**INFLUENCE OF WORKING MEMORY ON ACADEMIC PERFORMANCE AMONG SECONDARY SCHOOL STUDENTS**

**RASEENA. C**

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**DECLARATION**

 I, Raseena.C, do hereby declare that this dissertation entitled “**INFLUENCE OF WORKING MEMORY ON ACADEMIC PERFORMANCE AMONG SECONDARY SCHOOL STUDENTS**” has not been submitted by me for the award of any Degree, Diploma, Title or Recognition before.

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**CERTIFICATE**

 I, Dr. Fathima Jaseena MPM., do hereby certify that this dissertation entitled **INFLUENCE OF WORKING MEMORY ON ACADEMIC PERFORMANCE AMONG SECONDARY SCHOOL STUDENTS** is a record of Bonafide study and research carried out by **Raseena.C,** under my supervision and guidance. The report has not been submitted by her for the award of a Degree, Diploma, Title or Recognition before.

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**CHAPTER 1**

**INTRODUCTION**

* Need and Significance of the Study
* Statement of the Problem
* Definitions of Key Term
* Variable of the Study
* Objectives of the Study
* Hypothesis of the Study
* Methodology
* Scope and Limitations of the Study
* Organization of the Report

 Education is a process of develop from infancy to maturity. The process by which be adopts himself gradually in various ways of his a spiritual and physical environment (Reymont 1969). In this process usually two persons are involved, the educator and the educant. In fact, it is the classroom instruction alone that influences the behavioral changes of the child various factors that are related to classroom also influences social and educational development. Here, it is seen that the first principle of learning is the active participation of the learner is desirable for optional learning to occur. For the active participation a good classroom climate is necessary.

 Sometime children catch the words more effectively. The memory is a system for temporarily story and managing the information required to carry out complex cognitive tasks, such as learning and comprehension. So that, memory classified in to auditory memory, visual- special memory, short term memory and long term memory.

 Our memories are not often challenged in this age of technology. But it is very important to have a fine- tuned working memory for college and career. Understanding and exercising memory is a vital part of a brain based classroom with the new generation of assessment it has become a abundantly clear that the ability to hold information in working memory can make the difference between success and failure.

 It is thought that working memory is central to an understanding of people think and is closely associated with learning. Pupils’ abilities in key areas of reading, writing and mathematics can be closely linked to their scores on working memory test. Early identifications of working memory skills in children is clearly desirable between memory and learning. The aim of education IS to develop the innate potentials of the child.

 Working memory is the system that underlies the capacity to store and manipulate information for brief periods of time. It can be distinguished from short – term memory as it involves both storage and processing of information. While short term memory systems are specialized purely for the temporary storage of material within particular informational domains. Individual differences in working memory have important consequences for children’s ability to acquire knowledge and new skills.

 The term ‘working memory’ refers to the capacity to store and manipulate information in mind for brief periods of time. It provides a mental work space that is used in many important activities in everyday life. Working memory is measured by complex span tasks that require simultaneous short term storage of information while processing additional information.

 To sum up in today’s world the application of technology has resulted in the decrease of memory power. Working memory is conceived as one of the executive functions responsible for goal directed and problem solving behavior.

**Need and Significance**

 The traditional teaching learning method forced the students for rote memorization of learning materials. It reduced retention power of students but today in the constructivist teaching approach leads children towards activity oriented learning which helps them learning by doing. It empowers student’s memory capacity and retention. So the teaching learning process should be organized in a way that helps the development of memory power of students and the retention.

 Even though working memory helps the students to use effective home works and assignment tracking system. It provides written instruction for class work and helps to reducing reading ability with ICT and reducing processing demands. Working memory helps students hold on to information long enough to use it. It provide the pupils to understand and how to use memory prompts such as, pictures, numbers and symbols to represent the sequence of activities. Working memory importance to recognize failures and ensure that all staff working with students who has a poor memory is aware of that facts.

 In addition, students use multi task, they are trying to check various social media sites during their study. It causes lower retention capacity; also they are spending too much time on social sites, and much lesser time on socializing in person. Thus they cannot be considered as an adequate replacement for any face to face communications. Thus the generation is a great deal of time on these social networking sites and not able to communicate with other person effectively. Over use of these social networking sites tends to have a negative effect on the health of all students as it makes them more susceptible to various health problems in the future.

 The availability of technology changed the world and helps the students at all level. The usage of internet reduced memory power, like thinking power, reasoning skills, memory power of mind and effective learning in students. It highlight role of working memory is important in the future performance of children. So it is essential to know the memory power of students.

Asnow students are more engaged in social networking. So it affect their lost of abilities, and memory power. If such a situation is existing, it will seriously influence the learning environment of coming generation. Although, the power of memorization going down day by day. So the need of working memory arises and it is the major component of managing learning activity. Also fewer studies are conducted in the area of working memory in Indian scenario.

**Statement of the Problem**

 The present study is entitled as ‘**INFLUENCE OF WORKING MEMORY ON ACADEMIC PERFORMANCE AMONG SECONDARY SCHOOL STUDENTS’.**

**Definitions of Key Terms**

 The key terms in the statement of the problem are explained below.

**Influence**

 Influence is defined as the power to change or affect someone or something (Webster’s dictionary, 1996).

**Working Memory**

 “Working memory is the term used to refer to the ability we have to hold and manipulate information in the mind over short periods of time. It provides a mental work space or jotting pad that is used to store important information in the course of our everyday life” (Sue Gathercole, 2008).

**Academic Performance**

 Academic performance is the outcome of education the extent which a student, teacher, institution has achieved their educational goals. It is commonly measured by examination or continuous assessment but there is no general argument on how it is best tested or which aspects is most important procedural knowledge such all skills or declarative knowledge. Co- curricular programmes are not to be confused with extracurricular, which are programs that are done in addition to academic programs at another time in the school, co- curricular activities train the students to develop the sense of competitive spirit, cooperation, leadership, diligence punctuality, team spirit and provides a backdrop for the development of their creative talents. Co- curricular activities are those educational activities which are generally pursued outside the classroom but integral part of the school curriculum (for this study academic performance operationally defined as the scores of CE & TE, of secondary school students).

**Secondary School Students**

 It denotes the students those who are studying at the Secondary School affiliated to the Board of Secondary Examination, Kerala.

**Variable of the Study**

 Variables selected for the study are following

* Working Memory
* Academic Performance.

 Besides, the following Variable is treated as classificatory variable.

* Gender
* Type of management
* Locality

**Objectives of the Study**

1. To find out the extent of the working memory of secondary school students for total sample.
2. To know the extent of working memory for the components with respect to the subsamples based on
3. Gender
4. Type of management
5. Locality
6. To test whether exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
7. Gender
8. Type of management
9. Locality
10. To find out whether there is any influence of working memory on Academic performance among secondary school student.

**Hypotheses of the Study**

1. The secondary school students are average in working memory for total sample and in the relevant sub samples based on-
2. Gender
3. Type of management
4. Locality
5. There exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
6. Gender
7. Type of management
8. Locality
9. There exists significant influence of working memory on academic performance.

**Methodology of the Study**

 The study will conducted on a sample of 400 secondary school students.

**Method**

 The method used for study is survey method.

**Sample**

 The study was conducted on a sample of 400 Secondary School Students. Sample selection was done by stratified random sampling technique, giving due representation to the factors like gender, type of management and locality of the study.

**Tool**

* Working Memory Test

**Data Collection Procedure**

 Data will be collect from the students at secondary level who are studying in various schools/institutions, for the purpose of collecting data.

**Statistical Techniques Used**

* Preliminary analysis
* Percentiles
* T test
* ANOVA test

**Scope and Limitations**

 The present study is an attempt to find out the ‘Influence of Working Memory on Academic Performance of Secondary School Students’. It investigates the extent of working memory of secondary school. The concept of working memory is broad so the effort will be tough to select the relevant area which will help to know the level of working memory.

 Even though everyone attempt was made to make the study as precise and objectives as possible. Some limitations have crept in to the study.

 The following are some these:-

* Time constraints.
* A components wise analysis of working memory among the secondary school students is not easy task to practice.

**Organisation of the Report**

 Chapter 1 presents a brief introduction to the problem, need and significance of the study, statement of the problem, definition of the key terms, objective, hypothesis, methodology and scope and limitations of the study.

 A brief description of the variable and studies in the area received by the investigator is attempted in chapter 2.

 In chapter 3 the methodology of the study, describing in detail variable selected, tools employed selection of the sample, and procedure and statistical techniques used for analysis is presented.

 Details of statistical analysis of the data and discussion of results are given in chapter 4.

 Chapter 5 represents the summary of the study, major findings, educational implications and some suggestions for further research.

**CHAPTER II**

**REVIEW OF RELATED LITERATURE**

* Theoretical Overview
* Review of Related Studies
* Conclusion

**REVIEW OF RELATED LITERATURE**

**Theoretical Overview of Working Memory**

 Research project is an investigation to find out something new or reveal something that remains obscure. A perusal of related literature in this respect is very important. It provides with a background for the research project and makes the reader aware of the correct status of the issues. Familiarity with what is already known and what is still unknown and untested helps the researcher to eliminate the duplication of what has been done and provides useful hypothesis and helpful suggestions for significant investigations. (Best and Kahn, 1996). Best and Kahn (1986) notes “since effective research is based upon past knowledge, review of related literature is an important aspects of research study”.

 In the words of our father of nation- “by education, I mean the all round drawing out of best in man and child, mind, body and spirit”. The future of the nation will be secure in the hands of a well educated generation. “You can be more nearer to heaven through football than Githa”. Swami Vivekananda by his words pointing that, a well planned education is necessary to develop awareness and only the well informed people can lead a life. Here the educational awareness gets significance.

 If you believe you have an excellent memory and can keep information in mind easily you probably have a teacher to thank for it. The ability to hang information is not practiced today as was in the past. We have digital tools that have become our working memories. No need to remember your son or daughter and others cell phone number and in your phone. Do you forget some of the many passwords you need for various online accounts? Not to worry, your computer can store them for you. Working memory is the memory system that is responsible for the holding and processing of new and already stored information. For instance, as a student reads a question on an achievement test he/she must comprehend the question to know what they are supposed to do keep that information in mind draw on long-term memories (prior knowledge) and take the new and old information to put together and choose the correct answer or write the answer. All of this is done, of course, with time constraints. Weak working memory skills can affect learning at all grade levels and in all content areas.

 In 1974, [Baddeley](https://en.wikipedia.org/wiki/Alan_Baddeley) and [Hitch](https://en.wikipedia.org/wiki/Graham_Hitch) introduced the [multi component model of working memory](https://en.wikipedia.org/wiki/Baddeley%27s_model_of_working_memory). The theory proposed a model containing three components: the central executive, the phonological loop, and the visuospatial sketchpad with the central executive functioning as a control center of sorts, directing info between the phonological and visuospatial components. The [central executive](https://en.wikipedia.org/wiki/Baddeley%27s_model_of_working_memory#Central_executive) is responsible inter alia for directing [attention](https://en.wikipedia.org/wiki/Attention) to relevant information, suppressing irrelevant information and inappropriate actions, and coordinating cognitive processes when more than one task is simultaneously performed.

 A "central executive" is responsible for supervising the integration of information and for coordinating "slave systems" that is responsible for the short-term maintenance of information. One slave system, the [phonological loop](https://en.wikipedia.org/wiki/Phonological_loop) (PL), stores phonological information (that is, the sound of language) and prevents its decay by continuously refreshing it in a [rehearsal](https://en.wikipedia.org/wiki/Memory_rehearsal) loop. It can, for example, maintain a seven-digit telephone number for as long as one repeats the number to oneself again and again. The other slave system, the [visuo spatial sketchpad](https://en.wikipedia.org/wiki/Baddeley%27s_model_of_working_memory%22%20%5Cl%20%22Visuospatial_sketchpad), stores visual and spatial information. It can be used, for example, for constructing and manipulating visual images and for representing mental maps. The sketchpad can be further broken down into a visual subsystem (dealing with such phenomena as shape, colour, and texture), and a spatial subsystem (dealing with location).

 In 2000, Baddeley extended by adding a fourth component, the [episodic buffer](https://en.wikipedia.org/wiki/Baddeley%27s_model_of_working_memory#Episodic_buffer), which holds representations that integrate phonological, visual, and spatial information, and possibly information not covered by the slave systems (e.g., semantic information, musical information). The episodic buffer is also the link between working memory and long-term memory. The component is episodic because it is assumed to bind information into a unitary episodic representation. The episodic buffer resembles in to the concept of [episodic memory](https://en.wikipedia.org/wiki/Episodic_memory), but it differs in that the episodic buffer is a temporary store.

 Baddeley investigate a group of children who had been identified as having specific language impairment (SLI). They had a mean age of 8 years, with normal nonverbal intelligence, and a delay of 2 years in language development. They gave them a range of tests, test of verbal memory. This suggested a particular deficit in sound mimicry, the capacity to hear and repeat back onward. On the basis of this finding, they developed a onward repetition test that went considerably beyond the original in incorporating words ranging up to five syllables (Gathercole & Baddeley, 1989).

 Baddeley added sixth component, visual-semantic. Which hold Images and sentences are mapped into a common vector space, where the sentence representation is computed using LSTM. One of the main conclusions made by Geers in 2003 after comparing word reading and comprehension levels of children with early implantation was that children who experience deafness early in their development have a better prognosis for normal literacy development than ever before.

 Atkinson and Shiffrin also used the term to refer short- term memory, which they called “short- term store”. Short- term memory is the essential link between accessing information and storing it. “Without rehearsal, elaboration and contact with long-term memory information is quickly lost from short- term Working Memory” (Pisoni and Geers, 1998).

 There are two types of working memory: **auditory memory and visual- special memory**. Working memory us a cognitive system with a limited capacity that is responsible for temporarily holding information available for processing. Working memory is important for reasoning and the guidance of education making and behavior.

 In order to understand working memory and how it operates in our daily lives it is important to understand the different forms of memory that store a variety of information some of which are permanent stores and others more fleeting.

Different forms of memory are given below:-

**Procedural Memory**

 Procedural memory is formed of learned skills involving co-ordination of physical movements such as writing your name or driving a car. Once established these memories last a lifetime.

**Semantic Memory**

 Semantic memory means we store items of information that we frequently use or are exposed to; the capital of France, 5+5, the name of the first woman prime minister. If this information is frequently used- retrieved from the memory store-it will last a lifetime. However it will become more difficult to access if it is not used.

**Autobiographical Memory**

 It is the store of facts and significant events from your life such as a wedding day, first day at school. It comprises lots of sensory memories of feelings, sound, smell, taste and sight. These stimuli make the memories very strong and they can be easily brought back by experiencing the same sounds (e.g. songs), smells and other sensory stimuli.

**Episodic Memory**

 Episodic memory records the details of particular experiences and only lasts for up to several days the time that you need to store that particular information. For example remembering your supermarket delivery is due at 10am tomorrow.

 Once the need for that particular memory has passed then it will fade. Why is working memory important in classroom learning? Many of the learning activities that children are engaged with in the classroom, whether related to reading, mathematics, science, or other areas of the curriculum, impose quite considerable burdens on working memory. Activities often require the child to hold in mind some information (for example, a sentence to be written down) while doing something that for them is mentally challenging (such as spelling the individual words in the sentence).

 These are the kind of activities on which children with poor working memory struggle with most, and often fail to complete them properly because they have lost from working memory the crucial information needed to guide their actions. As a result, the children may not get the learning benefit of successfully completing an activity, and this slows down their rates of learning. Children with poor working memory also have problems following lengthy instructions to do one thing after another, because they forget the instruction before the whole sequence of actions has been completed. As a consequence, the child will often not engage properly with the normal pace of ongoing classroom activities. Often it appears that the child has not paid attention, when in fact they have simply forgotten what it is that they have to do.

 Working memory also needed for to remember where we have got to a complicated mental activity. Consider the case of a child with low working memory capacity attempting to follow the teacher’s instructions to write down a sentence she has just spoken. The child not only needs to hold the sentence in working memory for sufficiently long to guide his or her attempts to write the individual words, but needs to remember how far they have got in this attempt, and to find the next word in working memory. Although the skilled writers seems like an easy task, children with poor working memory capacities find this extremely difficult, and often either skip or repeat words and letters as they lose their place in this demanding mental activity.

 Characteristics of children with poor working memory:-

* Are reserved in group activities in the classroom, rarely volunteering answers and sometimes not answering direct questions.
* Behave as though they have not paid attention, for example forgetting part or all of instructions or messages, or not seeing tasks through to completion.
* Frequently lose their place in complicated tasks that they may eventually abandon, forget the content of messages and instructions.
* Make poor academic progress during the school years, particularly in the areas of reading and mathematics.

 Working memory is generally considered to have limited capacity. An early quantification of the capacity limit associated with short-term memory was the "[magical number seven](https://en.wikipedia.org/wiki/The_Magical_Number_Seven%2C_Plus_or_Minus_Two)" suggested by Miller in 1956.  He claimed that the information-processing capacity of young adults is around seven elements, which he called "chunks", regardless whether the elements are digits, letters, words, or other units. Later research revealed this number depends on the category of chunks used (e.g., span may be around seven for digits, six for letters, and five for words), and even on features of the [chunks](https://en.wikipedia.org/wiki/Chunking_%28psychology%29) within a category. For instance, span is lower for long than short words.

 Advantages of Working Memory:-

* An individual with better working memory will experience better ability to focus, resist distractions, and control impulses.
* The training benefits are comprehensive, but they all help to increase working memory capacity.
* It outlines Short Term Memory which help in explains effectively our ability to carry out tasks.
* The Working Memory model has been influential and is still being developed and expanded.
* Working Memory facilitate Continuous improvement, making more disciplined dietary choices, being more attentive in everyday life, coping with age-related cognitive decline and being in a better mood are important for working memory.
* Working memory helps kids hold on to information long enough to use it.
* Working memory plays an important role in concentration.
* Weak working memory skills can affect learning in many different subject areas including reading and math.
* Working memory is responsible for many of the skills children use to learn to read. Auditory working memory helps kids hold on to the sounds letters make long enough to sound out new words. Visual working memory helps kids remember what those words look like so they can recognize them throughout the rest of a sentence.

 In general, memory span for verbal contents (digits, letters, words, etc.) depends on the phonological complexity of the content (i.e., the number of phonemes, the number of syllables), and on the lexical status of the contents (whether the contents are words known to the person or not).Several other factors affect a person's measured span, and therefore it is difficult to pin down the capacity of short-term or working memory to a number of chunks. Nonetheless, Cowan proposed that working memory has a capacity of about four chunks in young adults (and fewer in children and old adults).

 Whereas most adults can repeat about seven digits in correct order, some individuals have shown impressive enlargements of their digit span up to 80 digits. This feat is possible by extensive training on an encoding strategy by which the digits in a list are grouped (usually in groups of three to five) and these groups are encoded as a single unit (a chunk). For this to succeed, participants must be able to recognize the groups as some known string of digits. One person studied by Ericsson and his colleagues, for example, used an extensive knowledge of racing times from the history of sports in the process of coding chunks: several such chunks could then be combined into a higher-order chunk, forming a hierarchy of chunks. In this way, only some chunks at the highest level of the hierarchy must be retained in working memory, and for retrieval the chunks are unpacked. That is, the chunks in working memory act as retrieval cues that point to the digits they contain. Practicing memory skills such as these does not expand working memory capacity proper: it is the capacity to transfer (and retrieve) information from long-term memory that is improved, according to Ericsson and Kintsch (1995; see also Gobbet & Simon, (2000).

**Theoretical Overview of Academic Performance**

 Academic Performance is the student’s ability and performance; it is directly related to human growth and cognitive, emotional, social and physical development. It reflects the whole child. It is not related to a single instance but occurs time and levels through a student’s life.

 Academic achievement/ performance represents, performance outcome that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, especially in school, college and university. School system mostly defines cognitive goals that either apply across multiple subject areas (e.g., critical thinking) or include the acquisition of knowledge and understanding in a specific intellectual domain. There for, Academic Performance should be considered to be a multifaceted construct that comprises different domains of learning. Because the field of academic achievement is very wide- ranging and covers a broad variety of educational out comes. The definition of academic performance depends on the indicators used to measure it. Among the many criteria that indicate academic performance, there are very general indicators such as procedural and declarative knowledge acquired in an educational system.

 Academic Performance is the outcome of education the extent which a student, teacher or institution has achieved through their educational goals. It is commonly measured by examination or continuous assessment, but there is no general agreement on how it is best tested or which aspects is most important procedural knowledge, such as skill or declarative knowledge. Education is a unique investment and Academic Performance is vital aspects of it. Academic Performance is considered as key to judge one’s potentialities and capacities hence parents and teachers become highly disappointed when children fall behind in academic performance. The reason for achieving low in academic is numerous. The physical disabilities, poor family background emotional conflicts, lack of social interaction are some of them. Deficiency in intelligence is however considered as the most critical reason for the scholastic backwardness of children. Low achievement is defined as a discrepancy between actual ability and achievement. Low achievement can occur due to poor self concept lack of family involvement and encouragement, peer pressure, cultural deprivation, study skill deficiency, emotional problems, physical illness and lack of academic motivation or lack of interest in school subjects and curriculum. To recognize these problems and provide solution make this type of students active and happy.

 Some students demonstrate their competence by serving as student body president or holding officer position in student group such as social club or the science club or they regularly organize students’ events. By education we mean all-round development of the child and hence by analyzing Academic Performance we analyses the all-round development attained through the educational objectives.

 Academic Performance can be regarded as the observable and measurable behavior of a student in a particular situation. For attainment of good performance from the part of child, teacher must effectively transact the objectives that help to obtain the educational goal and evaluate the performance of children and understand the problem for backwardness in particular area.

 Academic Performance includes all-round achievement of the students and help the teacher understand a student in totality and we can understand the excellence and backwardness of a child in different fields.

**Review of Related Studies**

 A brief report of the studies carried out on working memory of the students is given below.

**Studies on Working Memory**

 Alleyway (2011) revealed that when children had low working memory skills, they had a pattern of poor performances in a range of core subjects as well as in areas like art and music. This pattern of poor performances a range of core subjects as well as art and music. This pattern of poor performance remained even when the student's IQ was statistically accounted for. This study corresponds to evidence suggesting that working memory is even more important than other cognitive measurements such as IQ. For example, in typically developing students, Alleyway found that their working memory skills at five years old, rather than IQ, were the best predictor of achievement in reading, spelling, and math outcomes six years.

 Beer et al (2010) explained that auditory working memory in action is when the subject remembers individual sounds in a given word and then blends those sounds to recognize the word. From that point auditory working memory is used to remember the words of a sentence and their order so that the words can be put together to comprehend the meaning of the sentence. Those sentences are then remembered and put together to comprehend the meaning of a paragraph. Thus, working memory is critical for basic language skills that are required for recognizing words and understanding sentences and paragraphs.

 Gather Cole and Alleyway (2010) suggests strategies for teaching kids with working memory difficulties, they advise teachers to break down tasks and instruction into smaller components. It is also important to prompt kids with regular reminders of what they need to do next to finish a task. Children should be encouraged to ask questions when they have list their way. And children may benefit from being asked to repeat key information back.

 In a recent longitudinal study, Tracy and Ross Alleyway (2010) measured the IQs and working memory skills, assessing not only IQ and working memory, but also each child and academic achievement in reading, spelling and math. The results were sobering. Early working memory skills were a better predictor of later academic achievement then were early IQ scores. And, unlike IQ and working memory did not correlate with the parents and socio economic status or educational level.

 Holmes et al (2009) identified a group of school children- aged – 8 to 11 who performed poorly on the Automated Working Memory Assessment (AWMA). One is a test for screening children with poor Working Memory Deficit. Next, the children were enrolled in a computer- based training program developed by Cogmed (Holmes et al 2009). For about 35 minute’s day, children played computer games that challenged their working memory skills.

 Keyle and Harris (2006) presented in this review have shown a link between working memory and language acquisition as well as reading abilities. In typical hearing children, it is widely accepted that phonological awareness- the ability to distinguish between and manipulate the constituent sounds of words- is one of the strongest predictors of literacy achievement. Therefore, we must conclude that auditory working memory is especially important for language skills and development. To integrate auditory information in a meaningful way, one must rely on domain-general processes such as attention, working memory, executive functions and processing speed.

 Kane et al. (2004) indicates that subjects who responded with the correct answer for one set of span stimuli in these tasks (e.g., equation word pairs in operation span) tended to respond with the correct answer on the others (and vice versa).

 Barrouillet et al. (2004) found that a complex memory span paradigm in which they separately manipulated the rate of presentation of the memory items and the number of intervening items to be processed, complex memory span was found to be a direct linear function of the cognitive cost of the processing activity, computed as a ratio of the number of processing items divided the period over which they were presented. Thus, processing intervals that had relatively high loads (in other words, a relatively large number of items per unit time) were associated with lower span scores than processing intervals with low cognitive loads (low numbers of items per unit time).

 Geers (2003) explained an individual's digit span as “the number of spoken digits he or she is able to repeat back in the correct order (forward span) or in the reverse of the order (backward span)”. The string of numbers presented increases with every trial. The subject's digit span score is determined based on the length of the longest string of numbers he or she can recall correctly. Digit span is considered a measure of working memory capacity which has been found to be related to a variety of post implant outcome measures.

 Burkholder and Pisoni (2003) found that normal hearing children were able to retrieve information three times faster than children with cochlear implants. Hearing children also had shorter pause times between retrieved segments than children with cochlear implants. From these results, the researchers believe that children with cochlear implants showed slower serial recall. On-Word Repetition for this task the subject is required to repeat individual non-words of increasing length from one to five-syllable non-words. Working memory is unaffected by external environmental issues such as parents' educational level or socio-economic circumstances.

 Keeldson.et, al (2003) showed that measures of reading comprehension and word decoding correlate with phonological skills in hearing children. This research implies that children with CI also used phonological (coding) skills in reading (The central executive component of working memory allows one to store current information while the previous information is accessed. The two sets of information are then integrated so that one may understand what is being read. Basically, in order to comprehend while one is reading, it is necessary to “hold onto” what was just read while simultaneously “reaching back” to what was read previously.

 Hitch et al. (2001) found in each case, the period over which information was stored was a better predictor of complex memory span than the difficulty of the processing activity. This has led to the claim that complex memory span is constrained by a time-based loss of activation of memory items.

 Klein and Boals (2001) found that individuals who reported more life event stress scored lower on operation span than low life event stress individuals. The interpretation was that stressful events captured attention resources, which reduced ability to perform the Working Memory span task.

 Garrison, Long &Dowaliby (1997) found that the overall capacity of working memory is not different between good and poor readers. Rather they suggested that good readers are simply more efficient at processing information.

 Case et al. (1982) revealed that the developmental increases in working memory performance across the childhood years. They proposed that the total working memory resource remains constant as the child matures, but that the efficiency of processing increases, releasing additional resource to support temporary storage.

**Studies on Academic Performance**

 Shoukat Ali and Zubair Haider (2013) in a study, it was design to investigate the factors affecting academic performance of graduate students of Islamia University of Bahawalpur Rahim Yar Khan Campus. The data were collected from 100 students. The findings revealed that age, father’s social economic status and daily study hours significantly contribute the academic performance of graduate students.

 Joshi and Maya (2013) a study of motivation in relation to Academic Performance and selected psychological and background variables of students at intermediate level. The sample take for study consists of 600 students from class 12th. Academic Performance appeared to be significantly and positively related with self sentiment but negatively related with motivation in boys but in girls group Academic Performance was negatively correlated with career and motivation.

 Subramanian (2013) conducted a study, academic achievement of student with respect to parent child relationship and ordinal number. The sample consist 100 students from English medium school. The result indicated that mothers protecting nature and punishing tendency contribute more to the child’s academic achievement than the father.

 Upadhaya (2012) attempted a study of need achievement in relation to socio economic status of high school boys. Sample consists of 200 boys. The study revealed that correlation between total socio economic status and need achievement is significant.

 Bini and Sadanathan (2009) conducted a study between family relationship and academic achievement among higher secondary students. The sample consists of 300 higher secondary school students. The result revealed that there is no significance correlation between family relationship and academic achievement among higher secondary school students.

 Waters (2006) find out the Academic Performance of 575 medical students learning in rural settings differ from those learning in urban setting. Through the result no significant difference was found between academic performance of rural and urban students.

 Vamadevappa (2005) attempted in a study impact of parental involvement on academic performance achievement. The sample of the study was 200 students studying in 6th standard consisting 100 boys and 100 girls were selected from four higher secondary school of Deventer cities in Karnataka. The result of the study found that girls are better than boys in their academic achievement.

 Avanachilingam and Sharma (2005) examined identification of factors influencing student’s Academic Performance. A sample of final year undergraduate agricultural students of 2001 batch was taken has the sample the result of study revealed that the factors motivating students academic performance were classified as classroom factors, environmental factors, hostel factors and library factors.

 Babu and Kaliamoorthy (2005) try to study on higher secondary students’ achievement in accountancy and their parental encouragement on a sample of 700 higher secondary students. The study revealed that higher secondary students have moderate achievement.

 Tavani and Losh (2003) studied motivation, self confidence and expectation has predictors of Academic Performance on a sample of 4012 high school students. The finding indicated that parental education was found to be significant predictors of educational achievement parental education has also positive relationship with achievement motivation of the student.

 Misra (1986) in his study revealed that there was a positive relationship between SEs and academic achievement of the 500 secondary school students. The academic achievement of rural students was lower than that of urban students. The academic performance of girls was superior to the performance of boys.

**Conclusion**

 From the overall review of available literature mentioned above the investigator could reach the following conclusion.

 Review of related literature presented above indicates that there is limited number of studies based on memory is less. No study has been conducted on working memory and academic performance.

 Different studies have proved the different concepts of working memory. Some of the studies shows the advantages of working memory. (Case et al. 1982, Tows and Hitch, 1995). And several studies pinpoint the problems due to lackness of working memory. (Alleyway, 2011, Burkholder and Pisoni, 2003). These studies reveal the importance of working memory in education. However this review helped the investigator to get sufficient information regarding the present study, from this it can be seen that there are so less studies conducted in the area of them in working memory and its components. In the case of academic performance most of the studies are related to different area not in connection with memory aspects. It highlights the importance to know how working memory influences on academic performance in the life of adolescence.

**CHAPTER III**

**METHODOLOGY**

Variable of the Study

Objectives of the Study

Hypothesis of the Study

Procedure

Data Collection Procedure

Scoring and Consolidation of Data

Statistical Techniques used for Analysis of Data

**METHODOLOGY**

 The success of any research work depends upon the suitability of the methods, tools, and techniques followed by the researcher in collecting and processing data and statistical techniques applied for analyzing the data for drawing out the conclusion. An appropriate method is helpful to the researcher in exploring the divers areas of study where as an inappropriate method will prove fatal in the findings of the study. A research method is a way to systematically solve the research problem. It may be understood as a science of studying how research is done systematically. Methodology is the science of proper modes and orders f procedure.

 Research being is “the process of arriving the dependable solution to problem through planned and systematic collection, analysis and interpretation of data, the need for adopting right method for carrying out a study is important”(Mouly, 1970).

 The present study is an attempt to find out the influence of working memory on Academic performance among secondary school students. The methodology adopted for the study is described under the following headings.

* Variable of the study
* Objective of the study
* Hypothesis of the study
* Sample selected for the study
* Tool used for data collection
* Data collection procedure
* Scoring and consolidation of data
* Statistical techniques used for analysis

**Variable of the Study**

 The present study is concerned with variable

* Working memory
* Academic Performance

 Besides, the following Variable is treated as classificatory variable.

* Gender
* Type of management
* Locality

**Objectives of the Study**

1. To find out the extent of the working memory of secondary school students for total sample.
2. To know the extent of working memory for the components with respect to the subsamples based on
3. Gender
4. Type of management
5. Locality
6. To test whether exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
7. Gender
8. Type of management
9. Locality
10. To find out whether there is any influence of working memory on Academic performance among secondary school student.

**Hypotheses of the Study**

1. The secondary school students are average in working memory for total sample and in the relevant sub samples based on-
2. Gender
3. Type of management
4. Locality
5. There exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
6. Gender
7. Type of management
8. Locality
9. There exists significant influence of working memory on academic performance.

**Tool Used for the Study**

 Tool is the instrument developed or adopted by the investigator to collect data. The tool must collect relevant and appropriate data in order to achieve the stated objective; the investigator has developed the following tool.

**Working Memory Test**

 Working Memory test is a test used to find out the working memory level of secondary school students in different dimensions. The procedure of construction of working memory test described under the following headlines.

* **Planning of the Test**

 Working Memory Test includes different items from seven components under working memory. Each component includes 10 items. Each component has different concepts, so separate activity and task was added in every component. Thus all the items were prepared.

 For the preparation of the test the investigator made an extensive study on the features of Working Memory and its components. On the lights of these idea and discussions with teachers the investigator prepares the test. For the purpose of the study, the terms describing key components of Working Memory are given below.

1. Central Executive
2. Phonological Loop
3. Episodic Buffer
4. Visuo- spatial Sketchpad
5. Language
6. Visual Semantic
7. Short term Episodic memory
* **Preparation of the Test Items.**

 The test items were prepared in accordance with seven components of working memory. After preparing the test items, the investigator avoided ambiguous and vague items and added some new items. The item has pooled of seven areas.

1. **Central Executive**

 The central executive is the most important component, which means it is a flexible system responsible for the control and regulation of cognitive process.

 Some pictures of famous personalities were shown and asked to write each names within prescribed time. This component includes six items.

Example: - Famous personalities

1. Mahatma Gandhi 6) Barak Obama
2. Vivekananda 7) Raja Ram Mohan Roy
3. Dr. B.R. Ambedkar 8) Napoleon
4. A.P.J.Abdul Kalam 9) Adolf Hitler
5. Bhagath Singh 10) Abdul Kalam Azad
6. **Phonological Loop**

 The phonological loop (or articulator loop) as a whole, it deals with sound or phonological information.

 Some different sounds were played with the help of audio equipment, and asked to write each sounds within 15 minutes. This component includes six items.

Example: - **Songs**

1. Yesudas 6) Vineeth Sreenivasan
2. Usha Uthupp 7) Vaikkam Vijayalakshmi
3. K.S.Chithra 8) S. P. Balasubrahmanyan
4. Jasi Gift 9) Adnan Sami
5. Gopi Sunder 10) Kalabhavan Mani
6. **Visuo- spatial Sketchpad**

 The Visuo- Spatial Sketchpad it is the store which holds visual information for manipulation and temporary storage of visual and spatial information.

 Some different shapes were shown with the help of a PC and ask to draw within limited time schedule. This component includes six items.

Example: - **Draw the forms**

1)  2) 3) 4) 5)

1. **Episodic Buffer**

 The term episodic memory means it is a limited capacity of passive system dedicated to linking information across domains to form integrated units of visual, spatial, and verbal information with time sequencing (or episodic chronological ordering).

 Some historical incidents were shown through video clip and ask to write these in a sequence order within the time schedule. This component includes six items.

Example: - **Historical Incidents**

1. Independent of India 6) Development of Technology
2. Colonialism 7) Election Procedure
3. Formation of Constitution 8) Reversion of Britain
4. Educational Reforms 9) Nehru, the first prime minister
5. First World War 10) Malabar Rebellion
6. **Language**

 Alanguage is a system of communication which consists of a set of sounds and written symbols which are used by the people of a particular country or region for talking or writing.

 Here, some objective type questions were given and ask to write correct from the options given within the time limit. This component includes six items.

Example: - **A person who knows many languages is called.**

1. Illiterate 2) Bilingual 3) Literate 4) Multi- lingual
2. **Visual Semantic**

 Visual Semantics is the study of meaning. It focuses on the relation between and signifiers like words, phrases, signs, & symbols, and what they stand for, their denotation. Linguistic semantics is the study of meaning that is used for understanding human expression through language. It is the category of declarative memory.

 Some original videos on natural calamities were shown and asked to write these names within prescribed time limit. This component includes six items.

Example: - **Natural Calamities**

1. Tsunami 6) Earthquake
2. Acid Rain 7) Flood
3. Pollution 8) Typhoon
4. Drought 9) Katrina Storm
5. Volcano 10) Well Crack
6. **Short – term Episodic Memory**

 Short*-*term episodic memory means it is the capacity for holding, but not manipulating. It is the second stage of multi- store memory model proposed by Atkinson Schifrin. The duration of Short- term Episodic Memory seems to be between 15 and 30 seconds and the capacity about 7 items.

 Daily used materials were shown and asked to write their names within 30 seconds. This component includes six items.

Example: **- Identify the materials**

1. Spray 6) Powder
2. Specs 7) Mascara
3. Towel 8) Lipstick
4. Bangle 9) Chain
5. Ring 10) Pin
* **Scoring and Consolidation of Data**

 The response sheets were scored according to the scoring key prepared for the purpose. The test on working memory contains questions of seven dimensions. Each question carries 10 options. 10 marks were given for those who correct/complete the whole activity. 5 marks were given who finish half of the activity. The remaining were given based on the number of correct answer.

* **Sample selected for the study**

 For the present study the investigator selected sample from the secondary school students in Malappuram and Kozhikode districts. The sample constitutes 400 secondary school students from 8 schools. In selecting the sample the investigator include three major aspects.

Table 1

*Break-up of the sample*

Total Sample = 400

|  |  |
| --- | --- |
| Gender | Type of Management |
| Male | Female | Government | Aided | Unaided |
| 174 | 226 | 119 | 111 | 170 |

|  |
| --- |
| Locality |
| Urban | Rural |
| 119 | 281 |

**Gender**

 Gender has great influence on findings of a research. So investigator gave due representation to both the male and female in the present study.

**Type of management**

 The investigator has taken 111 students from aided, 170 students from unaided and 119 students from government schools.

**Locality (urban/rural)**

 The investigator divided the population in to two on the basis of locale of school. That is rural and urban secondary school students. The investigator selected urban and rural in the ratio 3:1.

**Data Collection Procedure**

**Administration of the tool**

 After the selection of the sample the investigator made necessary arrangements for the administration of the tool. The investigator sought permission from the Headmaster/ Headmistress of selected school for collecting data and made necessary arguments for it. The investigator met the students in the class and explains the test items of study.

 The investigator conducted a Working Memory Test among the secondary school students with the administration of prepared tool. They were given sufficient time for fill/ complete the activity to all items in respective area which is already given. Before starting the test, detailed descriptions of procedure for completing the tool was given. It was different steps for every component in the test and also sufficient directions were given for completing the item/ activity.

**Reliability**

 Reliability of a test refers to its consistency. Otherwise reliability ensures degrees to which a test agrees with itself. The validity of the present tool was established by test- retest method. Reliability of this test was estimated by test- retest method on a sample of 68 students with a gap of one week between two administrations. The reliability co- efficient obtained is .002. The value indicates that the test is reliable to measure the Working Memory.

**Validity**

 The validity of the present test was ensured by using face validity. Each item of the test was evaluated by the expert in the field. Modifications were made in the test as per the suggestions of these experts before finalizing the test.

 According to Best and Kahn (2012) validity is that “quality of data gathering instrument or procedure that enables to measure what is supposed to measure”.

 The validity of a test means that the item must not only elicit stable or reliable response, but they must also provide the kind of information which the researcher wants. A test is said to have face validity when it appears to measure whatever the author had in mind. Namely, what he thought he was measuring. For this, investigator established face validity. To ensure the face validity the investigator consulted experts in the area during the development of the tool and the tool was given to the experts for approval of items for testing working memory among secondary school students. The items were prepared in the least ambiguous way so that the component comprehended the test clearly and can respond to the items without misunderstanding. Thus the face validity was ensured.

* **Statistical Techniques**

 The score obtained from 400 students were subjected to statistical treatment. Statistical techniques used in the present study were: -

* Preliminary analysis
* Percentiles
* t- Test
* ANOVA test
* **Preliminary Analysis**

 Preliminary statistics like mean, standard deviation, skewness and kurtosis were calculated for the variable Working Memory for the total sample and sub sample based on gender, type of management and locality.

* **Percentiles**

 The Percentile Norms for the Total Sample to find out the Extent of Working Memory. It can be calculated using the formula.

**Pp=L+ (pN-F/f) x i** (Garrett, 1981)

Where,

P = Percentage of the distribution wanted.

L = Exact lower limit of the class interval upon which Pp lies.

pN = part of N to be counted off in order to reach Pp.

F = Sum of all scores upon intervals below L.

F = Number of scores within the interval upon which Pp falls.

i = Length of the class interval.

* **Test of Significant Difference Between Working Memory scores**

 Test of significant difference between mean scores of working memory was evaluated by using t- test.

Formula for calculating t is



Where,

X1 = Mean of the upper group for an item

X2 = Mean of lower group for an item

1 = Standard deviation of the upper group for an item

2 = Standard deviation of the lower group for an item

N1 = Sample size of upper group

N2 = Sample size of lower group

* **One way ANOVA**

 To find out whether there exist any significant difference in working memory among the sub groups based on gender, type of management and locality. One way ANOVA techniques was used by the investigator followed with Scheffe’s F test as post hoc analysis. Analysis of variance (ANOVA) has been defined as the separation of variance described to other group (Fisher, 1950) in its simplest form analysis of variance is used to test the significant of the difference between the means of a number of different populations. It is an effective way to determine whether the means of more than two samples are too different to attribute to sampling error. ANOVA is international statistical procedure.

**CHAPTER IV**

**ANALYSIS AND INTERPRETATION**

* Objectives of the Study
* Hypotheses of the Study
* Percentage Analysis
* Preliminary Analysis
* Major Findings
* Tenability of Hypothesis
* One Way ANOVA

**ANALYSIS AND INTERPRETATION**

 This chapter deals with the analysis and interpretation of data described in the methodology chapter. The present study is intended to find out the extent of working memory among secondary school students on the basis of gender, type of management and locality. The analysis is based on the following objectives and hypothesis.

**Objectives of the Study**

1. To find out the extent of the working memory of secondary school students for total sample.
2. To know the extent of working memory for the components with respect to the subsamples based on
3. Gender
4. Type of management
5. Locality
6. To test whether exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
7. Gender
8. Type of management
9. Locality
10. To find out whether there is any influence of working memory on Academic performance among secondary school student.

**Hypotheses of the Study**

* 1. The secondary school students are average in working memory for total sample and in the relevant sub samples based on-
1. Gender
2. Type of management
3. Locality
	1. There exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
4. Gender
5. Type of management
6. Locality

3) There exists significant influence of working memory on academic performance.

**Preliminary Analysis**

 The important statistical properties of the scores on the variable working memory were analyzed as a preliminary step. This will help to get a general idea of the distribution of scores. The mean, median, mode, standard deviation, skewness and kurtosis were calculated for total sample are in the table 2.

Table 2

*Mean, Median, Mode, Standard Deviation, Skewness and Kurtosis for Total Sample.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **N** | **Mean** | **Median** | **Mode** | **Standard Deviation** | **Skewness** | **Kurtosis** |
| Working Memory | 400 | 276.24 | 276 | 279 | 11.52 | 0.094 | -.114 |

**Discussion of the result**

 Table 9 shows that the values of mean, median, mode of variable Working Memory for total sample are almost equal with slight variation only. It can be seen that, values of arithmetic mean, median, mode for the variable Working Memory are 276.24, 276 and 279 respectively. The extent of skewness for the variable Working Memory for the total sample is 0.094 this shows that the distribution is positively skewed. The value of kurtosis is -.11, which suggests that the distribution is leptokurtic. The distribution of the variable working memory is approximately normal. A smoothed frequency curve of Working Memory of Secondary School Students in the total sample as expressed in the following figure.



*Figure 1.* Histogram with Normal Curve of Working Memory for Preliminary Analysis.

**Major Analysis**

**Extent of Working Memory among Secondary School Students in the Total Sample and in the Relevant Subsample**

 This section of the analysis was done to find out the extent of working memory among secondary school students in the total sample and in the relevant subsample based on gender, type of management and locality. As the second step of analysis is in order to find out the significant difference of Working Memory among secondary school students, calculated the percentile and mean score of Working Memory of secondary school students in the total sample and in the relevant subsample.

**Extent of Working Memory for the Total Sample**

Mean and Percentile Scores of Working Memory among Secondary School Students in the Total Sample are presented in given table.

Table 3

*Mean and Percentile Scores of Working Memory among Secondary School Students in the Total Sample.*

|  |  |  |
| --- | --- | --- |
| **Mean of Total Sample** | **Percentile** | **Percentile Value** |
| 276.24 | P10 | 262 |
| P20 | 266 |
| P30 | 270 |
| P40 | 273 |
| P50 | 276 |
| P60 | 279 |
| P70 | 282 |
| P80 | 286 |
| P90 | 291 |

**Discussion of the result**

 The above table 3 reveals that the 10th percentile of the Working Memory scores of Secondary School Students is 262 that mean the Working Memory scores of 10 percentage Secondary School Students lies below the score is 262, also from the table the percentile value also 50 percentages of the 400 students score is 276. It also shows that 90 percentage of the 400 students score below 291 in the distribution of Working Memory scores.

**Percentage Analysis**

**Category wise Analysis of Working Memory**

 The category wise analysis of working memory is given below

1. **Central Executive**

Table 4

*The Percentages of Central Executive Memory based on sub samples*

|  |  |  |
| --- | --- | --- |
| **Sample** | **Sub Sample** | **Central Executive****(Percentage)** |
| Gender | Male | 43.5 % |
| Female | 56.5 % |
| Type of Management | Government | 42.5 % |
| Aided | 27.75 % |
| Unaided | 29.75 % |
| Locality | Urban | 77.75 % |
| Rural | 29.5 % |

 Table 4 shows that female students have more capacity in central executive memory than their counter parts. Government school students possess more capacity in this category. Urban students have more than rural school students.

1. **Phonological Loop**

Table 5

*The percentage of Phonological Loop based on sub samples.*

|  |  |  |
| --- | --- | --- |
| **Sample** | **Sub Sample** | **Phonological Loop****(Percentage)** |
| Gender | Male | 41.5% |
| Female | 58.5% |
| Type of Management | Govt | 32.5% |
| Aided | 23.5% |
| Unaided | 44% |
| Locality | Urban | 60.75% |
| Rural | 39.25% |

 Table 5 reveals that female student shows better in phonological loop of memory than male students. Unaided students have more phonological loop of memory than government and aided school students. Urban students have more phonological loop of memory than rural school students.

1. **Visuo- Spatial Sketchpad**

Table 6

*The Percentage of Visuo- Spatial Sketchpad based on sub samples*

|  |  |  |
| --- | --- | --- |
| **Sample** | **Sub Sample** | **Visuo- Spatial Sketchpad****(Percentage)** |
| Gender | Male | 48% |
| Female | 52% |
| Type of Management | Govt | 32.5% |
| Aided | 30% |
| Unaided | 37.5% |
| Locality | Urban | 52.5% |
| Rural | 47.5% |

 Table 6 understood that female students are better in visuo spatial sketchpad than male students. Unaided students have more capacity than government and aided school students. Urban students have more visual and spatial capacity than rural school students.

1. **Episodic Buffer**

Table 7

*The Percentage of Episodic Buffer based on sub samples.*

|  |  |  |
| --- | --- | --- |
| **Sample** | **Sub Sample** | **Episodic Buffer****(Percentage)** |
| Gender | Male | 44. % |
| Female | 56 % |
| Type of Management | Govt | 41% |
| Aided | 26.5% |
| Unaided | 32.5% |
| Locality | Urban | 80.25% |
| Rural | 19.75% |

 The table 7 shows that female students have skills in episodic memory than male students. Government school students have more capacity than unaided and aided school students. Urban students have higher than rural school students

1. **Language**

Table 8

*The Percentage of Language based on sub sample*

|  |  |  |
| --- | --- | --- |
| **Sample** | **Sub Sample** | **Language****(Percentage)** |
| Gender | Male | 22% |
| Female | 78% |
| Type of Management | Govt | 36.5% |
| Aided | 19.25% |
| Unaided | 44.25% |
| Locality | Urban | 79% |
| Rural | 21% |

 The table 8 indicates that female students have better language ability than their counter parts. Unaided students are high in language ability than government and aided school students. Urban school students have higher than rural school students.

1. **Visual Semantic**

Table 9

*The Percentage of Visual Semantic based on sub samples*

|  |  |  |
| --- | --- | --- |
| **Sample**  | **Sub Sample** | **Visual Semantic****(Percentage)** |
| Gender | Male | 47% |
| Female | 53% |
| Type of Management | Govt | 56.5% |
| Aided | 23.5% |
| Unaided | 20% |
| Locality | Urban | 66.5% |
| Rural | 33.5% |

 Table 9 shows that female students are better in visual capacity than their counter parts. Government students have more visual capacity than aided and unaided school students. Urban school students have more capacity than rural school students.

1. **Short- term Episodic Memory**

Table 10

*The Percentage of Short- Term Episodic Memory based on sub samples*

|  |  |  |
| --- | --- | --- |
| **Sample** | **Sub Sample** | **Short- term Episodic Memory(Percentage)** |
| Gender | Male | 45% |
| Female | 55% |
| Type of Management | Govt | 30% |
| Aided | 44% |
| Unaided | 26% |
| Locality | Urban | 69% |
| Rural | 31% |

 The table 10 shows that female students have more capacity in short- term episodic memory than male students. Government students have more short- term episodic memory than aided and unaided students. Urban school students have more capacity than rural school students.

**Comparison of Mean Scores of Working Memory**

 In order to check whether there exist significance mean difference in Working Memory between sub groups based on gender, type of management and locality. Test of significance of difference between mean for large independent samples was used.

 The calculated Critical Ratio (t value) were interpreted using the table “t” distribution for two tailed test of significance for appropriate degree of freedom of 0.05 level and 0.01 level of significance.

**Extent of Working Memory among Secondary School Students in the Total Sample Based on Gender**

 Data and result of test of mean scores of Working Memory between male and female students are presented in the given table 11.

Table 11

*Extent of Working Memory Based on Gender*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TOTAL** | **Gender** | **Size of the Sample** | **Mean Score** | **Standard Deviation** | **t value** |
| Male | 174 | 273.54 | 10.12 | 4.19\*\* |
| Female | 226 | 278.32 | 12.11 |

0.01 level\*\*

**Discussion of the result**

 Table 11 shows that the mean scores of Working Memory of male and female are differ significantly. The mean score of male were 273.54 and the standard deviation was 10.12, and in the case of female are 278.32 and 12.11 respectively.

 The ‘t’ value obtained for the variable Working Memory of secondary school students with respect to gender is 4.19 which is greater than 2.58, required value of ‘t’ for significance at .01 level. It can be inferred that there exist significant difference between the mean scores of male and female students in secondary schools. From this result we can generalize that the female students has high Working Memory than male students.

**Extent of Working Memory of Secondary School Students in the Total Sample based on Locality**

 Data and result of teat of mean scores of working memory between urban and rural students are presented in the given table.

Table 12

*Extent of Working Memory based on Locality*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TOTAL** | **Locality** | **Size of the sample** | **Mean Score** | **Standard Deviation** | **t value** |
| Urban | 119 | 281.69 | 12.38 | 6.47 |
| Rural | 281 | 273.93 | 10.32 |

**Discussion of the result**

 Table 12 shows that the mean scores of Working Memory of urban and rural students are differ significantly. The mean scores of urban students were 281.69 and the standard deviation was 12.38, and in the case of rural students are 273.93 and 10.32 respectively.

 The ‘t’ value was calculated for the variable Working Memory of secondary school students with respect to locality is 6.47 which is greater than the tabled value 2.58, the required value of ‘t’ for significance at .01 level.

 From this test result we can interpret that the level of Working Memory was depend upon the locale of the school. i.e., the mean scores of rural and urban pupil were not equal. From this result we can generalize that the working memory of urban secondary school students has high working memory than rural secondary school students.

**One Way ANOVA**

 **To find out the Significant Differences in Working Memory among Subgroups Based on Type of management**

 To find out difference there exist any significant in working memory among subgroups based on type of management, viz., Govt, aided and unaided, the investigator used the technique of one- way ANOVA. The details of ANOVA are given in the table 13.

Table 13

*Result for ANOVA of Working Memory for Government, Aided and Unaided Secondary School Students****.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TOTAL** |  | **Sum of Squares** | **df** | **Mean Square** | **F** |
| Between Group | 5839.207 | 2 | 2919.603 | 24.593 |
| Within Group | 47129.753 | 397 | 118.715 |
| Total | 52968.960 | 399 |  |

0.05\*\*level

**Discussion of the result**

 From table 13 it can be found that ‘F’ value 24.59 for df (2,397)) at 0.01 is significant and it is above 3.00 level. This implies that influence of type of management in working memory among secondary school students is significant at 0.05 level.

 It can be interpreted from the result that there is significant difference between the scores of Working Memory among students of government, aided and unaided schools.

 To know the difference in working memory among secondary school students between the relevant sub samples based on the type of management, Scheffe’s test was done as Post Hoc Analysis.

**Scheffe’s Test of Post Hoc Comparison**

 To determine which one of the three groups cause this difference. Scheffe’s test of post hoc comparison was calculated.

Table 14

Result of Scheffe’s Test for Multiple Comparison.

*Post-hoc*

|  |  |  |
| --- | --- | --- |
| **Type of Management** | **Group Compared (J)** | **Mean Differences(I-J)** |
|
| Govt | Aided | 5.68\* |
| Unaided | 9.12\* |
| Aided | Government | -5.68\* |
| Unaided | 3.43\* |
| Unaided | Government | -9.12\* |
| Aided | -3.43\* |

\*. The mean difference is significant at the 0.05 level.

**Discussion of the result**

 Table 14 shows that there exists significant mean difference among the three groups. The mean difference for Government and aided students (5.68) shows significant differences between their Working Memory.

 The mean difference for the Aided and Unaided Students (3.43) shows significant differences in their Working Memory.

 The mean difference for the Government and Unaided Students (9.12) shows significant differences between their Working Memory.

 Through the Scheffe’s post hoc comparison for working memory interpret that the high working memory is associated with regard to unaided school students, aided school students are in second position and the working memory is lower in government school students.

**To Find Out the Influence of Working Memory on Academic Performance**

 To find out the Influence of working memory on academic performance the investigator used the technique of one- way ANOVA. Based on the academic performance students are categories into three groups viz, low, average and high**.** To find out difference there exist any significant in working memory among subgroups based on academic performance viz., low, average and high, the investigator used the technique of one- way ANOVA**.** The details of ANOVA are presented in the given table.

Table 15

*Result of ANOVA of Working Memory for Academic Performance among Secondary School Students*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Working Memory** | **Sum of Squares** | **df** | **Mean Square** | **F** |
| Between Groups | 758.062 | 2 | 379.031 | 2.882 |
| Within Groups | 52210.898 | 397 | 131.514 |
| Total | 52968.960 | 399 |  |

 From table 15 it can be found that ‘F’ value obtained for analysis of variance are 2.882 which is less than tabled value 3.00for df (2, 397) at 0.05 level. This implies that the influence of Working Memory on academic performance among secondary school students is not significant. From this result we can interpret that there is no significant difference in the scores of Working Memory based on academic performance among Secondary School Students.

**Result of Scheffe’s Test for Multiple Comparison on Academic Performance**

Table 16

*Scheffe’s Post Hoc Comparison on Academic Performance*

|  |  |  |
| --- | --- | --- |
| **Academic Performance** | **Group Compared (J)** | **Mean Differences(I-J)** |
|
| High | Average | 2.59 |
| Low | 4.43 |
| Average | High | -2.59 |
| Low | 1.83 |
| Low | High | -4.43 |
| Average | -1.83 |

**Discussion of the result**

 Table 16 shows that there exists significant mean difference among the two groups. The mean difference for high and average (2.59) shows significant differences between their Working Memory.

 The mean difference for the high and low (4.43) shows significant differences in their Working Memory.

 The mean difference for the average and low (1.83) shows significant differences in their Working Memory.

 It is interpreted that there exists significant different in high and low performance also there exists significant difference in average and low secondary school students in their Working Memory on Academic performance.

**Summary**

 In the present study the investigator attempt to find out the extent of Working Memory among Secondary School Students and the result reveals that the majority of the students are having an average level of Working Memory (65%). The percentages lie at the extreme ends of highly Working Memory (25%) and low Working Memory (10%).

 Comparison of mean score of Working Memory based on gender reveals that female students are better in Working Memory than male students. With respect to the locality there is slight difference between rural and urban secondary school students. From the result of ANOVA, the unaided school students are more working memory than government and aided.

**Tenability of Hypothesis**

 Based on the findings, the tenability of the hypothesis of the study was examined.

 The hypothesis states that there will be significant difference in Working Memory in the sub samples based on

1. Gender
2. Type of management
3. Locality

Result indicates:-

 There is significant difference in Working Memory in the sub sample based on gender. Also found there is significant difference in Working Memory in the sub sample based on locality. So the hypothesis based on these aspects (1and 2) are substantiated.

**Based on the result of ANOVA**

 There is significant difference in Working Memory in the sub sample based on type of management.

 There is significant difference in Working Memory based on academic performance. So the hypothesis based on these aspects is partially substantiated.

**CHAPTER V**

**SUMMARY, FINDINGS, SUGGESTIONS**

**AND CONCLUSION**

* Study in Retrospect
* Variable of the Study
* Objectives of the Study
* Hypotheses of the Study
* Methodology of the Study
* Major Findings of the Study
* Educational Implications of the Study
* Suggestions for Further Research

**SUMMARY AND FINDINGS**

 This chapter provides an overview of the significant aspects of the various stages of the study viz; study in retrospect, major findings, educational implications and suggestions for further research in this area.

**Study in Retrospect**

 Various aspects related to the different stages in the extensions of the present study like problem, variables, objectives and hypotheses are reviewed retrospectively.

**Restatement of the Problem**

 The present study is entitled as “Influence of Working Memory on Academic Performance among Secondary School Students”.

**Variable of the Study**

* Working Memory
* Academic Performance

 Following demographic variables also included in the study.

* Gender
* Type of management
* Locality

**Objectives of the Study**

1. To find out the extent of the working memory of secondary school students for total sample.
2. To know the extent of working memory for the components with respect to the subsamples based on
3. Gender
4. Type of management
5. Locality
6. To test whether exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
7. Gender
8. Type of management
9. Locality
10. To find out whether there is any influence of working memory on Academic performance among secondary school student.

**Hypotheses of the Study**

1. There exist significant different in the scores of working memory for total sample and in the relevant subsample based on-
2. Gender
3. Type of management
4. Locality
5. There exist significant in the different components of working memory among the students based on-
6. Gender
7. Type of management
8. Locality
9. There exists significant influence of working memory on academic performance.

**Methodology of the Study**

 Methodology deals with the description of sample, tool and statistical techniques used for the study.

**Sample**

 The population of the study is secondary school students at government, aided and unaided schools in Malappuram and Calicut districts. The study was conducted in 400 secondary school students drawn from different schools in Malappuram and Calicut districts. The samples were selected by stratified random sampling technique giving due representation to gender, type of management and locality.

**Tool-Working Memory Test**

 This was constructed by the investigator with the help of the supervising teacher. This test consisted of 42 items under six dimensions of variable.

**Statistical Techniques**

 Statistical techniques proposed to be used are:

* Preliminary analysis
* Percentiles
* t- test
* One way ANOVA

**Major Findings of the Study**

 Following are the major findings obtained after analysis of the collected data.

* The result shows that Working Memory among secondary school students is satisfactory to certain extent.
* With respect to Gender shows that the supremacy of female over males in their Working Memory capacity.
* Extent of working memory among secondary school students in the total sample is satisfactory
* 25 percentages of the Secondary School Students are high in Working Memory.
* 65 percentages shows moderate level of Working Memory.
* The obtained value of 10th percentile of the score of working memory among secondary school students is 262, it means only 10 percentages of secondary school students is lie below the score 262. And 20, 30, 40, 50, 60, 70, 80, 90 percentiles are 266, 270, 273, 276, 279, 282, 286, 291 respectively.
* Extent of Working Memory among secondary school students based on type of management shows that unaided school students posses high Working Memory than government and aided school students.
* Extent of working memory among secondary school students based on gender shows that female shows higher capacity than their counter parts. Based on locality urban school students posses more Working Memory than rural school students.
* In category wise analysis female students shows better in central executive dimension than male students. Based on type of management unaided school students have more score in this category. Based on locality urban school students have better result in central executive memory than rural school students.
* In phonological loop of category females have better ability than their counter parts. Unaided school students posses more in this category. Based on locality urban school students more capacity in these aspects.
* Female students possess high capacity in visuo- spatial sketchpad. Based on type of management, unaided school students are better in this type of memory. Urban school students posses high in this category.
* The skill in episodic buffer shows that females are higher than their counter parts. Government school students have better skill in this type of memory. Urban school students have more capacity in this category.
* In the area of language dimension female shows better language ability than males. Unaided students are better in language capacity. Based on locality urban school students have more language power than rural school students.
* In visual semantic memory it is clear that female possess better ability than male students. Government school students show high ability in this category. Urban school students posses more in this memory.
* In the aspects of short- term episodic memory females shows better than others. Aided school students posses more short- term episodic memory than government and unaided. Urban school students more ability in this dimension.
* There exists significant difference in their working memory and Academic Performance

**Conclusion**

 Based on investigation the investigator reached the following conclusion.

* Based on gender, Working Memory among secondary school students differs significantly. Female students have more working memory than males in secondary school students.
* Regarding type of management Working Memory differ significantly among secondary school students.
* Based on locality, the secondary school students are differ in their level of Working Memory. Urban school students posses more working memory than rural secondary school students.
* In category wise analysis female students shows better in central executive dimension than male students.
* Regarding type of management unaided school students have more score in this category.
* Based on locality urban school students have better result in central executive memory than rural school students.
* In phonological loop of category females have better ability than their counter parts. Unaided school students posses more in this category. Based on locality urban school students more capacity in these aspects.
* Female students possess high capacity in visuo- spatial sketchpad. Based on type of management, unaided school students are better in this type of memory. Urban school students posses high in this category.
* The skill in episodic buffer shows that females are higher than their counter parts. Government school students have better skill in this type of memory. Urban school students have more capacity in this category.
* In the area of language dimension female shows better language ability. Unaided students are better in language capacity. Based on locality urban school students have more language power than rural school students.
* In visual semantic memory female students possess better ability. Government school students show high ability in this category. Urban school students posses more in this dimension.
* In the aspects of short- term episodic memory females shows better than others. Aided school students posses more short- term episodic memory than government and unaided. Urban school students more ability in this dimension.

**Educational Implications**

 The present study provides a vivid picture of the Working Memory among secondary school students. It was found that there exists a high, moderate and low between Working Memory and Academic Performance of secondary school students. The value of the research lies in its implications.

* Importance should be given to include the concept of Working Memory in the learning activities for upgrading working memory capacity of school students.
* Boys are less in working memory than girls. Boys are more engaged in social media and other net workings. So, stress should be given to enhance their working memory ability.
* The rural environment should change to equip the elements of working memory capacity among the rural students for improving working memory level.

The following concrete suggestions can be taken in the educational scenario. In order to improve for Working Memory among Secondary School Students:

* In today’s technology era, the power of memory should be increased.
* New generation life style should be changed for using their mental memorization. It will be good for their future learning environment.
* Conduct different kinds of quiz programmes for improve the memorization of students.
* Provide different training programmes for enhancing working memory.
* Curriculum reformers can include elements of memorization to improve working memory of students at secondary level.
* Arrange digital tools for improving memory skill.

 Secondary school students have different opportunities in future. They must face many competitive examinations after completing the course. So enhancing Working Memory is relevant.

**Suggestions for Further Research**

 The present study was an attempt to know Working Memory of secondary school students. The findings of the study obliviously limited in its scope on with respect to other dimensions. Therefore, the investigator envisages some more studies in this area.

1. A study can be conducted to design a module to improve the working memory of students at secondary level.
2. A study may be conducted on school teachers to understand the attitude to the competent towards “working memory: A positive thinking”.
3. The replication of the study can be conducted using comprehensive measures of working memory which would incorporate all dimensions of working memory.
4. Working Memory and cultural Intelligence of secondary school students can be studied in depth.

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**BIBLIOGRAPHY**

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http://[www.harcourt-uk.com](http://www.harcourt-uk.com/)

http://[www.canlearnsociety.ca](http://www.canlearnsociety.ca/)

**APPENDICES**

**APPENDIX I**

**FAROOK TRAINING COLLEGE**

**WORKING MEMORY TEST (MALAYALAM)**

**(2018)**

**Dr. Fathima Jaseena MPM Raseena.C**

**Assistant Professor M.Ed Student**

**Supervising Teacher Farook Training College**

**Farook Training College**

**GENERAL DATA SHEET**

നിർദേശങ്ങൾ:

* നിങ്ങളുടെ വÀത്തസ്മൃതി അളക്കുന്നതിനുള്ള ഒരു ഉപകാരണമാണിത്.
* ഇതിൽ 42 വ്യത്യസ്ത ഇനങ്ങളാണുള്ളത്.
* അതിനുള്ള നിങ്ങളുടെ പ്രതികരണങ്ങÄ പ്രത്യേകം തന്നിട്ടുള്ള കോളത്തിÂ രേഖപ്പെടുത്തുക.
* നിങ്ങളുടെ പ്രതികരണങ്ങÄ രഹസ്യമായിസൂക്ഷിക്കുന്നതും ഗവേഷണാവശ്യത്തിനുമാത്രം ഉപയോഗിക്കുന്നതുമാണ്.

**Name of the student :**

**Name of the school :**

**Gender : M/ F**

**Type of management : Government/ Aided/ Unaided**

**Locality : Urban /Rural**

1. **പ്രശസ്തവ്യക്തിത്വങ്ങൾ(photos**)
2. മഹാത്മാഗാന്ധി
3. സ്വാമിവിവേകാനന്ദ³
4. Dr.ബി.ആÀ.അമ്പേദ്കÀ
5. അബ്ദുÄകലാംആസാദ്
6. എ.പി.ജെ.അബ്ദുÄകലാം
7. ഭഗXv knwഗ്
8. ബരാക്ഒബാമ
9. രാജാറാംമോഹ³dmയ്
10. നെപ്പോളിയ³ബോണപ്പാട്ട്
11. അഡോÄഫ്ഹിറ്റ്ലÀ
12. **സ്കൂൾസാമഗ്രികൾ (സാമഗ്രികൾ)**
13. ചോക്ക്
14. പേന
15. പെ³സിÂ
16. ബുക്ക്
17. ഡസ്റ്റÀ
18. സ്കൈÂ
19. കളÀപേന
20. വടി
21. കണ്ണട
22. വാച്ച്
23. **വസ്തുസാമഗ്രികൾ (documents)**
24. വിസിറ്റിംഗ്കാÀഡ്
25. ആധാÀImÀUv
26. റേഷ³ ImÀUv
27. ബാ¦v ]mസ്ബുക്ക്
28. പാ³കാÀഡ്
29. മുദ്രപത്രം
30. പാസ്പോÀ«v
31. തിരിച്ചറിയÂകാÀഡ്
32. ചെ¡v\_pക്ക്
33. ആധാരം
34. **പ്രധാനതുറമുഖങ്ങൾ (print out)**
35. ബേക്കÂകോട്ട
36. ചെങ്കോട്ട
37. പാലക്കാട്കോട്ട
38. കൊച്ചികോട്ട
39. ടിപ്പുകോട്ട
40. പള്ളിപ്പുറംകോട്ട
41. കൊടുങ്ങല്ലൂÀtImട്ട
42. A©p-sX-§vtIm«
43. കണ്ണൂÀകോട്ട
44. ഹിÂപാലസ്
45. **കായികവ്യക്തിത്വങ്ങൾ (photos)**
46. സച്ചി³ടെണ്ടുÂക്കÀ
47. വിരാട്കോlven
48. സി.കെ.വിനീത്
49. ഐ.എം.വിജയ³
50. Dssk³ t\_mÄ«v
51. പി.ടി.ഉഷ
52. റൊണാÄtUm
53. പി.വി.സിന്ധു
54. ലയണÂsaസ്സി
55. ശ്രീശാന്ത്
56. **എഴുത്തുകാർ(photos)**
57. കമലാസുരയ്യ
58. വൈക്കംമുഹമ്മദ്ബഷീÀ
59. അക്കിത്തം
60. എം.ടി.വാസുദേവ³\mbÀ
61. കുഞ്ഞുണ്ണിമാഷ്
62. ലിയോടോÄtÌmയ്
63. ജെ.കെ.റൗളിംഗ്
64. സÂമാ³റുഷ്ദി
65. ചാÄസ്ഡിക്ക³സ്
66. പുനത്തിÂകുഞ്ഞബ്ദുളള
67. **ജ്യാമിതീയരൂപങ്ങള്‍ (oral )**
68. വൃത്തം
69. ചതുരം
70. ത്രികോണം
71. ദീÀഘചതുരം
72. പഞ്ചഭുജം
73. ഷഡ്ഭുജം
74. കോ¬
75. സിലിണ്ടÀ
76. ക്യൂബ്
77. രേഖ
78. **വനിതാരത്നങ്ങള്‍ (oral)**
79. സരോജിനിനായിഡു
80. ഇന്ദിരഗാന്ധി
81. മലാലയൂസഫ്സായ്
82. മദÀsXരേസ
83. പ്രതിഭാപാട്ടീÂ
84. ലതാമങ്കേഷ്കÀ
85. മമതാബാനÀജി
86. വൃന്ദാകാരാട്ട്
87. സുനിതവിeywസ്
88. കÂ¸നചൗള
89. **പാട്ടുകൾ(കേൾപ്പിക്കുന്നു)**
90. യേശുദാസ്
91. ചിത്ര
92. ഉഷഉതുപ്പ്
93. വിനീത്ശ്രീനിവാസ³
94. ഗോപിസുന്ദÀ
95. ജാസിഗിഫ്റ്റ്
96. വൈക്കംവിജയലക്ഷ്മി
97. എസ്.പി.ബാലസുബ്രഹ്മണ്യ³
98. അദ്നാ³kmമി
99. കലാഭവ³ aണി
100. **മുഖ്യമന്ത്രിമാർ(oral)**
101. പിണറായിവിജയ³
102. ഇ.എം.എസ്.
103. ഉമ്മ³Nm­n
104. സി.എച്ച്.മുഹമ്മദ്കോയ
105. എ.കെ.ആâണി
106. കെ.കരുണാകര³
107. പട്ടംതാണുപിള്ള
108. ഇ.കെ.നായനാÀ
109. വി.എസ്.അച്ച്യുതാനന്ദ³
110. സി.അച്ച്യുതമേനോ³
111. **ചിലശബ്ദങ്ങൾ(record)**
112. മയിÂ
113. താറാവ്
114. കൊക്ക്
115. മാ³
116. കരടി
117. കുയിÂ
118. ഒട്ടകം
119. പ്രാവ്
120. കടുവ
121. ആട്
122. **ഒറ്റയായത്കണ്ടെത്തുക (oral)**
123. കവിത, പുസ്തകം, നോവÂ, ലേഖനം, നാടകം, പേപ്പÀ, ആÀ«nക്കിള്‍
124. സിംഹം, കരടി, കടുവ, ആന, പുലി, ആട്, സീബ്ര.
125. പാറ, ഒട്ടകം, കിണÀ, മരം, മല, മണÂ, പുഴ
126. വിരÂ, ചെവി, തൊലി, മൂക്ക്, കണ്ണ്, നാവ്, നാര്.
127. കേരളം, തമിഴ്നാട്, കÀWmടക, ഗുജ്റാത്ത്, ഇന്ത്യ, ജമ്മു, ആസ്സാം
128. ബെ©v, ഡസ്ക്, കസേര, പുസ്തകം, സ്റ്റൂÄ, മേശ, അലമാര.
129. തിരുവനന്തപുരം, ന്യൂഡÂln, മഹാരാഷ്ട്ര, ഗാന്ധിനഗÀ, ഇറ്റാനഗÀ,

ജയ്പൂÀ, ഭൂവനേശ്വÀ.

1. വൃത്തം, ചതുരം, ത്രികോണം, ഗോളം, ഹെക്സഗ¬, പെâK¬, കോ¬.
2. ല­³, പോÀ¨pKÂ, ഇംഗ്ല­v, ഫ്ര©v, ഡച്ച്, റഷ്യ, അâmÀ«nക്
3. ചന്ദ്ര³, സൂര്യ³, നക്ഷത്രം, മിസോസ്ഫിയെÀ, ഗോളം, ഗ്രഹണം, ഭൂമി.
4. **വരക്കുക (PPT)**

(1) (2) (3)

 

(4) (5)

1. **പൂർത്തിയാക്കുക(PPT)**

(a)

(b)

1. **ശ്രേണിമുഴുവനാക്കുക(PPT)**

(a)

(b) 

1. **വരക്കുക (PPT)**

(a)

(b)

1. **ഓർത്തെഴുതുക(PPT )**
2. Drum
3. Dog
4. Dragon
5. Driver
6. Dusk
7. Duster
8. Dress
9. Diagram
10. Danger
11. Delete
12. **വരക്കുക (PPT)**

(a)(b)(c)

1. **രാജാക്കന്മാർ(Chart)**
2. ഹുമയൂ¬
3. ജഹാംഗീÀ
4. ആലംഗീÀ II
5. മുഹമ്മദ്ഷാ
6. ഔറംഗസേബ്
7. ബാബÀ
8. അക്ബÀ
9. ഷാPഹാ³
10. ഷാPഹാ³ III
11. ഷാആലം II
12. **ചരിത്രസംഭവങ്ങൾ(chart)**
13. ഇന്ത്യയുടെസ്വാതന്ത്യം
14. ഭരണഘടനയുടെരൂപീകരണം
15. വിദ്യഭ്യാസപരിഷ്കാരങ്ങÄ
16. ഒന്നാംലോകയുദ്ധം
17. സാങ്കേതികവിദ്യയുടെആവിÀ`mവം
18. തിരഞ്ഞെടു¸v {]{Inb
19. കോളനീവÂ¡രണം
20. ബ്രിട്ടsâ തിരിച്ചുപോക്ക്
21. നെഹ്റു ആദ്യപ്രധാനമന്ത്രി
22. മലബാÀIലാപം
23. **പ്രധാനമന്ത്രിമാര്‍ (Black Board)**
24. ജവഹÀemÂ s\ഹ്റു
25. മ³മോഹ³ സിംഗ്
26. നരേന്ദ്ര മോദി
27. വാജ്പേയി
28. രാജീവ്ഗാന്ധി
29. ലാÂബഹദൂÀ ശാസ്ത്രി
30. ഗുÂkmരിലാÂ\ന്ദ
31. ഛര¬knwഗ്
32. ഇന്ദിരാ ഗാന്ധി
33. ചന്ദ്രശേഖÀ
34. **ഭൂപടക്രമത്തിലാക്കുക (chart)**
35. മലപ്പുറം
36. കേരളം
37. ഇന്ത്യ
38. ഏഷ്യ
39. റഷ്യ
40. ആഫ്രിക്ക
41. അâmÀ«nക്ക
42. പസഫിക്
43. അറബിക്കടÂ
44. കോവളം
45. **ക്രമത്തിലാക്കുക (സിനിമയിൽനിന്ന്ചിലഭാഗങ്ങൾകാണിക്കുന്നു)**
46. വീട്
47. വാതിÂXpറക്കുന്നു
48. അങ്ങാടിയിലേ¡v t]mകുന്നു
49. അങ്ങാടി
50. മാÀ¡റ്റിÂ
51. പണംകൈമാറÂ
52. തിരിച്ചുവീട്ടിലേക്ക്
53. വീട്ടിലെത്തുന്നു
54. കിഴിഅമ്മയെഏÂ¸nക്കുന്നു
55. വാതിÂ Aടക്കുന്നു
56. **ക്രമീകരിക്കുക (chart)**
57. അ
58. ല
59. ക
60. മ
61. ന
62. വ
63. യ
64. ശ
65. ഴ
66. ത
67. **ശരിയായപദംതിരഞ്ഞെടുക്കക(PPT)**
68. പതിവൃത
69. പതിവ്രത
70. പദിവ്രധ
71. പതിവ്രദ
72. A elephant
73. An elephent
74. A elephent
75. An elephant
76. **പൂരിപ്പിക്കുക (chart)**

I say my prayers …………….. I sleep

1. When
2. After
3. Before
4. **A person who knows many languages is** called (chart)
5. Illiterate
6. Bilingual
7. Literate
8. Multi-lingual
9. **ഉചിതമായഅർഥംതെരഞ്ഞെടുക്കുക. (PPT)**

Delay in the submission of the case is regretted

1. Cu tIkv kaÀ¸n-¡p-hm³ -Xm-akn¨-XnÂ ]Ým-¯-]n-¡p-¶p.
2. Cu Imcyw kaÀ¸n-¡p-hm³ Ime-Xm-akw h¶p-t]m-b-XnÂ tJZn-¡p-¶p.
3. Ime-X-amkw h¶p-t]mb Cu Imcyw {i²n-¡p-I.
4. Xma-kn¨ Cu Imcyw £Wn-t¡-­-Xm-Wv.
5. **കേട്ടെഴുതുക**
6. വിദ്യുച്ഛക്തി
7. തത്ത്വÚmനി
8. വിÚmനം
9. കൃത്യങ്കരൂപം
10. ഉത്കണ്ഠ
11. പ്രഥമദൃഷ്ടി
12. അംബരം
13. ദ്വന്ദ്വ³
14. ആപാദചൂഡം
15. അഭിവൃദ്ധി
16. **ബന്ധങ്ങള്‍കണ്ടെത്തുക (PPT)**
17. അദ്ധ്യാപക³ :: അമ്മ:: രാവ്::
18. പെ¬കുട്ടി:: വെള്ളം:: ഇടി::
19. ഡോക്ടÀ:: പ്രതിമ:: ദുഃഖം::
20. പൊലീസ് :: രാജാവ്: മുന്നിÂ ::
21. മഴവില്ല് :: മേശ :: മധുരം ::
22. തമസ്സ് :: ചൂട്:: പരാജയം ::
23. ആഴ്ച :: ഭൂമി :: ചന്ദ്ര³ ::
24. ഇ.സി.ജി :: കറുപ്പ് :: യൗവ്വനം ::
25. ആദ്യം :: കൊടുക്കുക:: മഷി ::
26. സാനിയ :: ശ്രീശാന്ത് :: വിദേശി ::
27. **പക്ഷികള്‍ (photos)**
28. പെന്‍ഗ്വിന്‍
29. എമു
30. കാക്ക
31. വേഴാമ്പല്‍
32. മയില്‍
33. പൊന്‍മാന്‍
34. മരംകൊത്തി
35. പിടക്കോഴി
36. കുരുവി
37. അരയന്നം
38. **പ്രകൃതിദുരന്തങ്ങള്‍ (PPT)**
39. സുനാമി
40. ആസിഡ്മഴ
41. മലിനീകരണം
42. വരÄ¨
43. അഗ്നിപÀവ്വതസ്ഫോടനം
44. ഭൂകമ്പം
45. വെള്ളപ്പൊക്കം
46. ചുഴലിക്കാറ്റ്
47. കിണÀXmgÂ
48. കത്രീനവ³Imറ്റ്
49. **പത്മശ്രീജേതാക്കള്‍ (Black Board)**
50. യേശുദാസ്
51. ദീപമാലിക്ക്
52. സാക്ഷിമാലിക്ക്
53. ഗോപിനാഥ³\mയÀ
54. ജവാഹÀemÂ IuÄ
55. ഹÀInഷ³knwഗ്
56. പൂനംസൂരി
57. ഗിരീഷ്ഭരധ്വജ്
58. ദേവേന്ദ്രദയാഭായ്പട്ടേÂ
59. അരുണമൊഹ്ദി
60. **ക്രമത്തിലാക്കുക (PPT)**
61. ഓറ©v
62. നീല
63. പച്ച
64. മഞ്ഞ
65. ഇ³Unകോ
66. ചുവപ്പ‌്
67. വയലറ്റ്
68. **കീർത്തിചക്ര (Black Board)**
69. മേജÀസന്ദീബ്
70. നായിക്സതീഷ്കുമാÀ
71. മേജÀരോഹിXv kqരി
72. മേജÀപ്രഫുÂIpamÀ
73. മേജÀഅനുരാഗ്കുമാÀ
74. ഗതീഷ്ചന്ദ്
75. വിശാÂ`{ÔÂ
76. അമÀസിങ്
77. ഹÀZnയാÂknwKv
78. രാജ്സിങ്
79. **സാമഗ്രികൾതിരിച്ചറിയുക (സാമഗ്രികൾ)**
80. സ്പ്രേ
81. കണ്ണട
82. ടവ്വÂ
83. വള
84. മോതിരം
85. പൗഡÀ
86. മസ്‌കാര
87. മാല
88. മൊട്ടുസൂചി
89. ലിപ്സ്റ്റിക്ക്
90. **വീട്ടിലെസാമഗ്രികൾ (materials)**
91. സോപ്പ്
92. അലക്കുസോപ്പ്
93. SÀ¡n
94. സൂചി
95. സോപ്പ്പൊടി
96. സ്പൂ¬
97. തീപ്പെട്ടി
98. **ഓർത്തെഴുതുക (black Board)**
99. 8
100. 12
101. 24
102. 28
103. 31
104. 13
105. 34
106. 54
107. 1
108. 17
109. **ഓർത്തെഴുതുക (PPT)**

808626 702572 9656 71

1. **ഓർത്തെഴുതുക (chart)**
2. कलम
3. पाठक्रम
4. किताब
5. लड़की
6. फूल
7. कक्षा
8. आकाश
9. स्कूल
10. मछली
11. काला
12. **അനുയോജ്യമായനിറംകണ്ടെത്തുക**



1. **പേരെഴുതുക**

(a)****(b)****

**APPENDIX II**

**FAROOK TRAINING COLLEGE**

**WORKING MEMORY TEST (ENGLISH)**

**(2018)**

**Dr. Fathima Jaseena MPM Raseena.C**

**Assistant Professor M. Ed Student**

**Supervising Teacher Farook Training College**

**Farook Training College**

**GENERAL DATA SHEET**

**INSTRUCTIONS**

* **This tool used to your Working Memory.**
* **The tool includes 42 items.**
* **Read carefully and complete each items.**

**Name of the student :**

**Name of the school :**

**Gender : M/F**

**Type of management : Government/ Aided/ Unaided**

**Locality : Urban /Rural**

1. **Famous Personalities (Photos)**
2. Mahatma Gandhi
3. Swami Vivekananda
4. Dr. Ambedkar
5. Abdul Kalam Azad
6. A. P. J. Abdul Kalam
7. Bhagath Singh
8. Barak Obama
9. Raja Ram Mohan Roy
10. Napoleon Bonaparte
11. Adolf Hitler
12. **School Materials(Things)**
13. Chalk
14. Pen
15. Pencil
16. Book
17. Buster
18. Scale
19. Colour Pen
20. Stick
21. Specs
22. Watch
23. **Documents(Real Documents)**
24. Visiting card
25. Aadhaar Card
26. Ration Card
27. Bank Passbook
28. PAN Card
29. Stamp Paper
30. Passport
31. Identity Card
32. Check Book
33. Documents
34. **Fort (Print out)**
35. Bekal Fort
36. Red Fort
37. Palakkad Fort
38. Kochi Fort
39. Tippu Fort
40. Pallipuram Fort
41. Kodungallur Fort
42. Anjuthengu Fort
43. Kannur Fort
44. Hill Palace
45. **Sports Personalities(Photos)**
46. Sachin Thendlkar
47. Virat Kohli
48. C. K. Vineeth
49. M. Vijayan
50. Usain Bolt
51. P. T. Usha
52. Ronaldo
53. P. V. Sindhu
54. Lionel Messi
55. Sreesanth
56. **Writers(Photos)**
57. Kamala Surayya
58. Vaikkam Muhammad Basheer
59. Akkitham
60. M. T. Vasudevan Nair
61. Kujunni Mash
62. Leo Tolstoy
63. J. K. Rouling
64. Salman Rushdie
65. Charles Dickens
66. Punathil Kunjabdulla
67. **Geometric figures (Oral)**
68. Circle
69. Square
70. Rectangle
71. Triangle
72. Hexagon
73. Pentagon
74. Cone
75. Cylinder
76. Cube
77. Line
78. **Female Gems (Oral)**
79. Sarojini Naidu
80. Indira Gandhi
81. Malala Yusuf Sai
82. Mother Teresa
83. Pratibha Patil
84. Latha Mankeshkar
85. Mamata Banargy
86. Vrinda Karat
87. Sunitha Williams
88. Kalpana Chawla
89. **Songs(Audio Recording)**
90. Yesudas
91. Chithra
92. Usha Uthupp
93. Vineeth Sreenivasan
94. Gopi Sunder
95. Jasi Gift
96. Vaikkam Vijayalakshmi
97. S. P. Balasubrahmanyan
98. Adnan Sami
99. Kalabhavan Mani
100. **Chief Ministers(Oral)**
101. Pinarayi Vijayan
102. E. M. S
103. Oommen Chandey
104. C. H. Muhammad Koya
105. A. K. Antony
106. K. Karunakaran
107. Pattom Thanupillai
108. E. K. Nayanar
109. S. Achuthanandhan
110. C. Achuthamenon
111. **Some Sounds (Record)**
112. Peacock
113. Duck
114. Heron
115. Deer
116. Bear
117. Quill
118. Camel
119. Dove
120. Tiger
121. Goat
122. **Odd One(oral)**
123. Poem, Book, Novel, Note, Drama, Paper, Article
124. Lion, Bear, Tiger, Elephant, Leopard , Zebra
125. Rock, Camel, ,Well, Tree, Mountain, Sand, River
126. Finger, Ear, Skin, Nose, tongue, Eye, Thread
127. Kerala, Tamil Nadu, Karnataka, Gujarat, India, Jammu, Assam
128. Bench, Desk, Chair, Book, Stool, Table, Almirah.
129. Thiruvananthapuram, New Delhi, ,Maharashtra, Gandhi Nagar, Ittanagar,

Jaipur, Bhubaneswar.

1. Circle, Square, Triangle, Glob, Hexagon, Pentagon, Cone.
2. London, Portugal, England, French, Dutch, Russia, ,Antarctic
3. Moon, Sun, Star, Mesosphere, ,Glob, Earth, Eclipse
4. **Draw the Picture (PPT**)

(1)(2)(3)

(4)(5)

1. **Complete the Picture(PPT)**

(a)

(b)

1. **Complete the Series(PPT)**

(a) (b)



1. **Draw (PPT)**

(a) (b)



1. **Recall and Write(PPT )**
2. Drum
3. Dog
4. Dragon
5. Driver
6. Dusk
7. Duster
8. Dress
9. Diagram
10. Danger
11. Delete
12. **Draw the figure (PPT)**

(a) (b)(c)

1. **Mughal Emperor (Chart)**
2. Humayun
3. Jahangir
4. Alangir II
5. Muhammed Sha
6. Aurangzeb
7. Baber
8. Akbar
9. Shahjahan
10. Shahjahan III
11. Sha Alam II
12. **Historical Incidents (Chart)**
13. Independence of India
14. Creation of Constitution
15. Educational Reforms
16. First World War
17. Emergence of ICT
18. Election Procedure
19. Colonialism
20. Go back to the Britain
21. Prime Minister, Jawaharlal Nehru
22. Malabar Rebellion
23. **Prime Ministers (Black Board)**
24. Jawaharlal Nehru
25. Manmohan Singh
26. Narendra Modi
27. Vajpayee
28. Rajeev Gandhi
29. Lal Bahadur Sasthri
30. Gulsarilal Nandha
31. Charan Singh
32. Indira Gandhi
33. Chandra Sekhar
34. **Atlas Order (Chart)**
35. Malappuram
36. Kerala
37. India
38. Asia
39. Russia
40. Africa
41. Antarctica
42. Pacific Ocean
43. Arabian Sea
44. Kovalam
45. **Arrange the Sequence (Clip From Movie)**
46. Home
47. Open the Door
48. Go to the Town
49. Town
50. On the Market
51. Cash Relay
52. Go to the Home
53. At the Home
54. Bag relay to the Mother
55. Close the Window
56. **Alphabetic order (chart)**
57. അ
58. ല
59. ക
60. മ
61. ന
62. വ
63. യ
64. ശ
65. ഴ
66. ത
67. **Choose the Correct One(PPT)**
68. പതിവൃത
69. പതിവ്രത
70. പദിവ്രധ
71. പതിവ്രദ
72. A elephant
73. An elephent
74. A elephent
75. An elephant
76. **Fill in the Blanks (chart)**

I say my prayers …………….. I sleep

1. When
2. After
3. Before
4. **A person who knows many languages is called (chart)**
5. Illiterate
6. Bilingual
7. Literate
8. Multi-lingual
9. **Find the appropriate Meaning**. (PPT)

Delay in the submission of the case is regretted

1. Cu tIkv kaÀ¸n-¡p-hm³ -Xm-akn¨-XnÂ ]Ým-¯-]n-¡p-¶p.
2. Cu Imcyw kaÀ¸n-¡p-hm³ Ime-Xm-akw h¶p-t]m-b-XnÂ tJZn-¡p-¶p.
3. Ime-X-amkw h¶p-t]mb Cu Imcyw {i²n-¡p-I.
4. Xma-kn¨ Cu Imcyw £Wn-t¡-­-Xm-Wv.
5. **Dictation**
6. വിദ്യുച്ഛക്തി
7. തത്ത്വÚmനി
8. വിÚmനം
9. കൃത്യങ്കരൂപം
10. ഉത്കണ്ഠ
11. പ്രഥമദൃഷ്ടി
12. അംബരം
13. ദ്വന്ദ്വ³
14. ആപാദചൂഡം
15. അഭിവൃദ്ധി
16. **Find the Relation (PPT)**
17. Teacher :: Mother:: Night::
18. girl:: Water:: Thunder::
19. Doctor:: Statue:: Sad::
20. Police :: King:: Frond ::
21. Rainbow :: Table:: Sweet ::
22. Blindness :: Hot:: Fail ::
23. Week:: Earth :: Moon ::
24. E. C. G :: Black :: Youth ::
25. first :: give away:: Ink ::
26. Saniya :: Sreesanth :: Foreigner ::
27. **Birds (photos)**
28. Penguin
29. Emu
30. Crow
31. Hornbill
32. peacock
33. Kingfisher
34. Woodpecker
35. Hen
36. Sparrow
37. swan
38. **Natural Calamities (PPT)**
39. Tsunami
40. Acid Rain
41. Pollution
42. Draught
43. Vacancies
44. Earthquake
45. flood
46. Cyclone
47. Well Fall
48. Katrina Typhoon
49. **Padmasree Winners (Black Board)**
50. Yesudas
51. Deepa Malik
52. Sakshi Malik
53. Gopinathan Nair
54. Jawaharlal Koul.
55. Harkishan Singh
56. Punam Suri
57. Girlish Bharadwaj
58. Devendra Dayabhai Patel
59. Aruna Mohdi
60. **Arrange in to Order (PPT)**
	1. Orange
	2. Blue
	3. Green
	4. Yellow
	5. Indigo
	6. Red
	7. Violet
61. **Keerthichakra (Black Board)**
62. Sandeep
63. Satheesh Kumar
64. Rohith Suri
65. Praful Kumar
66. Anurag Kumar
67. Gtheesh Chanth
68. Vishal Bhandral
69. Amar Singh
70. Hardiyal Singh
71. Raj Singh
72. **Identify the Materials (Materials)**
73. Spay
74. Spectacles
75. Towel
76. Bangle
77. Ring
78. Powder
79. Mascara
80. Chain
81. Needle
82. Lipstick
83. **Home Needs (materials)**
84. Soap
85. Bar Soap
86. Turkey
87. Needle
88. Soap Powder
89. Spoon
90. Match Box
91. **Identify the Numbers (black Board)**
92. 8
93. 12
94. 24
95. 28
96. 31
97. 13
98. 34
99. 54
100. 1
101. 17
102. **Identify the group Numbers(PPT)**

80 86 26

70 25 72 96 56 71

1. **Remember the Words (chart)**
2. कलम
3. पाठक्रम
4. किताब
5. लड़की
6. फूल
7. कक्षा
8. आकाश
9. स्कूल
10. मछली
11. काला

**41. Find the Appropriate Colour**



1. **Write the Names**

**(a) (b)**

**APPENDIX III**

**LIST OF SCHOOLS**

**Details of Colleges Visited For Data Collection**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl. No** | **Schools** | **District** | **Locale** | **Type of Management** |
| 1 | Government Girls HSS Manjeri | Malappuram | Urban | Govt. |
| 2 | Chekkutty Haji Memorial HSS Pookolathur | Malappuram | Rural | Aided |
| 3 | Rahmath Public HSS Pullur | Malappuram | Rural | Unaided |
| 4 | Izzathul Islam HS Kuzhimanna | Malappuram | Rural | Unaided |
| 5 | Government Ganapath HS Chalappuram | Calicut | Urban | Govt. |
| 6 | Farook HSS Farook College | Calicut | Rural | Aided |
| 7 | Presentation HS Chevayur | Calicut | Rural | Unaided |
| 8 | Calicut Orphanage HS Kolathara | Calicut | Rural | Unaided |