CHAPTER III

REVIEW OF RELATED LITERATURE

3.1 Introduction

3.2 Multiple intelligence Different Studies

3.3 Achievement in Mathematics - Different Studies

3.4 Multiple Intelligence and Achievement-studies in Different Subjects

3.5 Multiple Intelligence and Achievement in Mathematics - Different Studies
3.1 Introduction

The review of related literature is “the process of reading, analyzing, evaluating, and summarizing scholarly materials about a specific topic. This involves systematic analysis of documents or information’s related to the research program.” Every piece of research needs to be connected with the work already done, to attain an overall relevance and purpose. The review of literature thus becomes a link between the research proposed and the studies already done. It tells the reader about aspects that have been already established or concluded by other authors, and also gives a chance to the reader to appreciate the evidence that has already been collected by previous research. Review of literature is also important to highlight difference in opinions, contradictory findings or evidence, and the different explanations given for their conclusions and differences by different authors. In some cases, an analysis of these factors can help one understand different complex issue and at other times, such analysis can lead to a new possibility that can be researched upon in the current project. Thus review of literature is a very important part of one's research”. There is no research that is not related to any research that has taken place earlier. Every research project adds to the previous findings. “Unless the existing work, conclusions and controversies are properly brought about, most research work would not appear relevant, not will it appear important in the whole framework. Thus, review of literature is a very important aspect of any research both for planning our work as well as to show its relevance and significance”. (Cooper, 2010)

3.2 Different Studies on the Theory Multiple Intelligences

Gardner (1983) suggested, “people are intelligent in many different ways. Society must recognize, validate, and nurture the varied human intelligence profile.
Multiple Intelligences is a powerful lens that completely transforms the traditional perspective of intelligence. Student Performance reveals their talents. This performance will enable us to find individuals who enrich our society: artists, architects, musicians, naturalists, designers, dancers, therapists, and entrepreneurs, among others” (Armstrong, 2000)

Armstrong (1987) said different ways for the children to learn intelligently. He suggested various methods for the parents to teach their children efficiently through the use of multiple intelligence approach.

Gardener and Hatch(1989) proposed the importance of recognizing the talent and skill of students in schools. They emphasized the use of Verbal and Mathematical intelligence in schools.

Fowler (1990) published an article on the role of Artistic Intelligence. The study answered to the question why people seeks encounters with the art and why education in the arts is essential. The study shows that arts provide ‘inexhaustible insights’ which help to understand mysteries of life

Fowler (1990) believed that “most of the students that have good ability in linguistic and logical intelligence usually will be successful at schooling but are not when they are in job world. There are some cases that students were not doing great in school but are very successful in doing their job after graduated from school”

Blythe and gardener (1990) suggested the importance of the use of multiple intelligence s theory oriented instructional strategies in schools.

Woolsey and Johnson (1991) gave a definition to Naturalistic Intelligence as a good military operations research analysis and well damned the late4st hot dog technical hardware or software gadget .Expert system and Artificial intelligence and their purveyors and lackeys and treated with the amusement they deserve.
Ellison (1992) studied “the effect of Multiple Intelligence on diverse needs of students”. He found that teachers goal setting reflect Gardner’s Multiple Intelligence such as Linguistic intelligence, Logical Mathematical intelligence, Spatial intelligence, Bodily-Kinesthetic intelligence, musical intelligence, interpersonal intelligence and intra personal intelligence.

Hoerr (1994) head of New City School in St. Louis Missouri, faced a “professional epiphany”. This pave way for a “full-scale implementation of multiple intelligences theory” in New City School”.

Kornhaber, and Krechevsky, (1994). “Eight or more intellectual capacities were identified. The degree of autonomy is difficult to establish .All intelligences were are accessed via identical paper and pencil formats , there may be an inflated correlation among them”.

Mccahill (1994) proposed “teachers must strive to enhance their power as educational connoisseurs, critics and professional who understand how to use technological learning materials that promote growth across multiple intelligence”. He conducted the study in the 10grade English class. He included Verbal –Linguistic intelligence, Logical – Mathematical intelligence, Spatial intelligence, Bodily – Kinesthetic intelligence, Musical intelligence, interpersonal intelligence and intrapersonal intelligence

Radford (1994) examined the impact of Multiple Intelligences theory and flow theory in 13 school children .he found that Meta-cognition and self awareness have major role in the student’s success.They appreciated challenges which stimulate motivation and student ownership of the learning process.
Weber (1994) studied multiple Intelligence views of learning at High School level. Both Gardener’s multiple intelligence views of learning and constructivist views were considered for developing an interactive curriculum model for high school students and teachers. He found that change within the curriculum content that consistent with the multiple intelligence views of learning and constructivist views of learning would enable students to develop further development of their individual differences.

Layng (1995) prepared a report on inappropriate behavior of fifth and sixth grade students in Elementary school. They found that parent values and economic conditions were some of the factors of inappropriate behavior. They proposed to implement a series of learning activities addressing Multiple Intelligence theory and other activities utilizing cooperative learning.

Rogers (1995) in an article by name ‘intelligence in action’ said that drama can promote an interactive and dynamic kind of classroom participation. He allowed the students to learn and engage in dialogue.

McClaskey (1995) gives practical examples of Multiple Intelligences in the classroom and assessing student learning. Educators have often attempted to account for the discrepancies between abilities we see in student and results such as grades.

Sehulstar (1995) conducted a study on the notions of a person’s memory style and a person’s presentation of the self. The range of abilities and experiences was drawn from Gardners notion of Multiple intelligences. Distinct patterns of the self were observed for different memory styles.

Smagorinsky (1995) in his study revealed that the Introduction of Multiple Intelligences activities must be accompanied by large change in the value of the
classroom. Even though everyone probably has each of these Intelligences to some
degree, most people have strength in a few areas but not all.

Smagorinsky (1995) recommended for the re-conceptualization of the
curriculum on the basis of Multiple Intelligences. This article argues that “educators
ought to question the privileged status of the textual forms that they allow
students to produce and consider the potential of other acts of enabling students to
develop thought”.

Smagorinsky and Coppock (1995) found that “the use of multiple intelligences
based instruction enabled the students to make sophisticated interpretations of
literature.”

Glynn (1996) explained the relationship between organizational intelligence to
innovation keeping in mind of multiple Intelligences. The study found that the
individual and organizational intelligences are conceptualized as being functionally
similar.

Berger and Polman (1996) made a comparison between whole child approaches
and Gardener’s concept of multiple intelligences. They also provided specific
suggestions for parent experiences, field trips and constructivist experiences.

Campbell (1996) said that “teachers who are interested in considering multiple
intelligence theory as an instructional process provides numerous entry points in to
the lesson content”.

Hine (1996) proposed a detailed characteristics of the seven multiple
intelligences. He said that systematic approach to teaching meet the individual need of
children.
Hoerr (1996) examined that each of the Multiple Intelligences is possessed by everyone. But there are individual differences. If we implement Multiple Intelligences theory in schools, it is contextual and teacher-specific.

Jasmine (1996) said that uses of Multiple Intelligences in education depends on each learners ways of learning, interest and talents.

Teele (1996) introduced an idea saying: “intrinsic motivation, positive self-image, and a sense of responsibility develop when students become stakeholders in the educational process. Also they accept responsibility for their own actions”. “When students understand and apply their personal intelligences, they become more connected to their learning and invested in their educational experiences”.

Dalton, Morocco, Tivnan and Mead (1997) suggested that “children formulate ideas about the natural world that are often different from scientific conceptions. As a result, many students enter the classroom with preconceived ideas.”

Albero (1997) told about a Multiple Intelligences program for increasing reading test scores. This included “curricula by teaching Multiple Intelligences, creation of portfolios for students and teacher evaluation and the implementation of students reading logs.” In this study it reveals that students spend more time in reading and its reflections.

Coleman (1997) conducted an action research project based on Multiple Intelligences. He aimed at decreasing the gap between achievement levels between primary and secondary level school students. Study showed that Multiple Intelligences approach minimize the discrepancies between the achievement levels.

Dare (1997) conducted a project to implement and evaluate Multiple Intelligence program to reduce disruptive behavior interfering with students academic
growth. Analysis of the study shows that cooperative learning, Multiple Intelligences strategies and higher order thinking skills are reducing disruptive behavior.

Mallonee (1997) studied about Multiple Intelligences. The study revealed that everyone is capable of at least seven ways of knowing. Multiple Intelligences theory encourages teachers to expand their repertoire of techniques, tools and strategies beyond the typical Linguistic and logical Intelligences used more in classes.

Greenhawk (1997) discussed “the implementation of Multiple Intelligences at White Marsh Elementary School in Maryland. The application of Multiple Intelligences increased student performance on standardized tests and produced a school-wide culture of achievement”.

Mettetal (1997) studied “the impact of Multiple Intelligences on curriculum in an elementary school. Students, teachers, parents and administrators were interviewed. Teachers and parents were very positive about the concept of Multiple Intelligences. The classroom implementation of the multiple Intelligences concept was uneven across classrooms.”

Lind (1998) suggested “children gain essential ideas and beliefs about their environment through active involvement. As children explore their surroundings, they actively create and build their own knowledge. They develop an understanding of ‘how’ the world works. Children constantly modify and adjust their perceptions of the world. Some of the information children collect is correct and some is not”.

Kassell (1998) explored the link between Music and the theory of Multiple Intelligences through her article. According to Kassell, “Music educators need to stop and reflect critically before applying the Multiple Intelligences theory. They should consider the integrity of music and learning in general.”
Demiral (1998) investigated “whether there was a significant effect of Multiple Intelligences theory on the fourth grade Social Science students’ achievement. It was also investigated whether there was a significant effect of this theory on fourth graders’ attitudes toward social science”. Demirel also investigated about the opinions of teachers and students about the implementation of multiple Intelligences theory in Social Science classroom. This study, lasting for fifteen days, was conducted with fourth graders in Ankara Primary School. Two classes were selected. The experimental group had social science lessons through MI Theory, whereas the control group with traditional methods.

The observation results showed that “the students in the experimental group participated actively in the MI activities, produced creative and original thoughts. In addition, those MI activities affected the relationships among the students and students’ MI positively. Results of the teacher interviews showed that Multiple Intelligences theory activities affected students positively in terms of their logical thinking, establishing relations among cases, problem solving abilities. The teachers also thought that when conditions of the Turkish Schools were considered, conducting MI Theory was so difficult in the schools.”

Demiral (1998) and his doctoral students identified that “there was a significant effect of multiple intelligence and achievement of the fourth grade Social Science students”.

Eilers (1998) examined that the increase in the students achievement, increase in confidence and self image are the result of Multiple Intelligences activities in classrooms.
Harms (1998) studied about self-dominance of Multiple Intelligences among grade III, grade VII and grade VIII students. The result revealed out that Naturalistic Intelligence and Interpersonal Intelligence are dominant and Intra-personal Intelligence is least dominant.

Mayer (1998) studied about the naturalistic Intelligence. Teachers must provide the opportunity for the students to practice the Naturalistic Intelligence to grow. One of the way to encourage naturalistic Intelligence is to take the students out side of the classroom and explore their school community. Teacher has to consider all intelligences while planning the lesson.

Walker (1998) correlated the Gardner’s theory of Multiple Intelligences and the world wide web to teach about the war. The objectives of the study were, “1) To identify the historical milestones of the war, 2) To construct a purely student generated unit. Multiple Intelligences constructivist teaching approach can be more useful in Social studies classroom simply by involving the students in every aspects of discovery”.

Glasgow (1999) conducted a study on students Multiple Intelligences in literary nature of students. This article reflected the experiences that the investigator experiences from a semester filled with writing, projects and dialogues between students in college and students in high school.

Mjagkij and Cantu (1999) studied on the thematic and Multiple Intelligences’ Approaches to teach the gilded age. This studied about the Gilded age and multiple Intelligences. The study proposed that the thematic and Multiple Intelligences Approaches to teaching the Gilded age are almost similar.

Highland, McNally and Peart (1999) made a study as “examining multiple Intelligences and improved student behavior and participation. Students in pre
kindergarten, Kindergarten, and first grade, who exhibited misbehaviours such as talking out, distracting others, and not participating. Multiple Intelligences and Student Performance involved sixteen Multiple Intelligences-based lessons. Research data included classroom observations, anecdotal records, progress reports, and report cards. The data revealed that 77 percent of the students showed an improvement in their behavior including taking turns talking, keeping hands to themselves, staying on task, not daydreaming and wandering around the class, sharing, helping others, being respectful to peers, and an increased interest and participation in classroom activities.”

Borrego (1999) studied about the application of Multiple Intelligences principles by special education teachers interns in classroom. Study revealed that multiple strategy enhanced the ability of the special education interns to implement environmental modifications effectively in the classroom.

Cahill (1999) examined about the reflection of Multiple Intelligence in Shakespeare’s play. This finding argues that Shakespeare’s universal appeal proceeds from his ability to tap the various aspects of intelligences. Shakespeare allows the individuals to utilize their own particular interest and strengths among the various intelligences to approach and appreciate his art.

Contanzo and Paxton (1999) said that Multiple Intelligences theory could be used in the classroom as a guide to provide a variety of ways for students to demonstrate their learning.

Coustan and Rocka (1999) concluded that the objective of lesson plans based on multiple Intelligences with specific activities allow the learner to employ their ways of processing and communicating new information.
Eddy (1999) studied about adults second language learning and teaching. The objectives of the study was to make a link between multiple Intelligences and proficiency in second language. The study increased the interest and knowledge in the discussion of multiple Intelligence s and learning styles.

Elliott and Gintzler (1999) conducted a phenomenological study and evaluated an individualized approach to Multiple Intelligences instruction. An analysis of the study shows that each student has the capability to activate all eight intelligence. These intelligences may be developed to different degrees within each individual.

Feency (1999) conducted the impact of multiple intelligence on middle school language-arts curriculum. The findings of the study were 1. The highest level of change in the area of student performance, 2. pedagogy ranked second in the change, 3. assessment ranked third in the change, 4. lowest rank was in curriculum change.

Kallenbach (1999) found that within a Multiple Intelligence curriculum, students become aware that they have different strength and each person has a substantive contribution to make different intellectual functioning.

Lazear (1999) demonstrated “a comprehensive approach to teaching and learning strategies in the theory of Multiple Intelligences by using charts and diagrams he illustrated each of the multiple intelligences.”

Martin (1999) made a multiple intelligence inventory of middle school students by which teachers can identify and assess students growth in seven identified intelligences compatible with a poetry unit in language and arts.

Miller (1999) conducted a study on multiple intelligences survey on students in Guam’s public schools, using a nonverbal survey in multiple Intelligences. Result shows that intelligence selected most often by the Chamorro students were
Kinesthetic and Spatial intelligence. Most selected by the Chunkese students were Interpersonal and kinesthetic intelligence.

Stockstill (1999) developed a study on the relationship between multiple intelligence and faith information during adolescence. Result shows that a significant relationship exist between multiple intelligence and faith information. The verbal-linguistic intelligence was a predictor of spiritual maturity among the population selected for this study.

Bumen (1999) investigated “possible differences between multiple intelligences theory and traditional teaching. The achievements and attitudes of the students were discussed in the research. In this research, the lesson “Citizenship and Human Rights” was chosen. The students were 8-grade students of a private test – retest was administered with control groups. For data collection, achievement tests and attitude scale were administered which the researcher developed.” According to results “no significant difference could be seen in knowledge achievement between the group which used multiple intelligences strategies and the one which used conventional method.”

Dimirici (1999) studied about “Multiple intelligences theory and Active Learning Approach in order to compare the effects of active learning approach on students success with the effects of traditional method. The study was carried on in Life Sciences Course that was used for the first time on second grade students of primary education in 1998-1999 term. The students were chosen from among Beytepe Primary Education school students. The results post test average points showed that multiple intelligences and effective cooperative learning approaches had more positive results than the traditional method.”
Highland, McNally, and Peart (1999) conducted a study examining “multiple intelligences and improved student behavior and participation. Students in pre-kindergarten, Kindergarten, and first grade, who exhibited misbehaviors such as talking out, distracting others, and not participating, were involved. In an intervention that Multiple Intelligences and Student Performance involved sixteen multiple intelligences-based lessons. Research data included three-months of classroom observations, anecdotal records, progress reports, and report cards. The data revealed that 77 percent of the students showed an improvement in their behavior including taking turns talking, keeping hands to themselves, staying on task, not daydreaming and wandering around the class, sharing, helping others, being respectful to peers, and an increased interest and participation in classroom activities.”

Carver, Pricee, and Wilken (2000) tried “to improve the ability of applying knowledge to real-life experiences. They made research on second, sixth and tenth grade students at a school outside the city. They collected data by teacher generated assessments, observations and students responses. Analysing of these data revealed that students had difficulty in transferring knowledge due to the lack of motivation and the inability to make connections between classroom lessons and real life situations. Researchers reviewed solution strategies and founded three strategies that were multiple intelligences, cooperative-learning and journaling experiences. The study took 15 weeks and these strategies were implemented. At the end of 15 weeks the results showed that students improved their knowledge transfer through the use of multiple intelligences, cooperative-learning experiences and these three strategies improved students’ knowledge transfer from classroom to daily life activities”.

62
CheZaini, (2000) said that “there are some cases that students were not doing great in school but are very successful in doing their job after graduated from school“.

Beam (2000) conducted a study “to compare the social studies grade of fifth grade student’ instruction through two ways one is through Multiple Intelligences and the other is through the traditional instruction in a public school settings. Result showed that both methods of instruction were effective in teaching social studies.”

Goodnough (2000) in study on “exploring Multiple Intelligences theory in the context of Science Education. The study designed to make science teaching more meaningful and to describe the effectiveness of collaborative action research for teacher development and curriculum development.”

Holliday (2000) examined “the responsibilities of teachers in understanding the students learning process for identifying students learning styles and Multiple Intelligences.”

Hennigan (2000) conducted a study on “educational implications of computers for learning interacting with Multiple Intelligences. This study gave clear correlational developments in the field of brain studies, education and personal computing.”

Muehlbaner (2000) conducted the effect of an art infused Multiple Intelligences program in mathematical achievement. The result shows that there was no satisfactorily significant effect of the arts-infused, Multiple Intelligences program on students mathematical achievement.

Nguyen (2000) conducted “a study of the differential effect of a Multiple Intelligences based curriculum on student performance. Study results shows that there is no difference between Multiple intelligences curriculum and traditional system.”
Neville (2000) examined and compare native American student’s self perception regarding Multiple Intelligences theory. He found that the most predominant Intelligences was Visual/spatial Intelligence and least dominant intelligence was Musical/Rhythmic Intelligence.

Snyder (2000) found that “the majority of high school students were kinesthetic and global learners and the awareness of how students learn is in fact indispensable to successful classroom.”

Teele (2000) studied about the practical application of Multiple intelligences in the classroom to make each student to express their own personal rainbow. This elaborate s the exploration of Gardener’s Multiple intelligences.

Goodnough (2001) postulated that “as a pedagogical organizer, multiple intelligences helps educators consider and reflect on their curriculum and teaching styles as well as their beliefs about learners. Multiple intelligences also help educators structure engaging learning experiences that are accessible to every learner. Also multiple intelligences can promote positive teacher learning that transforms into improved student learning.”

Oklan (2001) established an elementary Multiple Intelligences school in California Victorville in 1992. “The school accepted the idea that every child can learn and children can be prepared for the society by an education which has equal quality. Basic skills were acquired by educational projects including seven intelligences. The projects lasted for 6 weeks. At the end of the projects, celebrations were arranged for the success in seven intelligences. Children were evaluated three times in a year, families took part in those evaluations. The school wanted every child to be equipped with variety of talents and skills and make them use those talents to
improve their own basic learning techniques. The school was renewed every five years. And that school model believed that responsibility and success should be shared by the children and also staff for a qualified education “.

Halm (2001) conducted a study on the distribution of Multiple intelligences among students and faculty in associate carrier program. The study shows that students rated highest in their interpersonal and intrapersonal intelligences and lowest in Naturalistic Intelligence.

Hoerr and Goodnough (2001) believes that “multiple intelligences helps educators individualize instruction by incorporating student individuality. Goodnough documented the integration of multiple intelligences -based instruction into an elementary classroom. Multiple intelligences was used an instructional organizer and provided a framework for curricular adjustments.”

Kallenbach and Viens (2001) conducted a study on Multiple intelligences theory on different adult learning contexts. “It discusses about how Multiple intelligences theory can support instruction in adult basic education ,adult secondary education and English for speakers of other languages.”

Manner (2001) outlined the types of learning styles and Multiple intelligences as well as instructional techniques that work best with students best learning traits.

Batulayan (2001) “ Relationship between multiple intelligences and academic achievement of grade six pupils in Northern Luzon Mission. The study explored the relationship of multiple intelligences to the academic achievement of grade six pupils in Northern Luzon Mission. The theory developed by Howard Gardner was the basis of the theoretical concept. Data were obtained from 310 pupils who were enrolled for the Year 2001 – 02 in the 24 church schools operated and supervised under the
Northern Luzon Mission. This comprised 61.5% of the total population of 504 pupils in 44 schools. Participants responded to the Multiple Intelligences Questionnaire (MIQ), a self-construct instrument, which was personally administered by the researcher. It contains 70 items with 10 questions each representing the seven intelligences namely: verbal-linguistic, logical-mathematical, bodily-kinesthetic, musical, visual-spatial, intrapersonal and interpersonal. The statistical analyses of the study employed mean, frequency, percentage, multiple regression and chi-square. Major findings in the study led to the following conclusions: The most dominant intelligences of the grade six pupils were logical-mathematical, musical, bodily-kinesthetic, and intrapersonal. The academic achievement level was 84.09%, which is average in the grading standard of the Mission. The study also found that logical-mathematical and intrapersonal intelligences were related to the academic achievement with a contribution of 9.25%. The other five intelligences, namely: verbal-linguistic, visual-spatial, musical, bodily-kinesthetic, and interpersonal did not have significant relationships to academic achievement. Gender among the grade six pupils does not confine one to a certain specific intelligence. The study found that male and female participants in the study did not have significant correlations in the multiple intelligences”.

Oklan (2001) conducted a research “to find out six years old children’s interest in the seven intelligence areas. The Researcher used Teele Inventory of Multiple Intelligences (TIMI) and Multiple Intelligences Developmental Assessment Scales (MIDAS) and compared their results. TIMI was administrated to the 411 six years old students. MIDAS was administrated to their families to find out their perception of their children’s multiple intelligences. It was found that according to the TIMI results
dominant intelligences were ranked as spatial intelligence, bodily-kinesthetic intelligence and interpersonal intelligence. MIDAS results showed that according to families their childrens’ dominant intelligences were ranked as spatial intelligence, interpersonal intelligence and bodily-kinesthetic intelligence.”

Şahin (2001) investigated about “the significant difference between Multiple Intelligences Theory and traditional methods on third grade Social Science students’ achievement and what opinions and views experimental group students and their teacher possessed about the implementation of the theory. This research was conducted in the second term of 1999-2000 academic year with third graders in Zonguldak Primary School. Pretest-posttest experimental and control group design, observations, and interviews were utilized in the study. According to results of tests, students’ achievement scores in the experimental group were significantly higher than the students in the control group. Besides, in the experimental group, there was no significant difference in terms of sex. In addition to those, the results of the observations and interviews made with the students in the experimental group indicated that using multiple intelligences activities and materials in the social science lessons affected students’ multiple intelligences positively. Teacher interview results showed that he had positive views on Multiple Intelligences activities and materials.”

Sims (2001) conducted an interview with Gardner on arts and its importance, uses of the new technologies in art education and Visual Thinking curriculum (VTC) Gardner Replied that most important and precious human ideas, sentiments and feelings cannot be expressed in words or mathematical symbols.

Vivona (2001) studied commonalities among elementary schools that have implemented the theory of Multiple intelligences. it was found that monthly inservice
days for teacher collaboration on Multiple intelligences curricular ideas, usage of self selected student projects, encouragement of students to recognize and identify their different intelligences and incorporation of the eight intelligences with understanding and depth

Martinez (2002) found that “babies and young children learn through extensive experimenting but if encouraged, unknowingly by parents to use their multiple Intelligences. Through this children can access major portion of the brain and learning becomes easier.”

Ramlah (2002) stressed that “there are still a huge figure showing most of the student haven’t reach the minimum level for general examination, for example subjects like Mathematics and English. Now, people are more concern and some even argued for the graduates’ quality.”

Robin (2002) expressed a reflection on multiple Intelligences and self efficiency in the university. He found that 14.7% of the variance in speaking self efficiency can be explained by the negative interaction between musical intelligence scores.

Rubado (2002) conducted a study on providing a variety of activities incorporating Multiple Intelligences. Students participate actively in the classroom.

Ruggieri (2002) showed a reflection on Multiple Intelligences and transcendentalism. Many students hate math and love other subjects. Most people can be excelling in every subject due to scarcity of variety in capturing meaningful connections and method of instruction. The investigator suggest that Multiple Intelligence theory provides provisions to the educator and students to enrich their knowledge through meaning full connections through comics, music, social commitment, free reading and multiple intelligences.
Rule and Lord (2003) constructed an activity book for learners who need special help. Multiple Intelligences and Blooms taxonomy were the basis of the activities.

Gaines and Lehmann (2002) found that the use of Multiple Intelligences strategies improved the students reading comprehension ability and it enhanced the academic performance.

Tupper (2002) in an article examined and developed “the possibility of an Existential Intelligence as postulated by Gardner. He used the revised theory of Multiple intelligences by Gardner. He used postulations of Existential Intelligence as a theoretical lens which account for the cognitive possibilities of Entheogens and explore potential ramifications of education.”

Gogebakan, (2003) studied about “How students’ multiple intelligences differ in term of grade level and gender’. The purpose of the study was to investigate the students’ multiple intelligences according to their preferences and how students’ multiple intelligences differ in terms of grade level (first, third fifth and eighth) and gender. Results showed that students multiple intelligences showed variety according to their grade levels. For example, the students at the first grade level demonstrated strong preference for linguistic intelligence and logical-mathematical intelligence in the first grade and the two intelligences were followed by spatial intelligence, and bodily kinesthetic intelligence. While the third grade students’ most dominant intelligences preferences were interpersonal, spatial, logical-mathematical, and linguistic intelligence the fifth and eight grade students’ preferences were interpersonal intelligence bodily-kinesthetic intelligence, musical intelligence, and spatial intelligence. When results are examined in terms of gender, it can be said that the male students’ logical-mathematical and bodily kinesthetic intelligence were
higher than female students’ whereas the female students’ musical intelligence was higher than male students.”

Chan (2003) studied about Multiple Intelligences and learning preferences. He found that students strength is in interpersonal, intrapersonal and linguistic intelligences. Their weakness in bodily-kinesthetic and naturalistic intelligences. Also there are higher ratings on personal and verbal intelligence.

Cluck and Hess (2003) found that the use of multiple intelligences in classroom resulted in the improved assignment completion, class participation and engagement in learning.

Mebuva (2003) examined “Multiple Intelligences as an effective tool for teaching and learning at all understanding pedagogy and static methods of teaching are giving way to the new classroom examination and application of Multiple Intelligences.”

Benette (2004) conducted “a study on the effectiveness and suitability of the strategies Involving Multiple Intelligences on the achievement in Physics. It is found that these strategies are more effective than traditional way.”

David (2004) conducted “a study on Multiple Intelligences of Chinese gifted students in Hong cong. The study shows that across different perspectives Logical mathematical Intelligence received the highest ratings and bodily-kinesthetic and Naturalistic Intelligence received lowest rating.”

Davis (2004) examined “the effect of Multiple Intelligences learning on student achievement. Students test scores increased an average of 66.25% to 82.25%.”
Diaz-Lefebvre (2004) studied about 2400 students who were studied in Multiple Intelligences class. It was found that students achievement increased through this method.

McMahon (2004) studied about “the relationship between multiple Intelligences and reading achievement with the help of Teele Inventory of Multiple Intelligences. The study examines the relationship between Intellectual preference and Reading Achievement. Students with higher scores on Logical-mathematical Intelligence were more likely to demonstrate at above grade level reading comprehension scores compared to students who scored lower on logical Mathematical Intelligence.”

Gardner and Robertson (2004) made a discussion session on ‘g’ factor to recognize “a multitude of intellectual capacities, each entailing its own processes and its own neural representation. The theory of Multiple Intelligences attempt to incorporate findings from these and other disciplines.”

Haley (2004) found that students in experimental group receiving Multiple Intelligences based instruction with best performance than that of the control group who receives teacher-centered instruction.

Haley et al. (2004) found that teachers involved in the multiple intelligences based second language action research study found that behavior problems were minimized and students in multiple intelligences based classroom reported a higher degree of satisfaction and more positive attitude towards their second language study than in the control group.

Hickey (2004) reported “increased student achievement in history, geography, literature and music. Multiple intelligences-based units were developed and implemented in various classrooms by teachers enrolled in a multiple intelligences..."
graduate course. The five case studies revealed an increase in student engagement and participation among others. In a music unit, students were more actively engaged, remembered information for longer periods of time, and utilized higher level thinking skills to make connections between different musical eras and artists.”

Kornhaber (2004) suggests that “student discipline is directly linked to student engagement. Whether students are interested in learning, actively participate “academically and socially” then “fewer students will get into trouble”.

Hoerr (2004) suggests that “Multiple Intelligences -based curriculum helps students solve practical ‘real-life’ problems, perform high on standardized tests, and strive toward excellence. New City School graduates who enjoy learning, are leaders in their community, and seek extra rigorous coursework. New City School is recognized worldwide as a ‘model school’ and welcomes 700 visiting educators every year. Multiple intelligences have the potential to empower students to become motivated, successful learners. There are many positive manifestations of multiple intelligences -based curriculum including improved behavior, increased student confidence, intrinsic motivation, engagement, and performance on standardized tests”.

Barrington (2004) examined about “encouraging students to use their multiple intelligences helps create “personal meaning” and enhances learning and achievement.

Dias-Ward and Dias (2004) summarize “A Kindergarten MI-based thematic unit on ladybugs. Aside from allowing the students to explore, investigate, touch, hold, and observe the ladybugs, the cross-curricular learning experience addressed a variety of unique learning preferences. The authors provide a quick ‘glimpse’ into the ladybug unit and provide pragmatic and simple applications of each intelligence.
Dias-Ward and Dias suggest that “designing experiences in which children explore, gather evidence, and formulate explanations is teaching science as inquiry”.

Bauerlein (2005) reviewed the theory of Multiple Intelligence and said that “this theory has had an enormous influence on educational thinking and practice throughout the world. Educators know that individuals have different intelligence strengths and profiles. But multiple intelligence is another thing. All of we are in favour of different talents which independent mental aptitudes.”.

Gershkoff (2005) used Gardeiners Multiple Intelligences in developing the multiple methods. The multiple Intelligences describes a student has implications for how he or she will master new material.

Rettig (2005) identified four ways to teach to the whole brain. one of that is give children to play with toys that lend themselves to the multiple intelligence. Then make use of the Multiple intelligences in lesson planning. Again introduction of learning centres that focus on the Multiple intelligences in the classroom. Finally the use of Multiple intelligences spotlight the different carriers that uses each intelligence.

A survey conducted by the National Science Teachers Association (NSTA) (2006), revealed “the top two barriers in student achievement in science (1) students are not taught enough science at the early grades (2) lack of classroom time dedicated to science instruction (science.nsta.org, 2006). In spite of these barriers and challenges, educators must find avenues to make science instruction and content accessible to every learner”.

Lekshmi (2006) conducted a study on the preparation and testing of multiple intelligences models for enhancing spoken English at secondary level. The study
shows that Multiple Intelligences model is more effective than conventional model for enhancing spoken English at secondary level.

Ozdemir, Guneysu, and Tekkaya (2006), summarized “a quantitative research project developed to investigate the difference between traditional -instruction facilitated by a teacher and multiple intelligences- science instruction on fourth grade students’ understanding in science. The authors suggest that multiple intelligences serves as a “framework” that helps teachers “make decisions about ways to structure teaching and learning experiences for students”. Ozdemir, Guneysu, and Tekkaya (2006), include a graphic and numerical summary of the project results including significantly greater student achievement and knowledge retention. The authors suggest multiple intelligences is especially powerful in an educational setting.” It helped “a significant number of educators, question their work and encourage them to look beyond the narrow confines of the dominant discourses of skilling, curriculum, and testing and assessment”

Asha (2007) studied about the interrelationship of different dimensions of multiple intelligences among secondary school students. The investigator found that there were no differences among the dimensions of multiple intelligences based on gender except for Linguistic intelligence and Musical intelligence. But there were differences among different dimensions of Multiple Intelligence based on locality and Socio-Economic status.

Carol and Shafer (2007) studied about the classroom practices of Multiple Intelligences theory by modeling instruction. Study shows that students participated in classroom activities that addressed the various intelligences.
Ebru and Akyol (2007) showed that the type institution and gender differences make changes in the development of linguistic intelligence, musical Intelligence and bodily kinesthetic intelligence. Musical Intelligence of the girls was higher than that of boys. The bodily-kinesthetic intelligence of the boys was higher than that of the girls.

Tracy and Rachey (2007) submitted a report of a development research study that focused on “to construct and validate an instructional Design (ID) model that include the theory and practice of Multiple Intelligence. This is a revised and validated Multiple Intelligences model.”

Cadwalader (2008) studied on the title “Are teachers always right?. This was a study of teacher’s accuracy for recognition of students Multiple Intelligences. It was found that teachers are less than 505 accurate when asked to recognize students too strongest and too weakest intelligences.

Kaplan (2008) studied about ‘Vedic and multiple Intelligence pedagogues’ A paradigm for development of home schooling and distance learning environments. The study shows that Vedic and multiple Intelligence pedagogues will become a paradigm for development of home schooling and distance learning environments. This is done through the inside practices derived from meditation practices.

Smith (2008) conducted a study on “integrating Multiple Intelligences and andragogical principle into a pre-service teacher education programme. The study shows that the experimental group performed significantly better than the control group. this study has a social implication as it provides alternative methods that apply Multiple Intelligences and andragogical model to accommodate adult learners to improve both learning outcomes and students satisfaction of the adults in the classroom.”
Vedapriya (2008) studied about “implementing Differentiated instructions (DI) in third grade math classroom. Based on the conclusions that DI appeared successful for max instruction, the recommendation was extended that educators should more generally implement DI in order to improve students achievements.”

Abdollah (2008) through s light on “the history of multiple Intelligences theory and the traditional IQ tests to clarify the rationale underlying of the new theory. It gave some implications about the theory of Multiple Intelligence in English Language teaching”.

Clarken (2009) explained in a paper presentation about ‘Moral Intelligence’. He said that “moral Intelligence refers to the ability to apply ethical principles, goals, values and actions. By developing greater Moral Intelligence, benefit to the schools and the society will result in organizations that are more positive, relationships and society”.

Owolabi and Okebukola (2009) conducted “a study on the reading ability of science students through study group and Multiple Intelligences. This explored appropriate pedagogical skills on students efficiencies in reading skills. The study revealed that there is significant difference in performance of the groups taught using Study groups and multiple Intelligences methods.”

Gulap Shahzada (2013) The main objective of the study was “to find out the relationship between mother’s education and students’ multiple intelligences. A significant correlation was found between mother’s education and students’ verbal/linguistic, logical/mathematical and musical intelligence. An insignificant correlation was found between mother’s education and students’ visual/spatial, bodily/kinesthetic, interpersonal, intrapersonal intelligence.”
Baran and Maskan (2011) Investigating “Multiple Intelligence Fields of 11th Grade Students with Respect to Some Variables and Physics Achievement. The aim of this study was to investigate the relationship between students’ multiple intelligence fields and some variables. The relationship between intelligence fields and students’ physics achievement. The study was carried out with students 327 attended to high school. In the study data was collected through Multiple Intelligences Scale, physics achievement scores and personal information questionnaire.”

The findings of the study demonstrated that “among the study-group students, the mean scores of those attending the Science High School were higher in such sub dimensions of intelligence as intrapersonal intelligence, visual-spatial intelligence and mathematical-logical intelligence than those of the other students attending the other three types of high schools. The comparisons with respect to the school types revealed that there were significant differences between the Science High School and the Vocational High School in favor of the former and between the Vocational High School and General High School.”

Prakash Alex (2013) Studied the topic “Interrelationship among multiple Intelligences and Science Interest :An analytic study on students at primary level.” The components of Multiple Intelligences like Logical –Mathematical Intelligence, Spatial Intelligence Naturalisic Intelligences and intrapersonal Intelligences have significant correlation with Science Interest at upper primary level.

Pearson (2015) studied about a Multiple Intelligence Approach to counseling: Enhancing Alliances with a Focus on strength. The study investigated the experience of eight councilors as a result of the introduction of multiple intelligence theory and activities into therapy with adult clients.
3.3 Achievement in Mathematics- Different Studies

The extend of the students opportunity to learn Mathematics content bears directly on students mathematics achievement. In mathematics, the achievement is depends upon the scope of the mathematics presented, how the mathematics is taught and the match between students entry skills and new material. Here some reviews about the studies in Mathematics and Multiple Intelligences.

Munro (1994) conducted a study on Individual ways of learning through Multiple Intelligence models and its implications for Mathematics learning. He examines that students also using mathematical ideas, mathematical management and related learning models according to their learning preferences.

McGraw (1997) studied about the effectiveness of reinforcing strategies based on the Theory of Multiple Intelligences on student’s learning of mathematical concept. Not much difference was obtained when reinforced by using the theory of Multiple intelligences in a non-aligned manner.

Roesch (1997) conducted a study on the perspectives of English teachers on the Multiple Intelligences theory in high school classes. Study reveals that half of the English teachers were linguistic learners and the others were non-linguistic learners.

Chandra (2002) conducted a study on the relationship between Multiple Intelligence and achievement in mathematics of secondary school pupils. The major findings were 1) all the components of multiple Intelligences are positively and significantly related to mathematics achievement. Certain components of Multiple intelligences could not discriminate the subsamples grouped in pairs on the basis of the sex, locale of the school and nature of the school management.
Krishna (2004) in study shows that the strategies involving Multiple Intelligences theory are more effective on the achievement in mathematics at the secondary level.

Gibson (2008) investigated on the effect of adding drill and practice using Spatial, Kinesthetic and Musical intelligences with connected Maths project of mathematics achievement of 6th grade students. The purpose of the study was to determine how Mathematics teach best by providing drill and skill exercise to enhance the effectiveness of Connected Mathematics Project. The study shows that 5/7 dominant intelligence groups improved more when using CMP+ drill and skill (Multiple Intelligences) is a potentially effective way to teach Mathematics. "This study used an existing 4th grade assessment database from a suburban Portland, Oregon school (2000) examine the relationship between cognitive ability and academic performance in reading and mathematics. As expected, a strong, positive correlation was found for both reading and mathematics."

Onika (2008) studied the effect of the Multiple intelligences teaching strategy on the academic achievement. The results suggested that "performance on a post mathematics assessment for students exposed to Multiple intelligences showed considerable increase when compared to those using direct instruction."

Senay and Gulen (2009) their study proposed "to examine the effect of mathematics education based on the theory of multiple intelligences on the mathematics ability of 6-years-old children attending Kindergarten and to determine the permanence of mathematics education provided in this way. The research sample was composed of 60 children. In this study, test of early mathematics ability-TEMA-3 form A and B were used. Results of the research was determined that the mathematics
ability test scores of children significantly changed, depending on the experimental procedure applied. The results of the t-test showed that the effect of mathematics education based on the theory of multiple intelligences continued after 1 month (p<0.01). In the mathematics, education program based on the theory of multiple intelligences, dealing with >1 area of intelligence through one activity and having children involved in the activities as much as they want and in the direction of their interests make children willing to get involved in the program.” “Similarly, the students’ mean scores regarding total intelligence, verbal-linguistic intelligence, musical-rhythmic intelligence and mathematical-logical intelligence differed parallel to their fathers’ educational backgrounds. The results of the analysis with respect to the number of the siblings of the students revealed that their mean scores regarding total intelligence, musical rhythmic intelligence and verbal-linguistic intelligence decreased as the number of their siblings increased. It was also seen that the students with higher family incomes had significantly higher mean scores regarding total intelligence, musical-rhythmic intelligence, verbal-linguistic intelligence, mathematical-logical intelligence, visual-spatial intelligence and intrapersonal intelligence. The students with computers at home had significantly higher mean scores regarding interpersonal intelligence, musical-rhythmic intelligence, bodily School-kinesthetic intelligence, verbal-linguistic intelligence, mathematical-logical intelligence, visual-spatial intelligence and total intelligence than those with no computer at home did.

Fowler (1990) examined that “most of the students that have good ability in linguistic and logical intelligence usually will be successful at schooling but are not when they are in job world.”
As Kolb (1971) argued “one will be more successful in any area if he knows his own strength and lowness.”

Hoerr, (2002) The results of “this study are consistent with the larger scale research conducted by the creator of Multiple Intelligences and its principles, Howard Gardner, in which the purpose was to "understand and enhance learning, thinking, and creativity in the arts, as well as humanistic and scientific disciplines, at the individual and institutional levels." The results demonstrates the effectiveness of MI with the noted improvements in standardized achievement scores, performance of students having learning difficulties, parent participation, and student discipline. Due to the length of the current research conducted, two of the four improvements were observed: improved academic performance and behavior improvements. Therefore, it can be concluded that as compared with the traditional Direct Instructional teaching method, Multiple Intelligence garners significant increases in several areas of importance to a student's academic, social, and emotional well-being. In the classroom, this task is accomplished by developing innovative lesson plans that will meet the needs of a diverse learning population.” Margaret Mead, a distinguished anthropologist, intellectual, and scientist stated it best, "if we are to achieve a richer culture ... we must weave one in which each diverse human gift will find a fitting place."