and concluded that out of 20 scores, the Minimum score obtained by the students is 2 and the Maximum score is 19.



### Classification of the Total Sample based on Logical-Mathematical Intelligence

The investigator classified the whole sample by using the scores obtained on the tool ‘Logical Mathematical Intelligence Test’. The investigator classified the whole sample into three categories. The classification is as follows,

Above  $M+1\sigma$  denotes High Logical-Mathematical Intelligence

Between  $M\pm 1\sigma$  denotes Average Logical-Mathematical Intelligence

Below  $M- 1\sigma$  denotes Low Logical-Mathematical Intelligence

where  $M$  is the Mean and  $\sigma$  is the Standard Deviation of the Scores on Logical Mathematical Intelligence Therefore,  $M + 1\sigma$  is 15.83, and  $M- 1\sigma$  is 9.23. The classification of the Total Sample based on the scores on Logical-Mathematical Intelligence is given in Table 3.

*Table 3*  
*Classification of the Total Sample based on Scores on Logical-Mathematical Intelligence*

Variable	Levels	Range	Number of Students	Percentage
Logical-Mathematical Intelligence	High	Above 15.83	76	18.18
	Average	Between 15.83 and 9.23	261	62.44
	Low	Below 9.23	81	19.38
Total			418	100

From Table 3, the investigator observes that the range above 15.83 is considered High Logical-Mathematical Intelligence, the range between 15.83 and 9.23 is considered Average Logical-Mathematical Intelligence and the range below 9.23 is considered low Logical-Mathematical Intelligence.

From Table 3, the investigator observed that 76 Secondary School Students scored above 15.83. They constitute 18.18 per cent of the total sample, and their Logical Mathematical Intelligence is High. 261 Secondary School Students scores between 15.83 and 9.23. They constitute 62.44 per cent of the total sample, and their Logical

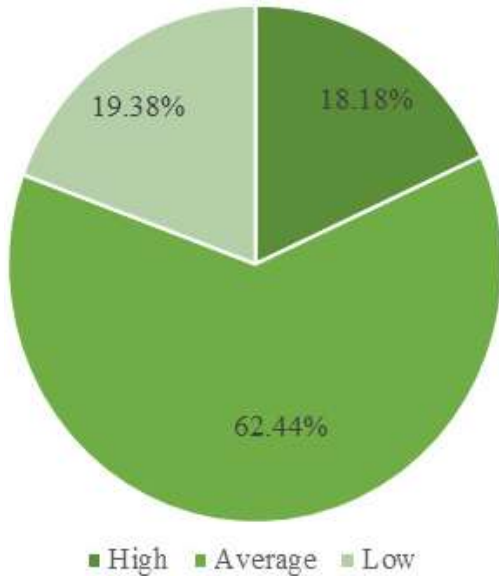
Mathematical Intelligence is Average. 81 Secondary School Students scored below 9.23. They constitute 19.38 per cent of the total sample, and their Logical Mathematical Intelligence is Low.

Therefore, from Table 3, the investigator concluded that 62.44 per cent of Secondary School Students’ Logical Mathematical Intelligence is Average.

The investigator presents the Pie Diagram showing the classification of Secondary School Students based on their Scores on Logical-Mathematical Intelligence into High, Average, and Low in Figure 2.



**Figure 2**  
*Pie Diagram showing the Percentage of Secondary School Students based on Scores on Logical-Mathematical Intelligence*



From Figure 2, the investigator observes that 18.18 per cent of the Secondary School Students scored above 15.83, that is their Logical-Mathematical Intelligence is High. 64.44 per cent of Secondary School students score between 15.83 and 9.23 have their Logical Mathematical Intelligence Average. 19.38 per cent of Secondary School Students score below 9.23, and their Logical Mathematical Intelligence is Low.

Figure 2 reveals that the majority of the students in the total sample have Average Logical-Mathematical Intelligence.

Thus, from the analysis of the first objective, the investigator concluded that 18.18 per cent of Secondary School Students have High Logical-Mathematical Intelligence, 64.44 per cent of Secondary

School Students have Average Logical-Mathematical Intelligence and 19.38 per cent of Secondary School Students have Low Logical-Mathematical Intelligence. It revealed that the majority of Secondary School Students have Average Logical Mathematical Intelligence.

**Comparison of the Means of Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Gender**

The investigator used Descriptive Statistics like Mean, Standard Deviation, and Inferential Statistics like a two-tailed *t*-test for the large independent sample. The description of the analysis is given in the following section.

To study the significant difference if any between the Means of Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Gender, the investigator used a two-tailed *t*-test for a large independent sample. The value of the *t*-test was at 0.05 level of significance with degrees of freedom 416 (N= 418)

The investigator presents the Variable, Category, Sub Category, Number, Mean, Standard Deviation, degrees of freedom, *t*-value, and *p*-value of the Scores of Logical-Mathematical Intelligence among Secondary School Students based on Gender is given in Table 4.

Table 4

Variable, Gender, Number, Mean, Standard Deviation (SD), degrees of freedom (df), *t*-value, and *p*-value of the Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Gender

Variable	Category	Subcategory	Number	Mean	SD	df	<i>t</i> -value	<i>p</i> -value
Logical-Mathematical Intelligence	Gender	Boys	208	12.26	3.32	416	1.65	.101*
		Girls	210	12.79	3.28			

\* Note:  $p > 0.05$  not significant at 0.05 level

From Table 4, the investigator observes that the obtained *t*-value of the Scores of Logical-Mathematical Intelligence among Secondary School Students with regard to Gender is 1.65 and the obtained *p*-value is .101. The investigator also finds that the Mean score of Logical Mathematical Intelligence of Boys is 12.26 and Standard Deviation is 3.32. For Girls, the Mean score is 12.79 and Standard Deviation is 3.28.

From the Table value, the investigator interprets that the obtained *t*-value is 1.65, which is less than the Table value of 1.96 at 0.05 levels of significance and the *p*-value is 0.101. This is greater than 0.05 with degrees of freedom 416. Therefore, the investigator infers that there exists no significant difference in the Means of Scores of Logical-Mathematical Intelligence among Boys and Girls of Secondary School.

### Comparison of the Means of Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Locale

The investigator used Descriptive Statistics like Mean and standard Deviation and Inferential Statistics like a two-tailed *t*-test for the large independent sample. The description of the analysis is given in the following section.

To study the significant difference if any between the Means of Scores on Logical Mathematical Intelligence among Secondary School Students with regard to Locale, the investigator used the two-tailed *t*-test for a large independent sample. The value of the *t*-test was at 0.05 level of significance with degrees of freedom 416 (N= 418).

The investigator presents the Variable, Locale, Number, Mean, Standard Deviation, degrees of freedom, *t*-value, and *p*-value of the Scores of Logical-Mathematical Intelligence among Secondary School Students based on the Locale given in Table 5.

Table 5

Variable, Locale, Number, Mean, Standard Deviation (SD), degrees of freedom (df), t-value and p-value of the Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Locale

Variable	Category	Sub category	Number	Mean	SD	df	t-value	p-value
Logical-Mathematical Intelligence	Locale	Rural	214	12.24	3.18	416	1.829	.068
		Urban	204	12.83	3.41			

\* Note:  $p > 0.05$  not significant at 0.05 level

From Table 5, the investigator observes that the obtained  $t$ -value of the Scores of Logical-Mathematical Intelligence among Secondary School Students with regard to Locale is 1.829 and the obtained  $p$ -value is .068. The investigator also finds out that, the Mean Score of Logical-Mathematical Intelligence of Secondary School Students in Rural areas is 12.24, and Standard Deviation is 3.18. For Secondary School Students in Urban Areas, the Mean of Score is 12.83 and Standard Deviation is 3.41.

From the Table value, the investigator interprets that the obtained  $t$ -value is 1.829, which is lesser than the Table value of 1.96 at 0.05 levels of significance and the  $p$ -value is .068. This is greater than 0.05 with degrees of freedom 416. Therefore, the investigator infers that there exists no significant difference in the Means of Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Locale.

### Major Findings of the Study

1. Majority of (62.44%) Secondary School Students' Logical Mathematical Intelligence is Average.
2. There is no significant difference in the Means of Scores on Logical-

Mathematical Intelligence among Secondary School Students with regard to Gender.

3. There is no significant difference in the Means of Scores on Logical-Mathematical Intelligence among Secondary School Students with regard to Locale.

### Conclusion

The study is an earnest attempt of the investigator to study in detail the topic under consideration with all the limitations. The findings of the study revealed that the majority of Secondary School Students have Average Logical-Mathematical Intelligence. The study also revealed that Logical-Mathematical Intelligence among Secondary School Students does not differ significantly with regard to Gender and Locale. The investigator firmly believes that the findings of this research would help teachers, parents, and academicians to understand Logical-Mathematical Intelligence among Secondary School Students. The investigator would feel gratified if the findings of the study would help in finding ways to increase Logical-Mathematical Intelligence among Secondary School Students.

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# GEOMETRIC INTUITIVE SKILLS AMONG SECONDARY SCHOOL STUDENTS: AWARENESS AMONG MATHEMATICS TEACHERS

Solly Susan Varghese\*  
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## Abstract

*The study explores the awareness of geometric intuitive skills among Mathematics teachers. Geometric intuitive skills are crucial in developing students' spatial thinking abilities and problem-solving capabilities in Mathematics. This research aims to assess the level of awareness among Mathematics teachers about their students' geometric intuitive skills. The sample of the study comprises thirty Mathematics teachers at secondary schools in Pathanamthitta District, Kerala. The results provide valuable insights into teachers' knowledge of geometric intuitive skills. The findings will help in designing targeted interventions to enhance teaching skills. It was found that mathematics teachers have an average level of awareness about geometric intuitive skills among their students. There is no significant difference between male and female secondary school teachers in their awareness of the geometric intuitive skills of their students. The study also discusses some essential teacher training programmes and curriculum development recommendations.*

**Keywords:** *Geometric Intuitive Skills, Teacher Awareness, Secondary School Students*

## Introduction

Geometry is an essential branch of Mathematics that plays a crucial role in our daily lives. It helps us understand the world around us and provides us with tools to solve real-world problems. However, geometry can be challenging for many students, especially when developing geometric intuitive skills. Geometric

intuition is the ability to perceive and reason about geometric objects, relationships, and properties in a way that is visual, spatial, and intuitive. Intuitive reasoning is vital in geometry and is linked to overall mathematical proficiency (Ben-Chaim et al., 2008; van Garderen, 2006). Students with strong geometric intuition are more

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likely to succeed in higher-level math courses and careers requiring spatially solid reasoning skills. However, developing geometric intuition can be challenging for students, especially those who struggle with abstract concepts.

Effective teaching strategies can play a significant role in helping students develop geometric intuition. One approach is to use visual aids and manipulatives, such as blocks, tangrams, and geoboards, to help students visualise and understand geometric concepts (Clements & Sarama, 2004). Another strategy is to encourage students to engage in problem-solving activities that require them to use their spatial reasoning skills (van Garderen & Montague, 2003). Teachers play a critical role in developing geometric intuition among secondary school students. By implementing effective teaching strategies and creating a supportive learning environment, teachers can help students overcome the challenges of learning geometry and develop the spatial reasoning skills necessary for success in higher-level math courses and related fields.

Developing geometric intuitive skills is crucial for secondary school students as it promotes their spatial thinking abilities and enhances their problem-solving capabilities in Mathematics. The effectiveness of developing these skills among students depends on the awareness and understanding of geometric intuition among Mathematics teachers. This study investigates the level of awareness of geometric intuitive skills of secondary school students among Mathematics teachers. By identifying gaps in teacher awareness, the study may provide valuable insights into pedagogical practices

and the mathematics curriculum.

## **Need and Significance of the Study**

Geometry is a fundamental branch of Mathematics that studies objects' shapes, sizes, and positions in space. It has immense applications in engineering, architecture, physics, etc. Hence, developing geometric intuitive skills among secondary school students is crucial for their academic growth and success. Teachers play a pivotal role in imparting these skills to students.

Geometric intuition helps students develop their spatial thinking abilities. Spatial thinking abilities involve the ability to visualise and mentally manipulate 2D and 3D shapes, which is an essential skill in many fields. Geometric intuition helps students comprehend complex mathematical concepts quickly. When students intuitively understand geometry, they can easily visualise and understand abstract concepts like vectors, matrices, and calculus. This, in turn, helps them perform better in math and science subjects (Harel & Sowder, 2007). Geometric intuition helps students develop their critical thinking skills. Teachers can encourage students to reason and analyse problems using geometric principles. This enables students to develop their logical reasoning abilities, which are essential in law, economics, and computer science.

Teachers have a decisive role in improving their students' geometric skills. Teachers must be aware of the intuitive skills required by their students to solve geometric problems. This will help them direct their teaching to improve their students' skills. This brings out the need to assess the awareness of Mathematics teachers about geometric intuitive skills among secondary school students. It

emphasises the significance of this research in improving instructional practices, identifying challenges, and enhancing students' mathematical understanding. The section also highlights the potential implications for curriculum development and teacher training programmes.

### Objectives of the study

The objectives of the study are:

- i. To find out Mathematics teachers' level of awareness of geometric intuitive skills among secondary school students
- ii. To find out whether there is any significant difference between male and female Secondary School Mathematics teachers in their awareness of geometric intuitive skills among secondary school students.

### Hypotheses of the study

The hypotheses of the study are:

- i. There is a significant difference between male and female secondary school Mathematics teachers in their awareness of geometric intuitive skills among secondary school students.

### Methodology

Awareness Scale for secondary school teachers are given in Table 1.

*Table 1*

*Descriptive statistics - mean and standard deviation on the awareness of secondary school Mathematics teachers*

Sl.No.	Sample	N	Mean	S.D.
1	Total	30	65.51	10.86
2	Male	10	70.40	10.28
3	Female	20	62.80	10.54

The maximum score that one can get on the awareness scale is 100.

The investigator used the normative survey method for the study.

### Sample of the study

The sample consisted of thirty secondary school Mathematics teachers from Pathanamthitta district.

### Tool used for the study

The investigator prepared a Geometric Intuitive Skills Awareness Scale to find out the awareness of Mathematics teachers of geometric intuitive skills among their secondary school students.

The scale consisted of twenty items. Each item has five response options: strongly agree, agree, undecided, disagree, and strongly disagree.

### Statistical Techniques used for the study

- Descriptive statistics - Mean and Standard deviation
- Inferential statistics - t-test

### Results and Discussion

The mean and standard deviation of scores on the Geometric Intuitive Skills

Table 1 shows that the mean value for the total sample is 65.51, and the



standard deviation for the total sample is 10.86.

The teachers were classified into three categories, namely, high, average, and low levels of awareness, based on their scores on the awareness scale. If the total score of a teacher is greater than the score of (mean+SD), then the teacher belongs to the high-level awareness group; if the total score of a

teacher is less than the score of (mean-SD), then the teacher belongs to the low-level awareness group; and if the total score of a teacher is in between the scores of (mean+SD) and (mean-SD), then the teacher belongs to the average level awareness group.

The level of awareness of secondary school Mathematics teachers is shown in Table 2.

Table 2

Grouping of secondary school Mathematics teachers based on scores on the awareness scale

Sample	N	High	Average	Low
Total	30	5	22	3
Percentage	100	16.66%	73.33%	10.01%

From Table 2, it is observed that 73.33% of the Secondary school Mathematics teachers in the sample have an **average awareness** of geometric intuitive skills among their students.

The Mean scores on Awareness of secondary school Mathematics teachers with respect to gender are given in Table 3.

Table 3

Sample	N	Mean	SD	t	p
Male	10	70.40	10.28	1.88	0.069*
Female	20	62.80	10.54		

\*Not significant

Table 3 shows that the t value is 1.88, which is not significant at the 0.05 level (the table value of t at the 0.05 level is 1.96). Here the *p-value* is 0.069, which is greater than 0.05. Hence, it is

not significant at the 0.05 level. This means that the mean awareness scores among male and female Mathematics teachers do not differ.

## Tenability of Hypothesis 1

Hypothesis 1, which states that there is a significant difference between male and female secondary school Mathematics teachers in their awareness of geometric intuitive skills among secondary school students, is not accepted.

## Suggestions

The study identified specific areas for enhancing teachers' knowledge and awareness. These areas include promoting visual thinking, spatial reasoning, and problem-solving strategies that foster geometric intuition. Mathematics educators and policymakers must provide targeted professional development opportunities and resources that address these areas, enabling teachers to cultivate their understanding of geometric intuition and apply it effectively in their classrooms.

Collaborative efforts between Mathematics education researchers, teacher training institutions, and practising teachers should be initiated to address the identified gaps. Professional development programmes incorporating firsthand activities, interactive workshops, and ongoing support can empower teachers to improve their pedagogical practices and foster geometric intuitive skills among their students.

Furthermore, school administrators and policymakers should consider integrating geometric intuitive skills into the mathematics curriculum, ensuring teachers access appropriate instructional materials and assessments. This integration can help create an educational environment that nurtures students' intuitive understanding

of geometry and prepares them for future mathematical challenges.

## Recommendations for Improvement

To improve Mathematics teachers' awareness of geometric intuitive skills and their ability to develop these skills in their students, we recommend the following:

1. Provide teachers with a deeper understanding of geometric intuition

This could be done through professional development courses, workshops, and online resources.

2. Incorporate geometric intuition into Mathematics teacher education

This could be done by requiring pre-service teachers to take courses on geometric intuition and by incorporating geometric intuition into methods courses.

3. Develop assessments of students' geometric intuition

This would allow teachers to track students' progress and identify areas where they need additional support.

4. Encourage teachers to use instructional strategies that promote geometric intuition

These strategies could include using manipulatives, drawing, and technology.

5. Provide teachers with opportunities to collaborate with other teachers on developing geometric intuition

This could be done through teacher networks, online forums, and conferences.

## Conclusion

This study investigated Mathematics teachers' awareness of intuitive geometric skills among secondary school students. The findings of this study shed light on the current state of Mathematics education and highlight the importance of developing teachers' awareness of geometric intuitive skills. Enhancing teachers' awareness of geometric intuitive skills will positively impact students' spatial thinking abilities and problem-solving capabilities in Mathematics, leading to improved academic performance. Gender does not influence the awareness among teachers of geometric intuitive skills.

The survey results revealed a need to improve Mathematics teachers' understanding and recognition of geometric intuitive skills among their students. Many teachers expressed average awareness of intuitive thinking skills in geometry, which could affect the teaching and learning of geometry.

Overall, this study emphasises the importance of increasing awareness among Mathematics teachers about geometric intuitive skills among secondary school students. By equipping teachers with the knowledge and tools necessary to foster these skills, we can enhance the quality of Mathematics education and promote a deeper understanding of geometry. This can contribute to students' overall mathematical competence and ability to apply mathematical concepts and reasoning in real-world contexts.

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## ENVIRONMENTAL AWARENESS AMONG SECONDARY SCHOOL STUDENTS

Anita James\*  
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### Abstract

*The present investigation is an attempt to study Environmental Awareness among Secondary School Students with regard to Gender and Locale. Descriptive Survey Method was used for the present study. The investigator surveyed the sample consisting of 420 Secondary School Students of Standard Eight and Nine of Kottayam District of Kerala State. The investigator administered the tool to 210 Boys and 210 Girls. The Secondary School Students studying in Rural and Urban Schools were also 210 each. The tool used for the study is the 'Environmental Awareness Questionnaire' constructed by the investigator. For the analysis of data, the investigator used an appropriate statistical technique namely the Test of Significance of the difference between Means. The Stratified Random Sampling Technique was used for selecting the sample giving due representation to Gender and Locale. The findings of the present study revealed that the majority of Secondary School Students' Environmental Awareness is Average. Environmental Awareness among Girls is higher than that of Boys. Environmental Awareness among Secondary School Students studying in Rural and Urban Schools does not differ. Hence the Environmental Awareness Programme can be widely implemented in Secondary Schools to promote Environmental Awareness.*

**(Key Word:** *Environmental Awareness*)

### Introduction

Education is the gateway to success. Education is the best way which shows us many ways to lead and utilise our life properly. Education encompasses both the act of passing on knowledge to others and

the process of receiving it from others. Education encompasses both the act of instructing and the act of learning. Education is the nurturing of learning and change in a thoughtful, hopeful, and respectful manner, with the notion that we should all have

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the opportunity to share in life. Education shapes a person's personality, thoughts, and social abilities. It also helps people prepare for life's challenges. Everyone, from cradle to grave, deserves an education.

There has been a rising concern for environmental issues worldwide. Environmental Awareness is exactly what it sounds like, conscious knowledge of the natural environment and the choices that either benefit or hurt it. It is also the recognition that the earth requires protection to survive. Furthermore, the term environmentalism refers to the belief that humans are responsible for protecting and preserving the environment from human-caused harm. As previously stated, man-made decisions are the primary cause of the planet's deterioration.

Environmental Awareness is important because it can make us aware of how human activity affects the planet and causes to global warming. Encouraging the use of renewable energy like solar, wind, and water, can also assist us in building a more sustainable future. Environmental Awareness is crucial for several reasons, including the preservation of vulnerable plant and animal species, the creation of sustainable infrastructure, and the development of a sense of connectedness to the natural world. In essence, Environmental Awareness is a teaching tool that helps people everywhere realise how important it is to preserve resources and lessen or completely eradicate the negative effects of human interference. This includes economic, aesthetic, and biological reasons.

The present study aims to find out the Environmental Awareness among Secondary School Students with special reference to Gender and Locale.

## Need and Significance of the Study

Environmental issues have advanced through different stages, and the concern for the challenges they present has doubled with each passing decade. The conservation of our environment is important. Environmental Awareness is essential for the protection of natural resources. There is a requirement for information that clarifies modern environmental quotes that touch on the need to conserve biodiversity, the need to lead a more sustainable lifestyle and the need to use resources more equitably. There is a need to change how we view our environment using a practical approach based on observation and self-learning. There is the need to create a concern for our environment that will trigger pro-environmental action including simple activities we can do in our daily life to protect it.

The significance of Environmental Awareness is recognised by all but there is little experience or knowledge about the way to provide it. The objective of such education is that individuals and social groups should become aware, acquire knowledge, develop attitudes, skills, and abilities, and be able to address real-life environmental problems. Integrated interdisciplinary and holistic education is to be provided to all sections of the population. It would, first of all, require a new approach to education itself.

The present study is an attempt to gain insights into Environmental Awareness. It helps to understand the Environmental Awareness among Secondary School Students. With the help of this study, people can be sensitised towards environmental issues and help them modify their behaviour accordingly to contribute their bit to saving Mother Earth.

## Objectives of the Study

The major objectives of the present study are the following;

1. To find out Environmental Awareness among Secondary School Students.
2. To compare the Environmental Awareness among Secondary School Students with regard to Gender.
3. To compare the Environmental Awareness among Secondary School Students with regard to Locale.

## Methodology

The present investigation is an attempt to study Environmental Awareness among Secondary School Students with regard to Gender and Locale. Descriptive Survey Method was used for the present study. The investigator surveyed the sample consisting of 420 Secondary School Students of Standard Eight and Nine of Kottayam District of Kerala State. The investigator administered the tool to 210 Boys and 210 Girls. The Secondary School Students studying in Rural and Urban Schools were also 210 each. The tool used for the study is the 'Environmental Awareness Questionnaire' constructed by the investigator. The Stratified Random Sampling Technique was used for selecting the sample giving due representation to the Gender and Locale. For the analysis of data, the investigator used an appropriate statistical technique namely the Test of Significance of the difference between Means.

## Analysis and Interpretation

### Distribution of the Scores on Environmental Awareness among Secondary School Students

The investigator used Descriptive Statistics namely Frequency Distribution, Mean, and Standard Deviation for the analysis and graphical representations like Histograms and Pie diagrams for the visualisation of the data about this objective.

The investigator presents the Frequency Distribution of the Scores on Environmental Awareness among Secondary School Students in Table 1.

*Table 1*  
*Frequency Distribution of the Scores on Environmental Awareness among Secondary School Students*

Class Interval	Frequency	%
15-18	3	0.71
18-21	6	1.42
21-24	6	1.42
24-27	21	5
27-30	41	9.76
30-33	74	17.61
33-36	163	38.80
36-39	102	24.28
39-42	4	0.95
Total	420	100

From Table 1, the investigator observes that out of the 420 Secondary School Students, three students or 0.71 per cent of the students got scores between 15 and 18. Six students or 1.42 percent of the students got scores between 18 and 21. Six

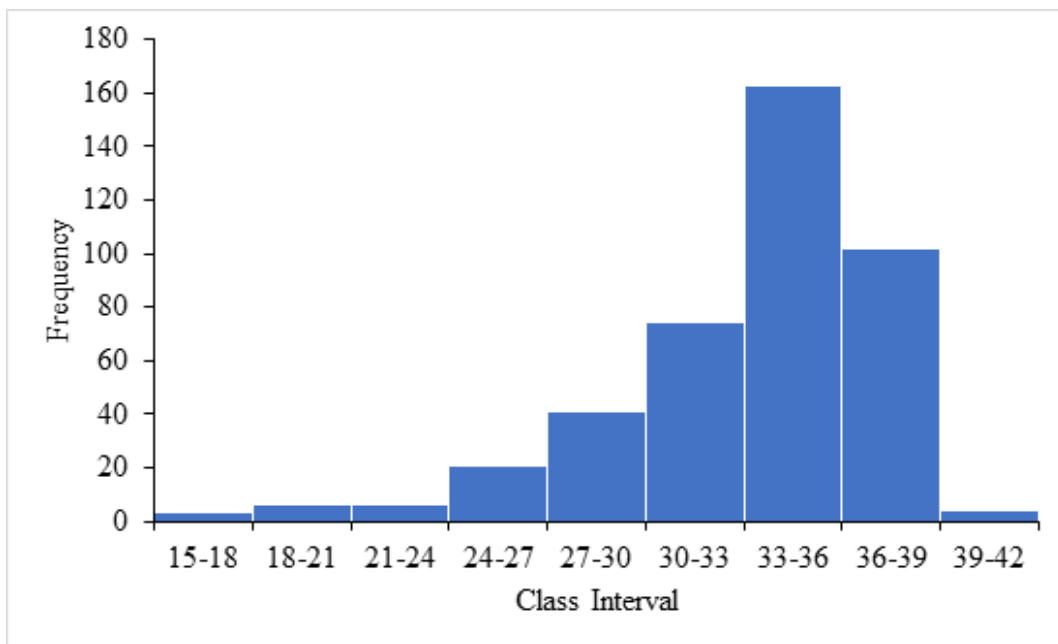
students or 1.42 percent of the students got scores between 21 and 24. 21 students or 5 percent of the students got scores between 24 and 27. 41 students or 9.76 percent of the students got scores between 27 and 30. 74 students or 17.61 percent of the students got scores between 30 and 33. 163 students or 38.80 percent of the students got scores between 33 and 36. 102 students or 24.28 percent of the students got scores between 36 and 39. Four students or 0.95 percent of the students got scores between 39 and 42.

From the above Table, the investigator interpreted that the distribution of the scores on Environmental Awareness for a sample of 420 Secondary School Students falls between 15 and 42.

From Table 1, the investigator concluded that out of the 420 Secondary School Students, the majority of the Secondary School Students fall in the class intervals 33 and 36.

Figure 1 represents the Histogram showing the Frequency Distribution of the Scores on Environmental Awareness among Secondary School Students.

*Figure 1*  
Histogram showing the Frequency Distribution of the Scores on Environmental Awareness among Secondary School Students



From Figure 1, the investigator observes that the highest number of frequencies falls in the class intervals 33 and 36. The lowest number of frequencies falls in the class intervals 15 and 18.

The Descriptive Statistics employed for the distribution of the scores on Environmental Awareness among Secondary School Students is presented in Table 2.



Table 2

Variable, Number (N), Mean (M), Standard Deviation (SD), Minimum Score, and Maximum Score on Environmental Awareness among Secondary School Students

Variable	Number	Mean	Standard Deviation	Minimum Score	Maximum Score
Environmental Awareness	420	32.71	4.08	15	39

From Table 2, the investigator observes that the Mean and Standard Deviation of the Scores on Environmental Awareness are 32.71 and 4.08 respectively. Minimum and the Maximum scores obtained are 15 and 39 respectively.

From the above Table, the investigator interpreted and concluded that out of 40 scores, the Minimum score obtained by the students is 15 and the Maximum score is 39.

#### Classification of the Total Sample based on Environmental Awareness

The investigator classified the Secondary School Students based on the scores obtained on the tool 'Environmental

Awareness Questionnaire'. The investigator classified the whole sample into three categories. The classification is as follows,

Above  $M+1\sigma$  denotes Environmental Awareness is High

Between  $M+1\sigma$  and  $M-1\sigma$  denotes Environmental Awareness is Average

Below  $M-1\sigma$  denotes Environmental Awareness is Low

Where  $M$  is the Mean and  $\sigma$  is the Standard Deviation of the Scores on Environmental Awareness. Therefore,  $M+1\sigma$  is 36.79, and  $M-1\sigma$  is 28.63. The classification of the Total Sample based on Environmental Awareness is given in Table 3.

Table 3

Classification of the Total Sample based on Environmental Awareness

Variable	Levels	Range	No. of Students	%
Environmental Awareness	High	Above 36.79	106	25.23
	Average	Between 36.79 and 28.63	257	61.19
	Low	Below 28.63	57	13.57
Total			420	100

From Table 3, the investigator observes that the range above 36.79 is considered Environmental Awareness High, the range between 36.79 and 28.63 is considered Environmental Awareness Average and the range below 28.63 is considered Environmental Awareness Low.

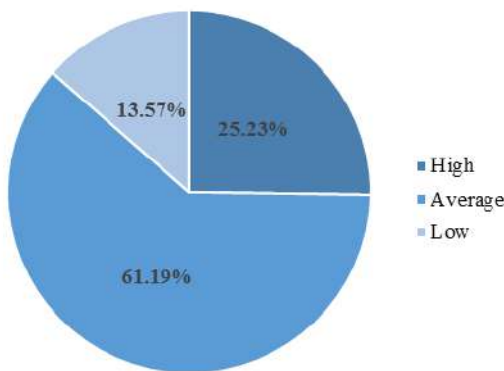
From the above Table, the investigator interpreted that 106 Secondary School Students scored above 36.79. They constitute 25.23 percent of the total sample and their Environmental Awareness is High. 257 Secondary School Students scored between 36.79 and 28.63. They constitute

61.19 percent of the total sample and their Environmental Awareness is Average. 57 Secondary School Students scored below 28.63. They constitute 13.57 percent of the total sample and their Environmental Awareness is Low.

Therefore, from Table 3, the investigator concluded that in the majority of Secondary School Students that is, 257 students or 61.19 per cent of the total sample, Environmental Awareness is Average.

The investigator presents the Pie Diagram showing the Percentage of Secondary School Students based on Environmental Awareness in Figure 2.

*Figure 2  
Pie Diagram showing the Percentage of Secondary School Students based on Environmental Awareness*



From Figure 2, the investigator observes that 25.23 per cent of the Secondary School Students scored above 36.79, their Environmental Awareness is High. 61.19 percent of Secondary School Students lie between 36.79 and 28.63, their Environmental Awareness is Average and 13.57 percent of Secondary School Students lie below 28.63, their Environmental Awareness is Low.

Figure 2, reveals that the majority of the Secondary School Students in the total sample, Environmental Awareness is Average.

Thus, from the analysis of the first objective, the investigator concluded that in 25.23 per cent of Secondary School Students, Environmental Awareness is High, 61.19 per cent of Secondary School Students, Environmental Awareness is Average and 13.57 per cent of Secondary School Students, Environmental Awareness is Low. It revealed that the majority of the Secondary School Students, Environmental Awareness is Average.

### **Comparison of Environmental Awareness among Secondary School Students with regard to Gender**

The investigator used Descriptive Statistics like Mean and standard Deviation and Inferential Statistics like a two-tailed *t*-test for the large independent sample. The description of the analysis is given in the following section.

To study the significant difference if any between the Means of Scores on Environmental Awareness among Secondary School Students with regard to Gender, the investigator used a two-tailed *t*-test for a large independent sample. The value of the *t*-test was at 0.05 level of significance with degrees of freedom 418 (N= 420)

The investigator presents the Variable, Category, Subcategory, Number, Mean, Standard Deviation, degrees of freedom, *t*-value, and *p*-value of the Scores on Environmental Awareness among Secondary School Students based on Gender is given in Table 4.

Table 4

Variable	Category	Sub Category	Number	Mean	SD	df	t-value	p-value
Environmental Awareness	Gender	Boys	210	31.44	4.42	418	6.683	.000*
		Girls	210	33.98	3.26			

\* Note:  $p < 0.05$  significant at 0.05 level

From Table 4, the investigator observes that the obtained  $t$ -value of the scores on Environmental Awareness among Secondary School Students with regard to Gender is 6.683 and the obtained  $p$ -value is .000. The investigator also found that the Mean of Scores on Environmental Awareness of Boys among Secondary School Students is 31.44 and Standard Deviation is 4.42. For Girls, the Mean score is 33.98 and Standard Deviation is 3.26.

From the Table value, the investigator interprets that the obtained  $t$ -value is 6.683, which is greater than the Table value, of 1.96 at 0.05 level of significance. The  $p$ -value is .000. This is lesser than 0.05 with degrees of freedom 418. Therefore, the investigator infers that there exists a significant difference in the Means of Scores on Environmental Awareness among Secondary School Students with regard to Gender at a 0.05 level of significance. Environmental Awareness among Girls is higher than that of Boys.

### Comparison of the Means of Scores on Environmental Awareness among Secondary School Students with regard to Locale

The investigator used Descriptive Statistics like Mean and standard Deviation and Inferential Statistics like a two-tailed  $t$ -test for the large independent sample. The description of the analysis is given in the following section.

To study the significant difference if any between the Means of Scores on Environmental Awareness among Secondary School Students with regard to Locale, the investigator used a two-tailed  $t$ -test for a large independent sample. The value of the  $t$ -test was at 0.05 level of significance with degrees of freedom 418 (N= 420)

The investigator presents the Variable, Category, Subcategory, Number, Mean, Standard Deviation, degrees of freedom,  $t$ -value and  $p$ -value of the Scores on Environmental Awareness among Secondary School Students based on Locale given in Table 5.

Table 5

Variable, Category, Subcategory, Number, Mean, Standard Deviation (SD), degrees of freedom (df), *t*-value and *p*-value of the Scores on Environmental Awareness among Secondary School Students about Locale

Variable	Category	Sub Category	Number	Mean	SD	df	t-value	p-value
Environmental Awareness	Locale	Rural	210	32.91	3.89	418	1.014	.311
		Urban	210	32.50	4.26			

\* Note:  $p > 0.05$  not significant at 0.05 level

From Table 5, the investigator observes that the obtained *t*-value of the scores on Environmental Awareness among Secondary School Students with regard to Locale is 1.014 and the obtained *p*-value is .311. The investigator also found that the Mean Score on Environmental Awareness among Secondary School Students in Rural Areas is 32.91 and Standard Deviation is 3.89. The Mean of Scores among Secondary School Students in Urban Areas is 32.50 and Standard Deviation is 4.26.

From the Table value, the investigator interprets that the obtained *t*-value is 1.014, which is lesser than the Table value, 1.96 at 0.05 levels of significance and the *p*-value is .311. This is greater than 0.05 with degrees of freedom 418. Therefore, the investigator infers that there exists no significant difference in the Means of Scores on Environmental Awareness among Secondary School Students with regard to Locale at 0.05 level of significance. Environmental Awareness among Secondary School Students studying in Rural and Urban Schools is almost the same.

### Major Findings of the Study

1. Majority of Secondary School Students' Environmental Awareness is

Average

2. There is a significant difference between the Means of Scores on Environmental Awareness among Secondary School Students with regard to Gender. Environmental Awareness among Girls is higher than that of Boys.
3. There is no significant difference between the Means of Scores on Environmental Awareness among Secondary School Students with regard to Locale. Environmental Awareness among Secondary School Students studying in Rural and Urban Schools does not differ.

### Educational Implications

The study put forward the following educational implications.

- Awareness classes can be organised by the school for students about the environment.
- Increase the content and activities about the concepts of environmental education in Secondary School Education Programmes
- Organise seminars and training for students based on an environmental theme, especially environmental education, and environmental problem.

- Environment-related topics can be regularly discussed in the classroom.
- Debate can be conducted in the classroom about environmental issues.

## Conclusion

The study is an earnest attempt of the investigator to study in detail the topic under consideration with all the limitations. The present study's findings revealed that the majority of Secondary School Students' Environmental Awareness is Average. Environmental Awareness among Secondary School Students differ significantly with regard to Gender. Environmental Awareness among Girls is higher than that of Boys. Environmental Awareness among Secondary School Students does not differ significantly with regard to Locale. Environmental Awareness among Secondary School Students studying in Rural and Urban Schools does not differ. The investigator firmly believes that the findings of this research would help teachers, parents, and academicians to understand Environmental Awareness among Secondary School Students. The investigator would feel gratified if the findings of the present study would help in finding ways to increase Environmental Awareness among Secondary School Students. Hence the Environmental Awareness Programme can be widely implemented in Secondary Schools to promote Environmental Awareness.

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## AWARENESS OF RESPONSIBLE CONSUMPTION AMONG SECONDARY SCHOOL STUDENTS

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### Abstract

*The present investigation is an attempt to study the Awareness of Responsible Consumption among Secondary School Students with respect to Gender and Locale. For this, the investigator used the Descriptive Survey Method. The sample for the present study included 420 Secondary School Students of Standard Eight and Nine in Kottayam District of Kerala State. The Stratified Random Sampling Technique was used for selecting the sample. The data about the objectives are collected by administering the tool titled 'Questionnaire on Awareness of Responsible Consumption' constructed by the investigator. For the analysis of data, the investigator used a statistical technique, Test of Significance of the difference between Means. The investigator administered the tool to 209 Boys and 211 Girls. The Secondary School Students studying in Rural and Urban area schools were 210 each. The findings of the present study revealed that the majority of the Secondary School Students have Average Awareness of Responsible Consumption. Awareness of Responsible Consumption among Girls is higher than that of Boys. Awareness of Responsible Consumption among Secondary School Students studying in Rural areas is higher than that of Secondary School Students studying in Urban areas. Hence, Responsible Consumption Programmes can be widely implemented in Secondary Schools to promote Awareness of Responsible Consumption.*

**Key Words:** *Responsible Consumption, Secondary School Students, Gender, Locale.*

### Introduction

Education is a systematic process through which a child or an adult acquires knowledge, experience, skill and sound attitude. It makes an

individual civilized, refined, cultured and educated. The only way to have a civilised and socialised society is through education. Its goal is to make

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an individual perfect. Education is the art of appreciating life and making one responsible. Responsible Consumption is an emerging trend among the world nations for future conservation. United Nations established 17 Sustainable Development Goals (SDG) for a better and more sustainable future for all. These goals are intended to be achieved by 2030 and are known as the 2030 Agenda. Among the 17 goals, the 12<sup>th</sup> goal is Responsible Consumption and Production. The official wording of SDG 12 is ensuring Sustainable Consumption and Production patterns. This type of consumption minimises the use of natural resources and toxic materials. It reduces polluting emissions of waste over the life cycle of the service or product so as not to jeopardize the needs of future generations.

The goal emphasises doing more with less, thus promoting resource efficiency, green economies, and sustainable infrastructure. It also focuses on reducing degradation and pollution and minimising waste. The efficient management of our shared natural resources and the way we dispose of toxic waste and pollutants are important targets to achieve this goal. It calls for awareness generation and dissemination on sustainable development, lifestyles and practices.

The present study aims to compare Awareness of Responsible Consumption among Secondary School Students with respect to Gender and Locale.

### **Need and Significance**

Our planet has provided us with an abundance of natural resources. But we

have not utilised them responsibly and currently consume far beyond what our planet can provide. We must learn how to use and produce in sustainable ways that will reverse the harm that we have inflicted on the planet. Everything we produce and consume has either a positive or negative impact on the economy, the environment, and social development. Achieving Responsible Consumption and Production patterns secures efficiency and productivity gains, ensuring that human activities remain within the carrying capacity of the planet while respecting the rights of future generations.

Education for Responsible Consumption is essential to empower individuals and social groups with appropriate information on the impact of their daily choices as consumers, as well as for workable solutions and alternatives. Education can provide necessary changes in society. A more responsible generation can be cultivated through quality education. Education for Responsible Consumption aims to provide citizens with the appropriate information and knowledge on the environmental and social impacts of their daily choices, as well as workable solutions and alternatives towards more sustainable lifestyles, by limiting inefficient use of resources and environmental degradation.

Sustainable development is supported globally to undertake development that meets the needs of the present without compromising the ability of future generations. Responsible Consumption awareness enculturation should be inculcated at an early age to promote a positive attitude towards the environment. In-depth knowledge concerning the environment will lead to changes in



behaviour. Schools are the early institutions responsible for instilling the love of the environment. Therefore, studies on the knowledge and activities of Responsible Consumption among students can be conducted.

### Objectives of the Study

The major objectives of the study are:

1. To find the Awareness of Responsible Consumption among Secondary School Students.
2. To compare the Awareness of Responsible Consumption among Secondary School Students with respect to Gender.
3. To compare the Awareness of Responsible Consumption among Secondary School Students with respect to Locale.

### Methodology

The methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. The present study used a Descriptive Survey Method for the collection of data on Awareness of Responsible Consumption among Secondary School Students. The sample consisted of 420 Secondary School Students in Kottayam District. The Stratified Random Sampling Technique was used for selecting the sample. The investigator administered the tool to 209 Boys and 211 Girls. The Secondary School Students studying in Rural and Urban area Schools were 210 each. The tool used for the study is the 'Questionnaire on Awareness of Responsible Consumption' constructed by the investigator. For the analysis of data, the

investigator used an appropriate statistical technique namely the Test of Significance of the difference between Means.

### Analysis and Interpretation

#### Distribution of the Scores on Awareness of Responsible Consumption among Secondary School Students

The investigator formulated the first objective as 'To find the Awareness of Responsible Consumption among Secondary School Students'. The data needed for the analysis of the objective was obtained by administering a self-constructed tool 'Questionnaire on Awareness of Responsible Consumption' on Four Hundred and Twenty Secondary School Students.

The investigator used Descriptive Statistics namely Frequency Distribution, Mean, Standard Deviation, and graphical representations like Histograms, Bar diagrams and Pie diagrams for the analysis and visualisation of the data about this objective.

The investigator presents the Frequency Distribution of the Scores on Awareness of Responsible Consumption among Secondary School Students in Table 1.

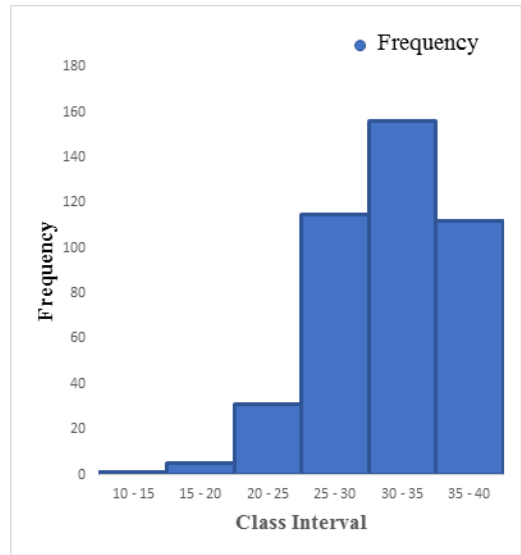
*Table 1*  
*Frequency Distribution of the Scores on Awareness of Responsible Consumption among Secondary School Students*

Class Interval	Frequency	%
10 - 15	1	0.24
15 - 20	5	1.19
20 - 25	31	7.39
25 - 30	115	27.38
30 - 35	156	37.14
35 - 40	112	26.7
Total	420	100

From Table 1, the investigator observes that out of 420 Secondary School Students, one student or 0.24 per cent got scores between 10 and 15. The score between 15 to 20 was scored by five students or 1.19 percentage of Secondary School Students. The score between 20 to 25 was scored by 31 students or 7.39 percentage of Secondary School Students. The score between 25 to 30 was scored by 115 students or 27.38 percentage of Secondary School Students. There are 156 Secondary School Students or 37.14 per cent of Secondary School Students who got scores between 30 and 35. Out of 420 Secondary School Students, 112 students or 26.7 per cent obtained scores between 35 and 40.

From the above Table, the investigator interpreted that the distribution of scores on the Awareness of Responsible Consumption for a sample of 420 Secondary School Students falls between 10 to 40. From Table 1, the investigator concluded that out of the 420 Secondary School Students, the majority of the students fall in the class interval 30 and 35. Figure 1 represents the Histogram of the Frequency Distribution of the Scores on Awareness of Responsible Consumption among Secondary School Students.

*Figure 1  
Histogram of the Frequency Distribution of the Scores on Awareness of Responsible Consumption among Secondary School Students*



From Figure 1, the investigator observes that the highest number of frequencies falls in the class interval 30 and 35. The lowest number of frequencies falls in the class interval 10 and 15. The Descriptive Statistics employed for the distribution of the Scores on Awareness of Responsible Consumption among Secondary School Students is presented in Table 2.

Table 2

Variable, Number (N), Mean (M), Standard Deviation (SD), Maximum Score, and Minimum Score of Awareness of Responsible Consumption among Secondary School Students

Variable	Number	Mean	Standard Deviation	Maximum Score	Minimum Score
Awareness of Responsible Consumption	420	31.08	4.71	39	10

From Table 2, the investigator observes that the Mean and Standard Deviation of the Scores on Awareness of Responsible Consumption are 31.08 and 4.71 respectively. Maximum and the Minimum scores obtained are 39 and 10 respectively.

From the above Table, the investigator interpreted and concluded that out of 40 scores, the Maximum score obtained by the students is 39 and the Minimum score is 10.

### Classification of the Total Sample based on Awareness of Responsible Consumption

The investigator classified the whole sample by using the scores obtained on the tool 'Questionnaire on Awareness of Responsible Consumption' among

Secondary School Students. The investigator classified the whole sample into three categories. The classification is as follows,

Above  $M + 1\sigma$  denotes Awareness of Responsible Consumption is High

Between  $M \pm 1\sigma$  denotes Awareness of Responsible Consumption is Average

Below  $M - 1\sigma$  denotes Awareness of Responsible Consumption is Low

Where  $M$  is the Mean and  $\sigma$  is the Standard Deviation of the Scores on Awareness of Responsible Consumption. Therefore,  $M + 1\sigma$  is 35.79, and  $M - 1\sigma$  is 26.37. The classification of the Total Sample based on the Scores on Awareness of Responsible Consumption is given in Table 3.

Table 3

Classification of the Total Sample based on Scores on Awareness of Responsible Consumption

Variable	Levels	Range	Number of Students	Percentage
Awareness of Responsible Consumption	High	Above 35.79	112	26.66
	Average	Between 35.79 and 26.37	239	56.90
	Low	Below 26.37	69	16.42
Total			420	100

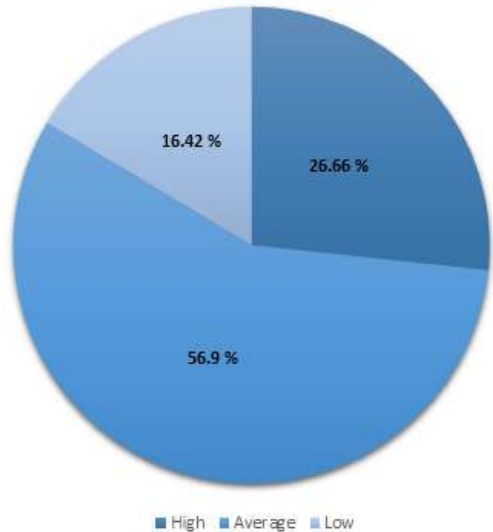
From Table 3, the investigator observes that the range above 35.79 is considered as Awareness of Responsible Consumption is High, the range between 35.79 and 26.37 is considered as Awareness of Responsible Consumption is Average and the range below 26.37 is considered as Awareness of Responsible Consumption is Low

From the above Table, the investigator interpreted that 112 Secondary School Students scored above 35.79. They constitute 26.66 per cent of the total sample and their Awareness of Responsible Consumption is High. 239 Secondary School Students scores between 35.79 and 26.37. They constitute 56.90 per cent of the total sample and their Awareness of Responsible Consumption is Average. 69 Secondary School Students scored below 26.37. They constitute 16.42 per cent of the total sample and their Awareness of Responsible Consumption is Low.

Therefore, from Table 3, the investigator concluded that the majority of Secondary School Students, 239 or 56.90 per cent of the total sample possessed Average Awareness of Responsible Consumption.

The investigator presents the Pie Diagram showing the percentage of Secondary School Students based on Scores on Awareness of Responsible Consumption in Figure 2.

Figure 2  
Pie Diagram showing the percentage of Secondary School Students based on Awareness of Responsible Consumption.



From Figure 2, the investigator observes that 26.66 per cent of the Secondary School Students scored above 35.79, and their Awareness of Responsible Consumption is High. 56.90 per cent of Secondary School Students lie between 35.79 and 26.37 and their Awareness of Responsible Consumption is Average. 16.42 per cent of Secondary School Students lie below 26.37, their Awareness of Responsible Consumption is Low.

Figure 2, reveals that the majority of the students in the total sample have Average Awareness of Responsible Consumption.

Thus, from the analysis of the first objective, the investigator concluded that 26.66 per cent of the total sample of Secondary School Students level of Awareness of Responsible Consumption is High, 56.90 per cent of the total sample of Secondary School Students the level of

Awareness of Responsible Consumption is Average and 16.42 percentage of the total sample of Secondary School Students the level of Awareness of Responsible Consumption is Low. It revealed that the majority of the Secondary School Students have Average Awareness of Responsible Consumption.

**Comparison of Awareness of Responsible Consumption among Secondary School Students with respect to Gender**

The investigator used Descriptive Statistics like Mean and standard Deviation and Inferential Statistics like a two-tailed *t*-test for the large independent sample. The description of the analysis is given in the following section.

Table 4

*Variable, Category, Subcategory, Number, Mean, Standard Deviation (SD), degrees of freedom (df), t- value and p-value of the Scores on Awareness of Responsible Consumption among Secondary School Students with respect to Gender*

Variable	Category	Sub category	Number	Mean	SD	df	t- value	p-value
Awareness of Responsible Consumption	Gender	Boy	209	30.51	5.08	418	2.47	0.014*
		Girl	211	31.64	4.26			

\* Note:  $p < 0.05$  significant at 0.05 level

From the Table value, the investigator interprets that the obtained *t*-value is 2.47, which is higher than the Table value of 1.96 at 0.05 levels of significance. The *p*-value is 0.014, which is less than 0.05 with degrees of freedom 418. Therefore, the investigator infers that there exists a significant difference in the Means of Scores on Awareness of Responsible Consumption among Secondary School Students with regard to Gender at 0.05 level of significance. Awareness of Responsible

To study the significant difference if any between the Means of Scores on Awareness of Responsible Consumption among Secondary School Students with respect to Gender, the investigator used a two-tailed *t*-test for a large independent sample. The value of the *t*-test was at 0.05 level of significance with degrees of freedom 418 (N= 420)

The investigator presents the Variable, Category, Subcategory, Number, Mean, Standard Deviation, degrees of freedom, *t*-value, and *p*-value of the Scores on Awareness of Responsible Consumption among Secondary School Students based on Gender in Table 4.

Consumption among Girls is higher than that of Boys.

**Comparison of Awareness of Responsible Consumption among Secondary School Students with respect to Locale**

The investigator used Descriptive Statistics like Mean and standard Deviation and Inferential Statistics like a two-tailed *t*-test for the large independent sample. The description of the analysis is given in the following section.

To study the significant difference if any between the Means of Scores on Awareness of Responsible Consumption among Secondary School Students with respect to Locale, the investigator used a two-tailed t-test for a large independent sample. The value of the t-test was at 0.05 level of significance with degrees of freedom 418 (N= 420)

freedom 418 (N= 420)

The investigator presents the Variable, Category, Sub Category, Number, Mean, Standard Deviation, degrees of freedom, *t*-value and *p*-value of the Scores on Awareness of Responsible Consumption among Secondary School Students based

Table 5

Variable, Category, Subcategory, Number, Mean, Standard Deviation (SD), degrees of freedom(df), *t*-value and *p*-value of the Scores on Awareness of Responsible Consumption among Secondary School Students with respect to Locale

Variable	Category	Sub category	Number	Mean	SD	df	<i>t</i> -value	<i>p</i> -value
Awareness of Responsible Consumption	Locale	Rural	210	31.54	4.58	418	1.99	0.047*
		Urban	210	30.62	4.81	418		

\* Note:  $p < 0.05$  significant at 0.05 level

From the Table value, the investigator interprets that the obtained *t*-value is 1.99, which is higher than the Table value of 1.96 at 0.05 levels of significance. The *p*-value is 0.047, which is less than 0.05 with degrees of freedom 418. Therefore, the investigator infers that there exists a significant difference in the Means of Scores on Awareness of Responsible Consumption among Secondary School Students with regard to Locale at 0.05 level of significance.

Awareness of Responsible Consumption among Secondary School Students studying in Rural areas is higher than that of Secondary School Students studying in Urban areas.

### Major Findings of the Study

- Majority of the Secondary School Students have Average Awareness of Responsible Consumption.
- There is a significant difference in the Means of Scores on Awareness of Responsible Consumption among Secondary School Students with respect to Gender. Awareness of Responsible Consumption among Girls is higher than that of Boys.
- There is a significant difference in the Means of Scores on Awareness of Responsible Consumption among Secondary School Students with respect to Locale. Awareness of Responsible Consumption among Secondary School Students studying in Rural areas is higher than that of Secondary School Students studying in Urban areas.



## Conclusion

The Awareness of Responsible Consumption needs to be inculcated in students. School can act as an important agent in this regard. The study is an earnest attempt of the investigator to study in detail the topic under consideration with all limitations. The findings of the study show that the majority of the Secondary School Students have Average Awareness of Responsible Consumption. Awareness of Responsible Consumption among Girls is higher than that of Boys. Awareness of Responsible Consumption among Secondary School Students studying in Rural areas is higher than that of Secondary School Students studying in Urban areas. Hence, Responsible Consumption Programmes can be widely implemented in Secondary Schools to promote Awareness of Responsible Consumption.

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## INFLUENCE OF GENDER AND LOCALE ON LIFE SKILLS AMONG SECONDARY SCHOOL STUDENTS

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Dr Pratheesh Abraham\*\*

### Abstract

*The present study aims to study the Life Skills among Secondary School Students using the Descriptive Survey Method. The sample consists of 405 Secondary Students selected from six Secondary Schools in Idukki District. The technique used for selecting the sample is Stratified Random Sampling giving due representation to Gender and Locale. The investigator used a scale- Life Skills Scale to measure Life Skills among Secondary School Students. For analysis, statistical techniques like Mean, Standard Deviation and Test of Significance of the Difference between Means (t-test) are used. The findings of the study reveal that there is no significant difference between the means of scores on Life Skills among the Secondary Students with regard to Gender, Life Skills of Boys and Girls are more or less the same. However, there is a significant difference between the means of scores on Life Skills among the Secondary Students with regard to Locale- Life Skills of students in Urban Schools is higher than that of Rural schools. Therefore, the investigator concludes that Gender has no influence and Locale influences the Life Skills of Secondary Students*

**Key Words:** Life Skills, Boys, Girls, Urban, Rural, Secondary School Students.

### Introduction

Education is an important human activity. John Dewey says 'Education is the process of living through a continuous reconstruction of experiences. It is a form of learning in which the knowledge, skills and habits of a group of people are transferred from one generation to the

next through teaching, training or research. It is the development and fulfilment of one's possibilities. An educated person can differentiate between right and wrong or good and evil. The widest road leading to the solution of all our problems is education. Education is not only aimed at

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studying and getting good marks. It is the creation of a sound mind in a sound body. Skill development and vocational education have added a new feather to the modern system of education. While difficulties executing certain skills during placement can be mostly ascribed to poor design, what students experienced during placement—or what they believed was significant to their learning—generally corresponds with best practice guidelines for Work Integrated Learning (WIL) programmes. (Jackson, 2015) 2015 There is something to learn for everyone. Education is the most important means for the development of various skills among individuals.

Life skills are those that people acquire in one setting, like sports or education, and then apply to other settings, such as the workplace, the community, or the home (Williams et al. 2020). Life skills are defined as the adaptive and positive behaviours necessary to navigate the demands and challenges of everyday life (Duff et al., 2020).

### **Significance of the Study**

Life Skills is the ability of students to monitor and control their behaviours. It is one of the most important and useful skills everyone should possess. This skill is essential in every area of life. Though most people understand its importance, very few do something to strengthen it. People have started acknowledging the importance of Life Skills to lead a successful life. Life Skills play a very important role in personal and professional life. to incorporate life skills into the curriculum to impact students' professional and interpersonal abilities, including problem-solving, teamwork, communication, leadership, and time management. (Nair, P. K., & Fahimirad, M.

(2019). Everyone must learn and upgrade themselves with Life Skills. Life Skills should be practised and improved regularly. School can play an important role in developing Life Skills among students. It is important to study the extent of Life Skills among secondary-level students. Also, the difference in the Life Skills based on Gender and Locale requires special attention.

### **Objectives of the Study.**

The following are the objectives for the present study.

1. To compare the Life Skills among Boys and Girls of Secondary Schools.
2. To compare the Life Skills among students in Urban and Rural Secondary Schools.

### **Methodology of the Study**

The investigator used the Descriptive Survey Method to study the Life Skills among Secondary Students. The sample consists of 405 Secondary School Students selected from six Secondary Schools in the Idukki District, using the Stratified Random Sampling Technique giving due representation to Gender, and Locale. The investigator used a scale- Life Skills Scale to measure Life Skills among Secondary School Students. For analysis, statistical techniques like Mean, Standard Deviation and Test of Significance of the Difference between Means (t-test) are used.

### **Life Skills of Secondary School Students about Gender**

The first objective of the study is to compare the Life Skills among Boys and Girls in Secondary Schools. The investigator observes that the means of scores on Life Skills among Boys is 154.23 and for Girls is 156.86. For analyzing and interpreting data

the investigator used inferential statistics namely the Test of Significance for a large independent sample (two-tailed t-test). The *t*-value was set as 1.96 at a .05 level of significance with degrees of freedom

403. The investigator presents the data and results of the scores on Life Skills among the Boys and Girls in Secondary Schools in the following table.

Table 1

Variable, Number, Mean, Standard Deviation and T-value of the Life Skills among Boys and Girls in Secondary Schools

Variable	Category	N	Mean	SD	df	t-value	Remarks
Life Skills	Boys	169	154.23	16.771	403	1.62	Not Significant at .05 level
	Girls	236	156.86	15.656			

From the table, the investigator interprets that the obtained *t*-value is 1.62 which is less than the table value 1.96 at a .05 level of significance with degrees of freedom 403. It shows that means of the scores on Life Skills among Secondary Students with regard to Gender do not differ significantly. There is no significant difference between the means of scores on Life Skills among Boys and Girls in Secondary Schools. The life Skills of Boys and Girls are almost the same. Therefore, the investigator concludes that Gender has no significant influence on the Life Skills of Secondary School Students.

**Life Skills among Secondary School Students with regard to Locale**

The second objective of the study is to compare the Life Skills among Urban and Rural students in Secondary Schools. The mean score on Life Skills of Rural students is 153.46 and for Urban students is 158.14. For analyzing and interpreting data the investigator used inferential statistics namely the Test of Significance for a large independent sample (two-tailed t-test). The *t*-value was set as 1.96 at .05 level of significance with degrees of freedom 403. The investigator presents the data and results of the scores on Life Skills among the Urban and Rural Secondary Students in the following table.

Table 2

Number, Mean, Standard Deviation and T-value of the Life Skills among students in Urban and Rural Secondary Schools

Variable	Category	N	Mean	SD	df	t-value	Remarks
Life Skills	Urban	192	158.14	16.5636	403	2.91	Significant at .05 level
	Rural	213	153.46	15.62			

From the above table, the investigator interprets that the obtained t-value is 2.91, which is greater than the table value of 1.96 at .05 level of significance with degrees of freedom 403. It shows that means of scores on Life Skills among the Secondary Students with regard to Locale differ significantly. There is a significant difference in the means of scores on Life Skills among the Urban and Rural students in Secondary Schools. Life Skills of students in Urban Schools is higher than that of Rural schools. Therefore, the investigator concludes that Locale has a significant influence on the Life Skills of Secondary School Students

### Major Findings of the Study

The major findings of the present study are the following:

- There is no significant difference between the means of scores on Life Skills among Boys and Girls in Secondary Schools. The Life Skills of Boys and Girls are almost the same.
- There is a significant difference in the means of scores on Life Skills among the Urban and Rural students in Secondary Schools. Life Skills of students in Urban Schools is higher than that of Rural schools.

### Conclusion

Adolescent empowerment is thought to be achieved through the integration of Life Skill Education (LSE) into the school mental health programme through the use of resources provided by instructors and schools. (Srikala & Kishore Kumar, 2010) The present study attempts to analyse the Life Skills among Secondary School

Students. The findings of the study show that there is no significant difference between the means of scores on Life Skills among the Secondary Students with regard to Gender, Life Skills of Boys and Girls are more or less the same. However, there is a significant difference between the means of scores on Life Skills among the Secondary Students with regard to Locale. Life Skills of students in Urban Schools is higher than that of Rural schools. Therefore, the investigator concludes that Gender has no influence and Locale influences the Life Skills of Secondary Students.

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## SCIENTIFIC TEMPER AMONG SECONDARY SCHOOL SCIENCE TEACHERS

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### Abstract

*The current study aims to determine the awareness of secondary school science teachers to foster Scientific Temper in Secondary School Students. The study employed a thorough survey method with a random sampling technique. The sample includes 30 secondary school science teachers. The survey was created for science teachers to get their opinions on developing scientific viewpoints and fostering Scientific Temper in Secondary School Students. The data were evaluated using various statistical techniques, including mean, standard deviation and t-test. The findings reveal that 66% of Secondary School Science Teachers possess an average and high level of awareness of Scientific Temper and the study finds no significant difference between Male and Female and Urban and Rural Secondary School Science Teachers in their Awareness of Scientific Temper.*

**Keywords:** *Scientific Temper, Secondary School Science Teachers, Secondary School Students*

### Introduction

“It shall be the duty of every citizen of India to develop the scientific temper, humanism and the spirit of inquiry and reform”. Article 51A (h).

In 1976, India became the first country to include in its Constitution, Scientific Temper with humanism as a fundamental duty of all citizens of the country (Article 51-A (h)). The term Scientific Temper reached among common people after the release of the book ‘The Discovery

of India’ by India’s first Prime Minister Pandit Jawaharlal Nehru in 1946. Nehru defined Scientific Temper as a way of life, a process of thinking, a method of acting and associating with fellow men and he made every effort to convince the importance of inculcating rational thinking among the common people of India.

Nowadays, science is permeating every part of going of human life, and society is becoming increasingly dependent

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on it in every aspect. Scientific literacy is essential for the well-being of society, as it promotes logical thinking and helps avoid biases. Therefore, a Scientific Temper can be defined as an open and inquisitive mind that is directed towards scientific problem-solving methods.

Krishnan and Bhuvaneshwari (1990) define scientific temper as one's reactions in his or her life situations, as the practice of seeing cause and effect relationship, appreciation of the utility of science in daily life functions, adventurousness, experimental bent, intellectual honesty, objectivity, open-mindedness, challenging, blind faith and receptivity to change.

'A Statement on Scientific Temper' prepared by a group of scholars and issued on behalf of the Nehru Centre, Bombay, in July 1981, mentions that Scientific Temper involves the acceptance, amongst others, and made certain premises:

- The wide area of science provides a viable method of acquiring knowledge;
- The human problems can be understood and solved in terms of knowledge gained through the application of science;
- The fullest use of the method of science in everyday life and every aspect of human endeavour from ethics to politics and economics is essential for ensuring human survival and progress; and
- That one should accept knowledge gained through the application of the method of science as the closest approximation of truth at that time and question what is incompatible with such knowledge; and that one should from time to time re-examine the basic foundations of contemporary knowledge.

Teaching is constrained by the preparedness of the learner, and by the nature and value of what is being learnt. Teaching exemplifies content as well as character. In education, the content of science cannot be severed from its character and conduct. Science education concerns as much with the nature, character, and conduct of science, as with its content (Scheffler 1976)

### **Need and Significance of the Study**

Scientific temper is an essential attribute of modern societies. Scientific temper can help in the development of a society and lead to innovations to tackle complex issues and challenges. NEP-2020 also aims to nurture human beings capable of scientific temper, rational thinking, and creative imagination. It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution.

Scientific temper allows students to understand the concepts of what they are learning and logically apply those concepts in a real-world scenario. Educators also have a huge role when it comes to developing the student's scientific temper and some techniques that they can follow to help the students with developing their scientific temper.

Scientific temper is vital as it allows civil society's participation and helps develop a democratic state in a country that leads to the promotion, and welfare and pulls people out of the pool of visually impaired confidence, strange notions, and superstitions and can lift the standards of living of citizens.



Learning science is distinct from rote learning. If the student remembers science as a body of constant, universal, necessary, diverse but law-bound facts of nature, then such memory is at best a poor partial representation of what science is. The teacher of scientific temper has an eye on qualities of character, like honesty and consistency and has to reflect on the contributions of science education to the development of such qualities among students (Bardapurkar, 2020).

Students are encouraged to adopt the impression of their teacher and her or his outlook. The criteria of a science teacher include idealistic and full of passion for pupils with a developed scientific viewpoint. A good teacher can only facilitate the gradual development of a scientific mindset and he or she has an active desire to foster habits and actions in their children. To better understand this, the researcher is interested in exploring Scientific Temper among Secondary School Science Teachers.

Science education plays a crucial role in the holistic cultural and societal advancement of humanity, contributing to the evolution of a civilized society. The essence of the scientific spirit is to think globally and act locally, as scientific knowledge is universal while the fruit of science has some site specificity. Nurturing a scientific temper in our youth should be an intrinsic quality fostered through regular cultivation, as relying solely on curriculum-based efforts may not always suffice. Educators, who possess exceptional intellect, should devise methods to instil scientific temper in young learners. By doing so, they will make significant contributions to the technological progress of our nation. Hence, there is a justified need to prioritize research in science education that specifically addresses the

urgent development of scientific temper in students. (Maqbool, 2014)

The researcher intends to determine the awareness of secondary school science teachers on Scientific Temper.

### **Objectives of the study**

1. To determine the level of Awareness of the Scientific Temper of Secondary School Science Teachers.
2. To determine whether there is any significant difference between Male and Female Secondary School Science Teachers in their Awareness of Scientific Temper.
3. To determine whether there is any significant difference between Urban and Rural Secondary School Science Teachers in their Awareness of Scientific Temper.

### **Hypotheses of the study**

1. There is a significant difference between Male and Female Secondary School Science Teachers in their Awareness of Scientific Temper.
2. There is a significant difference between Urban and Rural Secondary School Science Teachers in their Awareness of Scientific Temper.

### **Methodology**

The purpose of the survey was to determine whether Secondary School Science Teachers are aware of Scientific Temper so that they can foster the same among secondary school students. The researcher conducted a thorough study using the survey approach. A descriptive survey method was employed for the study. This method was concerned with surveying the awareness of secondary school science teachers on Scientific Temper about selected

variables such as gender and locality of the institution.

**1. Sample**

The sample of the study consisted of 30 Secondary School Science Teachers of Kottayam districts of Kerala. A random sampling technique was adopted to select the sample from the population.

**2. Tool Used**

The scientific Temper Awareness Scale of Secondary School Science Teachers were developed for collecting data. For scoring purposes, a five-point (Likert, 1932) scale with five responses i.e., Strongly Agree,

Agree, Undecided, Disagree, and Strongly Disagree. Scoring was done by awarding 5,4,3,2 and 1 marks to the responses for favourable statements and the scores were reversed for unfavourable statements.

**3. Statistical Techniques Used**

Descriptive statistics and *t-tests* were used for the analysis

**Results and discussion**

The data were consolidated and applied for statistical treatment. The result of descriptive statistics of the Awareness of the Scientific Temper of Secondary School Science Teachers of the total sample is given in Table 1.

*Table 1*

*Awareness of Scientific Temper of Secondary School Science Teachers for Total Sample*

Category of sample	Subsample	Mean	Standard Deviation (SD)
Gender	Male	52.44	3.80
	Female	52.28	4.47
Locality of Institution	Urban	52.66	4.20
	Rural	52	4.33

Table 1 shows the Awareness of the Scientific Temper of Secondary School Science Teachers of the total sample. The mean score of Awareness on Scientific Temper of Secondary School Male Science Teachers is 52.44 with SD 3.80 and for Female teachers is 52.28 with SD 4.47. The mean score of Awareness of Scientific Temper of Secondary School Science

Teachers in Urban Institutions is 52.66 with SD 4.20 and for Science Teachers from Rural Institutions, the mean score is 52 with SD 4.33.

The Level of Awareness of the Scientific Temper of Secondary School Science Teachers for the total sample is presented in Table 2.

*Table 2*

*Level of Awareness on Scientific Temper of Secondary School Science Teachers*

No of Teachers	Level of awareness	Sample	
		Number	Level in %
1	High	5	16.66
2	Average	15	50
3	Low	10	33.33

Table 2 shows the level of Awareness of Scientific Temper of Secondary School Science Teachers for the total sample; it is clear that 16.66% of teachers show a high level of Awareness of Scientific Temper, 50% show an average level of Awareness, and 33.33% show low level of Awareness. From the result, it can be inferred that more than 66% of Secondary School Science Teachers possess average and high levels of Awareness of Scientific Temper.

*Table 3*

*The difference in the level of Awareness of Scientific Temper based on the Gender of Secondary School Science Teachers.*

Gender	Number	Mean	SD	t	Level of significance
Female	21	52.28	4.47	0.10	p>.05
Male	9	52.44	3.80		

The mean score of Awareness for Secondary School Female Science Teachers is 52.28 with SD 4.47 and for Male Teachers is 52.44 with SD 3.80. The *t*-value came out to be 0.10 which is not significant at 0.05 level of significance(1.96). It implies that there exists no significant difference in the Awareness of Male and Female Secondary School Science Teachers towards Scientific Temper.

*Table 4*

*The difference in the Level of Awareness of Scientific Temper based on the Locality of the Institution*

Locality of the institution	Number	Mean	Standard deviation	t	Level of significance
Rural	15	52	4.33	0.42	p>.05
Urban	15	52.66	4.20		

The mean score of Awareness of Secondary School Science Teachers from Rural Institutions is 52 with SD 4.33 and

Awareness of the Scientific Temper of Secondary School Science Teachers based on Gender is presented in Table 3.

The significance of mean scores for Awareness of Scientific Temper of Secondary School Science Teachers based on Gender was calculated by the *t*-value. The data and the result are given in Table 3.

Awareness of the Scientific Temper of Secondary School Science Teachers based on the Locality of the Institution is given in Table 4.

The significance of mean scores for Awareness on Scientific Temper of Secondary School Science Teachers based on the Locality of the Institution were calculated by the *t* value. The data and the results are presented in Table 4.

for Urban Institutions is 52.66 with SD 4.20. The *t*-value came out to be 0.42 which is not significant at a 0.05 level of

significance(1.96). It implies that there exists no significant difference in Awareness of Rural and Urban Secondary School Science Teachers on Scientific Temper.

### Summary And Findings

1. 66% of Secondary School Science Teachers possess an average and high level of awareness of Scientific Temper.
2. There is no significant difference between Male and Female Secondary School Science Teachers in their Awareness of Scientific Temper.
3. There is no significant difference between Urban and Rural Secondary School Science teachers in their Awareness of Scientific Temper.

### Suggestions Based on the Study

1. An awareness programme should be conducted for the teachers on different dimensions of scientific strategies.
2. Innovative teaching strategies should be incorporated to develop scientific knowledge and scientific literacy
3. The curriculum may be modified in such a way that teachers can improve all the dimensions of the scientific domain.
4. Discussion, debate, workshops and seminars be conducted to develop the scientific temper.

### Conclusion

The study reveals that 66% of the Secondary School Science Teachers possess average and high levels of awareness of Scientific Temper. There is no significant difference between male and female secondary school science teachers in their awareness of Scientific Temper. And it also shows there is no significant difference between urban and rural secondary school science teachers in their awareness of Scientific Temper.

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## JURISPRUDENTIAL EXPOSITION ON RIGHT TO EDUCATION OF MINORITY IN INDIA

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### Abstract

*Education is one of the tools for social change and it opens an individual new opportunity in social and personal life. The skill and knowledge acquired through education empowers him to face various challenges in societies and it helps him to overcome marginalization and exclusion. Moreover, the realization of rights qualifies the demand for inclusive growth, and it helps the marginalized minority to guarantee a fair allocation of resources, equal access, and tolerance in diversities. The educated group can participate in dialogue to inculcate their demands in various instrumentalities of state, which is founded on a majoritarian structural framework. It promotes collaboration, contribution, and distribution of diverse interests in multifaceted society. As a result, they can integrate religious and cultural diversity into the majority ethnicity. However, this dream comes true only when the state assures access to education for minorities. It may be in the form of special protection for guarding their linguistic, cultural, or religious assortments along with the prevailing general support system. This paper analyses how far Indian Constitution devises right to education of minorities and its viability in a secular, democratic polity.*

**Keywords:** Instrumentalities, Ethnicity, Linguistic, Liberty.

### Introduction

As with all persons in positions of authority, the majority's tendency is to give the minority as little rights and responsibilities as possible. This view is supported by the history of democracy in every age and in all civilizations. The justifications put forth to defend the majority's attitude are the factors of nation's progress and interest. As a result, historians and proponents of liberty have claimed

that the tyranny of the majority is the only enduring evil of democracy, and that the safety of minority serves as a barometer of liberty in all civilized nations.

The great tensions in the present-day world due to ethnicity, religion and linguistic identities lead to conflict among nations and groups of people within the nations. Numerical religious majority in

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one state concocts tension with numerical minorities in other states which may adversely affect the peace of nation as well as the empowerment of minority group. Hence, in a democracy, protecting minorities' basic rights and freedom is crucial both at the national and global prospects. Furthermore, terrorists from all over the world exploited these problems to further their own agendas, focusing on the defenseless and impoverished members of minority groups. The exploration of solution to this problem is of complex nature because it affects almost all spheres of society such as economic, political, and social etc. As a result, concerns for minorities around the world brought up important challenges in the human rights regime, and following World War II, minority rights were taken into prime consideration within the context of human rights jurisprudence.

In addition to their freedom to exercise personal liberties including the right to equality and nondiscrimination, and other freedoms, the group rights of minorities should be upheld. i.e. freedom to follow and conserve language, religion, and cultural specifics of the minority. The members of minority community have the basic right to communicate, maintain, and grow their identity based on religion, culture, language, or ethnicity. Without interference from the majority's assimilation, they ought to be allowed to preserve and grow their culture in all its forms. In preserving and developing the culture and traditions of the minorities, it is inevitable to save their education rights.

The realization of this right in its true spirit is possible only when they get opportunities to impart their diversities to future generations. This is not possible through the general or public education system which the nations offer. Therefore, a separate

education scheme is required, and it must be operated through separate institutions. The responsibility to run such institutions can be taken by the community. Accordingly, in human rights jurisprudence, minorities are allowed to create and preserve educational and cultural institutions. But this right may conflict with loyalty to the state, various legal responsibilities, and commitment to civic duties etc. Obviously, minority rights should be exercised in such a way as not to impair the rights and legitimate interests of other groups and the integrity of nation.

Law has taken three –prong approaches to address questions relating to minority education. They are:

1. International Protection
2. Regional Arrangements
3. National Safeguards

### **International Protection**

Despite the fact that, the United Nations Declaration which recognized the standard of human rights does not specifically mention minority protection. However, it is the first international document which declares and urges the international community to embrace education as a human right. Article 26 of the Declaration (UDHR, 1948) casts duties on member nations to undertake indispensable steps to guarantee primary education at the fundamental stages. It also acknowledges the necessity of providing professional and technical education in general. The international community confirmed a Covenant for foiling various interests grounded on culture, social, or economic aspects of public, and Article 13 of this treaty (ICESCR, 1966) honors parents' right to select schools for their children. Choosing schools other than those set up by the state is included as part of this



right and really it stretched out a guarantee that students can avail or receive moral and religious education that is consistent with their personal beliefs. Furthermore, states have an obligation to take measures to promote teaching of historical literacy, customs, dialect, and way of life of the minority groups residing on their land. Therefore, those who are identified as minorities get adequate opportunity to gain knowledge of their populace as well as other groups in society.

If the nations which ratified the Covenant are not committed to acknowledge the freedom of parents and, if appropriate, legal guardians, they are unable to select the school for their kids other than those established by the public authorities. It violates the human rights of minorities because the standard of education the state follows intends to provide general education alone. It necessitates the Govt to confer responsibility on those who are ready to undertake the same on its behalf. The responsibilities may be shaped as the right of the minority to impart religious, moral, ethnic, and linguistic education in accordance with their personal beliefs.

The UN protected minorities' rights over a Declaration, and it confines its protection to minorities having separate linguistic, cultural, religious, ethnic, and national identity, and it provides that states ought to support the circumstances necessary for promoting their identities. The safeguards projected by the international community (UN DRPNERLM, 1992) emphasized that a broad spectrum of values should be the focus of education. The basic values of right prescribed in this document propose to overcome the boundaries of religion, nation,

and culture. The first treaty to be adopted about education in general was a Convention that UNESCO adopted in 1960 to eliminate prejudices in education. This Convention prompts the nations to give first priority to national minorities' rights as those groups are the most vulnerable sections. The UN established a forum to provide a platform for promoting dialogue and co-operation on issues of minorities and directed the UN High Commissioner for Human Rights to support in its effort. The Human Right Committee, which is the implementing body constituted under an International Convention for safeguarding the political and civil rights of individuals, called the states to submit the reply on their disrespect towards minorities from safeguarding their identity through the establishment of educational institutions. The Convention on Rights of Child was organized to protect the overall development of children and Article 30 of this agreement protects child's right to culture, religion, and language.

All these documents in the international law are effective in its true sense, only when education is embraced by the Govt. through availability, accessibility, acceptability, adaptability, and inclusivity. The countries could endow them by giving aid or recognition to these establishments. The members of the minority can run and operate these institutions without compromising their identity.

### **Regional Arrangements in Europe**

Initiatives were taken at regional level to protect the interests of national minorities in Europe and the Convention adopted urged the member states of European Union to respect the minorities'



right to set up private institutions for education. Moreover, a Conference was convened for the Co-operation and Security of members of Europe (CSCE, 1973) in which they acknowledged the Copenhagen document. This document also endorsed the minorities' right to institute establishments of their own for education. It also appointed a separate High-Commissioner to solve the problems of minorities including equal educational opportunities and access to the educational facilities which are essential for shielding their identity. Moreover, various countries have an obligation to identify the status of minorities in their territory and to incorporate their culture and traditions as part of general education. They are obligated to bring the minority within the domain of compulsory education system. Equal opportunities in general education shouldn't be denied to them. The treaties at different regions for guarding minorities' rights are more effective than the international documents which support functioning of educational institutions and right to education.

### **National Protection**

The Constitution of India stipulates that the state is required to undertake the responsibility to afford free and obligatory education to children under Article 45. This protection can be extended till the age of 14. But in Mohini Jain case, the highest court in India elevated the prestige of free education to fundamental right. It observed that the entitlement to all levels of education is a derivative right of Article 21. A dignified life can't be accomplished without ensuring free education across all levels. But the highest judiciary (*Unnikrishnan case, 1993*)

restricted the application of the inalienable right to free instruction to those under the age of 14. Thereafter, the state took this responsibility on its shoulders in 2002 and added Article 21 A to the Constitution's Third Part to ensure education as a fundamental right. Therefore, minority children between the ages of 6 and 14 can avail free education without facing any discrimination. Article 51 A (k) states that parents or guardians of kids in the same age group, especially parents from minority communities, have an obligation to give their kids access to education. Even though the Constitution of India, which is the source of every law within the region, does not define minority, it recognized only the minority's grounded on languages and religions and Art. 30 ensures their privilege to create and preserve educational establishments. They possess the ability to exercise choice to set up their own institutions for exercising this right. Moreover, as per Article 29 (2), the state is obliged to admit students of linguistic and religious minority in Govt. institutions without discrimination. Art. 30(2) creates an obligation on Govt. to handle all educational institutions equally when offering assistance and therefore, minority status is not an excuse for rejection of Govt. aid.

### **Minority in India -Definition**

The definition of minority is essential to be analyzed to identify the group which can claim constitutional right to education. The term "minority" designates a group of people who are smaller than the majority in each location; it does not, however, specify which characteristics should be used as a litmus test to separate one group

from another. i.e., a group that is smaller in number with traits that are shared by everyone in the community. It is difficult to find out specific common characteristics among the smaller group. It might be the outcome of successive civilizations integrating over some period of time. Truly, the group constituting a minority acquires the feeling of belonging to one common unit. They possess an understanding of unity or community with those belonging to the majority. Minority may also be defined as those who perceive themselves as distinct from the vast majority of people living in a specific political unit and are bound together by bonds of similar ancestry, language, or religious faith. There are also thinkers who define minority in terms of the minority's relationship with the dominant group. Therefore, understanding about origin and connection between the majority and dominant group is considerably more important than knowledge about the characteristics that define a person as belonging to either group. A minority comprises a subset of people, who although being a part of the same group, are distinguished from one another by factors such as ethnicity, language, citizenship, faith, etc. They also perceive others as belonging to a distinctive class that has negative connotations and view themselves as such.

Although it did not define the term minority, the Report submitted by Motilal Nehru in 1928 demonstrated a strong desire to grant security to minorities. The Report of Sapru tabled in 1945 suggested to designate Commissions of Minorities at centre and provincial level. However, they failed to identify minority communities. The Sub-

Commission constituted by U.N. to protect minorities demarcated and clarified what is meant by "minority" and according to its definition, any undocumented group is considered as a minority group. The community having linguistic, cultural, religious, traditions and distinguishing features from the general population, can also seek to keep these items intact. These minority groups should be committed to the nation wherein they are citizens and appropriately comprise the quantity of people who are adequate on their own to maintain such customs or features. In India minority comprises a group that feels distinct from the bulk of society's members and is bound together by a common language or religious belief.

The initial attempt in court to address this question was contrived in 1957 (*Re: Education, 1956*) and in this case the highest Court suggested the Govt. to adopt the methods of mathematical indices. S.R. Das, the Chief Justice of SC adhered that a minority represents a "community, which is numerically less than 50 percent" of the entire populace. The statistical criterion embraced was upheld by the highest Court in Kerala in 1965 (*Aldo Maria case, 1965*). Furthermore, the Court (*Balwinder Kumar case, 1976*) unequivocally observed that minority should be a minority community in proportion to India's total population. This definition refers to a collection of people who are especially fewer in number than the majority of inhabitants in a country. However, it does not indicate as to what are factors of distinction, subjective or objective, to differentiate a group from the rest. Therefore, when evaluating a "minority," which is a numerically more

compact group, some weight ought to be provided to traits that the minority's constituents share and these qualities work as objective determinants of differentiation. In this sense, the phrase can refer to segments of a state's population that are different from the bulk of the population regarding race, religion, or language.

Convinced by this principle the court in 1992 (*St. Stephen' College case, 1992*) opined that the minority necessarily means those who form a distinct or identifiable group of citizens in India. In 2003 (*TMA Pai case, 2003*) an 11- judge bench of Highest Court overturned its previous ruling and observed that for deciding the status of minorities grounded on language and religion, the state will serve as the unit, not India as a whole. Section 2(f) of the National Commission for Minority Education Institution Act, 2004 defines minority as a community that the Central Government has notified. But the Court (*Bal Patel case, 2005*) held that the Government at Centre needs to use its authority to determine minority groups and the Govt. is not bound to proceed merely on the recommendation of the commission. The Govt. should consider the social, cultural, and religious conditions of the people in the State.

### **What is Minority Educational Institution?**

The status of 'minority educational institution' is required for claiming constitutional protection of imparting religious and linguistic education. It is a constitutionally protected right to ensure identity founded on spiritual and linguistic grounds. The Courts (*Azeez Basha case, 1968*) held the opinion that use of

foreign-obtained funds cannot be exhausted as a justification for denying minority status if the founder and manager of the school ought to be someone from an Indian minority population. The place of birth of the person who provides funds for the operation of the establishment is unimportant in claiming special status in education (*S.K. Patro, 1970*). The court (*Mother Provin. case, 1970*) approved the minority standing of a learning establishment though the founder of the organization contributes funds for the advantage of community at large. Minorities shouldn't be the only ones receiving education. The children from other groups may be the beneficiary of the institution but that may not be a sound reason for denying minority status. In essence, the institution established by a person from a minority community can claim minority status if the primary concern of establishment is the minority community's advantage. The 'Minority Educational Institution' means a college or school founded or retained by a person or a collection of individuals from the minority. In *T. M.A Pai case (2003)*, the Court laid down that the State Government can provide the organization with minority status only after taking into account of the minorities' socio- economic backwardness in the territory. Thereafter, a law was enacted to settle the minorities educational institutes' standing. Section 2(f) of the law enacted by the legislature (CEIRA Act, 2006) defines minority education institution as an institution created and run by minorities that has been officially recognized as such either by the Parliament or the Central Government. Such an organization needs to be declared as having a minority identity under the Act of 2004 (NCMEI Act, 2004).

## Administration of Educational Institutions

*TMA Pai* Case introduced sea change in the existing system of regulation of unaided educational institutions and was acknowledged as operational resolution in securing standard and quality of education. The Court (*P.A. Inamdar case, 2005*) observed that aided educational establishments founded by minority are entitled to have the authority to admit pupils from the minority group and are also bound to admit reasonable number of students from other group without discarding the principle of merit. The different stakeholders namely the Union of India, State Governments and different educational institutions started interpreting this decision in their own interests. In *Inamdar* Case the court reiterated that Govt. has no power to regulate unaided institutions founded for instruction and moreover they have the power to grant admission to students without any interference of state or university. However, the admission needs to be done in a transparent way, and merit should be sufficiently addressed. The court (*Islamic Academy case, 2002*) discussed the national interests of minority operating educational institutions and directed the Govt. to provide them complete autonomy in administration. They can follow a fee structure and admission of their own, and therefore they can provide better facilities in professional education. In *St. Stephen's case (1992)*, the Court acknowledged the right of a minority-aided institution to conduct a reasonable admission process of its own, including granting Christian students a mark relaxation in defiance of the university's admission circular,

because it falls under the purview of their administrative authority. The court has discussed the positive role of these establishments in the educational scenario and directed the state to grant them freedom to adopt their own measures to raise funds. In *Re: Education Bill*, it was held that admitting a child from a group other than minority category in a minority founded establishment does not by itself change the institution a non-minority standing. It was opined by the court (*St. Xaviers College, 1974*) that the right to admission to an institution for instruction is a right to all irrespective of minority or majority. Hence a school run by a minority and aided by state funds cannot refuse admission to children from other communities. Whereas even in cases where the minority institution is aided by the state the minority community may reserve up to 50 percent of the seats for the members of its own community.

## Scope and Ambit of Right to Exercise Choice in Operating Educational Institutions

Art.30 (1) of the Constitution of India gives all religious or linguistic minorities the right to launch and manage institutions of their own choice. If Art. 29 and 30 are read together, the state cannot restrict the rights of minorities to set up educational institutions only to preserve or convey linguistic, religious, or moral values. The terminology used in Article 29 (1) is 'section of the citizens having distinct culture, language or script' which very well includes the majority also, whereas Article 30(1) grants rights only to minorities. Article 29(1) deals with protection of language, script, or culture, whereas article 30(1) is

regarding minorities based on religion or language. Moreover, Article 29(1) deals with the right to conserve language, script, or culture, whereas article 30(1) relates to setting up of educational establishments. The conservation of script, language or culture under article 29(1) might be totally unassociated with educational institutions, and in the same way creation and supervision of educational establishments by a minority under article 30(1) may not be associated with any objective to conserve language, script or culture. A minority might run an institution for religious education, which is wholly unconnected with conserving language, script, or culture. In essence, article 29(1) and article 30(1) may overlap in some cases but the former can in no way restrict the scope of the latter. It is pertinent to note that the right to establish and administer educational institutions under Article 30 is guaranteed only to members of linguistic or religious minority and no other section of citizens. Here a linguistic minority irrespective of their religion has the right to set up educational institutions and therefore secular education cannot be excluded from the purview of Article 30. Also, it is not right to say that religious minorities should establish educational institutions for teaching of their own moral values to the community. The provision permits them to exercise choice in establishing such institutions which will serve both the resolutions, namely, the object of conserving their religion, language, or culture, and for the object of giving general secular education to their children. Minorities are, however, not confined to establishing educational institutions exclusively for their benefit.

In *Re: Kerala Education Bill case (1958)*, Education Bill of Kerala, sponsored by the Communist Government of the state was vehemently opposed by Christian and Muslim minorities. The Chief Justice S.R. Das observed that the minority has the right to a comprehensive, high-quality general education. It is not mandatory that an institution run by a religious minority should impart religious education alone or that an institution managed by a minority based on language should teach language alone. Institutions offering secular general education are similarly safeguarded.

From *St. Stephens college case*, courts in India started to interpret the minority's right to govern educational institutions favorably and extended their right for running professional colleges also. However, *TMA Pai case* the court went a long way by denying the government's control on unaided educational institutions and allowed them to admit students from the entrance test held by themselves. In *Inamdar case* the court placed a sword on the government's initiative of imposing reservation policy in such institutions and established that majority's right to set up and manage educational institution is enshrined in Art.19(g), but that of minority is in Art.30 and therefore, minority can claim special protection. But the government introduced 93rd Amendment in the Constitution in 2005 and reinstated the reservation policy in Art. 15(5) but reservation is confined only in majority educational establishments, aided or not.

### **Critical Evaluation**

The Bill offered by Kerala Legislature in 1957 to improve the quality of education,



authorized the state to assume control or management of minority schools in the event of specified failings, in effect, annihilated the entitlement of minorities to oversee establishments founded for teaching. The right of minorities to build and run educational institutions is mentioned in article 30(1), but it does not intend the same to be denied to the majority community. It is not correct to say that minorities should be considered backward and needed concessions through Art. 30(1). The goal is to ensure that they will not be discriminated against. The state should follow Articles 14 and 15 for providing similar treatment in the matter of recognition, affiliation and government aid or non-displacement of management in respect of educational institutions established by majority as accorded to minority institutions. Of course, conditions can be imposed for aid, affiliation, and recognition in order to ensure a standard of teaching. The same needs to be equally burdensome and not so severe as to require the community, the institution's founder, or the management to give up their right to preserve language and religious education.

## **Conclusion**

The right to education of minority community is protected through various international, national, and regional arrangements. The knowledge and skill acquired through education is important for the minority to ensure their presence in the social and political scenario. They need additional protection for conserving their identity in religion, language, ethnicity, and nationality. The Constitution approved the rights of some sections of citizens

having distinct culture, language, and script to preserve the same by all means. The Constitution identified religion and language as grounds for identifying minorities and conferred on them the right to establish educational institutions. This includes the right to run, operate and convey linguistic, religious, general, and professional education. An institution established by any person or group of persons belonging to a minority community can claim minority status. Moreover, the objective of setting the institution is a crucial test to get the status of minority education institution. The courts have taken a very stern stand in approving the minorities' absolute right in the management and administration of schools and colleges. Similarly, the Constitution includes provisions to avoid discrimination against minority education institutions in providing aid, recognition, and approval. Moreover, children cannot be deprived of their right to education by the state on grounds of religion or language.

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## EMPOWERING ADHD LEARNERS: A COMPREHENSIVE BLEND OF STRATEGIES FOR SUCCESS

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### Abstract

*This study employs a content analysis to explore the nature, characteristics, causes and identification of Attention Deficit Hyperactivity Disorder (ADHD), and various aspects of a blended learning approach for students with ADHD. A comprehensive examination of existing literature provides insight into genetic predisposition, neurological imbalances, and environmental influences as key contributors to ADHD. The study also focuses on the potential benefits of blended learning for students with ADHD. Blended learning is characterized by a combination of traditional classroom methods and online components, to address the diverse learning needs of students with ADHD. Strategies such as Individualized pacing, Multimodal content delivery Flexible learning environments etc. are effective in engaging students, accommodating different learning styles, and promoting academic success. The information may help educators, policymakers, and researchers, foster a deeper understanding of effective strategies to support the academic success and the overall well-being of individuals with ADHD in educational settings.*

**Key words:** *Attention Deficit Hyperactivity Disorder, Blended learning, Individualized pacing, Multimodal content delivery, Flexible learning environments.*

### Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by persistent patterns of inattention, impulsivity, and hyperactivity that can impact daily functioning and quality of life. ADHD is frequently

diagnosed in childhood and can persist into adulthood, affecting various aspects of an individual's academic, occupational, and social functioning. Not all children exhibit identical ADHD symptoms; some may be hyperactive, while others might

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struggle with attention or impulsivity, and variations exist in the combination of these challenges. This inattention results in daydreaming, distractibility, and challenges sustaining focus on a task. Academic underachievement and behavioural problems are common in children with ADHD, leading to a risk of low self-esteem, troubled peer relationships, conflicts with parents, and an increased likelihood of delinquency, smoking, and substance abuse as they mature. Individuals with ADHD often struggle to maintain focus, are easily distracted, and may have difficulty in completing tasks. Hyperactivity involves excessive restlessness and impulsive behaviour, while impulsivity can lead to hasty decision-making. Blended learning approach effectively supports successful learning for students with ADHD. In this study, various aspects of blended learning tailored to accommodate the learning needs of ADHD students.

### **Causes of ADHD**

The exact causes of ADHD are not fully understood, but a combination of genetic, environmental, and neurological factors is believed to contribute. Genetic predisposition plays a role, as ADHD often runs in families. Neurologically, imbalances in neurotransmitters, particularly dopamine and norepinephrine, are associated with the disorder. Environmental factors, such as exposure to toxins during pregnancy, premature birth, and early childhood lead exposure, may also contribute. Additionally, factors like prenatal tobacco smoke, low birth weight, and certain prenatal complications have been linked to an increased risk of developing ADHD.

### **Identification of ADHD**

The identification process should be thorough and conducted by trained professionals. Early and accurate identification allows for timely intervention and support to address the unique needs of children with ADHD. Identifying ADHD in children involves a comprehensive approach that considers various factors. Key elements include:

- **Clinical Evaluation:** Healthcare professionals, such as paediatricians, psychologists, or psychiatrists, conduct clinical assessments. They gather information from parents, teachers, and the child to evaluate behaviour, attention span, impulsivity, and hyperactivity.
- **Diagnostic Criteria:** The diagnosis is often based on established criteria outlined in diagnostic manuals like the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) or ICD-10 (International Classification of Diseases, 10th Edition). These criteria help standardize the identification process.
- **Parent and Teacher Reports:** Obtaining detailed information from parents and teachers about the child's behaviour in different settings is crucial. ADHD symptoms may manifest differently at home, in school, or during other activities.
- **Observation:** Direct observation of the child's behaviour, both in structured and unstructured settings, provides valuable insights. This may be done by healthcare professionals, educators, or other qualified observers.

- **Rule Out Other Conditions:** It is essential to rule out other medical or psychological conditions that may mimic ADHD symptoms. This includes assessments for learning disabilities, anxiety, depression, or other behavioural disorders.
- **Developmental History:** Understanding the child's developmental history, including prenatal and early childhood factors, can contribute to a comprehensive assessment. Information about family history and environmental influences is also considered.
- **Behavioural Rating Scales:** Standardized rating scales, completed by parents and teachers, help quantify and evaluate the severity of ADHD symptoms. Examples include the ADHD Rating Scale or Conners' Rating Scales.
- **Neuropsychological Testing:** In some cases, neuropsychological testing may be conducted to assess cognitive functions, attention span, and executive functioning. This provides a more detailed understanding of the child's cognitive profile.
- **Collaboration:** Collaboration between healthcare professionals, educators, and parents is crucial for a holistic approach. Information-sharing and communication help ensure a comprehensive understanding of the child's behaviour across various settings.

## **Blended learning**

Blended learning should be implemented with sensitivity to the unique requirements of each student with ADHD. Regular communication between educators, parents, and students can help to maximize its effectiveness. Implementing effective blended learning strategies for students with ADHD involves a thoughtful combination of in-person and online components. Here are specific strategies to consider:

- **Multimodal Content Delivery:** Integrate various learning materials such as videos, interactive simulations, and hands-on activities to cater to different learning styles and sustain attention.
- **Personalized Learning Paths:** The educational journey based on individual needs and progress, allowing students with ADHD to proceed at their own pace and revisit concepts as needed.
- **Frequent Breaks:** Incorporate short breaks between learning segments to accommodate attention spans. This can help in preventing cognitive fatigue and maintaining focus during study sessions.
- **Interactive Platforms:** Utilize platforms that encourage active participation, discussions, and collaboration, fostering engagement and creating a more stimulating learning environment.
- **Visual Aids and Organizers:** Implement visual organizers, mind maps, and graphic aids to enhance understanding and assist with organization, aiding individuals with ADHD in structuring their thoughts.

- **Regular Feedback and Rewards:** Provide consistent feedback on performance and offer rewards for achievements to reinforce positive behaviour and motivate continued participation.
- **Flexible Scheduling:** Allow flexibility in study schedules, permitting students to choose optimal times for learning when their focus and attention are naturally heightened.
- **Mindfulness and Relaxation Techniques:** Integrate brief mindfulness or relaxation exercises into the learning routine to help manage stress and improve attention regulation.
- **Technology-Assisted Tools:** Educational apps, adaptive learning platforms, and gamified elements to make learning more interactive and enjoyable while maintaining educational objectives.
- **Clear Instructions and Expectations:** Provide clear and concise instructions for assignments, along with well-defined expectations, to reduce anxiety and improve task comprehension for students with ADHD.
- **Clear Structure and Routine:** Provide a clear structure for both in-person and online components, including consistent schedules and routines. Predictability can help students with ADHD manage their time and expectations.
- **Visual Supports:** Use visual aids, schedules, and reminders to enhance organization and reduce anxiety. Visual supports can include online calendars, to-do lists, and visual cues in the classroom.
- **Chunked Information:** Break down learning materials into smaller, manageable chunks. This applies to both in-person lessons and online content. Short, focused segments are more conducive to attention and understanding.
- **Interactive Content:** Incorporate interactive and engaging online content. Gamified elements, interactive simulations, and multimedia presentations can capture attention and make learning more enjoyable.
- **Flexible Learning Paths:** Offer flexibility in learning paths to accommodate different learning styles. Allow students to choose from a variety of resources or approaches that suit their preferences and strengths.
- **Digital Organization Tools:** Introduce digital tools for organization and time management. Online planners, reminder apps, and collaborative platforms can assist students in staying organized and on top of assignments.
- **Regular Check-Ins:** Schedule regular check-ins to monitor progress and address concerns. This can be done through online discussions, individual meetings, or feedback sessions to provide ongoing support.
- **Collaborative Learning Opportunities:** Incorporate collaborative projects and group activities, both in-person and online. Collaborative learning can enhance social interaction and provide additional support through peer relationships.

- **Mindfulness and Brain Breaks:** Integrate mindfulness practices and scheduled brain breaks. These moments allow students to refocus, reduce stress, and enhance overall well-being.
- **Accessibility Considerations:** Ensure that online content is accessible to all students. This includes providing alternative formats, captioning for videos, and considering the needs of students with different learning preferences.

Adapting blended learning strategies to accommodate the unique needs of students with ADHD requires flexibility, creativity, and ongoing collaboration between educators, students, and parents.

## Discussion & Conclusion

This research inquires into the intricate landscape of Attention Deficit Hyperactivity Disorder (ADHD), clarifying the nature, causes, and the potential efficacy of a blended learning approach for academic success. The examination of characteristics of ADHD – inattention, hyperactivity, and impulsivity- underscores the complexity of this neurodevelopmental disorder. The exploration of causes reveals a multifaceted interplay between genetic predisposition, neurological imbalances, and environmental factors, emphasizing the need for a comprehensive understanding to inform targeted interventions. Blended learning emerges as a promising strategy, offering individualized pacing, multimodal content delivery, and flexible learning environments that cater to the diverse needs of students with ADHD.

As educators, policymakers, and researchers seek ways to optimize education for individuals with ADHD, the findings from this study contribute valuable insights. Blended learning stands out as a dynamic and adaptable approach, offering not only academic support but also fostering a more inclusive and engaging educational experience. The recognition of multifactorial nature of ADHD and the exploration of innovative educational strategies align with the broader goal of promoting the success and well-being of students with ADHD in diverse learning environments.

By bridging the understanding of ADHD characteristics, exploring its root causes, and advocating for effective educational approaches, this research paves the way for informed practices that can positively impact the educational journey of individuals with ADHD. It is our hope that these insights inspire continued research, informed policymaking, and practical implementations that foster an inclusive and supportive educational environment for all students, including those with ADHD.

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