

Improving Teaching of Mathematics through Multiple Intelligences Theory based activities at Secondary School Level

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Abstract

This study was conducted to improve the academic achievement of students in the subject of mathematics at the secondary school level through the application of multiple intelligences theory-based activities at the secondary school level. The researcher used a true experimental design in this study. The population of the study comprised of all secondary school students of district Bannu and 60 students were randomly selected as a sample of study who were further divided (based on pre-test score) into two equivalent groups (Control and Experimental). The experimental group was taught through MIT-based activities, while the control group was taught through the traditional method of teaching. This treatment lasted for eight weeks. At the end of the procedure, a post-test was conducted to find out its outcome. The data obtained was analyzed by SPSS. To compare the achievements of both classes, researchers used the Independent Sample t-test and the Paired Sample t-test. To find out its effect size, Cohens'd was used. Results showed that the experimental group taught through multiple intelligence theory-based exercises has good academic achievements as compared to the results control group taught through the conventional method of teaching.

Keywords: Multiple Intelligences Teaching, Learning, Traditional Teaching, Secondary School.

Introduction

Gardner (1983) suggested the idea of 'Multiple intelligence' as human intelligence plays a crucial role in learning. Gardner's idea of intelligence varies from that of typical concepts. According to him, intelligence is not limited to mathematical and verbal knowledge. He wanted to judge people who use their abilities in different ways to develop a precise sense of intelligence. Gardner made a significant shift in the concept of intelligence when he expanded the intellectual parameter to take into account the various abilities of a person (Gardner, 2011b & 2013, Shearer, 2012). (Gardner, 2011b & 2013, Shearer, 2012). According to Gardner, intelligence is the capacity to solve or construct something that is respected by individuals or in a community (Gardner, 1983). He included intelligence since the conventional theory of IQ was based on two fundamental principles: individual intellectual capacity is a unit and individuals have a single intelligence that can be quantified. Contrary, Gardner had the view that intelligence is the aptitude to find out the solution to a problem facing by an individual, talent to produce new things to be solved, and to generate or propose a service, important in one's society. So MI theory had broadened the scope of intelligence by adding creative and practical abilities, related to eight intelligences (Bas, 2014, Davis, et.al. 2012, Shearer, 2012). Gardner defined the term intelligence by claiming that each individual had special types of intelligences. Education and past experiences support in strengthening or weakening these intelligences. Gardner (1983, 2013) suggests that people vary in terms of eight kinds of intelligence: visual, verbal, mathematical, kinaesthetic, interpersonal, intrapersonal, naturalistic, and musical intelligence.

In the past, intelligence was considered to be an IQ test and a single test score could be objectively measured. To reduce their failure percentage, Binet, (French psychologist, 1904) and his other contemporaries sought to increase the concentration of elementary level students in school. Furthermore, in the United State of America intellect is considered to assess students' capacity by judgment of their academic achievement.

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They use the IQ test for that reason if they need to identify any impairment in learning. The Harvard psychologist Howard Gardner developed this theory against this belief. Gardner suggested that the concept of intelligence is limited in our society. Undoubtedly, Intelligence Quotient tests are applicable to foretell educational attainment of students however these are not capable to judge the intelligence of an individual (Gardner, 1999). Gardner (1983) anticipated a new theory of intelligence called multiple intelligences theory (MIT). He thought that each one has a different intelligences sketch and that consisted of seven types of intelligences. They are: verbal-linguistic, kinaesthetic, spatial/visual, mathematical-logical, intrapersonal, musical, and interpersonal. Later, based on intelligence work, he added two more intelligences, i.e. Naturalist and Existentialist (Gardner 1983, 1993, 1999). Armstrong (2000, 2009) and Palmberg (2011) addressed the intelligences to explain his work in the following ways:

Linguistic intelligence refers to the talent of a person to make use of speech successfully. It is related to all skills. It refers to skills to learn and to employ verbal communication to achieve purpose. It has skills of having potential about order and meanings of words, motivating a person for an act, to explain teaching and learning, wit, recollection and to evoke. In the occupation, such intelligence is shown, such as poets, writers, and editors, storytellers, politicians, and even those with foreign language skills. This kind of people learn properly in the course of verbal communication, explanation, inscription, listening, story-telling, interpretation, and analyzing a language/sentence structure in the learning environment.

Logical/mathematical intelligence is a talent to explore a problem rationally, to carry out arithmetical operations, and to examine an issue. It refers to the ability to apply figures efficiently throughout rational patterns and connections. People with this kind of aptitude want to think in multifaceted ways to get eminence /take pleasure in judgment of model in shape and number. In occupations such as mathematician, tax accountant, statistician, scientist, computer programmer, and logician, individuals with this intellect show good performance. This includes sample skills such as the identification of abstract patterns, inductive/deductive and scientific reasoning, discerning relationships and ties, etc. Such types of learners learn best through mathematical perspective or new information which is related to experiments by giving reason or asking for gaining new answer to offer their work.

The ability to identify and control the patterns of large space (such as those used by navigators and pilots) as well as the patterns of more restricted areas is the key function of Visual-Spatial intelligence. It also means the capacity to correctly perceive the visual world and to make adjustments to certain experiences. Such kinds of people also accept professions such as hunters, scouts, guides, interior decorators, architects, photographers, mechanics, graphics, and engineers. By presenting new data in the form of diagrams, photographs, mazes, and maps that can visualize their definition, learners with such intelligence learn best.

Bodily/Kinaesthetic Intelligence refers to the aptitude of having one's entire body or its' part like hands or mouth or any other part of body, be involved in some activity. It involves the ability to express feelings, emotions or alter things using one's whole body or its components. Surgeons, craftsmen, mime, athletes, singers, actors, and all those who perform well on stage or are gifted with this intelligence in model making or sculpture-related fine motor skills. They can learn best by using the body to create some idea on the topic to be learned. They can learn through various body movements.

People with musical intelligence can sing, compose and understand the patterns of music. They can interpret musical forms, discriminate, turn and articulate them. For those who like creating rhythm sounds or shows, musicians, composers, conductors all have good musical intelligence. When new knowledge is introduced in the form of music or song, they may understand better. They tend to listen to the sound of voice instead of learning by lecture and debate.

According to this theory, the capacity to interpret and make a difference in other people's moods, intentions, motivation, and emotions is interpersonal. These individuals have the opportunity to effectively correspond. They might be leaders or adherents of either. They love conversation and debate and like it. They are capable of being a psychologist, a teacher, a politician, a professor, a consultant, a social worker.

Intrapersonal intelligence is concerned with skills that are introspective and self-reflective. It implies having a deep understanding of oneself. The person is well aware of his strengths and

weaknesses. It makes one unique and can foresee responses and feelings of one's own. The individual is self-conscious. They have the capacity for self-discipline, self-understanding, and self-esteem. Such kinds of individuals can learn on their own by reading about new knowledge. That's why they are reflective, logical, and intuitive intrapersonal learners.

Gardner suggested eighth intelligence in 1985, i.e. naturalist. He wrote that he would certainly make an addition to 8th intelligence-Naturalistic intelligence if he had to write his book "Frame of mind again". For example, this ability is linked to the natural environment to distinguish natural forms such as animal and plant groups and types of rocks and mountains. This intelligence was valued in our evolutionary past as hunters, gatherers, and farmers. To judge various classes, this intelligence often helps to understand the distinction, comparison, or description of natural phenomena by categorizing nature in the form of animals and plants. It also helps to carry out natural environment-related initiatives, to carry out experiments and activities by using natural world objects. It also helps the senses to be exposed to natural noises, smells, tastes.

Gardner wrote about the probability of Existential Intelligence, the ninth intelligence (Gardner 1995, 1999). The ability to find oneself and the ability to consider oneself and its relationship with nature, the truth of death, and transformation in the physical and psychological universe concerning the farthest reaches of the cosmos, infinite and infinitesimal (Gardner, 1999). According to Gardner, the main characteristic of this ability is Gardner clarifies that this intelligence does mean. According to this definition, there is a space for both religious groups and non-religious groups and others who, as a part of their original expression, raise these deeper questions). This intelligence should be included in MI theory, according to Gardner, since it matches most of his intelligence criteria: Extraordinary individuals (savant)—In various parts of the world, some individuals are said to have deeper knowledge, insight, or ability to ask existential questions by local people. But at the same time, they have a low IQ or lack of other intelligence capabilities.

Gardner (1983) believed that intelligence is different than that it has been presented or measured by the I.Q test. He wrote that instead of having knowledge about intellect it is better to know about its' function. His theory presented a new approach to intellectual powers and helped to identify various aspects of intellect. So it is important to be familiar with the individual intellectual strengths (Gardner, 2006).

All over the world a lot of research has been done on MIT. Different psychologists and researchers have worked on this theory. They have done descriptive and empirical studies on MIT and obtained good results. They have also applied this theory in their classroom teaching as well in different subjects at different levels. But in our country, very rare work has been carried out and most teachers have no idea/ knowledge about MI theory. To work with different intelligences, teachers need to know how to use various teaching methods. They will be able to strengthen their weak points by introducing effective practices according to the intellect of the students. Once teachers are conscious of various ways in which students can learn correctly, several techniques can be used to reach children.

Teachers should develop such learning according to the intellectual needs of the entire class. The teacher would have a more productive class and good students by applying Multiple Intelligence (Johnson, 2007). Gardner suggests that almost all eight intelligences can be created and strengthened by proper motivation, enrichment, and guidance (Armstrong, 2009).

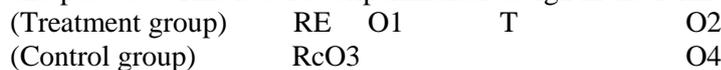
Most teachers teach traditional means in our classrooms in our country and they never attempt to implement the latest strategy in class because most teachers are not aware of the world's modern developments. Gardner's theory supports teachers to know about different approaches in the school system to improve learning and functioning.

Keeping in view the related literature review, the following null hypothesis has been adopted by the researcher to guide the study.

Ho: There is no significant difference in students' academic achievement as taught through MI activities and traditional methods of teaching in the subject of Mathematics.

Methodology

The research employed the true experimental and control group design of the Randomized pre-test and post-test. This is a true experimental design in the form of the following diagram that can be seen:



R stands for randomly selected groups

E stands for Experimental group

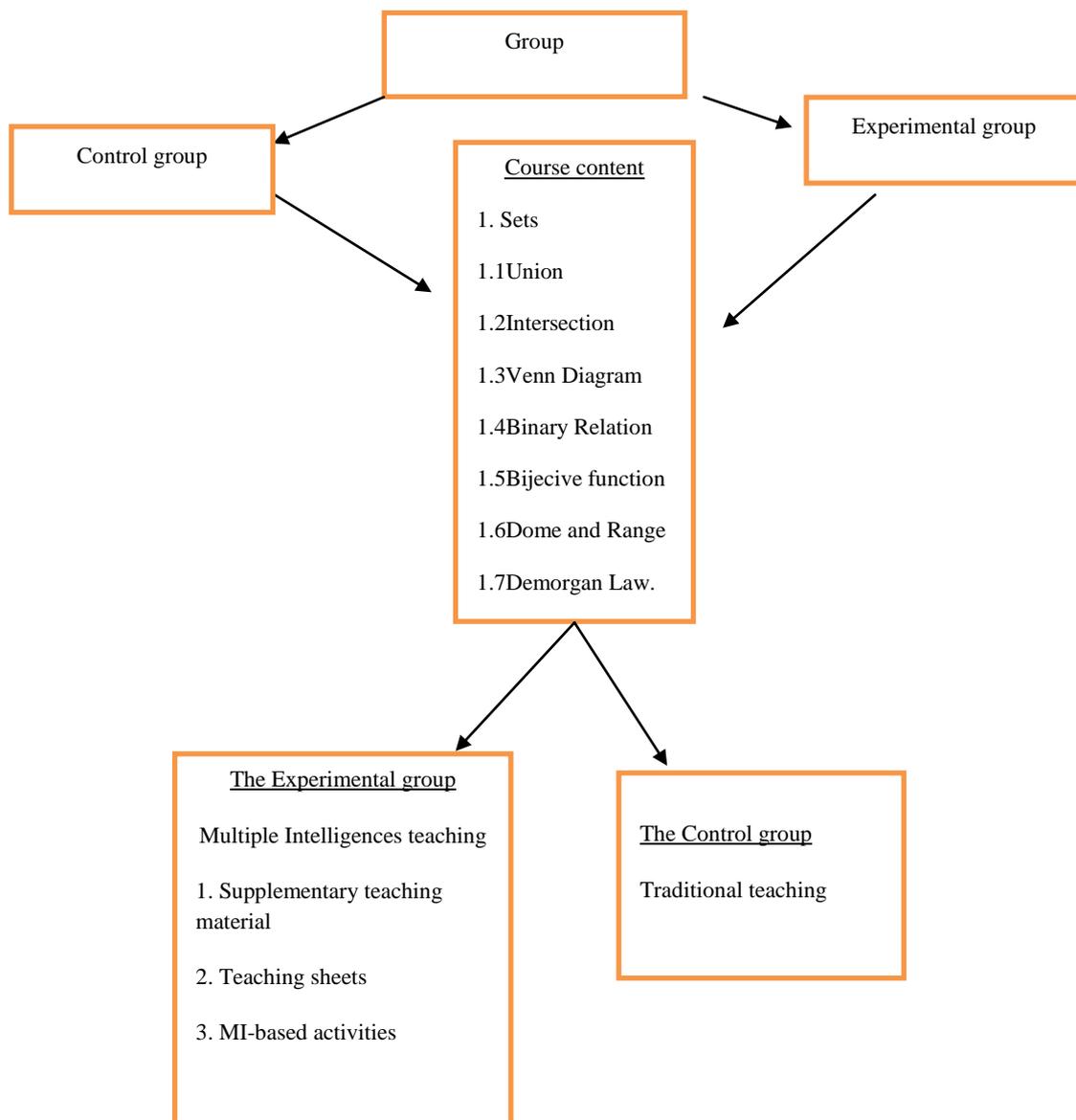
C stands for control group

O stands for observation

T stands for Treatment

The population of the study consisted of all the females studying at the secondary school level in KP. 60 students were randomly selected from Government Girls Centennial Model School of district Bannu city as a sample of the study. The researcher conducted a pre-test at the beginning of the study and based on the pre-test score they were divided into two equivalent groups. Researchers taught both groups over 8 weeks. The syllabus consisted of the Mathematics 10th degree (Unit No 5- Sets and Union). Before the presentation of class lessons, the researcher provided all the material needed. The implementation of two or three MI activities according to the length of the class was included in each lesson. For example, explanation, presentation, and resolution of questions (verbal-linguistic and logical/mathematical intelligence), Puzzles and games, Logical-mathematical intelligence and classification categorization, presentation of power points, flashes (visual/spatial intelligences, pair work, group work (interpersonal intelligence), individual tasks and worksheets (intrapersonal intelligence), real-life taking and teaching those objects to teach by using them (naturalistic intelligence). The researcher tried to present the content in different ways.

Research Framework



Preparation for Experiment

Lesson plan according to the traditional method of teaching for control group

Through conventional teaching approaches, researchers have taught control groups. For that reason, the researchers used standardized exercises included in the textbook. To learn these principles by heart, students were always predictable. Besides, instructions as well as a contact in their native language (Urdu) were also given. Other approaches used in class integrated dialog memorization, question and response practice, replacement exercises, and directed speaking, reading, and writing practices were used.

Lesson plan according to MIT based for experimental group

The investigator applied teaching based on MIT based to the experimental community. The purpose of using MI activities was to meet the needs of all learners with various kinds of intelligence. The researcher also clarified the protocol during the experimental time that was to be followed. Before the presentation of class lessons, the researcher provided all the material needed. Each lesson is related to the execution of two or three. The investigator had not concentrated exclusively on the structure. The researcher not only taught by material but also used meaning. After teaching verbs the researcher assigned a task to class to apply verbs in their daily life. They learned in this way from different activities. The investigator tried to familiarize them with new terms by using multiple exercises instead of supplying them with a list of verbs to memorize them.

Lesson Presentations

The researcher followed the lesson plan suggested by Armstrong (2000) with the addition of two more. These steps are as following:

1. First of all, researchers have formed specific objectives of activity that clearly shown that what the researcher intends to do or achieve. Objectives were formulated according to SLOs of the National curriculum 2009.
2. Keeping in view objectives, researchers have planned key MI questions that have to be attained during this activity.
3. Although activities were planned and required material was also provided before starting the activity, but due to any kind of emergency like light, internet, projector etc. alternate activities were also planned.
4. The researcher has used the brainstorming technique to activate the minds of students and to utilize their potentials.
5. According to the nature of the content and needs of students, suitable and appropriate activities were selected.
6. All the activities were presented in such a way that the first one provides a base for the coming activity. All the material was presented in a logical sequence.
7. The whole lesson plan was implemented very carefully so to achieve the targets.
8. After each activity students were provided a chance to reflect upon this activity and shared their views about it in form of a KWL chart.
9. In the end, they were provided feedback in different forms according to their needs.

Variables of the Study

In the research process concepts are generally referred to as variables. In research, we mostly use the term variable for the factors like age, gender, location, academic characteristics, family size etc. Variables are the most important part of experimental research. It refers to the changing factors in a research study. We can say that these are the changing/ manipulating/ controlling/ measuring factors of an experiment.

An experimental study has different types of variables such as dependant variables, independent and extraneous variables. In the present study the following variables are present:

Independent Variable

Independent variables are those factors that are manipulated by the researcher in the study. In the present study, the independent variable was the teaching method (MIT-based activities to experimental group and traditional method of teaching for control group). The researcher has planned activities for the treatment group and manipulated them during the experimental process.

Dependent Variable

Dependent variable refers to those factors that are measured or observed by the researcher as a result of the manipulation of the independent variable. In the present study, the dependant variable was the academic achievement of students as a result of the treatment provided during the experimental process.

Extraneous Variable

Extraneous variables are those factors that may threaten the external and internal validity of the study. In this study, extraneous variables were the demographic variables (location, parents' education, no of siblings, family income), students' age, gender, time.

During study students' age (15-17), time and teacher variables were controlled whereas demographic variables were uncontrolled. Similarly, due to cultural constraints in Bannu, the gender factor was also uncontrollable.

Experimental Procedure

After making necessary preparation for the experiment now the researcher has started the actual experiment in the classroom. First of all the researcher has conducted a pre-test of 60 randomly selected students of class 10th of GGCMS Bannu city. It was marked and a list was prepared in ascending order. After that from this list, students were randomly selected for both groups (Control and Experimental group) in such a way that both group has equal marks of students and equal strength (30) of students. Then lessons were taught to both groups according to pre-planned lesson plans by the researcher herself. This experiment lasted for two weeks. At the end of this period, a post-test was administered to measure their academic achievement.

Pilot Test

To find out the validity and reliability of the instrument, the researcher has conducted a pilot test. Data were collected from 30 students of class 10th. Then the item difficulty level was computed according to the formula used by Crocker and Algina, (1986). The item difficulty ranges from .80 to .70. Similarly, the reliability of test items was computed by SPSS. The values were ranging .80 to .90

Results

The paired sample t-test for both groups was used separately to find discrepancies between pre-test and post-test scores within the same group. Besides, the independent sample t-test was used to find out whether there were any variations between these two classes. The findings have been identified and interpreted as follows:

Table 1. Posttest data analysis of Control and Experimental groups

Group	No.of Students	Mean	Std. Deviation	t-value	df	p-value
Experimental	35	22.14	2.76	11.86	34	.000
Control	35	10.40	2.46			

Table 1 indicates the independent sample t-test data, the overall experimental and control group with a standard deviation of 2.76, 2.466 is 22.14 and 10.40 respectively. The p-value is .000, which is less than the significant amount of .05, which implies substantial differences exist between these groups.

Table 2. Control group pre-test and post-test data analysis.

Group	Mean	Std. Deviation	T	df	P
Pre-test	7.94	3.66	7.68	34	.46
Post-test	10.40	2.46			

Table 2 shows the paired-sample t-test result of a control group for pre-test and post-test. The mean score is 7.94, 10.40 with a standard deviation of 3.66, 2.46, and the p-value (.46).

Table 3. Experimental group pre-post-test analysis

Group	Mean	Std. Deviation	T	df	P
Pre-test	7.94	3.66	-21.10	34	.000
Post-test	22.14	2.76			

The paired sample t-test results of the pre-test and post-test experimental groups are shown in Table 3. Mean scores of the experimental group in pre and post-test are 7.94 and 20.14, with standard deviations of 3.66 and 2.76 with a p-value is .000, less than the significance level of .05. It proves that pre-test and post-test scores vary significantly.

Table 4 Effect size of treatment

Group	Mean	SD	t	p	95%CI		Cohen's d	Effect-size r
					LL	UL		
Post-Experimental	22.54	1.88	19.06	.000	8.01	10.38	4.23	0.90
Post-Control	13.34	2.46						

Discussion

Since Gardner suggested his theory of multiple intelligences back in 1983, this theory and its application in the teaching-learning method have been discussed in different ways. In this research, according to the facilities provided in our classrooms, an attempt has been made to incorporate this theory in Pakistan. In this experimental research MIT based learning practices (the theory of Gardner) are applied to improve students' academic achievement at the secondary school level. The researcher organized various activities for the experimental group and treated students for eight weeks. After analyzing pre-test results, it was obvious that both groups equal at the beginning of the study since the .169 p-value showed that there was no significant difference between both groups. But it was evident from the findings that MIT-based activities have greatly improved the academic achievement of students. So the null hypothesis that there are no significant differences in students' academic achievement as taught through MI activities and traditional method of teaching in the subject of Mathematics has been rejected. Jing (2012) researched "teaching English in primary schools through MI theory." It was an empirical study on the implementation of MIT in the English primary school class and found that MI-based reading significantly contributed to the interest of students in reading English and their abilities to learn. A study was conducted in 2013 by Ali to investigate the MI-based learning practices on academic achievement of students in the science. The study has shown the effectiveness of the teaching method based on MI as compared to conventional teaching procedures. Widiana (2016) has researched on to Improve the creative thinking and achievement of students by implementing Multiple Intelligence with Mind Mapping." The findings showed that the execution of multiple intelligence strategies enhanced students' innovative thinking and achievements in studying science. The findings showed that the introduction of a multiple intelligence strategy. Gardner's theory of multiple intelligences encourages new strategies and practices to be implemented in conjunction with children's mental abilities. As each individual is urged to have nine intelligences, so teaching method should be based on this theory, the instructor must follow teaching practices. Through this review, an attempt was made to apply this theory to teaching in Pakistan. Gardner's MIT has been effectively applied in classrooms in foreign countries, especially in western countries. In our country, particularly in Bannu, teachers mostly complain that they haven't enough material assets and qualified teachers to implement this theory in class. But through this study, researchers have shown that these activities are easily applicable in classes.

Implication of the study

1. In the present study, the researcher has developed and applied different activities according to the multiple intelligences theory. These activities include verbal, logical/mathematical, visual/spatial, intrapersonal, interpersonal, musical, and naturalistic. All these planned activities will be helpful for teachers to develop and plan such activities for different types of students.
2. By using various activities for the same topic, students were greatly motivated and took a lot of interest in learning. So present study is helpful for teachers to create positive teaching and learning environment in class and to motivate learners.
3. Teachers would be encouraged to plan teaching strategies based on different MIT.
4. Just as a seed need a fertile land to grow similarly for better nourishment of intelligences favorable environment is essential. By applying these activities students can be provided a chance to develop their capabilities and potentials and to achieve their pick.
5. The researcher has planned and developed these activities for Mathematics, teachers can apply them in another subject as well.
6. This study is also helpful for curriculum developers. They should introduce such types of activities in textbooks, so that every student has e a chance to learn according to his intelligence. In this way, the stereotype traditional method of teaching can be changed.

Suggestions

It is clear from the results of the study that the experimental group taught through multiple intelligence-based activities has shown good academic score than the control group taught through the traditional method of teaching. It means that by applying these activities real learning can be achieved. So the researcher recommended that these activities should be applied in classes regularly. As by the researcher MI activities were applied only in the Mathematics subject, efforts should be made to apply it in other subjects as well. Moreover, while planning curriculum and lesson planning, individual differences in intelligences of students should be considered by developers and teachers. Different learning activities according to their intelligence will lead to real learning in life.

Limitation of the Study

Ideally students of both gender (male and female should be a part of the study but due to cultural constraints they were not included in the study. Since it was an experimental study and the data has been collected only from Public Secondary Schools female students so the generalization of results should be done carefully. Similarly the variables like location (rural/urban), gender (male/female) could not be controlled in this study.

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References

- Armstrong, T. (7). Kinds of Smart: Identifying and Development Your Intelligences.
- Armstrong, T. (2009). Multiple intelligences in the classroom. Ascd.
- B. A. Ş. (2014). Evaluation of multiple intelligences based instruction in English course from the views of students. *Kastamonu Education Journal*, 22(1), 177-201.
- Barrington*, E. (2004). Teaching to student diversity in higher education: How multiple intelligence theory can help. *Teaching in Higher Education*, 9(4), 421-434.
- Bas, G. (2008). Integrating Multiple Intelligences in EFL/ESL Classrooms. Online Submission.
- Campbell, L., Campbell, B., & Dickinson, D. (1996). *Teaching & Learning through Multiple Intelligences*. Allynand Bacon, Simon and Schuster Education Group, 160 Gould Street, Needham Heights, MA 02194-2315 (Order No. H63373, \$27.95, plus shipping and handling).
- Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences*. Hachette UK.
- Gardner, H. E. (2008). *Multiple intelligences: New horizons in theory and practice*. Basic books.
- Gündüz, Z. E., & Ünal, I. D. (2016). Effects of Multiple Intelligences Activities on Writing Skill Development in an EFL Context. *Universal Journal of Educational Research*, 4(7), 1687-1697.
- Gardner, H. (2011). *The Theory of Multiple Intelligences: As Psychology, As Education. As Social Science*.
- Gardner, H. (2004). Frequently asked questions—multiple intelligences and related educational topics. Retrieved February 9, 2008.
- Johnson, M. (2007). An Extended Literature Review: The Effect of Multiple Intelligences on Elementary Student Performance. Online Submission.
- Pokey, R. (2003). Multiple Intelligences revisited [online] Available: [www.esldepot.com/pdf/English club-multiple intelligences-revisited.pdf](http://www.esldepot.com/pdf/English%20club-multiple%20intelligences-revisited.pdf) (March, 2013).
- Rockwood, A. C. (2003). *Bodily-Kinesthetic intelligence praxis: A test of its instructional effectiveness*. Unpublished doctoral dissertation, State University of New York at Buffalo, USA.
- Shearer, C. B. (2012). An inter-rater reliability study of a self-assessment for the multiple intelligences. *International Journal of Psychological Studies*, 4(3), 131.
- Sternberg, R. J. (2018). Evaluating merit among scientists.
- Sternberg, R. J. (2018). Evaluating merit among scientists. *Journal of Applied Research in Memory and Cognition*, 7(2), 209-216.
- Sabena. (2001) *Cokluzekateorisiveegitimi*. Ankara: Nobel Yayinlari.

- Smith, B.A. (2002). Thought on teaching; Twisted NLCBor twisting NCLB. *Phi Delta Kappan*, 84(4), 314-315.
- Shore, J. R. (2004). Teacher education and multiple intelligences: a case study of multiple intelligences and teacher efficacy in two teacher preparation courses.
- Widiana, I. W., & Jampel, I. N. (2016). Improving Students' Creative Thinking and Achievement through the Implementation of Multiple Intelligence Approach with Mind Mapping. *International Journal of Evaluation and Research in Education (IJERE)*, 5(3), 246-254.
- Xie, J., & Lin, R. (2009). Research on multiple intelligences teaching and assessment. *Asian journal of management and humanity sciences*, 4(2-3), 106-124.