ASSESSMENT OF COGNITIVE ABILITY OF UPPER PRIMARY SCHOOL STUDENTS (8-13 YEARS) IN ERNAKULAM

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BY

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DECLARATION

I hereby declare that this dissertation entitled "*Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam*" is a bonafede record of research work done by me under the guidance and supervision of Ms. Nimmi Jacob, Assistant Professor in the Department of Home Science, and has not been previously submitted by me for the award of degree, diploma, or recognition elsewhere.

AMRA FATHIMA

Place: Ernakulam

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INTRODUCTION

CHAPTER 1

INTRODUCTION

Each child has an individual constellation of skills, dispositions, personality traits, interests, cognitive capacities, and goals. The mental skills used to acquire knowledge are referred to as cognitive talents (Mayfield, 2011). According to Gottfredson (1997), cognitive ability is defined as a general mental capability that includes abstract cognition, planning, reasoning, problem-solving, understanding complicated concepts, and experience-based learning. Cognitive capacity, which includes intelligence, persistence, creative thinking, and pattern identification, is the cornerstone of an individual's innovative abilities. The term "cognitive aptitude" describes a person's generally acknowledged mental abilities. According to Ispas, and Walter C. (2015), people are generally more adept at creating and putting into practice innovations from outside sources the stronger their cognitive ability.

The word "cognition" is used loosely and in a variety of academic contexts. It suggests a psychological viewpoint on a person's capacity for information processing. According to some definitions, cognition is the process by which ideas are formed in the minds of people, groups, and organizations—which are essentially societies working together to create concepts. In reaction to a crisis or opportunity, each of "society's independent components would have the opportunity to exhibit emergent behaviour." Cognitive processes can also be described as "understanding and trying to make sense of the world." The word "cognitive" comes from the Latin word "cognates," which means "to know." According to Neissor (1967), "a sensory input is transformed, reduced, elaborated, recovered, and used" is the subject of cognitive psychology. The mental processes and behaviours that enable us to make sense of the world are known as cognitive processes. These processes include learning, perception, memory, and reasoning, and they are impacted by a variety of biological, environmental, social, and motivational factors. All types of knowing are together referred to as cognitive. The study of cognition is an investigation of the mind. A broader definition of "cognition" is the act of understanding or comprehension. It can also refer to the emergent growth of concepts and information within a group that results in both thought and action. This definition can be understood in a social or cultural context. (P, Krishna, 2015).

According to Jean Piaget's seminal thesis from 1976, knowledge, cognition, and intelligence are all influenced by experience and are interdependent. This theory's main premise is that children's and adults' thought processes are very different from one another. Cognitive capacity is considered as a condition of balance in which all structures emerging from perception, habit, and basic sensory-motor systems tend to gravitate, rather than as a discrete set of cognitive processes. Instead of being viewed as a separate ability, intelligence is understood to be a basic component of behaviour that is closely related to affective characteristics. The theory also addresses how affect and cognition are related, stressing the importance of distinguishing between "primary action"—the interaction between the subject and the object—and "secondary action"—the subject's response to their own actions—and how both are integral to human thought (Jean, 2005). Instead of being viewed as a separate ability, intelligence is understood to be a basic component of behaviour that is closely related to affective characteristics. The theory also addresses how affect and cognition are related, stressing the importance of distinguishing between "primary action"—the interaction between the subject and the object—and "secondary action"—the subject's response to their own actions—and how both are integral to human thought (Jean, 2005).

The foundation of Piaget's theory of cognitive development is the idea of cognitive structure, which is characterised as the mental and physical behavioural patterns that support intelligence. These systems, also known as cognitive schemas, help people understand their environment by helping them to interpret the information in a logical manner. According to the hypothesis, intelligence serves the purpose of assisting individuals in adapting to their surroundings, and these structures are symbolic of various stages of newborn growth. Assimilation and accommodation are two steps in the adaptation process that cause changes in cognitive structures (Ikiugu, 2007). Four phases of cognitive development were hypothesised by Piaget:

1. Sensorimotor Stage: Infants use their senses and their actions to learn about their environment from birth until they are about two years old.

2. Preoperational Stage: Children learn to think symbolically and acquire language between the ages of two and seven, but they still have egocentric and illogical thought processes.

3. Concrete Operational Stage: Between the ages of seven and eleven, children learn to reason logically about concrete occurrences and grasp the concept of conservation.

4. Formal Operational Stage: This stage begins at 12 years old and lasts until adulthood, during which individuals gain the ability to think abstractly, use hypothetical thinking, and engage in deductive reasoning.

These stages represent the progression of cognitive abilities and understanding as individuals grow and mature.

When the subject and the universe interact in a way that goes beyond brief and fleeting encounters to establish long-lasting and meaningful relationships, intelligence—which Piaget defined as the highest level of mental adaptation—becomes the indispensable instrument. This approach highlights that intelligence is the state of equilibrium that all structures arising from perception, habit, and fundamental sensorimotor mechanisms strive towards, rather than a specific class of cognitive activities. It also emphasises how adaptive intelligence is, arguing that it is not a distinct ability but rather a basic component of behaviour that is closely related to affective dimensions. Examined is the relationship between effect and cognition, emphasising the distinctions between "primary action" (the subject's interaction with the object) and "secondary action" (the subject's reaction to their own actions), and how both are essential to and fundamental to human thought (Piaget, 2005). The The Two-Factor Theory of Intelligence, proposed by Charles Spearman in 1904, suggests that cognitive performance is a function of two factors: general and specific. General intelligence, or factor "gf," is required for performance on all mental tests, while specific factors measure specific abilities that only occur during specific tasks, he believed that general mental ability (inventive) and specific ability (specific factors) were represented and measured. (Kaur, 2016)

Attention is the first essential component in the process of acquiring knowledge. Humans have one of the most sophisticated and highly evolved neural systems, every human interacts with environmental inputs throughout their existence. A wide range of social backgrounds surround us. Toddlers acquire the ability to interpret information in their own unique way. As a result, the intellect progressively develops. In addition to learning a multitude of skills informally at home, children are inherently interested, eager to explore, and learn. Parents are children's first teachers and provide the foundation for future development; they do not force their children to study. Children are admitted into preparatory schools as the years go by, and after a few months, they have to be ready for rigorous study, which necessitates the complete engagement of students. The pupil needs to focus in order to learn. "The selective activity of the human organism in which one's consciousness is focused on a specific narrow field to the

exclusion of everything else in the environment" (D, Wakode, 2010) is the definition of attention, which is the first stage in various cognitive processes. Numerous elements, such as intensity, size, repetition, change, novelty, and subjective considerations, all have an impact on this attention process. The best way to define attention is as the continuous concentration of cognitive resources on information while removing or filtering irrelevant information. One can typically only focus on one item at a time. Some people, nevertheless, are able to multitask that is, work on multiple projects at once. It is thought that they have a longer attention span. (Dhenwal, 2021)

The potential influence of gender on cognitive performance is a topic of continuous discussion. The increasing amount of books, insightful commentary, and empirical study on the subject of the differences in intelligence quotient (IQ) between the sexes indicates that both the general public and psychologists are nonetheless captivated by these distinctions. Within the discipline of psychology, this question has generated intense controversy and a great deal of discussion. Over time, there have been several definitions of intelligence proposed, including unidimensional and multidimensional definitions. There is ongoing debate over whether there are differences in general intelligence or total cognitive ability between the sexes, despite research consistently showing differences between the sexes in particular cognitive domains such as linguistic and spatial abilities (Savage-McGlynn, 2012).

Most importantly, academic achievement and these cognitive abilities are related. According to McClelland, and others (2013), parental assessments of 4-year-olds' attention span persistence predict college completion at age 25. Additionally, executive function tests in preschool predict math and reading ability in kindergarten. In a similar vein, working memory (WM) capacity is linked to reading and arithmetic proficiency in kids ages 5 and 6 as well as in kids ages 11 and 12, and it also predicts success in math and science in teens (Alloway & Alloway, 2010). Accordingly, cognitive abilities seem to either facilitate or obstruct learning in an educational context (Kumari, 2020).

Cognitive ability testing reveals details about a person's ability to recognise and resolve issues. It all comes down to how well we comprehend the information we are given and how much we already know. The main focus of school systems is to fulfil cognitive goals by offering several subject areas that facilitate the development of knowledge and comprehension related to intellectual domains, such as science, history, and numeracy. These aid in the development of child's critical thinking abilities as well as their ability to reason logically and solve issues

and will undoubtedly be able to address issues in later life due to the problem-solving abilities they acquired in their early years. Studies have indicated that a person's cognitive capacity determines their learning capacity. Poor cognitive ability makes learning difficult for the students. Some kids struggle in school because they lack the cognitive abilities needed to effectively comprehend information. The formal operational stage, which begins at age 12 and lasts through the adolescent years, is gradually approached by the kid at the upper primary stage. At this age, kids begin to reason and gradually begin to think abstractly about potential answers to specific problems. Students who struggle with cognitive abilities find it challenging To Learn (Sarma, 2021).

The relevance of the study

Understanding cognitive development and analysing gender disparities in children's cognitive test performance across continuous age groups were the goals of this study. To do this, the Six-Letter Cancellation Test and Raven's Progressive Matrices were used to examine normative data from two domains. Research on a person's capacity for learning is needed, especially for carrying out the many mental tasks involved in problem-solving and learning. By taking this into account, a study was conducted to evaluate the cognitive capacities of upper primary pupils in the Kerala state of Ernakulam district.

This study is important because it adds to our understanding of cognitive development and how it affects individual needs-based interventions and educational methods. This study looks at potential gender disparities in cognitive ability across age groups. The findings can be used to enhance better teaching practices and student support systems, which will eventually improve academic accomplishment and intellectual progress.

In light of this, the topic "*Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam*" was chosen for study.

Aim

To understand cognitive development and analyse gender differences in cognitive test performance among primary school students.

Objectives

General Objective

1. To assess the cognitive ability of children in upper primary school (grades 3–7) between the age of 8-13 years in Ernakulam

Specific Objectives

- To assess the IQ of upper primary school students (grades 3–7)
- To assess the attention of upper primary school students (grades 3–7)
- To evaluate the relation between IQ and gender of upper primary school students (grades 3–7).
- To evaluate the connection between attention and gender of upper primary school students (grades 3–7).

REVIEW OF LITERATURE

CHAPTER 2
REVIEW OF LITERATURE

The review of literature about the study "*Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam*" is as follows:

2.1 Cognitive Abilities and Academic Performance

2.2 Cognitive Style and Gender Difference

2.3 Cognitive Development and Individual Differences

2.4 Cognitive Abilities and Instructional Approaches

2.5 Nutrition and Its Impact on Cognitive

2.6 Attention and Gender Difference

2.1 Cognitive Abilities and Academic Performance

Kharbanda & Jyotika (2021) investigated the relationship of Cognitive Dissonance, Critical Thinking, Academic Achievement, and Academic Disengagement of Higher Secondary Students using a descriptive survey method. The majority of students had an average level of cognitive dissonance, with gender playing a significant role in academic achievement and engagement. Stress is one of the major fatalities in worldwide, and it can lead to various health issues. Student those who are exposed to stress often experience Cognitive Dissonance, it is a psychological state of mind that is characterized by perceived discrepancies in cognitions and behaviours. A self-constructed scale was used in a study with 602 students to test Academic Disengagement and Cognitive Dissonance, whereas Murthy's Critical Thinking scale (2015) was used to measure Critical Thinking, the marks of Class X for Academic Achievement were also recorded and the results showed that the majority of students experience cognitive dissonance at an average level, with no gender differences in this regard. It was observed that

the majority of pupils had ordinary critical thinking skills, with very few having high or low levels. There is no discernible function for gender in critical thinking. Additionally, it was shown that most children had average academic achievement and were only mildly disengaged. Gender does, however, have a big impact on both academic achievement and academic disengagement. Additionally, it was discovered that Cognitive Dissonance has a positive correlation with Academic Disengagement and a negative correlation with Critical Thinking and Academic Achievement, with the latter tending to boost the former. Fresh line

A study was conducted by Sankagond, Vani (2021**)** on the topic Relationship among Study Habits and Attitude Intelligence Cognitive Style and Achievement in English of Secondary School Students. Attitudes and habits are essential for scholastic achievement. A innate ability, intelligence aids people in solving complex situations. A person's cognitive style, or method of information processing, affects their academic achievement. The purpose of the study was to determine how intellect, study habits, attitude, and cognitive style affected the academic performance of secondary school pupils. The hypothesis was that management styles, study habits, attitude, IQ, and academic difficulties, along with gender and geography (urban vs. rural), were significantly correlated. To analyse these aspects, the study employed standardised instruments and a stratified random sample technique. According to the survey, private high school students outperformed government pupils in terms of study habits, attitude, IQ, and cognitive style. Additionally, female students had significantly higher English scores than male students, indicating better cognitive style and English skills compared to government students.

A study done by Aadil, and Dr. Peerzada Najmah, (2022) on the topic “A Study of Metacognition and Academic Achievement among College Students of Kashmir” states that Education is crucial for personal and social advancement, fostering positive thinking, reasoning, problem-solving skills, intelligence, aptitude, and positive values. Metacognition, a new concept in Cognitive Psychology, is essential for developing critical thinking, analytical skills, problem-solving, creativity, innovation, aptitude for research, computer skills, communication skills, soft skills, leadership, teamwork, and positive attitudes. Research shows a significant difference in academic achievement between students who scored high on metacognitive awareness and those who scored low. College professors should present information that encourages metacognitive skills, improving academic achievement and teaching performance. A study comparing 400 college students in Kashmir found no significant

difference in metacognition levels between male and female students. The study concluded that metacognitive abilities.

2.2 Cognitive style and gender difference

A study done by Sharma, & Pooja (2018) investigated the relationship between cognitive styles (field independent/dependent) and academic achievement of 9th-grade English students at Om Public School of Gohana. The research involved 64 students, taught English grammar concepts through multimedia and traditional methods. An experimental environment was used to conduct the inquiry. Some English grammatical principles were covered in the instructional materials, which were delivered via both traditional instruction and multimedia. The Witkin et al.-developed Group Embedded Figure Test (GEFT) was utilised to assess cognitive styles (field independent/dependent). Students' academic success was gauged using a benchmark that the researcher herself created. For data analysis, Pearson's Product Moment Correlation was employed. The study's conclusions demonstrated a strong correlation between academic success and cognitive types (Field Independent & Field Dependent).

A study was undertaken by Ajai, & Imoko, (2015) to assess gender differences in mathematics achievement and retention by using Problem-Based Learning (PBL). The design of the study was pre–post-test quasi-experimental. A sample of Four hundred and twenty-eight senior secondary one (SS I) students were assessed using multistage sampling from ten grant-aided and government schools were involved in the study. Two hundred and sixty-one male students and one hundred and sixty-seven female students were taught algebra using PBL method of instruction. Algebra Achievement Test (AAT) constructed by the researchers was the main instrument used for data collection. Two hypotheses were raised for the study and tested using t-test at .05 level of significance. The study revealed that male and female students taught algebra using PBL did not significantly differ in achievement and retention scores, thereby revealing that male and female students are capable of competing and collaborating in mathematics. In addition, this finding showed that performance is a function of orientation, not gender. The studies recommend the use of PBL by mathematics teachers to overcome the male image of mathematics and enhance students' (male and female) achievement and retention

The study conducted by Hooda, & Rani Devi, (2018) was to investigate secondary school students' self-confidence in connection to cognitive style. Self-confidence was considered a dependent variable, whereas gender (male or female) and cognitive styles (integrative, intuitive,

split, systematic, and undifferentiated) were considered independent variables. For this investigation, a descriptive survey method was used. Using a multi-stage random sampling procedure, 400 pupils preparing for their tenth grade class were included in the sample. The data was collected using the Cognitive Style Inventory (CSI) produced by Jha (2011) and the Self-confidence inventory (PSCI) developed by Pandey (2007). The data was then analysed using a Two Way ANOVA using a 5×2 factorial design. Levene's Test of Homogeneity of Variance was also applied to test the assumption of homogeneity of variance for ANOVA. The main effect of cognitive style and gender on self-confidence of secondary school students was found to be significant. On the other side, the double interaction effect of cognitive style and gender on the self-confidence of secondary school students was also found to be significant. The findings of the present study have an implication for the teachers that they should plan their teaching accordingly by adopting effective teaching methods, proper teaching strategies and by guiding students for promoting their academic excellence and self-confidence. For this, seminar and guest lecturers may be organized for the students who are lagging behind the poor selection of cognitive style

2.3 Cognitive Development and Individual Differences

The study done by Nigam, (2021) underscores the necessity of harmonising approaches in the investigation of emotional ageing and stresses the significance of taking sociocultural viewpoints into account. It implies that cognitive ageing may be shielded from emotional ageing. Throughout life, there are changes in the link between emotion regulation and cognitive ageing. For older persons, maintaining emotional well-being requires them to give priority to positive information. The study used a variety of approaches to investigate how different emotion processing components interact with cognitive ageing. Age group baselines were obtained using neuropsychological profiling, and variations in the regulation of happy and negative emotions was found using lab-based techniques. Age-related changes in emotion goals were seen, with a preference for positive information. Compared to younger persons, older adults showed a separation from negative feelings. Additional insights were obtained using longitudinal and implicit techniques, which demonstrated a trajectory of middle-aged and older persons prioritising good events. Older people' predilection for pleasant feelings and uniqueness in affect valence representation were shown by self-reports and implicit testing. The study highlights the need to converge methodologies for studying emotional aging and emphasizes

the importance of considering sociocultural perspectives. It suggests that emotional ageing may act as a protective factor for cognitive aging.

Pal, (2021**)** investigated on how parental neurocognitive abilities—such as verbal working memory, concept formation through reasoning, creativity, and emotional intelligence—function in their offspring. Data was gathered through two tests measuring verbal working memory, concept generation through reasoning, creativity, and emotional skills, as well as self-developed sociodemographic data sheets. Siblings had an impact on verbal working memory that was externally led, demonstrating the functional networking of neurocognitive abilities. Few studies have been done on neuro-cognitive capacities, although previous research has shed light on the consequences of parent-child connections and gender differences in a variety of domains. With an emphasis on verbal working memory, reasoning, concept creation, creativity, and emotional intelligence, the current study seeks to uncover a functional network of parental neurocognitive abilities in kids. The findings revealed substantial variations in the way family members generate concepts through reasoning, but no discernible differences in verbal working memory across parents, fathers, and kids in any of the three types of families.

A study done by Felicita, (2021) emphasizes the significance of comprehending these ideas through experience-based explanations by concentrating on alternative conceptions of celestial bodies and astronomical phenomena. It has been demonstrated in earlier research that even after being taught fundamental ideas, students frequently continue to explain phenomena incorrectly. Children's observations of the sky and their understanding of basic astronomical ideas and phenomena are the subjects of this study. It also explores the role of cognitive abilities in the construction of scientific knowledge of astronomical concepts. The research aims to develop astronomical knowledge, basic concepts, and phenomena for students, and to determine the most reliable indicators of children's conceptual comprehension of advanced astronomy theories. Spatial ability tests, probes, and other research instruments were used to gather data. The study found that written descriptions and explanations provided to 30 probes were instrumental in children's conceptual comprehension of astronomical phenomena.

2.4 Cognitive Abilities and Instructional Approaches

A research project was done by Kalyanaraman, (2020) for a Doctor of Philosophy degree, addressing the need for personalized e-learning systems. Traditional e-learning methods, which rely on a limited range of learning styles and materials, fail to cater to the diverse mental processing capacities of learners, leading to a standardized and potentially ineffectual

educational experience. To combat this, Kalyanaraman proposed an integrated management system designed to personalize learning based on cognitive skills like memory, concentration, perception, and logical thinking. This system categorizes learning materials by associating them with these cognitive skills, facilitated by expert annotations and a standardization process to organize materials into a vector space for efficient retrieval. Utilizing a distributed storage model with four servers, the framework aimed to reduce latency in accessing learning content. Tested with 145 documents, the system demonstrated increased efficiency and effectiveness, achieving an 81.3% success rate in delivering content faster than traditional single-server setups. This research underscores the importance of personalized learning environments that accommodate individual cognitive capabilities, implemented through innovative distributed storage solutions.

The study conducted by Dafedar & Bibisadiqa (2014) covers a number of topics including learning achievement, metacognitive skills, scientific aptitude, and education. It also includes a review of relevant literature. Education is characterised as a developmental process that strives for the progressive expansion of intrinsic abilities and all-around development. In order to improve learning tactics, metacognition entails reflecting on cognitive processes. All intrinsic or taught skills that influence learning and performance are included in scientific aptitude. Learning attainment, which include gaining information and skills by experience, is essential for assessing academic performance. Studies on self-concept, adjustment, values, academic accomplishment, and the effect of the teaching medium on science achievement, interest, and mental health of secondary school students are highlighted in the review of related literature. The findings from these studies provide valuable insights into the relationship between various factors influencing educational outcomes

A study done by Neeru (2015) to understand the “Emotional Intelligence and Meta Cognitive Skills as Determinants of Academic Achievement of Secondary School Students.”, the goal of this study is to provide education to students with thinking skills and strategies that they will use throughout their lives. Emotional intelligence and meta-cognitive skills are emerging areas that need to be explored for better schooling. Quality education stresses on all all-around development of a child in academic and co-academic areas. Parental discord at home or school environment can lead to the development of negative emotions like pessimism, anxiety, hatred, and rebellion. The concept of emotional intelligence has grown in popularity with theorists and practitioners who recognize the possibilities of such a concept in broadening the understanding of human potential. Academic achievement is the most desirable outcome of

school life, and it is the responsibility of all educational institutions to promote wholesome academic development of students. Various factors like socio-economic status, intelligence, aptitude, gender, locality, type of institution, home environment, birth order, etc. determine the academic achievement of students, and emotional intelligence occupies an important place in adolescent life.

2.5 Nutrition and Its Impact on Cognitive

A study conducted by Kejriwal & Sunita (2015) investigated the impact of socioeconomic status, nutritional awareness of mothers, and nutritional status on the cognitive development of preschool children. This study involved 300 children aged 3-4 years old from kindergarten and pre-primary schools of Kolkata. After studying the results it was shown that there is a positive relation between maternal nutrition awareness and socioeconomic status, which has a significant influence on the child's nutritional status. The study also found that boys are more likely to have a higher nutritional status and cognitive development than girls. The models developed were suitable for predicting cognitive development and nutritional status. This study has practical implications for educators, health experts, stakeholders, the government, and the common masses.

Under the multi-dimensional issue of nutrition in India, which impacts the health and cognitive development that in turn affects the educational achievement of the school children. The study by R, Anitha (2021) was done to assess the risks of undernutrition on the cognitive function of public and private school-going children (6- 12 years) and also to assess the impact of intervention strategies for improving the nutritional status and cognitive function in undernourished children. For this about 600 school children were recruited. Information about their socio-demographic profile, economic status, nutritional status, cognitive function and academic activities were collected. The study assessed children's nutritional status, cognitive function, academic marks, and attendance percentage. The prevalence of undernutrition was found to be higher among public school children, with stunting, underweight, and thinness being more prevalent. Public school children had less RCPM total scores than private school children. To address this, selected undernourished children in public schools were given a formulated health mix containing protein, iron, zinc, selenium, and Brahmi leaves, along with nutrition and health education to their mothers. The intervention study results showed that the children in the Experimental Group II who received health mix supplementation and health and

nutrition education improved their overall nutritional status and cognitive function statistically compared to the Experimental Group I and Control Group.

Food plays a major role in our lifestyle, and it has long been understood to have an impact on every aspect of our wellbeing. It has also been a topic of research that food affects our cognitive functions. The study done b Sharma, Divolka (2019) aims to understand the nutritional deficiencies in children from the age of 8-11 years. A sample size of 141 children who are deficient in vitamin B12, iron, folic acid and vitamin D were selected for the study. The research was conducted in two phases where a pre-test and post-test of the cognitive functioning was recorded by the researcher. 91 children in the intervention group were given a 45-day diet chart and nutritional supplements according to the prescription of a paediatrician. The parents of the intervention group were also given sessions regarding hygiene and food safety, importance of breakfast, product label reading, importance of drinking water etc. After 45 days, a post test was conducted to identify the impact and there were drastic changes in the cognitive functioning scores of the intervention group when compared to the test scores taken at the time of intake and post-intervention, this indicates that nutritional supplements, diet module, and awareness module increased the cognitive functioning in children.

2.6 Attention and Gender Difference

A study conducted by Gajda, & Gralewski, (2021) on the topic" Attention effect on student's creative self-efficacy and the role of gender**"** was done to examine the relationship between creative abilities, focus of attention and creative self-beliefs. With the objective of understanding if there is any relation between attention & creative self-efficacy. And structure of these relationships depends on the gender of the students. 523 middle school students—278 females and 245 boys—were involved in this study. The main finding of the research are as follows a fairly low level of novelty was seen between creative abilities and creative self-efficacy in math and language. Based on the study's findings, it was able to conclude that girls' focus of attention is a substantial predictor of their creative self-efficacy, but not boys'; conversely, boys' creative self-efficacy is mostly predicted by their thinking fluency. Research was done by undertaking a main factor the socialization variations between boys and girls, which is examined with the study's findings.

A study done by Lee and others (2019) on the topic" The Effects of Music and Gender Difference on Attention and Memory Test Performance among Undergraduates in Malaysia" was done to investigate how various stimuli, such as music, affect the attention and memory

abilities, of undergraduates. Thirteen college students took the PAL and RVP tests in a repeated-measures design, while listening to self-selected music and music at a frequency of 15 Hz alpha brainwaves, and while in quiet. Alternative theories positing that there are no appreciable variations in attention and memory under the three distinct circumstances have been bolstered by the current study's findings. In the self-selected music condition, participants showed greater distraction. Additionally, there was no discernible gender difference in the attention and memory tests taken by college students. According to the study's findings, it is not practical to use the CANTAB to assess how well people pay attention and remember different types of music. Therefore, it was advised that future researchers look at other, more helpful measurements or evaluations to go deeper into the relevant subject. The theory of the capacity model of attention was emphasised in the debate

A study done by Bhardwaj, (2019) on the topic ” Prevalence of attention deficit hyperactivity disorder, gender difference and its co morbidity among urban school children in a city of southern Rajasthan, India” aimed to investigate the prevalence of ADHD in school-aged children of Udaipur. A Total of 1200 students were selected for the study , 60.83% were male and 39.17% female. Out of these, 6.3% were ADHD positive. ADHD was more common in male students (73.7%), urban locality (57.89%), age group (6 to 9 years) (44.7%), and higher economic class (46.1%). Hyperactivity-Impulsivity type was the most common type (51.32%). Male students had a higher prevalence of hyperactivity (60.7%), while female students had a higher prevalence of inattention (45%). Aggressive behavior (19.6%) and rule-breaking behavior (80.4%) were more common in males. Somatic complaints were more common in females (60%). Oppositional defiant disorder was observed in both male and female students. 15.8% of ADHD students had a learning disorder. The study found a 6.3% prevalence of ADHD, with hyperactivity being more common in boys and inattention in girls.

METHODOLOGY

CHAPTER 3
METHODOLOGY

The methodology adopted for the study *"Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam"* comes under the following subheadings:

3.1 Selection of Area

3.2 Selection of Sample

3.3 Selection of Tool

3.4 Conduct of The Study

3.5 Analysis and Interpretation

3.6 Analysis & Interpretation

3.1 Selection of Area

The present study was conducted in Kochi, a metropolitan city in the Ernakulam district of Kerala. To assess and understand the cognitive ability of the primary school going students a total of three schools were selected. M.M.O.V.H.S.S, St. Mary's Convent L.P school, and St. Rita's H.S Ponnurunny, were purposively selected for this research study. The selection of this school was purely based on the accessibility and availability to participate in the study. Approximately one hundred were selected as a strong representation of the intended audience.

3.2 Selection of Sample

For conducting a research study, we should consider the sample to be representative to the target population, as much as possible, with the minimum possible error and any incompleteness (Elfil, and Ahmed, 2017) Through sampling we can study a manageable subgroup to arrive at a conclusion about a larger population. The selected population for this study includes school-going children between the age group of 8 – 13 years by accounting the criteria of primary school students of standard 3 – 7. Sample of 110 students were selected

from 3 different schools of Kerala Board of Public Examination. The samples were selected by using a probability sampling technique which is a stratified random sampling technique. This was done for maintaining randomization within each stratum.

3.3 Selection of the Tools

The general information of the selected samples was obtained through a self-administered questionnaire, and the data was collected through a personal interview. (The questionnaire is given in Appendix I.) According to Dr. Nader (2016) "Research Tools is a vehicle that broadly facilitate research and related activities. Which enables the researcher to collect, organize, analyse, visualize and publicized research outputs Two psychological test used to assess the cognitive abilities of the participants are:

a. **Six Letter Cancellation Test:** This test evaluates an individual's sustained attention and concentration by requiring them to identify and cancel specific letters within a matrix of randomly arranged letters. Six Letter Cancellation test was administered by providing students with worksheets with six targeted letters to be cancelled. The alphabetic letters were arranged in 14 columns and 22 rows. Participants were given instructions to cancel out targeted letter one from the six letters at a time / to do all the six letters at once with in a time period of 90 seconds. The net score was calculated by deducting wrong cancellation from total cancellation attempted (a sample of the worksheet is attached in the appendix IV) The basic information of the respondents was collected via google form. (a sample of the form, is given in appendix II).

b. **Raven's Standard Progressive Matrices:** a non-verbal test which measures an individual's ability to perceive and analyse visual patterns, which is considered a reliable indicator of fluid intelligence. Raven's Standard Progressive Matrices was developed by Raven in 1983 to measure the abstract intelligence (non-verbal component of general intelligence), Fluid intelligence, etc. This test consists of 60 diagrammatic puzzles divided into 5 sets (A, B, C, D, & E) each containing 12 items. Every set contains a distinct "theme". Or principle for finding the missing puzzle, the questions are roughly arranged in an increasing complexity hence its name Standard Progressive Matrices. A total time period of 45 minutes is given and the time taken in completing the test is noted. The total scores are obtained for which the percentile and

grade are obtained from the manual (Standard Progressive Matrices, 2004 Updated version). The RMT test's linguistically minimal design makes it possible to examine reasoning ability independent of linguistic, educational, and cultural variables. As a result, the RMT is regarded as one of the most accurate measures of individual variations in thinking capacity. (the sample of RSPM and answer sheet is given in Appendix II & III respectively)

Table 1

Time Classification of Intellectual Capacity Based on the Percentile Score of RSPM

Percentile Score	Intellectually Capacity
95 RSPM Percentile Score	Intellectually Superior
90 RSPM Percentile Score	Above Average Intellectual Capacity
75 RSPM Percentile Score	
50 RSPM Percentile Score	Intellectually Average
25 RSPM Percentile Score	Below Average in Intellectual Capacity
10 RSPM Percentile Score	
5 RSPM Percentile Score	Intellectually Impaired

3.4 Conduct of the study

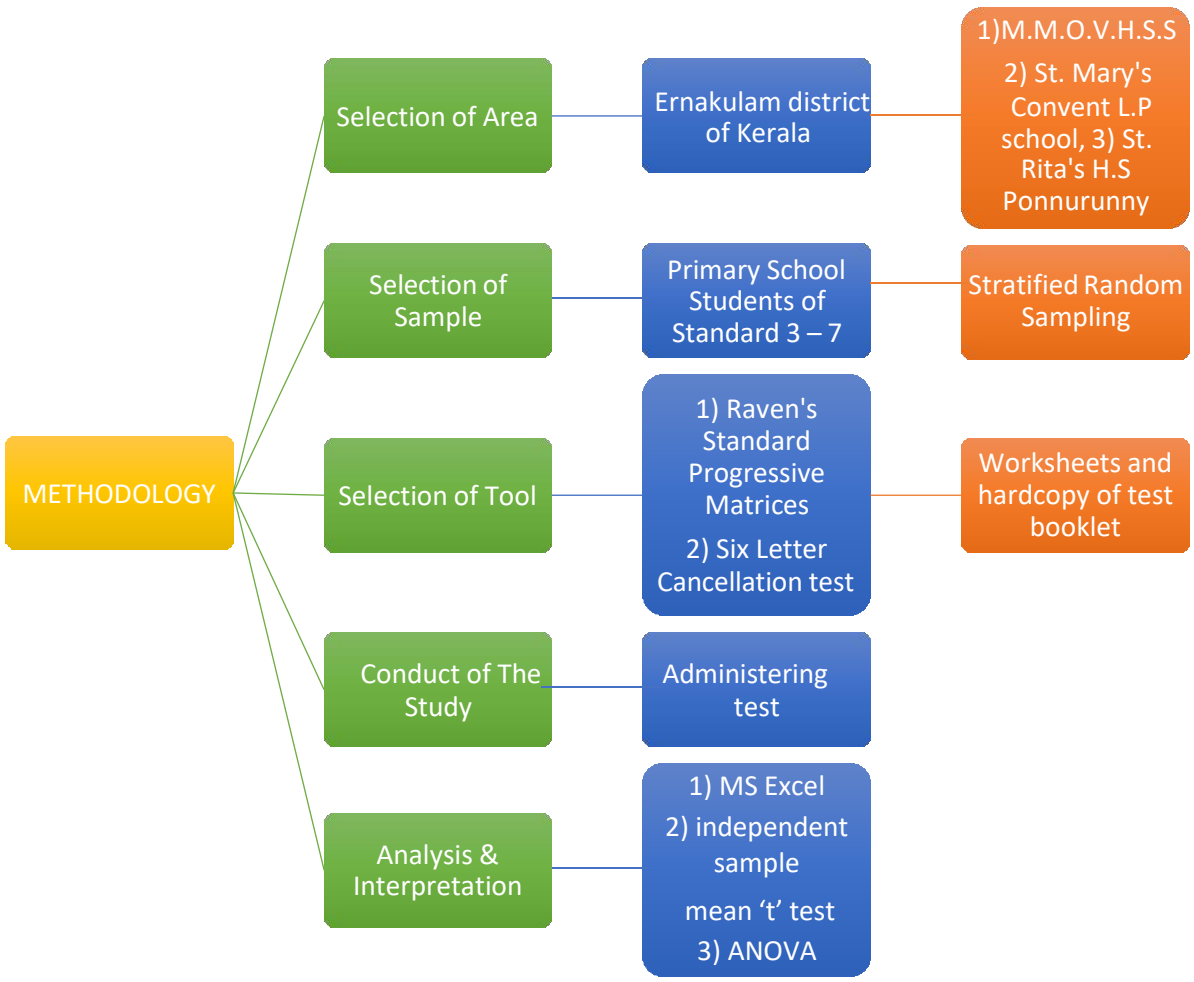
The study titled "*Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam*" The samples were selected through stratified random sampling from 3rd and 7th standard primary school student of three different school. For data collection consent was attained from school authorities by informing them the nature, purpose and importance of the study, and after obtaining the consent from respective institution, days were fixed for conducting the group test. The testing schedule were arranged by coordinating with the teachers to ensure minimal disruption to their regular classes. The students were personally contacted during their free periods, and the RSPM & SLCT test were administered. the details such demographic information was collected from the participants via Google form. This type of study involves extensive fieldwork during the period of data collection.

3.5 Analysis and Interpretation

MS Excel was used for the tabulation of general information and score of the respondents. The data collected from Google form was transferred to Excel and data cleaning was undertaken so that the statistical calculation and generation of graphs can be done through IBM SPSS. An Independent-Samples T Test was used for finding the corelation between cognitive abilities and gender. ANOVA was used for calculating the meantime taken by each standard for completing RSPM.

Research Design

The figure given in the next page depicts the research design of the study entitled "*Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam*".



RESULTS AND DISCUSSION

CHAPTER- 4

RESULTS AND DISCUSSION

The results obtained from the analysis of data is described in this chapter. The results are explained under the following headings for convenience and understanding.

4.1 Profile of the Respondents

4.1.1 General Information of the Respondents

4.1.2 Background Information of the Parents of Respondents

4.2 Assessment of the IQ of upper Primary School Students (grades 3–7) using Raven's Progressive Matrices

4.2.1 Assessment of 3rd Standard

4.2.2 Assessment of 4th Standard

4.2.3 Assessment of 5th Standard

4.2.4 Assessment of 6th Standard

4.2.5 Assessment of 7th Standard

4.3 Assessment of the Attention of Upper Primary School Students (Grades 3–7) Using the Six-Letter Cancellation Test.

4.2.1 Assessment of 3rd Standard

4.2.2 Assessment of 4th Standard

4.2.3 Assessment of 5th Standard

4.2.4 Assessment of 6th Standard

4.2.5 Assessment of 7th Standard

4.4 Evaluation of the Relation Between IQ and Gender of Upper Primary School Students (Grades 3–7)

4.5 Evaluation of the Connection Between Attention and Gender of Upper Primary School Students (Grades 3–7).

4.1 Profile of the Respondents

The table and graphical representation shows the general information of the respondents.

4.1.1 General Information of the Respondents

The table 2, Figure 2 and Figure 3 depicts the general information of the children selected for undergoing the study.

Table 2

General Information of the Respondent

Sl. No	Particulars	Respondents
		N = 110
1.	Gender	
	• Male	55
	• Female	55
2.	Age (in years)	
	8	16
	9	20
	10	18
	11	23
	12	23
	13	9
3.	Class	
	III Standard	22
	IV Standard	22
	V Standard	22
	VI Standard	22
	VII Standard	22

4.	School	
	M.M.O.V.H.S.S	60
	St. Mary's Convent L.P school	20
	St. Ritas H.S Ponnurunny	30

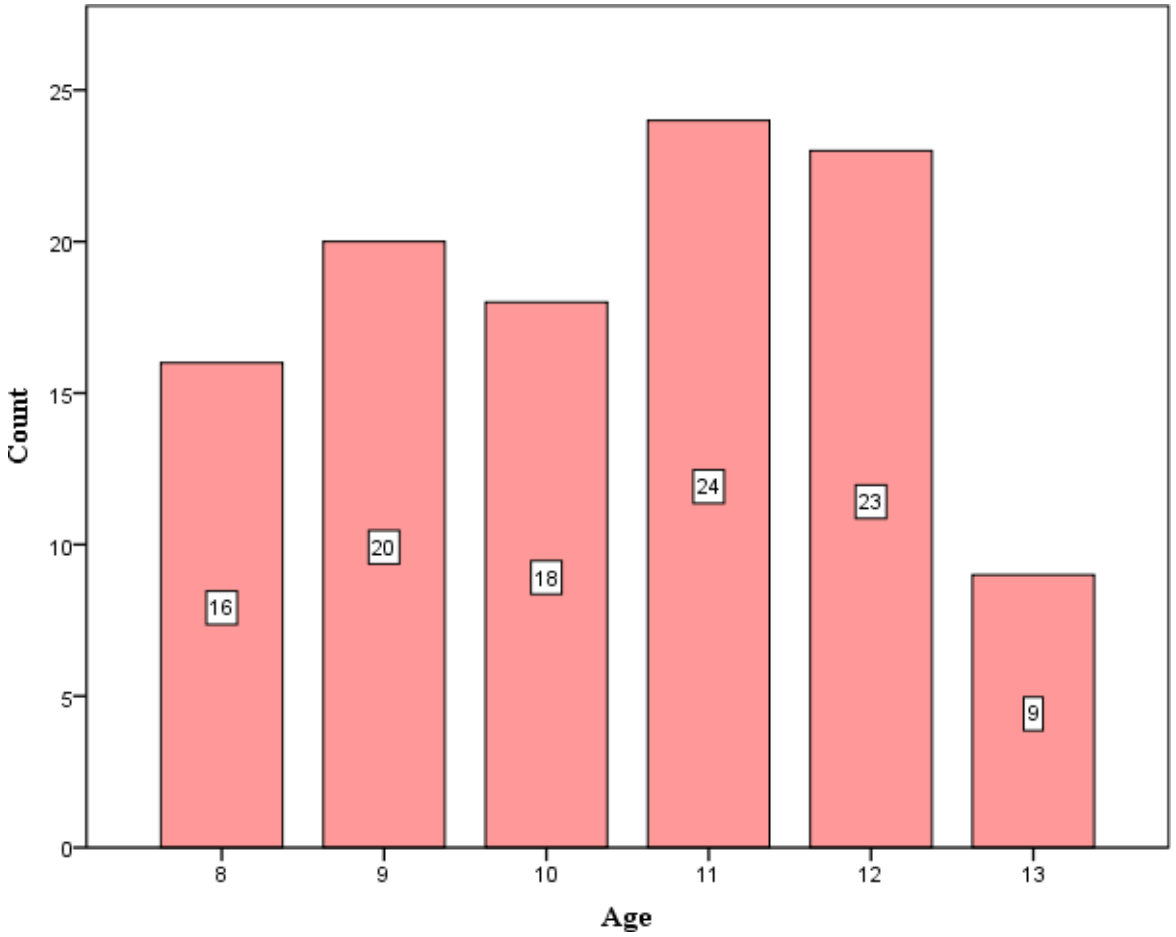


Figure 2

Age of the Respondents

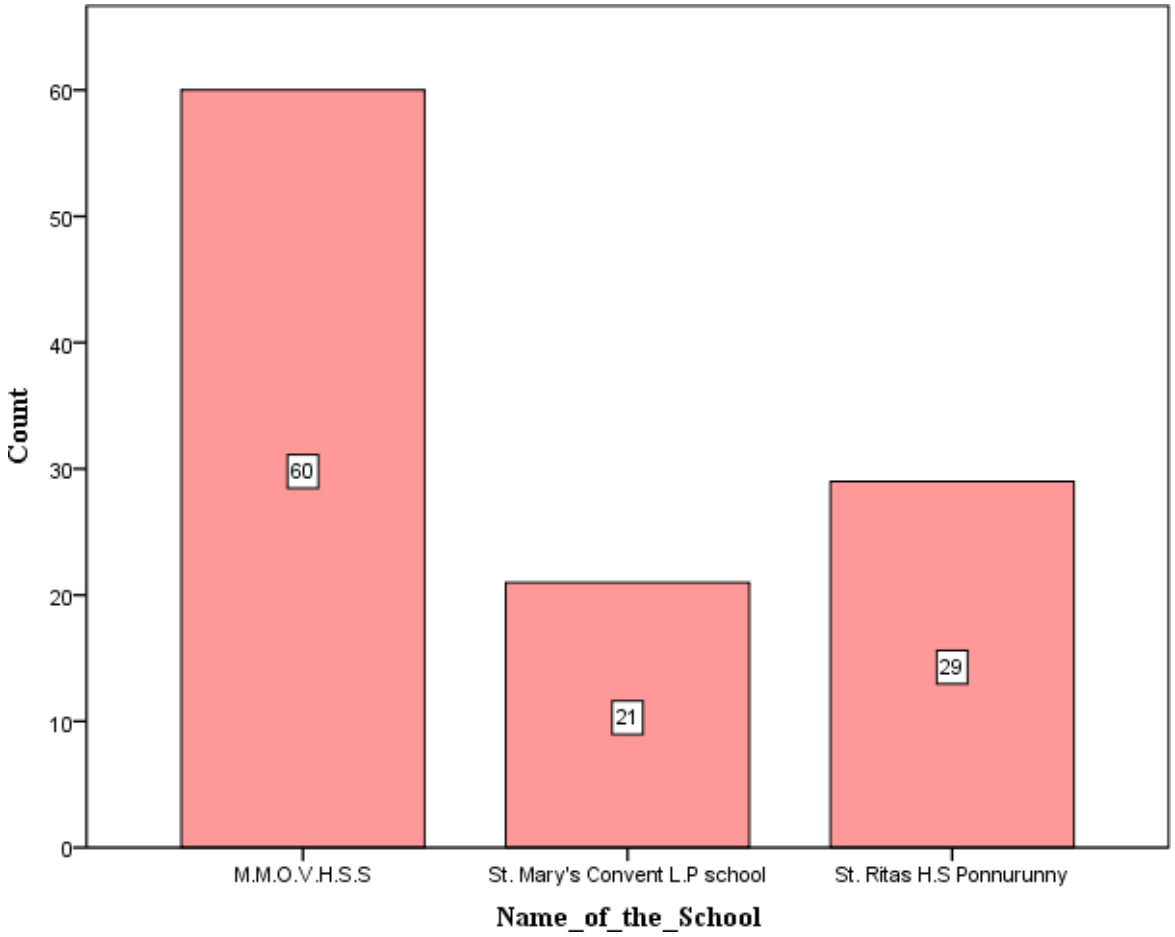


Figure 3

School the Respondents Belongs to

It is evident from the table that there was an equal representation of male and female respondents, with 55 from each gender group (comprising 50% of the total sample size N=110). The respondents are also evenly chosen across 5 different standards of primary school with each class level represented by 22 respondents. The age range of respondents is from 8 to 13 years as this study is focused on the primary school children. The highest count of respondents is from age 11 with 24 number of students from that age group. The second highest count is age 12, with a total of 23 respondents. The age groups of 9 and 10 have 18 and 19 students, respectively. The age group of 13 has the lowest number of respondents, and the age group of 8 has the second-lowest count of respondents.

4.2 Assessment of the IQ of upper Primary School Students (grades 3–7) using Raven's Progressive Matrices (RSPM)

The table 2 given below shows the classification of intellectual capacity based on the percentile score of RSPM. The table 3 and Figure 4 below depicts an average time take by students to complete RSPM who underwent the study.

Table 3

Time Taken by Students to Complete RSPM

Standard	No of Samples	Mean Time Taken (minutes)	Std. Deviation	Std. Error
3rd grade	22	26.0455	10.48117	2.23459
4th grade	22	22.2727	7.29763	1.55586
5th grade	22	23.0000	7.05084	1.50324
6th grade	22	26.7273	7.69157	1.63985
7th grade	22	21.9545	6.81369	1.45268
Total	110	24.0000	8.08328	.77071

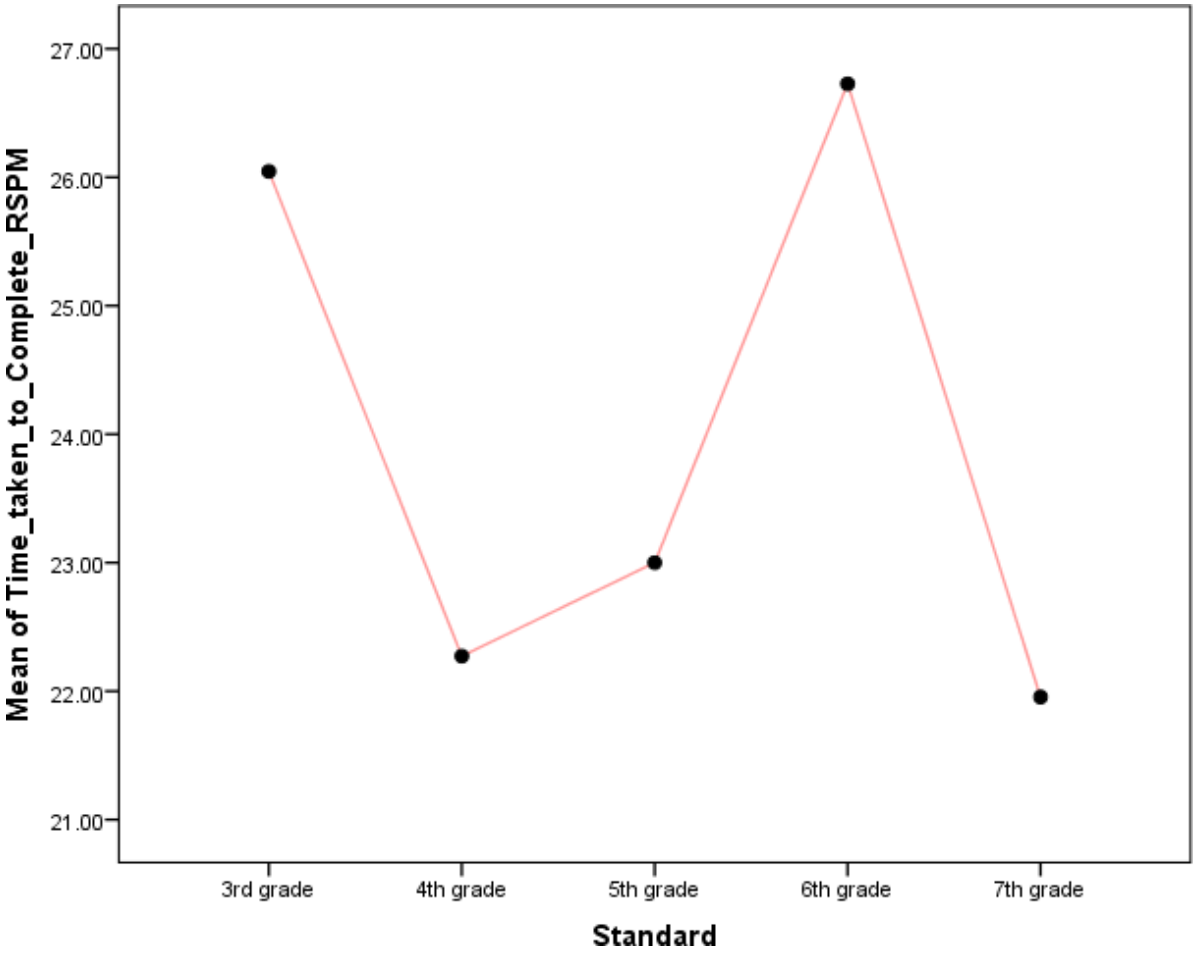


Figure 4

Time Taken by Students to Complete RSPM

The overall allotted test duration was 45 min and relatively the longest average time taken by the student in completing the test was 26 min, this was taken by the 3rd graders. The average time taken in completing the test significantly decreases for 4th standard with 22 min, where as it slightly increases for 5th standard with an average time take of 23 minutes. The mean time taken to complete the test Protract again for 6th standard students as close to the time taken by 3rd standard, about 26.7 minutes. And the smallest amount of time taken by students to complete the test is taken by 7th standard for an average of 21.9 minutes.

4.2.1 Assessment of 3rd Standard

Table 4

RSPM Scores of 3rd Standard Students

Age in Years	RSPM Percentile Score	No. of Children N =22
8	5	Nil
	10	Nil
	25	3
	50	3
	75	3
	90	4
	95	3
9	5	Nil
	10	Nil
	25	2
	50	3
	75	Nil
	90	Nil
	95	1

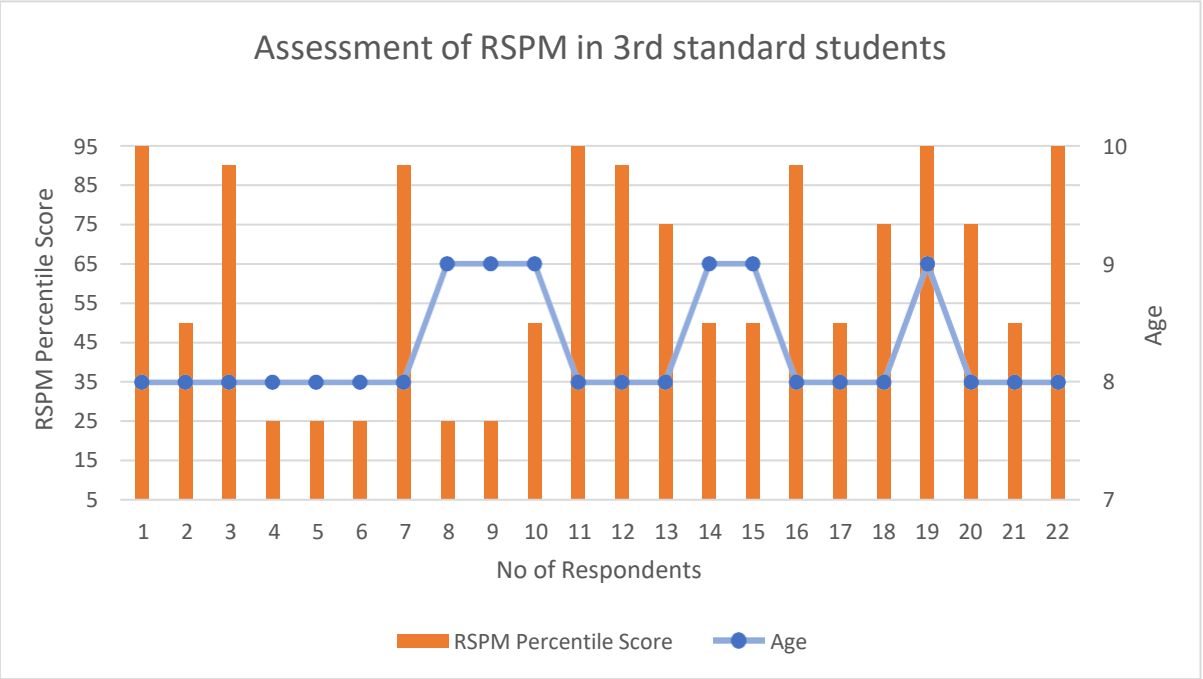


Figure 5

Assessment of RSPM in 3rd Standard Students

Table 4 and Figure 5 show the analysis of the relation between the RSPM percentile score and age within the 3rd standard student population. There are a total of 22 respondents from the 3rd standard, of which 16 were 8 years and 6 were 9 years of age during the time of the test. From the 8-year-old students, it was found that 3 of the scores in the 95th percentile exhibited that they have a superior intellectual capacity, and another 3 each from the 75th, 50th, and 25th percentiles had an intellectual capacity that was above average, average, and below average, respectively. Among the 9-year-old students in the third grade, there was only one child who scored 95th percentile, making him among the intellectually superior category, and the rest scored 50th and 25th percentile, respectively, in the intellectual average and below-average categories, respectively. By analysing the combination graph, we can understand that there is an inverse relationship between age and percentile score, which suggests that students with a higher cognitive ability score tend to be younger in the same class. Certain data points, like the one within the RSPM score of over 90th percentile at the age of 8 years, can be regarded as outliners, indicating the exceptional cognitive ability of the class.

4.2.2 Assessment of 4th Standard

Table 5

RSPM scores of 4th Standard Students

Age in Years	RSPM Percentile Score	No. of Children N =22
9	5	Nil
	10	2
	25	2
	50	6
	75	3
	90	Nil
	95	Nil
10	5	Nil
	10	2
	25	2
	50	1
	75	2
	90	1
	95	Nil

11	5	Nil
	10	Nil
	25	1
	50	Nil
	75	Nil
	90	Nil
	95	Nil

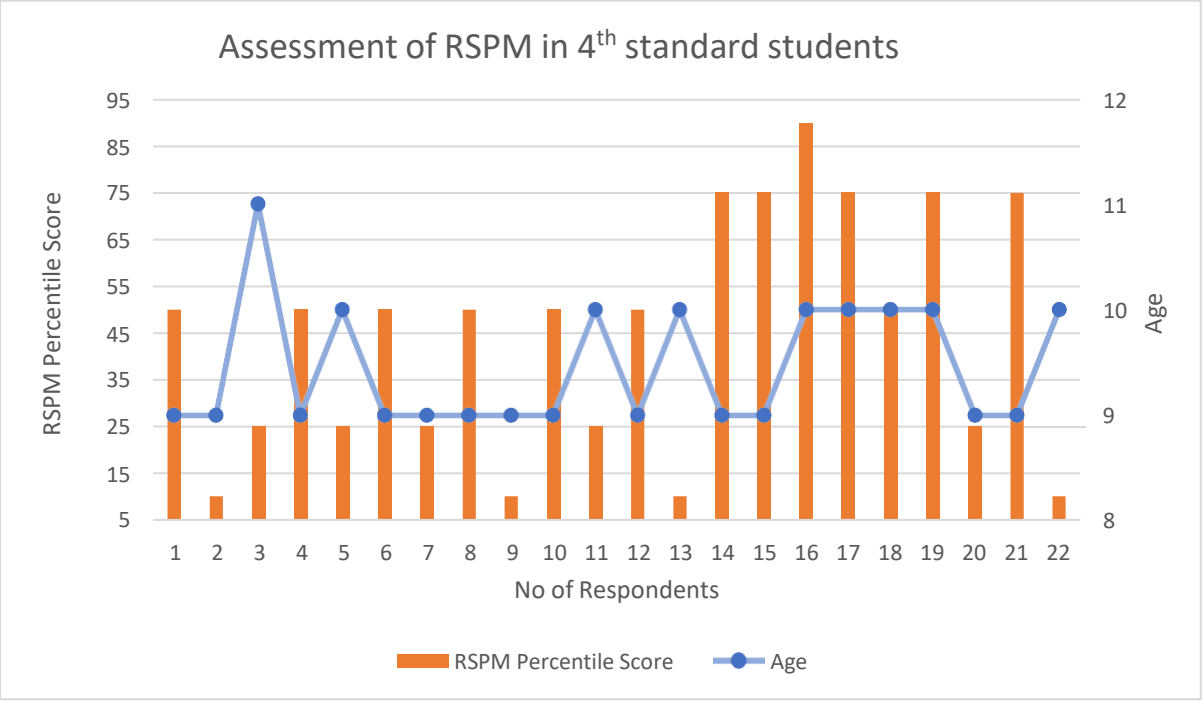


Figure 6

Assessment of RSPM in 4th Standard Students

Table 5 and Figure 6 depict the analysis of the relationship between the RSPM percentile score and age within the 3rd standard student population. There are a total of 22 respondents from the 4th standard, of which 13 were 9 years of age and 8 were 10 years of age during the time of the test. From the 9-year-old students, it was found that the greatest number of students (6) scored 50th percentile exhibiting intellectually average capacity, 3 of the students scored in the 75th percentile, showing that they have an above average intellectual capacity, 2 students each scored in the 25th & 50th percentiles, showing that they belong to the average & below average intellectual capacity, respectively. Among the 10-year-old students in the fourth grade, there was only one child who scored in the in the 90th percentile, making him among the above-average intellectual capacity category, and 2 each from the 75th, 25th, and 10th percentiles had an intellectual capacity above average and definitely below average in intellectual capacity, respectively. By analysing the combination graph, we can understand that there is an inverse relationship between age and percentile score, which suggests that students with a higher cognitive ability score tend to be younger in the same class. Certain data points, like the one within the RSPM score of over 90th percentile at the age of 9 years, can be regarded as outliners, indicating the exceptional cognitive ability of the class.

4.2.3 Assessment of 5th Standard

Table 6

RSPM score of 5th Standard Students

Age in Years	RSPM Percentile Score	No. of Children N =22
9	5	Nil
	10	Nil
	25	1
	50	Nil
	75	Nil
	90	Nil
	95	Nil
10	5	Nil
	10	1
	25	3
	50	5
	75	Nil
	90	1
	95	Nil

11	5	Nil
	10	Nil
	25	5
	50	4
	75	Nil
	90	1
	95	Nil
12	5	Nil
	10	Nil
	25	Nil
	50	1
	75	Nil
	90	Nil
	95	Nil

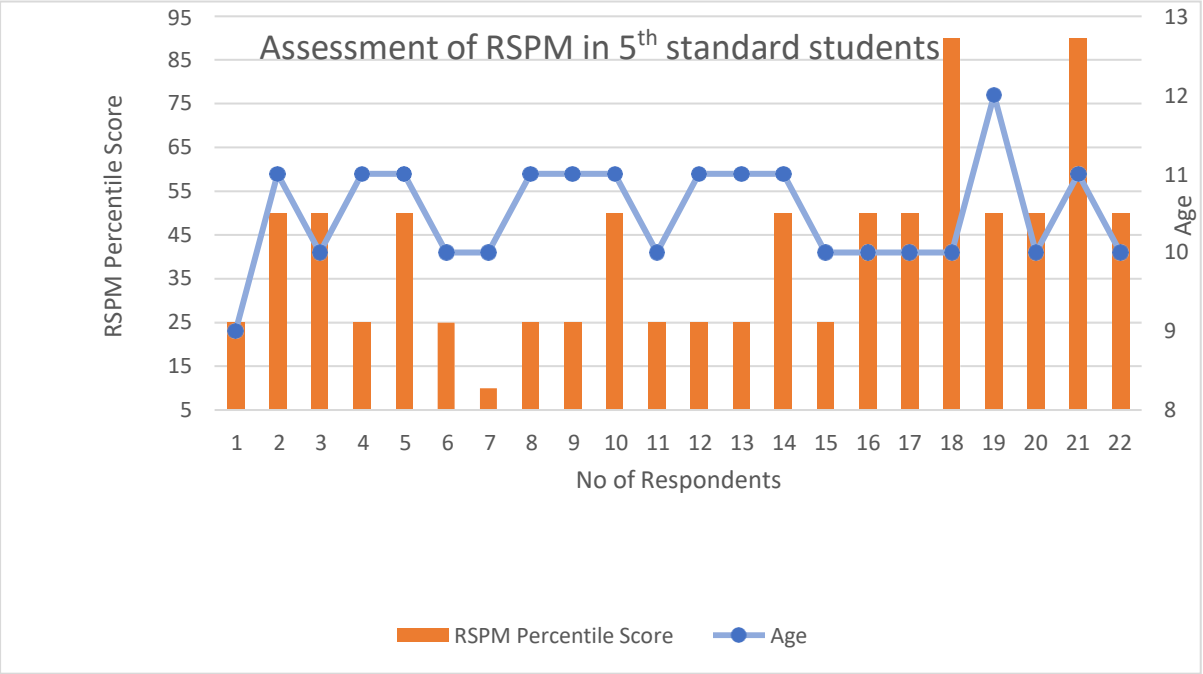


Figure 7

Assessment of RSPM in 5th Standard Students

Table 6 and Figure 7 show the analysis of the relationship between the RSPM percentile score and age within the 5th standard student population. There are a total of 22 respondents from the 5th standard, belonging to the ages of 9, 10, 11, and 12 at the time of test. From the 10-year-old students, it was found that 4 of the scores in the 50th percentile exhibited that they have an average intellectual capacity, 5 students belonged to below average (3, students scoring in 25th percentile and 1 students scoring in the 10th percentile). only 2 student of ages 11 and 10 were able to score 90th percentile among the 5th standard students. From the rest of the 11-year-old students in the fifth standard, scored among the average and below average intellectual capacity (with 4 students 50 percentile and 5 students scoring 25 percentile) the student of 12 years of age scored among the average intellectual capacity By analysing the combination graph, we can understand that there is an inverse relationship between age and percentile score, which suggests that students with a higher cognitive ability score tend to be younger in the same class. Certain data points, like the one within the RSPM score of over 90th percentile at the age of 9 years, can be regarded as outliners, indicating the exceptional cognitive ability of the class.

4.2.4 Assessment of 6th Standard

Table 6

RSPM scores of 6th Standard Students

Age in Years	RSPM Percentile Score	No. of Children N =22
11	5	1
	10	2
	25	2
	50	3
	75	2
	90	1
	95	2
12	5	Nil
	10	2
	25	2
	50	5
	75	Nil
	90	Nil
	95	Nil

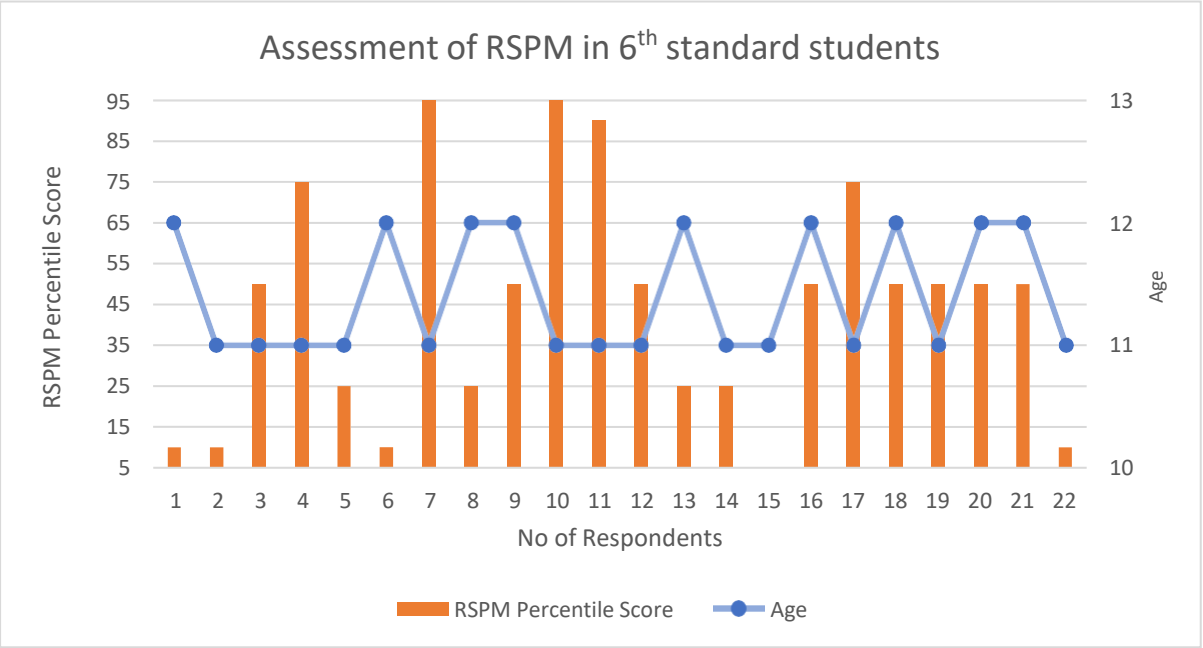


Figure 8

Assessment of RSPM in 6th Standard Students

Table 7 and Figure 8 show the analysis of the relation between the RSPM percentile score and age within the 6th standard student population. There are a total of 22 respondents from the 6th standard, of which 13 were 11 years of age and 9 were 12 years of age during the time of the test. From the 11-year-old students, it was found that 3 of the scores in the 50th percentile exhibited average intellectual capacity, and another 2 each from the 95th, 75th, 25th and 10th percentiles had an intellectual capacity that was intellectually superior, above average, and below average, respectively. Among the 11-year-old students in the fifth grade, there was only one student who got Intellectually impaired by scoring in the 5th percentile. From the sixth graders who are 12-year-old, 4 of the scored among 25 & 10 percentile exhibiting a below average in intellectual capacity and the rest belonged to average intellectual group. By analysing the combination graph, we can understand that there is an inverse relationship between age and percentile score, which suggests that students with a higher cognitive ability score tend to be younger in the same class. Certain data points, like the one within the RSPM score of over 90th percentile at the age of 11 years, can be regarded as outliners, indicating the exceptional cognitive ability of the class.

4.2.5 Assessment of 7th Standard

Table 8

RSPM scores of 7th Standard Students

Age in Years	RSPM Percentile Score	No. of Children N =22
12	5	1
	10	3
	25	2
	50	6
	75	1
	90	Nil
	95	Nil
13	5	1
	10	3
	25	3
	50	Nil
	75	1
	90	Nil
	95	Nil

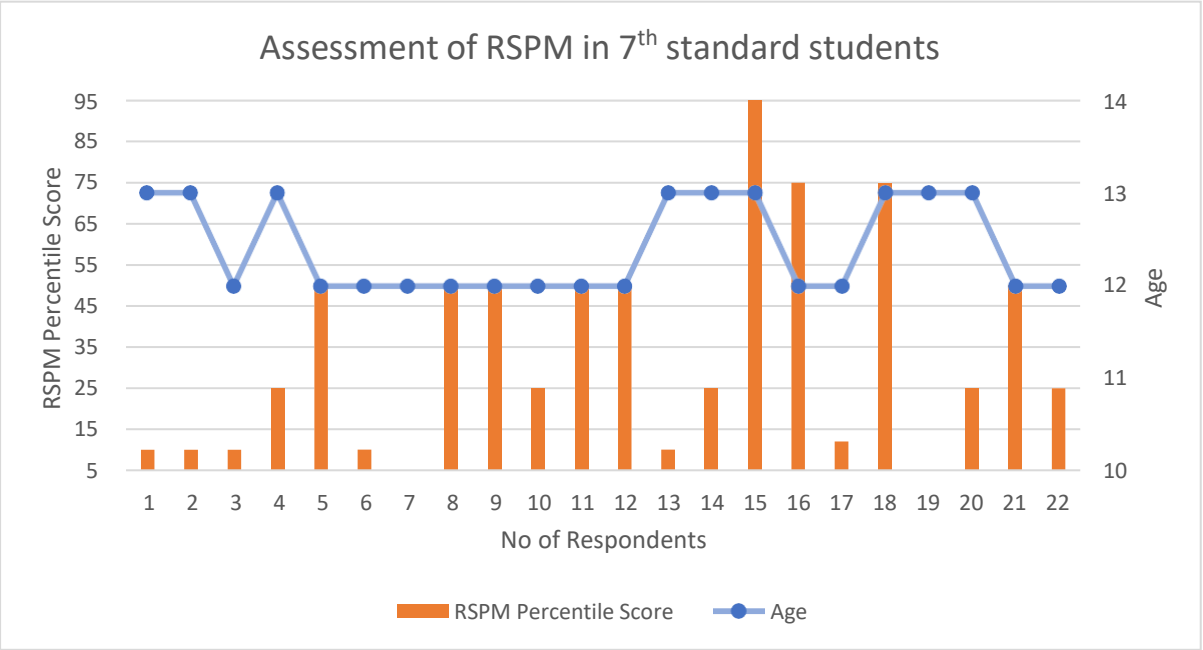


Figure 9

Assessment of RSPM in 7th Standard Students

Table 8 and Figure 9 show the analysis of the relation between the RSPM percentile score and age within the 7th standard student population. There are a total of 22 respondents from the 7th standard, of which 13 were 12 years of age and 9 were 13 years of age during the time of the test. From the 12-year-old students, it was found that most of the students belonged to the intellectually average category (total of 6 students), 5 students belonged to below average in intellectually average intellectual capacity category with 2 students scoring 25th percentile and 3 students scoring 10th percentile. there was only one child who scored 75th percentile, making him among the above intellectually average intellectual category. Among the 13-year-old students in the seventh grade, there was only one child who scored 95th percentile, making him among the intellectually superior category, and the rest scored 10th and 25th percentile belonging to the below-average intellectual capacity categories. There was also a student who scored into the Intellectually Impaired category among the seventh standard students. By analysing the combination graph, we can understand that there is an inverse relationship between age and percentile score, which suggests that students with a higher cognitive ability score tend to be younger in the same class. Certain data points, like the one within the RSPM score of over 90th percentile at the age of 12 years, can be regarded as outliners, indicating the exceptional cognitive ability of the class.

4.3 Assessment of the Attention of Upper Primary School Students (Grades 3–7) Using the Six-Letter Cancellation Test(SLCT).

The overall time take for conducting this test was 90 seconds as it was timed test for assessing attention. This test is directly related to attention measurement.(Sarang, 2006)

4.2.1 Assessment of 3rd Standard

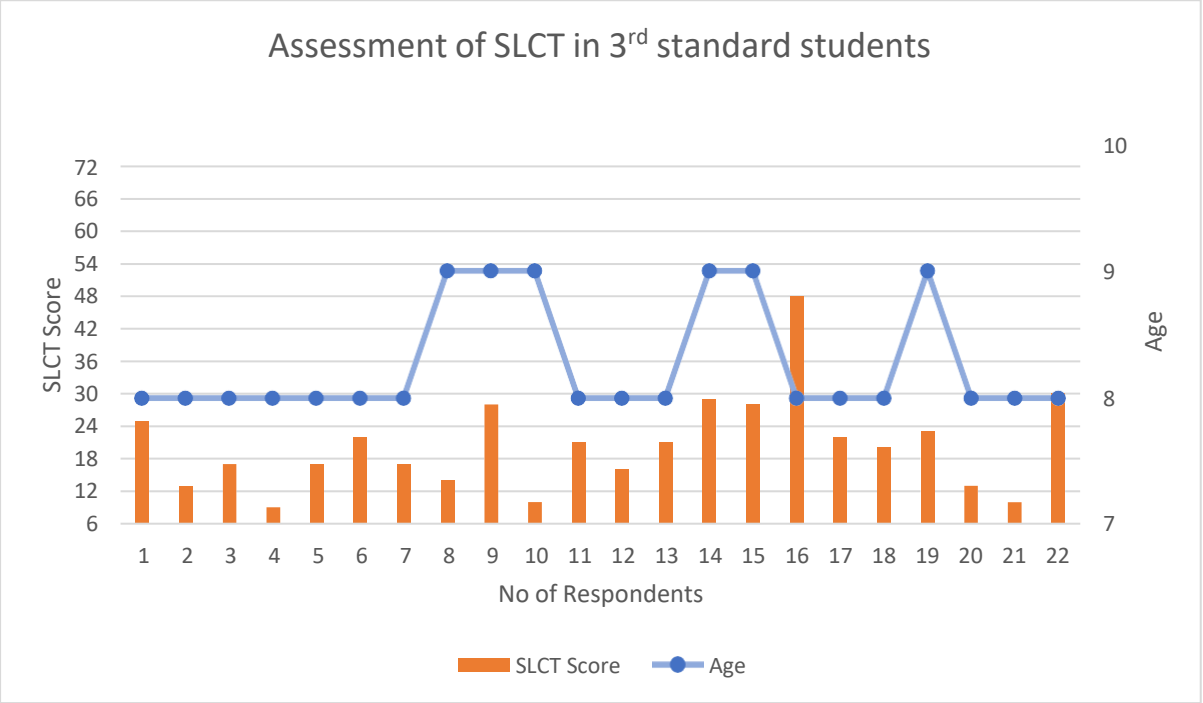


Figure 10

Assessment of SLCT in 3rd Standard Students

Figure 10 depicts the analysis of the relation between the SLCT score and age within the 3rd standard student population, there are a total of 22 respondents from the 3rd standard, of which 16 were 8 years of age and 6 were 9 years of age during the time of the test. The combination chart exhibits the SLCT score and age a all the 22 respondents. A total of 12 students scored among the 20 –30 range indicating that they have good attention skills. And the rest of the nine students exhibited good attention span. Whereas there was a child from third standard that got a score of 48 from which we can understand that he has an superior attention skill.

4.2.2 Assessment of 4th Standard

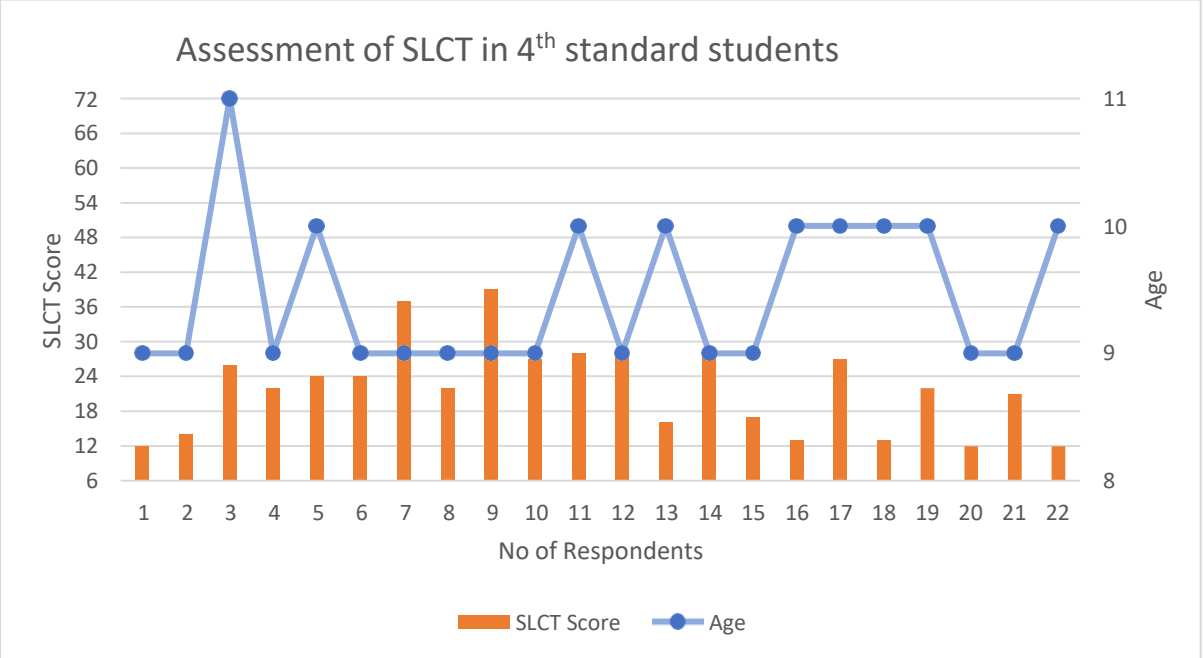


Figure 11

Assessment of SLCT in 4th Standard Students

The investigation of the relationship between age and the SLCT score in the population of the fourth -standard students is shown in Figure 11. There are 22 respondents from the fourth standard in total; 13 of them were 9 years old when the test was administered, 8 of them were 9 years old and a 11 year old. The age and SLCT score of each of the 22 respondents are displayed in the combo chart. 11 students received scores in the range of 20 to 30, which suggests that they have good attention spans. The remaining 8 pupils showed average attention span. Conversely, there were 2 a third-grader who achieved a score of 37 & 39, indicating they had a superior attention skills.

4.2.3 Assessment of 5th Standard

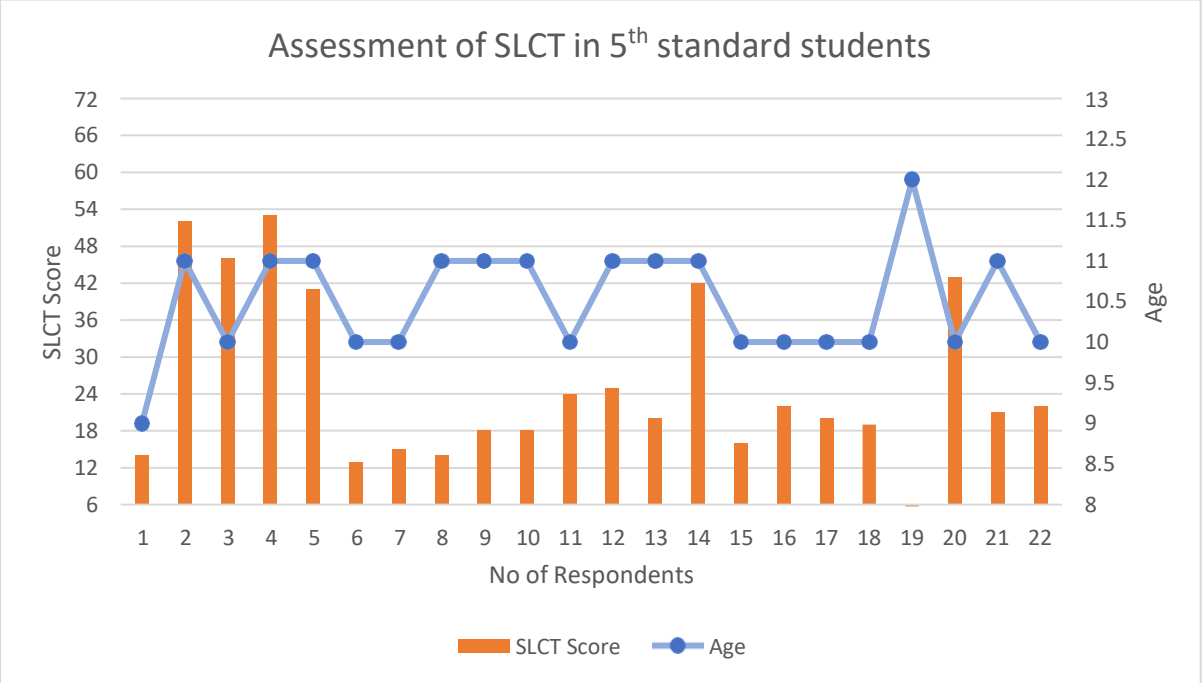


Figure 12

Assessment of SLCT in 5th Standard Students

Figure 12 depicts the analysis of the relation between the SLCT score and age within the 5th standard student population, There are a total of 22 respondents from the 5th standard, of which 10 were 10 years of age, 9 were 11 years of age, a 9 year-old and a 10 year old. The combination chart exhibits the SLCT score and age of all the 22 respondents. A total of 8 students scored among the 40 –50 range indicating that they have superior attention skills, 5 students scored among the 20 –30 range exhibited good attention span, and the rest of the 7 students scored between 10 -20 indicating average attention skills. Whereas there was a child from fifth standard that got a score of 5 from which we can understand that the attention skill of that particular child is poor.

4.2.4 Assessment of 6th Standard

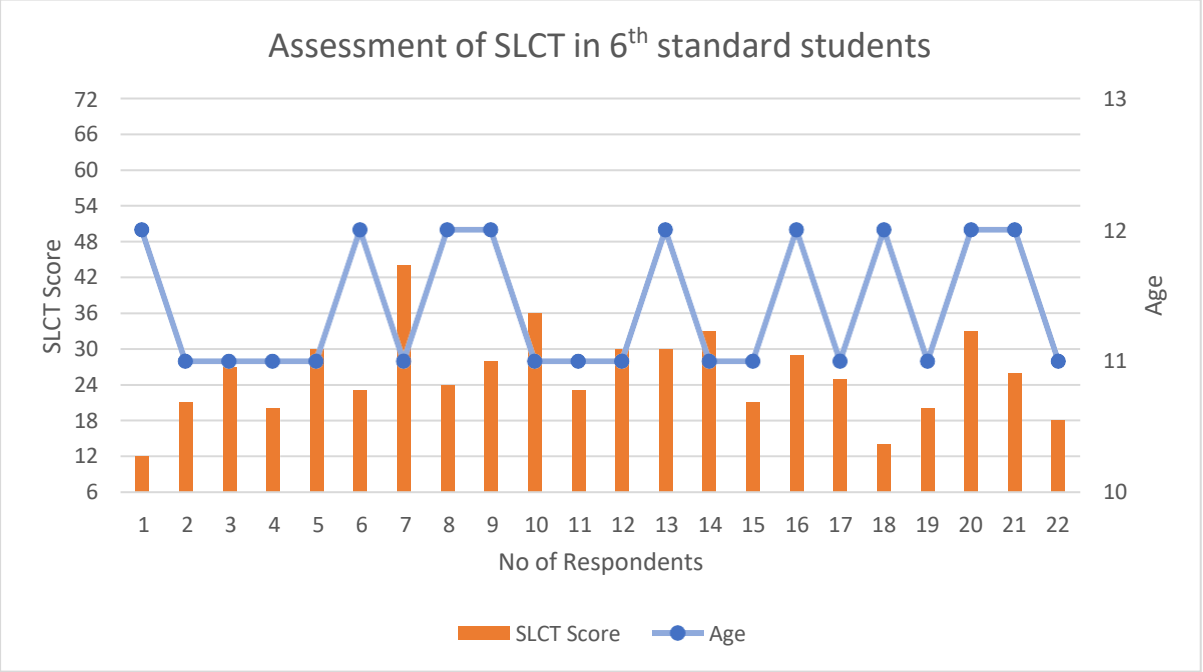


Figure 13

Assessment of SLCT in 6th Standard Students

The investigation of the relationship between age and the SLCT score in the population of the sixth -standard students is shown in Figure 13. There are 22 respondents from the fourth standard in total; 13 of them were 11 years old when the test was administered, 9 of them were 12. The age and SLCT score of each of the 22 respondents are displayed in the combo chart. 15 students received scores in the range of 20 to 30, which suggests that they have good attention spans. , 5 students scored among the 30 –40 range exhibited verygood attention span, and the rest of the 2 students scored between 10 -20 indicating average attention skills.

4.2.5 Assessment of 7th Standard

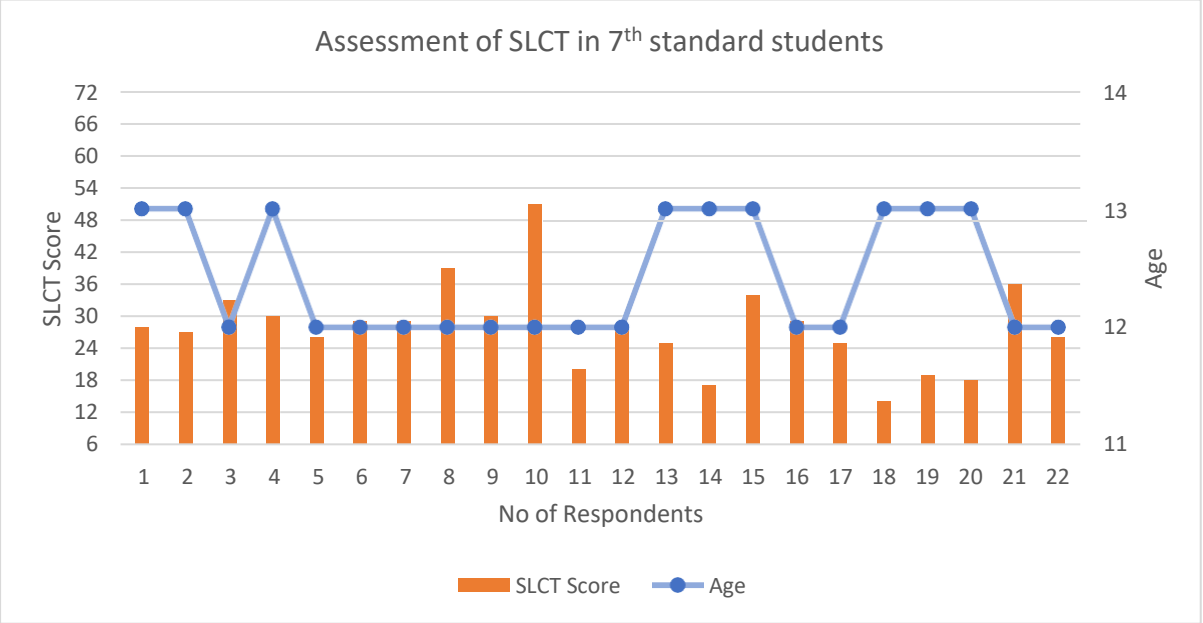


Figure 14

Assessment of SLCT in 7th Standard Students

Figure 14 depicts the analysis of the relation between the SLCT score and age within the 7th standard student population, There are a total of 22 respondents from the 5th standard, of which 13 were 12 years of age test and 9 were 13 years of age during the time of the test. The combination chart exhibits the SLCT score and age of all the 22 respondents. A total of 12 students scored among the 20 –30 range indicating that they have good attention skills, 5 students scored among the 30 –40 range exhibited very good attention span, and the rest of the 4 students scored between 10 -20 indicating average attention skills. Whereas there was a child from seventh standard that got a score of 59 from which we can understand that the attention skill of that particular child is superior.

4.4 Evaluation of the Relation Between IQ and Gender of Upper Primary School Students (Grades 3–7

Table 8

Group Statistics of RSPM

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
RSPM Percentile Score	**female**	55	44.0909	27.89018	3.76071
	male	55	46.8545	26.32589	3.54978

Table 9

Independent Samples Test of RSPM

		Levene's Test for Equality of Variances		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
RSPM Percentile Score	**Equal variances assumed**	.677	.412	-.534	108	.594	-2.76364	5.17145	-13.01435	7.48708
	Equal variances not assumed			-.534	107.642	.594	-2.76364	5.17145	-13.01473	7.48746

From the above tables 8 and 9, we can see that there are females (N = 55), and the mean RSPM percentile score attained by them is 44.8909 with a standard deviation of 27.89018 and a standard error mean of 3.76071. And in the case of males (N = 55), the mean RSPM percentile score attained by them is 46.8545 with a standard deviation of 26.22969 and a standard error

mean of 3.54978. The significance of 0.412 and the F value of 0.677 are obtained using Levene's Test for equality of variances. With 108 degrees of freedom, the t-value for the assumed equal variances is -0.534, and the 2-tailed significance (Sig. (2-tailed)) is 0.594. With a standard error difference of 5.17145, the mean difference is -2.76364. For assuming equal variances, the 95% confidence interval of the difference lies between -13.01435 and 7.48708, and for assumed equal variances, it varies between -13.01473 and 7.48746. The results of the analysis indicate that there is no statistically significant difference between the RSPM Percentile Score of boys and females, as the p-value (Sig. (2-tailed)) exceeds the standard significance level of 0.05.

4.5 Evaluation of the Connection Between Attention aand Gender of Upper Primary School Students (Grades 3–7).

Table 10

Group Statistics of SLCT

Group Statistics					
	Gender	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
SLCT Score	**female**	55	28.8727	8.44164	1.13827
	male	55	23.3636	10.38226	1.39994

Table 11

Independent Samples Test of SLCT

		Levene's Test fo Equality of Variances		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
SLC Score	**Equal variances assumed**	.296	.587	3.053	108	.003	5.50909	1.80430	1.93265	9.08553
	Equal variances not assumed			3.053	103.684	.003	5.50909	1.80430	1.93097	9.08721

From the above tables 10 and 11, we can see that there are females (N = 55). The SLCT score mean for females is 28.8727, with an 8.44164 standard deviation, and in the case of males, we have an average SLCT score of 23.3636 and a standard deviation of 10.38226. The standard error of the mean is shown for both groups. From doing the test for independent samples with

an F-value of 0.296 and a significance (Sig.) value of 0.587, the Levene's Test for Equality of Variances shows that the assumption of equal variances between the two groups is met, and with 108 degrees of freedom and a two-tailed significance (Sig. (2-tailed)) of 0.003, the t-test for equality of means reveals a t-value of 3.053, which is statistically significant (usually at $p < 0.05$). The standard error difference is 1.80430, while the mean difference in SLCT score between males and females is 5.50909. If equal variances are assumed, the mean difference's 95% confidence interval falls between 1.93265 and 9.08553. Hence, we can conclude that the analysis contrasts the male and female groups' SLCT scores. The findings show a statistically significant difference in the mean scores between the two groups, with the mean score for females being higher than the mean score for males (23.3636), at 28.8727. The true mean difference between the groups is given as a range by the confidence interval.

Pictures Taken During the Conduction of test

Plate 1
Conducting Test for Students From School A

Plate 2
Conducting Test for Students From School B

SUMMARY AND CONCLUSION

CHAPTER 5
SUMMARY AND CONCLUSION

The study undertaken by the researcher was on "*Assessment of Cognitive Ability of Upper Primary School Students (8-13 years) in Ernakulam*". This study was done to assess the cognitive abilities of upper primary school students in Ernakulam district, Kerala by focusing on the cognitive development and analysing the potential gender difference in test performance. The two main factor that comes under cognitive abilities were analysed while conducting the study, there were attention and IQ. The study was focused on Kochi metropolitan city, a for this purpose primary school students at three schools (M.M.O.V.H.S.S, St. Mary's Convent L.P school, and St. Rita's H.S Ponnurunny) were selected through stratified random sampling and around 110 responses were recorded & assessed for this study. Data was collected, consolidated and analysed using statistical analysis like **Independent-Samples T Test**.

5.1 Reseaerch Findings

The findings of the study can be summarized as follows:

Profile of the Respondents

- Equal representation of male and female respondents, with 55 from each gender group.
- Respondents chosen evenly across 5 primary school standards (3-7), each class level represented by 22.
- Age range: 8 to 13 years, Highest student count: 11 (24 respondents), Lowest student count: 13 (no respondents), Second-lowest student count: 8 (no respondents).

Assessment of the IQ of upper Primary School Students (grades 3–7) using Raven's Progressive Matrices

- The average time take by the students by the 3rd graders was 26 minutes, for 4th and 5th graders was 22 minutes, 23 minutes for 5th graders, and 26.7 minutes for 6th graders and the smallest time was 21.9 minutes for 7th graders out of 45 minutes which was the total duration given for test completion.
- From further analysis of the score achieved by each class during the assessment, it was found that there is an inverse relationship between age and percentile score, suggesting that students with higher cognitive ability scores tend to be younger in the same class

- Most of the respondents belonged to the average intellectual group, there were only 3 students who belonged to intellectually impaired and 7 students who belonged to intellectually superior category.

Assessment of the Attention of Upper Primary School Students (Grades 3–7) Using the Six-Letter Cancellation Test.

- Attention levels were assessed through the SLCT. It was a timed test to be completed within 90 seconds. The analysis also highlighted variations in attention levels across different standards and genders. Notably, most of the students scored between 20 and 30 marks; the average attention of the students can be noted as good. Whereas students demonstrated superior attention skills, others showed poor attention spans.

Evaluation of the Relation Between IQ and Gender of Upper Primary School Students (Grades 3–7)

- The study reveals that females (N = 55) achieved a mean RSPM percentile score of 44.8909 with a standard deviation of 27.89018 and a standard error mean of 3.76071, while males (N = 55) achieved a mean score of 46.8545 with a standard deviation of 26.22969 and a standard error mean of 3.54978. The t-value for the assumed equal variances was -0.534, and the 2-tailed significance was 0.594. The 95% confidence interval for the difference lies between -13.01435 and 7.48708, and for assumed equal variances, it varies between -13.01473 and 7.48746, indicating that there is no statistically significant difference between the RSPM Percentile Score of boys and females. Hence there is no particular relationship between IQ and gender of the students.

Evaluation of the Connection Between Attention and Gender of Upper Primary School Students (Grades 3–7).

- The study reveals a statistically significant difference in the mean scores between male and female groups. Females scored 28.8727, with an 8.44164 standard deviation, while males scored 23.3636 and 10.38226, respectively. The t-test for equality of means reveals a t-value of 3.053, indicating a statistically significant difference. The standard error difference is 1.80430, and the mean difference in SLCT score between males and females is 5.50909. If equal variances are assumed, the 95% confidence interval falls

between 1.93265 and 9.08553. The analysis contrasts the male and female groups' SLCT scores, with females scoring higher at 28.8727. The true mean difference between the groups is given as a range by the confidence interval. Hence, there is a particular relationship between attention and gender among the students, with girls having higher attention than boys.

5.2 Conclusion

The present study discusses the “Assessment of Cognitive Ability of Upper Primary School Students (8–13 years) in Ernakulam." In conclusion, the study shed light on the intellectual capacity and attention levels of upper primary school students in Ernakulam district, Kerala, analysing potential gender differences in test performance and revealing intriguing patterns and insights. The study focuses on the cognitive abilities and attention levels of upper primary school students. The findings from the assessment of IQ suggest that most respondents belonged to the average intellectual group, with only a few fallings into the intellectually impaired or superior categories. The Six-Letter Cancellation Test (SLCT) revealed that most students’ scores indicated good attention skills. However, there were variations in attention levels across different standards and genders, with some students demonstrating superior attention skills while others exhibited poor attention spans. The study found no statistically significant difference in RSPM percentile scores between male and female students, challenging the notion of inherent gender-based differences in cognitive abilities. However, females had higher mean scores in SLCT scores, suggesting better attention skills than their male peers. Over all this highlights the need for further investigation into potential factors contributing to the observed gender gap in cognitive abilities.

5.3 Limitations

- The study's generalizability may be limited due to its small sample size of 110 respondents, which could have provided more robust findings.
- The study's scope was restricted to Ernakulam district, potentially limiting its generalizability to other regions or populations. Future research should consider expanding to a broader geographical area for better results.
- The study primarily examined upper primary school students, excluding other age groups, which could provide a more comprehensive understanding of intellectual capacity and attention development.

- For a more accurate assessment, an individual test can be done other than the group test that has been taken for this study.
- Other assessment tools can be used for further and more comprehensive expansion of this study into a broader range of cognitive abilities.
- Demographic considerations such as socioeconomic status, cultural background, and educational resources were not thoroughly explored, potentially influencing the observed patterns.

5.4 Recommendations

- Expand sample size include a for more diverse population to enhance the study's generalizability
- Incorporate multiple assessment tools and consider broader demographic factors.
- Track students' progress over time for elucidating developmental trajectories.
- Develop interventions enhancing cognitive abilities and attention skills for educational setting.
- Implement tailored educational programs, classroom strategies, and parental involvement initiatives.
- Other assessment tools can be used for further and more comprehensive expansion of this study into a broader range of cognitive abilities.
- Demographic considerations such as socioeconomic status, cultural background, and educational resources were not thoroughly explored, potentially influencing the observed patterns.

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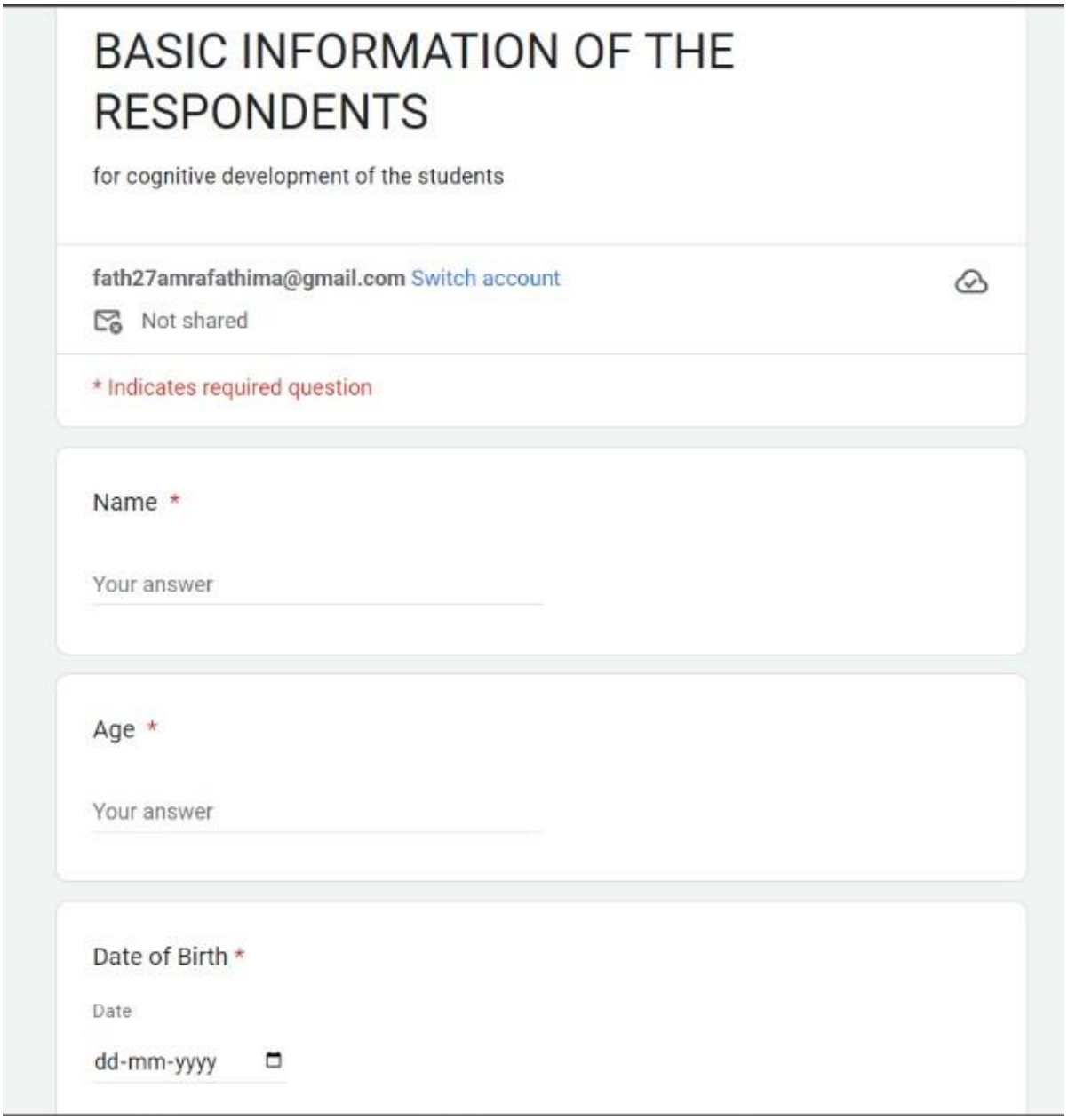
APPENDICES

APPENDIX I

GOOGLE FORM FOR COLLECTING THE BASIC INFORMATION OF THE RESPONDENTS



BASIC INFORMATION OF THE RESPONDENTS

for cognitive development of the students

fath27amrafathima@gmail.com Switch account

Not shared

* Indicates required question

Name *

Your answer

Age *

Your answer

Date of Birth *

Date

dd-mm-yyyy

Date Student Took RPM *

Date

dd-mm-yyyy

Standard *

- 3rd
- 4th
- 5th
- 6th
- 7th

Gender *

- ◯ Male
- ◯ Female
- ◯ Prefer not to say

Name of the School *

- ☐ M.M.O.V.H.S.S
- ☐ St. Mary's Convent L.P school
- ☐ St. Ritas H.S Ponnurunny

Fathers Name

Your answer

Fathers Occupation

Your answer

Mothers Name

Your answer

Mothers Occupation

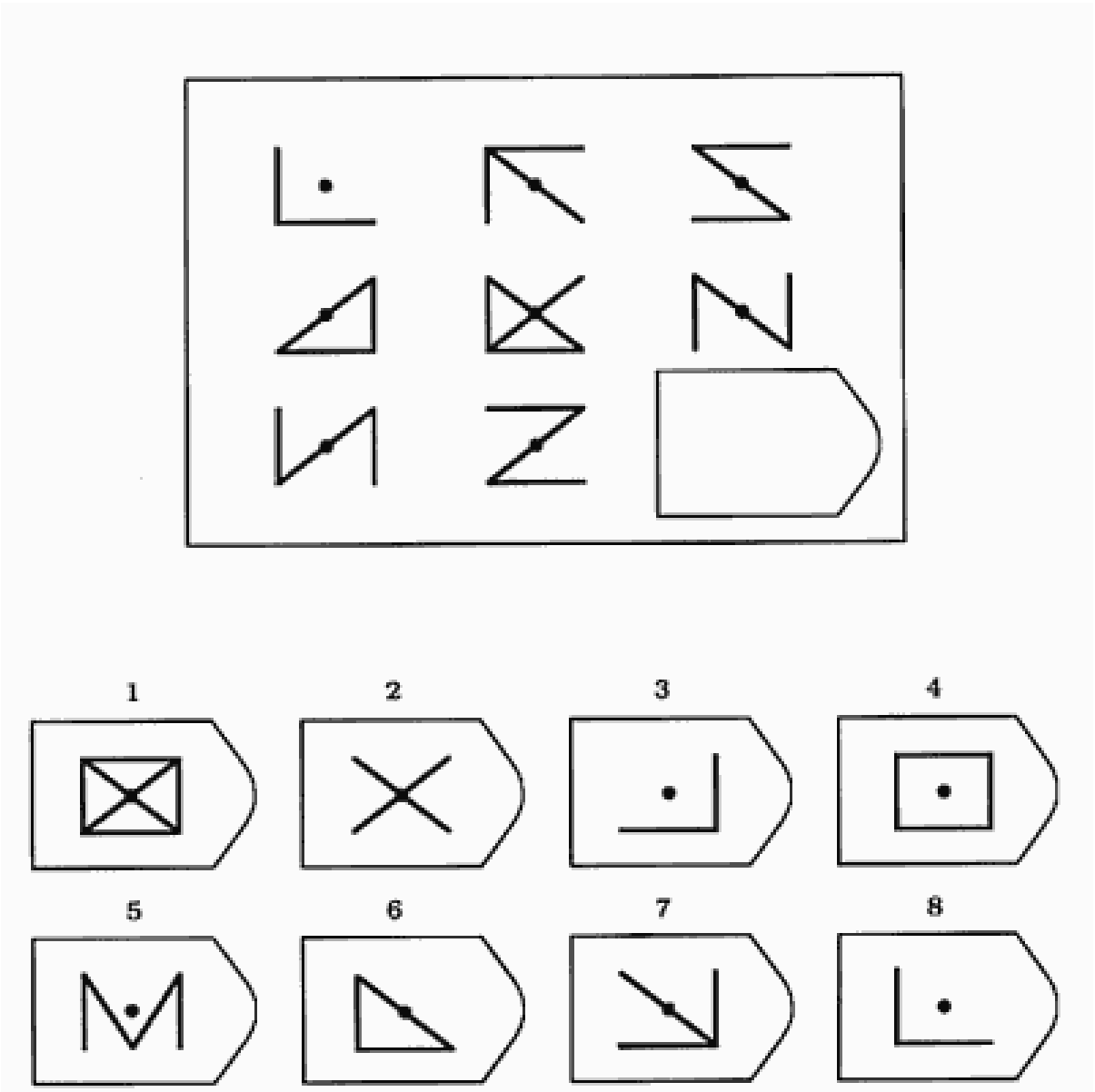
Your answer

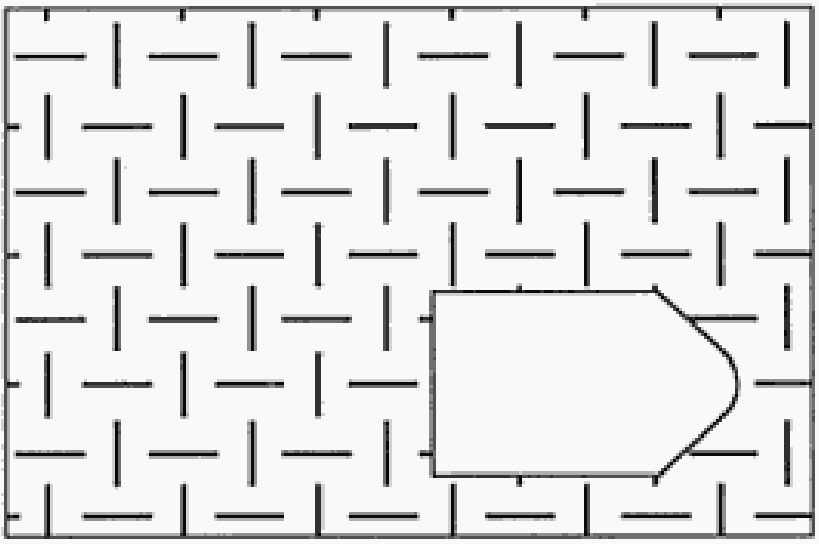
Submit

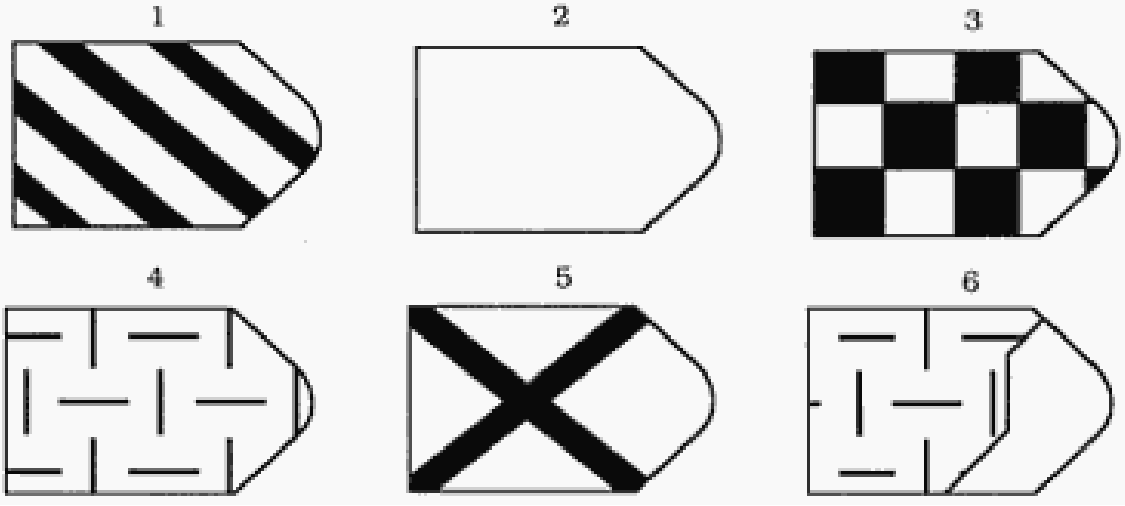
Clear form

APPENDIX II

SAMPLES OF STANDARD RAVEN'S PROGRESSIVE MATRICES (RPM)






1
2
3
4
5
6

APPENDIX III

ANSWER SHEET OF STANDARD PROGRESSIVE MATRICES

ANSWER-SHEET
OF
STANDARD PROGRESSIVE MATRICES

SETS A, B. C, D, & E

NAME----------GROUP NO.----------

PLACE---------- DATE----------

AGE----------BIRTHDAY----------

TEST BEGUN----------TEST ENDED----------

A	A	B	B	C	C	D	D	E	E
A-01		B-01		C-01		D-01		E-01	
A-02		B-02		C-02		D-02		E-02	
A-03		B-03		C-03		D-03		E-03	
A-04		B-04		C-04		D-04		E-04	
A-05		B-05		C-05		D-05		E-05	
A-06		B-06		C-06		D-06		E-06	
A-07		B-07		C-07		D-07		E-07	
A-08		B-08		C-08		D-08		E-08	
A-09		B-09		C-09		D-09		E-09	
A-10		B-10		C-10		D-10		E-10	
A-11		B-11		C-11		D-11		D-11	
A-12		B-12		C-12		D-12		E-12	
TOTAL									

AGE---------- TOTAL----------

GRADE---------- PERCENTILE----------

APPENDIX IV

SIX LETTER CANCELLATION TEST

SIX LETTER CANCELLATION TEST

Instructions:

1. Search out the target letters given below and cancel them by slash (/)
2. Cancel as many as possible within the given time
3. Start and stop only when told

Target letters:
J, T, K, M, U, F

J	G	Y	L	S	E	T	B	L	U	V	G	K	H	A	W	U	J	M	K	R	B
X	N	O	D	F	C	K	N	E	H	W	Z	L	J	S	D	Q	L	N	H	U	O
U	K	W	A	I	M	P	G	Q	X	M	F	Y	B	I	R	X	G	F	P	J	K
Z	V	B	H	J	S	Y	D	K	O	S	Q	T	M	P	O	E	I	A	T	L	E
T	L	Y	R	O	Z	L	F	A	U	I	N	Z	G	W	T	J	K	D	R	Y	A
D	S	Q	C	E	T	R	W	Z	J	A	E	H	L	U	Y	V	Z	S	O	N	X
E	W	K	F	H	M	N	C	P	X	R	O	K	I	C	R	F	G	P	I	K	S
G	U	A	P	S	V	I	O	B	D	C	S	F	X	E	H	W	Q	M	L	O	R
H	T	Y	G	D	L	U	Q	G	Y	W	A	B	Z	D	Y	V	U	A	E	Q	P
L	V	O	E	J	Z	F	T	L	E	M	H	Q	J	A	X	R	D	B	Z	N	J
S	W	N	Q	K	H	C	A	Z	N	O	I	S	M	L	E	J	S	H	G	T	F
A	P	F	X	O	R	I	J	B	D	P	K	W	I	J	K	O	R	I	B	Z	A
R	T	Y	B	V	D	X	S	U	F	R	X	O	Q	B	T	B	X	W	D	S	Z
M	I	G	U	W	K	O	C	E	N	V	T	H	Z	M	N	C	U	Y	P	K	E

Total attempted: Wrongly attempted: Net attempted: