

**The effectiveness of Brain Gym® Exercises on Improving
Students' Performance in classes of middle school boys in
private schools in Dubai, UAE**

**(Ethnographic Study Conducted at the American
International School. Dubai, UAE)**

فعالية تمارين Brain Gym® في تحسين أداء الأولاد في صفوف التعليم المتوسط في المدارس
الخاصة في إمارة دبي ، دولة الإمارات العربية المتحدة

(دراسة إثنوغرافية تم عملها في المدرسة الأمريكية الدولية في دبي، دولة الإمارات العربية المتحدة)

by

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Abstract

School education plays an important role in shaping the personality of students throughout the first seventeen years of their lives. This is why teachers should make sure students are grasping knowledge and are able to apply it effectively in the present and the future regardless of any obstacles or challenges. One of the promising educational interventions that is said to help teachers to do so is a group of physical exercises called Brain Gym®.

This experimental research was interested to test the effectiveness of these exercises in enhancing boys' academic and behavioral achievements in their classes. The research was conducted in one of the private schools in Dubai, UAE. Brain Gym® was applied inside two classes of grades six including forty-four students. The methodology that was used was a mixed-methods approach. Results showed that on the behavioral level, students' ability to settle down and listen to the teacher's instructions increased and students became less aggressive towards each other and they started enjoying learning. On the academic level, the marks of post-implemented quizzes showed a significant drop, however, post-implemented major exams showed a significant rise. The research concluded that Brain Gym® exercises were indeed effective in improving the behavior and attitudes of the students and in making them more focused in what they doing in class, however, more researches should be done to prove the effectiveness of these exercises on increasing the academic level in terms of educational attainment.

Key words: Brain Gym®, Kinesiology, Achievement, Cognitive, skills, behavior.

الملخص :

يشكل التعليم العامل الأساسي لصقل شخصية الطالب للتعامل مع الحياة الآن وفي المستقبل. و هنا يتوجب على المعلم التأكد من أن المعلومات قد وصلت للطالب وانه قادر على توظيفها في الحاضر و المستقبل. و لما كانت لدى بعض الطلاب مشاكل جسدية و نفسية قد تشكل حاجسا في العملية التعليمية؛ كان على المعلم إيجاد حلول تعليمية لهذه العقبات. هذا البحث يتناول التمرينات العقلية المسماة ب Brain Gym® ، كحركات جسدية منظمة تساعد في إيجاد التركيز، وخلق سلام داخلي، وتنشيط وتحفيز الدماغ كنوع من التهيئة لتلقي المعلومة وتوظيفها.

يهدف هذا البحث التجريبي إلى دراس مدى فعالية تمارين Brain Gym® في تحسين أداء الأولاد في صفوف التعليم المتوسط في المدارس الخاصة في إمارة دبي ، دولة الإمارات العربية المتحدة. تم عمل البحث مع أربعة وأربعين طالبا من الصف السادس بشعبتيه الأولى و الثانية و كان الطلاب مختلفي القدرات و قد كان منهم سبعة تلاميذ من أصحاب الهمم .

استخدم البحث عدة أدوات لدراسة النظرية اهمها مقارنة سلوك الطلاب قبل وبعد التمارين و كذلك استبيان قبلي وبعدي يبين مدى تفاعل الأولاد مع التمارين و كذلك تمت تسجيل ملاحظات كل من مدرسة المادة الإنكليزية و مادة العلوم حول فعالية هذه التمارين في حصصهم. خلص البحث إلى ان التمارين كانت فاعلة و إيجابية في تحسين سلوك الطلاب في الصف و زادت من تفاعلهم بينما أوصى البحث بزيادة عدد الأبحاث في هذا المجال للتمكن من اثبات النظرية على مستوى الدرجات و التحصيل العلمي.

Dedication

This research is dedicated to my mother Mounira Maraqa, my father Mohamad Amin and my whole family who gave me all the power to go throughout this process. This is also dedicated for Sana H. and Safa H. for believing in me and for all the psychological support they provided me with. This research wouldn't be done without the energy and passion I saw in my students' eyes. I hereby dedicate this research to all students in 6B1 and 6B2 (Class of 2017-2018) for giving me the opportunity to discover how great they were.

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Chapter One: Introduction

No one can deny that we are living in a world that is changing and evolving at a supernatural speed. These rapid changes and accelerated developments in the world -at all levels- have cast its shadow over all fields and have greatly affected people's lives as new challenges have appeared along with these changes. Hence, the human being's nature had to change in order to be able to comply with the newly evolving world's requirements and challenges. One of the most important things that happened is the major change in human beings' lifestyle and nature in general (Redecker et al., 2011).

The common phenomenon of that evolution is the penetration of electronic devices in human being's everyday's lives and them becoming an integral part of the life of most people. Despite the fact that these devices have helped to accelerate human beings' achievements; researches proved that they also had their negative impacts and have added new problems to people's lives (Wajcman 2008). This and all other changes led to the need of having nations who are occupied with the abilities to deal with the world's new challenges. This is why providing the new upcoming generations with the latest educational techniques and making sure that they apply them, is highly required if a country wants to keep up with the world's developments (Redecker et al., 2011).

This research is interested in the aspect that is related to students' nature -in middle school- under this developing world and in the importance of understanding students' recent psychosomatic conditions to be able to find the best educational intervention that can be used inside classrooms by the teacher to ensure a smooth, professional, interesting and long life learning for all students who are learning together at the same room and at the

same time despite the differences in their personal, psychological, intellectual and social conditions.

Students' nature nowadays is totally different from the classic students' nature fifty to a hundred years ago. This is due to the major changes happening in the factors that affect every student's life. These factors include the environment lived in, parents' educational, psychological and emotional conditions, lifestyle, electronic devices usage rate, daily activities, challenges facing the parents at the social and financial levels and school environment. All of these conditions are being faced by the student every day and unless a majority of these conditions are healthy; the student's learning process – as a major part of every student's life - will get affected negatively (Rowan 2009).

On the other hand, students' intellectual and physiological conditions have changed a lot due to the new lifestyle they live. Students in the past used to be less stressed as they move and play a lot outside in their free time and their games included jumping, riding bicycles and running and other physical movements. Students nowadays spend most of their free time playing with their electronic device barely moving their figure muscles (Rowan 2009). Moreover, researchers have found a direct link between the regular usage of electronic devices and the increase in tension among students. Stress and tension will adversely affect students' academic performance in the classroom. Electronic devices invaded students' lives massively all over the world. An online statistics done in 2017 showed that almost 50% of people worldwide spend between three to seven hours daily on their smart-phones. In her newspapers article, Pennington (2016) found that for every four students studying in the United Arab Emirates (UAE), one or more use their smart-phones to check the social

media for at least 5 hours per day which makes them more exposed to stress due to lack of rest and cyber-bullying.

Researchers have proved that students nowadays are also stressed out due to the school's academic rules and regulations. Essel and Owusu (2017) have said that "The very mention of the word 'stress' brings thoughts such as increased rate of depression, anxiety, cardiovascular disease, and other potentially life-threatening issues to one's mind." Students nowadays are under stress for at least five days out of seven days from waking up early in the morning to not having enough sleep in addition to all the stress of assessments and exams. This will definitely affect the student's attitude toward school and towards learning (Essel & Owusu 2017).

Since the educational sector is responsible to raise up new generations with the abilities and skills to deal with all the previously mentioned conditions; the old paradigm of teaching that tends to raise generations fully dependant on teachers' explanation; had to change into a new paradigm that allows students to be independently working to find solutions and to be strong enough at problem-solving and other skills. This required the teacher to be no longer the person who stands in front of the class as the source of the information. Instead, to be the person who facilitates a class which is led and centered by the students themselves (Bada 2015).

Teachers all over the world need to be able to facilitate a students' centered classroom, active and project-based, and to be able to achieve this goal; teachers need to make sure that all students are ready to learn despite any outer thoughts and problems. This can be

achieved by the help of school's leaders and administrators who should facilitate the process of teachers meeting and discussing classroom issues and challenges with educational experts, physiologist councilors and people who are expert in educational theories and interventions to help them fulfill their job as facilitators (Bada 2015).

A teacher nowadays needs not only an up-to-date strong knowledge base of the particular subject but also very strong classroom management skills to be able to provide the right classroom environment conditions for all students.

1.1 Background of Study

This research aims to test the effectiveness of the daily implementation of a set of movements called Brain Gym® exercises inside the classroom on students' performance in the classroom on both the academic and behavioral levels. These exercises were designed as an effective intervention to solve students' intellectual and behavioral challenges.

According to Oxford dictionary learning as a verb is being defined as "To get some information about something; to find out" (Oxford English Mini Dictionary 2007, P446). Oxford dictionary also refers to teaching as the "Impart knowledge to or instruct (someone) as to know how to do something" (Oxford English Mini Dictionary 2007, P792).

From what was mentioned previously a definition of teaching and learning nowadays can be merged together in one phrase and referred to as the process by which students are provided which the right environment, instructions and facilities to learn by themselves (Oxford English Mini Dictionary 2007, P792).

As mentioned previously, the nature of students has changed dramatically which affected the way they can be approached by their teachers, in terms of the way they get instructions and the way they give out results and in terms of their attitude towards the learning process in the school (John& Harlan 2018)

A teacher nowadays is dealing daily with students under pressure and stress of a hectic lifestyle and of meeting their grade level expectations set by both the family and the school system and does their tasks completely in addition to bullying and different learning disabilities each student has. All of these conditions lead to difficulties in understanding and following instructions in class (Essel & Owusu 2017).

In addition, each student in class is a unique mixture and this blend is a combination of the hereditary variables, the condition of wellbeing, the social and familial circumstance, the previous experiences, and the put away materials in memory, mental capacities and imagination, therefore, every student has his or her individual identity. This is the greatest challenge that teachers face in the moderate and essential evaluations where there are around 20 students in each class, each with his/ her own background and life experiences which is different from the others. Furthermore, it is the instructor's job to attract all the students' attention into one point or undertaking notwithstanding any external diversion the students have (Anghelache 2013). To do so, there are many educational solutions provided by regionally or internationally recognized educational institutions. One of the most recent educational interventions that are used and said to solve many educational problems and helps teachers facilitate their classes is Brain Gym® This research is interested in testing the

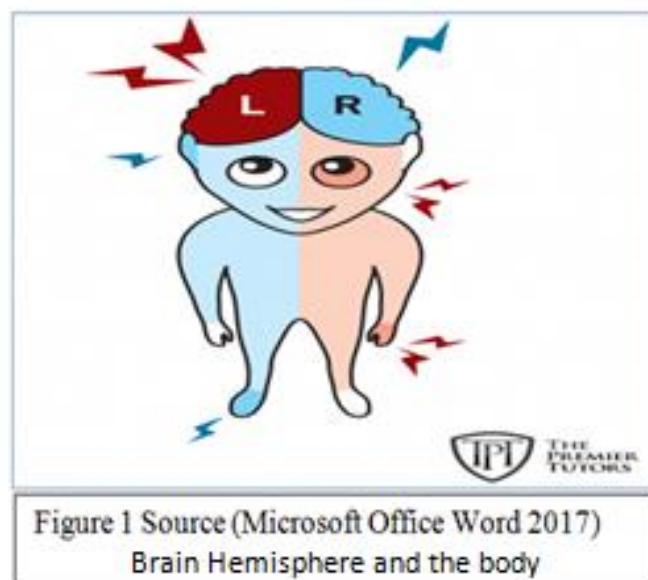
effectiveness of Brain Gym® exercises in enhancing the students' academic and behavioral performances.

- **What is Brain Gym®?**

Brain Gym® is an educational trademark intervention or solution. This intervention is being marketed by the Educational Kinesiology Foundation or Brain Gym® International Corporation in Ventura, California, USA. Brain Gym® as a definition is a set of several exercises that are done as a suggested solution for many physical and psychological challenges. Brain Gym® trainers believe that Brain Gym® motions lead to better learning. This foundation started its activities back in 1987 (Braingym.org, 2018). Various Researches have given special attention to the importance of physical movements on children's mental and physical development. Children should be given chances to practice moving activities as part of their physical and mental progress. Moving activities are being considered as a valuable component of early childhood. Muscle movements have numerous benefits. Some of the advantages that are worth mentioning are the following: improving physical fitness of the body, develop communication, social interaction and team work skills through interaction with peers during the activity. Through motor exercises, children can develop knowledge and vocabulary including but not limited to Learning the different colors, identifying the parts of the human body and learning the counting skill (Davis 1997). Under the Brain Gym® umbrella, there are 26 exercises and each exercise has organized steps of special moves that connect all body sensors with each other. Brain Gym® also adopted drinking enough water as part of the exercises program. Brain Gym® idea emerged originally from the "learning through movements" program which was

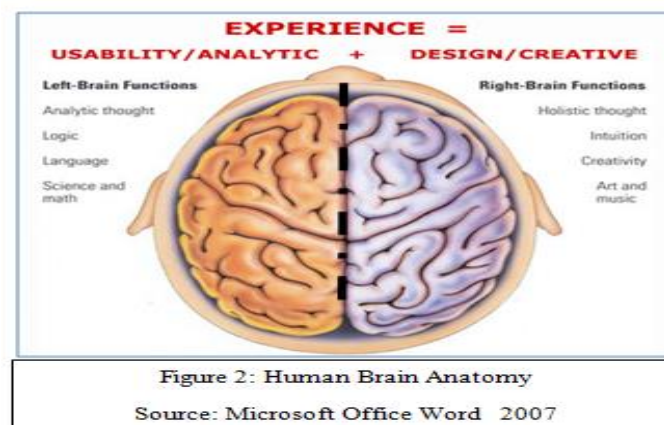
originally developed by the educators Dr. Paul E. Dennison and Dr. Gail E. Den back in 1975 when both educators started a research about the relation between the ability of the student to read and the brain development. The idea of Brain Gym® started with Dr. Paul E. Dennison by offering his students special movements that were developed to improve brain balancing and capabilities in all aspects emotionally, intellectually, educationally and linguistically. These exercises were later called Brain Gym® and a new branch of knowledge appeared under the title of Educational Kinesiology (Edu-k) (Braingym.org, 2018).

According to Wagner (2009) Brain Gym® works on increasing individual's concentration which will lead to better cognitive skills this will provide the chance for students to score better in schools. The Brain is generally partitioned into two major parts one is situated on the right side which is known as the right side of the brain and its role is to control the left half of the body, and the other half is situated on the left side and is responsible for controlling the right side of the body as appeared in figure 1 (Gibbs 2007).



Scientists found out that some students tend to use one side of the brain more than the other one. Brain Gym® founders believe that both brain hemispheres should be collaborating with each other at the same time in order to have better cognitive skills. Basically, Brain Gym® Idea depends mainly on supplying the body with enough water, oxygen and ensures the collaboration of the right and the left hemispheres of the brain by doing the Brain Gym® serial movements (Gibbs 2007).

Each hemisphere of the brain is responsible organizing certain orders. The right hemisphere is responsible of analytical and logical thinking, language and science and mathematics skills, (Figure 2) shows the right hemisphere labeled with purple. The left hemisphere of the brain labeled with orange is responsible for design and creativity (Corballis 2014). Researches usually focus on the two hemispheres however; the middle part which is labeled by the black dashed-line in between the two hemispheres does not have a significant value in the books of biology like the two hemispheres. This is the part that Brain Gym developers are exactly interested in enhancing the activities of its cells as thesis exercises are said to be able to enhance neurotransmitters to cross the middle area of the brain which connects the two hemispheres by activating both hemispheres at the same time (Gibbs 2007). Figure 2 illustrate this hypothesis.



- Educational Kinesiology

Historically, Brain Gym® falls under a branch of science called kinesiology. (Braingym.org, 2018) Kinesiology as a science is defined as “The study of body movement” (Abbott 2011). According to Abbott (2011) who is a massage licensed therapist; If the main organs responsible for movements in the body which are the muscles, tendons, and cartilages are moved in an organized mechanism; this will lead to not only in rescuing stress but also increases body energy, quality of life and lifespan in general. Kinesiology specifically describes the human movements. This branch of science describes and treats the disorders associated with human motion and also explains how some other disorders in the human body can be treated by certain movements (Knudson 2007).

Some of the disorders that are said to be cured by kinesiology are related to students’ cognitive abilities. Brain Gym® developers have provided educational promises to solve the previously mentioned problem for many educational organizations over more than eighty-seven countries all over the world their promises include providing an educational intervention that would increase the ability of the students focus in their class, control their behavior and reactions, have better cognitive skills which are reflected by better writing, reading and calculations, have better social skills and become active positively every day. This intervention is in the form of the exercises called Brain Gym® (Braingym.org, 2018).

1.2 Statement of problem/ rationale of the study

Nowadays, the new generation is highly connected to electronic devices due to the recent trend of lifestyle which depends mostly on technologies; this attachment became an

addiction that lasts for hours a day (Wajcman 2008). It's unfortunate to mention that physical activity is almost disappearing due to introducing latest attracting technologies to children at an early stage. We are living in an era of high technology in which electronic devices invaded our homes. Children spend the majority of their time using the smart phones, digital cameras, Tablets and social media. Overusing these tools negatively impact the children's well-being, their relationship with the family members and others and can lead to psychological disabilities, such as depression and isolation (Alghamdi 2016). In a research done in Malaysia, results showed that people spend an average of almost three hours checking their electronic devices. (Ithnain, Ghazali & Jaafar 2015). This causes severe cognitive problems in the kids' minds and bodies as well and the danger comes from focusing on the device screen and from the lack of movement as well. (Abu-shanab& Haddad 2015). In this case, teachers have two options. The first one is preventing the use of electronic devices at home or limit that for a few hours a day, or to ensure that students exercise in the classroom. Since we cannot control the situation at home then the second option is the only solution. Students need to move their bodies and if adults do not encourage them to do it they will not. This is why the researcher believes that teachers can cause a great difference in the students' performance if they make them move. This has to happen in a systematic and organized manner in schools so we can have a reasonable outcome. (Anghelache 2013)

Recently, many academic institutions have realized the importance of exercises in increasing children's education performance. Therefore, they are looking for several

methods to engage the students in physical activities inside the classroom and consider it as a main component in the education process. (Davis 1997)

1.3 Research Hypothesis

- Hypothesis

Conducting Brain Gym® exercises will increase the students' academic performance and behavior in classrooms.

- Null Hypothesis

Brain Gym® has no effect on enhancing students' academic performance and behavior in classrooms.

1.4 Research Questions

1. To what extent are the promises of Brain Gym® International Company relevant?
2. How can teachers apply Brain Gym® exercises in the most effective way to enhance students' performance in class?
3. What problems in the classroom can be solved by Brain Gym®?
4. Can Brain Gym® help teachers attract the students' attention during the class?

1.5 The context of the study

This paper will represent an experimental type of researches to test the effectiveness of Brain Gym® exercises on students' academic performance in classes. The experimental

research will be done at the American International School- Dubai, UAE. Forty-four students in grade 6B1 and 6B2 will participate in this test. Students will conduct Brain Gym® according to an organized plan for almost six months. Qualitative data and quantitative data will be collected to test the hypothesis of the research. At the end of the research results found will be analyzed to find out the probability for the research hypothesis to be correct. The research will end by mentioning the research limitations and some recommendations along with the conclusion of the research.

Chapter Two: Literature Review

In the previous chapter, the identity, definition, and implementation of Brain Gym[®] exercises were discussed in details. This chapter will review the main published studies related directly to Brain Gym[®] exercises effectiveness along with their methodologies that helped them in the process of issuing a final judgment regarding the effectiveness of these exercises in enhancing students' academic achievements.

Since the start of the strong marketing campaign of these exercises in more than eighty-seven countries in 1980 (Braingym.oge 2018), researches and studies -that were never less powerful than that marketing campaign- have begun to evaluate these exercises. Critics, scientists, academics and even doctors have begun to analyze the effectiveness of Brain Gym[®] exercises in fulfilling their developers' academic promises.

In fact, any researcher in this area will be surprised by the divergence of views on this subject as he or she will find articles that either defends Brain Gym[®] hypothesis fiercely or an article that totally refuse to believe in it. To generate a reliable view, this research needs to review most of the articles and compare their findings and methodologies and go through their conclusions and recommendations which will help in the development of the next chapter: The methodology. In general most of the research papers found about Brain Gym[®] are reviewing type of researches, only some researchers are quasi-experimental or experimental.

A study was conducted at an elementary school in Indonesia with eighteen children between ten to twelve years old to measure the influence of Brain Gym[®] on students' performance. Brain Gym[®] was conducted for thirty minutes; this process was repeated three times a week for two months. The researcher did a pre and post test design in the

experimental research to measure the difference in test scores in order to decide the effectiveness level of these exercises. After Brain Gym® exercises were conducted, the results that were collected showed a significant improvement of the students (IQ) results and other tests results as well (Marpaung et al. 2017).

The Brain Gym® instructor McClelland, B. (2008) addressed in her article the reading difficulties faced by individuals. She did many pieces of research and found out that the main reason behind poor reading is due to a problem in a certain part of the brain that detects moving images. It could be also due to difficulties faced by the individual to control the movement of the eyes. In order to assess the effectiveness of Brain Gym® on improving the reading of those who suffered from learning difficulties, she developed a software program that helps to measure visual processing speed in order to measure the activity in this particular part of the brain. She did tests after Brain Gym® sessions and found out that the results of the tests after practicing Brain Gym® showed a significant improvement in the reading skills of the individuals.

Unlike McClelland, B. (2008) and Marpaung et al. (2017), Spaulding, Mostert, and Beam (2010), Dabell (2018) and many other researchers mentioned in this chapter were totally against Brain Gym®. In their article titled as “Is Brain Gym® an Effective Educational Intervention?” Spaulding, Mostert, and Beam (2010) from the school of education at Liberty University, firmly refused to accept the fact that Brain Gym® exercises are useful due to the lack of pre-marketing scientific experiments they also considered that is not even worth the time, effort and money to try.

Spaulding, Mostert and Beam (2010) found that Brain Gym® International started aggressively marketing their exercises, training teachers, spreading their messages

throughout the world before testing their hypothesis on the medical level, specially that -as per the three authors- Brain Gym® exercises developers introduced Brain Gym® as a brain-based intervention which takes it to the physiological level which has only one way of validation which is medical tests in clinics. They added that for an educator to dare to claim that certain exercises can physically open neurological tracks which will enhance learning in the human brain, neuro-images must be there to show that. Since no proof in the medical levels, authors considered Brain Gym® hypothesis and promises no more than a placebo to market the product up. Authors also wondered why researches about Brain Gym® are limited and most of them are not a scholar but commercial and published by the developers or people who are working with the same company the thing that increases the percentage of Brain Gym® developers' bias. To reach this conclusion, the three authors basically criticized Brain Gym® articles that published by Brain Gym® company in their Journal which is called Brain Gym®, against a list of scientific-researches quality indicators to test their validity. Indications showed that researches done were not valid on the scientific and scholarly levels (Spaulding, Mostert& Beam 2010).

In his blog, Dabell (2018) agreed with Spaulding, Mostert& Beam (2010). He believed that what makes Brain Gym® widely accepted is that Brain Gym® founders kept repeating the theories of kinesiology and neuroscience and kept linking it directly to these exercises however, they didn't mention any scientific proof of the relation between Brain Gym® and these theories although Brain Gym® was said to be established and developed based on them.

Moreover, Sánchez E. (2013) studied showed the impact of Brain Gym® on the reading skills of elementary school students. The study was done on grade three students.

Students who were included in the study completed five chosen movements from Brain Gym® exercises. The duration of each exercise was five minutes every school day for a period of thirty days. The total time for practicing the movements was 150 minutes. A post test was done to measure the effectiveness of the Brain Gym® on students' scores in reading. The post test findings showed that the 150 minutes of Brain Gym® movements did not help in improving the reading scores of the students. Unlike other studies and researchers, this study didn't recommend Brain Gym® as a method to increase the reading scores of students. Despite the fact that this study didn't support that Brain Gym® had any effect on students reading grades, the writer had emphasized on the short duration on Brain Gym® sessions as a major limitation of the experiment.

Gibbs K. (2007) studied Brain Gym® as a part of her doctoral research titled as "The effect of Brain Gym® on student learning" Gibbs has applied Brain Gym® exercises on her students to check whether it works or not. The students who participated in Gibbs' experimental study were from one of the suburban schools in New York City, USA. Gibbs wanted to find if Brain Gym® idea is effective in terms of improving students' learning. Students that joined the study were third graders and were from different economic backgrounds and the researcher split the students into two groups the control group which consisted of high achievers and talented and gifted students and the experimental group which included other mixed abilities students. Gibbs also chose four students as a case study. Students were chosen randomly for the case study and Gibbs separated boys from girls. The four students were from different backgrounds and some of them were diagnosed by having learning disabilities (Gibbs 2007). Gibbs encouraged the students to drink water as part of her experiment. She started practicing three Brain Gym® exercises which were

Brain Buttons, Cross crawl and Neck Roll with the students every day in the morning for fifteen minutes. She used surveys and interviews to collect data two times each. The first survey was done before starting the practices and the last one was done at the end of the process (Gibbs 2007). Gibbs notices that her students started to do tasks on time and the four students overcome their learning challenges. Gibbs also notices that Brain Gym® has caused a great positive change in students attention span to increase it into a longer period of time which in her opinion, led to better achievement (Gibbs 2007). After implementing the experiment and collecting the data required reading and analyzing them Gibbs has come up with a conclusion that Brain Gym® had a positive impact on students' performance in class by in enhancing their ability to pay more attention in class. Gibbs added that Brain Gym® had also a positive impact on his students' academic performance, in the end, Gibbs suggested that a long-term study should be done to have more accurate results. At the end, Gibbs has ended by stating that students need to move in order to have better cognitive skills (Gibbs 2007).

In the same year when Gibbs (2007) published her article, Hayatt K. (2007) published a review paper. Hayatt K. (2007) read the articles published by Brain Gym® International as well and analyzed their researches to reach into a judgment about whether Brain Gym® works or not. Hayatt K. (2007) concluded that Brain Gym® idea is totally ineffective because according to his review, studies have shown that Brain Gym® International didn't show any real pieces of evidence that it pattern any neurons paths in the human brain.

This was supported by his analytical criticism of the way Doman-Delacato – the person behind the Brain Gym® idea- did his procedure was not scientifically convincing

and did not follow all criteria of scientific methods thus cannot be taken into the next level which is implementing in schools. Moreover, Hyatt (2007) depended on the fact that well recognized medical and national institutions didn't approve Brain Gym® as a useful intervention at that time again based on the fact that they required neurological scientific evidence rather than promises. Hyatt (2007) and most of the review articles about Brain Gym® refused to accept the Brain Gym® claim because they didn't find enough scientific evidence. According to him, the researchers were not really clear about the methodology details and findings were relieved in a way for marketing purposes (Hyatt 2007). In fact, articles published in Brain Gym® Journal clearly show that the Hyatt opinion about them is valid as you can hardly find any scientific article in this journal.

Patterson L. (2012) wrote an academic critique about Brain Gym®, to show what were the things that most articles relied on to criticize Brain Gym®. According to the review, most articles had a major objection against labeling Brain Gym® as a “brain re-patterning” intervention with no neurological or clinical evidence or clinical depending only on linking Brain Gym® movements to neurosciences which was either proved scientifically itself according to these articles.

On the other hand, in 2000, a scholarly study was conducted in one of the schools in New Jersey, USA. The study aimed to check the effect of practicing Brain Gym® with a group of students with special educational needs and was focused on monitoring the progress of reading ability of forty-five students who were third-graders at that time. The experiment lasted for seven months and included implementing some Brain Gym® exercises for twenty minutes daily. The study included fourteen students with different learning disabilities the research focused on case studies. The researchers used “The

Woodcock-Johnson Reading Mastery Test-Revised” (Boonmun & Ruengtragul 2009) to evaluate the level of the students before the experiment, and another test was done which is “The Lincoln-Oseretsky Motor Development Scale” (Boonmun & Ruengtragul 2009) and that was used to be able to have a general idea about the students’ movement ability. The researchers used three of the Brain Gym® exercises: Brain Buttons, Cross Crawl, and Hook-Ups along with drinking a glass of water before each session. After the end of all session “Lincoln-Oseretsky Motor Development Scale” (Boonmun & Ruengtragul 2009) was made again and marks of pre and post-implementation tests were compared. The researchers found that students in the experimental group were able to increase their marks by 8.7 points and the control group was able to improve by 7.2 points. Researchers found out that both experimental and control group have increased in average, however, looking at the marks of each student separately shows that experimental group improved more but this improvement was not significant enough to conclude that Brain Gym® is behind this improvement but they didn’t deny that there was minor effect that could possibly bloom in the long-term (Boonmun & Ruengtragul 2009).

In 2017 a study was done in the Philippines on the effectiveness of Brain Gym® movements in increasing grade one students to have a better writing ability. Writing abilities of four students were tested by applying pre-tests then post-tests, after Brain Gym® was implemented for ten days writing ability including spelling, neatness, and organization, was tested before and after Brain Gym®. The researchers noticed that the ability of the students to write increased not only that but they noticed that students started to write neatly. Moreover, the time taken to do tests became less after Brain Gym® as it added an environment of excitement and encouragement to learn among the students (Ocampo, Jr.,

Leonora & Laura 2017).

On the other hand, a study was done in 2014 on several autistic students and other students who were diagnosed by having developmental delays, the study was done one three students academic tests performances were done before and after the implementation of Brain Gym[®]. The results showed that after implementing Brain Gym[®] for seven to eight weeks, no significant academic progress was detected on students with developmental disabilities; however, it suggested a promising hope on some students if implemented for a longer period of time (Watson & Kelso 2014).

Moreover, another study was done on the same area showed that Brain Gym[®] was an effective intervention to improve quality of life in students suffering from autistic spectrum disorder. In this research, the authors practiced Brain Gym[®] exercises with fifteen students between seven and seventeen years old for twelve weeks. At the end of all sessions, a “Pediatric Health-related Quality of Life (HRQOL)” (Nagarkar et al. 2018) scale was implemented and results showed an improvement in the quality of students’ lives (Nagarkar et al. 2018).

Another research was done in Indonesia in 2017, proved that Brain Gym[®] has helped kids to improve their physical skills. The authors of this articles implemented Brain Gym[®] on kids in early ages, four to six years old. To prove their hypothesis, the authors used data on students’ progress. The main research instrument which was used was the KPSP to test sixty kids. The authors of this article suggested implementing Brain Gym[®] in the curriculum for kids with early ages as results were showing remarkable effects by a percentage of almost 66.70% (Diana, Mafticha & Adiesti 2017).

Another study was done in 2016, tested the ability of Brain Gym[®] exercises to

increase the reading and mathematical skills for grade four students. Szczasny (2016) found that Brain Gym[®] has almost no impact on students' improvement in these two fields. She reached into this conclusion after conducting a quasi-experiment and quantitative study and to test her hypothesis. She used two standardized international tests for mathematics and reading and the experiment was done to test the effect of these exercises on 76 students in one of the schools of Midwestern city. Experiment period was nine months and the author noticed that no significant change happened in students scores of MAP test after implementing Brain Gym[®] (Szczasny 2016).

Emilda (2015) conducted Brain Gym exercises with her students to test the effectiveness of Brain Gym in enhancing cooperative learning in math. She divided her experiment into two groups represented by two classes one class was her experimental group and the other one was the control group. Emilda (2015) found out that the experimental group achieved better than the control group in cooperative learning.

At the end of this section, it is worth mentioning that some review papers rejected Brain[®] Gym[®] hypothesis after only reviewing articles that were published by Brain Gym developers in Brain Gym Journal, where other empirical and scholarly papers published by people outside Brain Gym[®] Cooperation were absolutely neglected. For example, Bundens (2000) published a master thesis as an experimental empirical paper to test Brain Gym[®] effectiveness on increasing the learning abilities of students' meanwhile. In the same year, a scholarly study was conducted in one of the schools in New Jersey, USA. The study aimed to check the effect of practicing Brain Gym[®] with a group of students with special educational needs and was focused on monitoring the progress of reading ability and they had promising results (Boonmun & Ruengtragul 2009). Hyatt (2007) stated in 2007 that

there were no empirical data being collected about Brain Gym® which made him reject the hypothesis but there were many experimental types of research published before 2007 which were not mentioned in most of the reviews including Hyatt (2007).

In the research's point of view, some review articles focused on criticizing the marketing policy of Brain Gym® which shifted their research stream away from answering their main question which was about Brain Gym® effectiveness.

The basic role of this research is to test the effectiveness of Brain Gym® in enhancing students' performance in classrooms in private schools in Dubai, UAE. This study will be planned for six months long as recommended by Gibbs (2007) and it will also be based on empirical studies done on a whole group of forty-four students. The methodology of this research will be described in details in the next chapter.

Chapter Three: Methodology

As mentioned in the introduction and the literature review, this research aims to study the effectiveness of applying Brain Gym® exercises in classrooms on students' academic performance and students' behavior. The study will examine the relationship between students' academic achievement and their continuous application of Brain Gym® exercise in classroom on regular and planned bases. The research will focus on observing and evaluating the academic and moral aspects reflected in students' behavior and reactions, as well as their academic achievement in the implementation of these exercises and whether the exercises have a real tangible benefit or not in this particular aspect. This chapter will present the methods that will be used in this experimental research in details. It will also provide information about the tools that will be used to approach each method. Moreover, this chapter will provide an explanation of each tool and how it will help in testing the research hypothesis. This chapter will also describe the used exercises and the steps of implementing them in classes.

This research will follow the mixed methodologies approach. Mixed research method is combining two distinct research methods in doing a research. The two methods are the qualitative study and the quantitative study (Mckim 2017). The implementation of both methodologies requires additional time, efforts and resources for implementing both methodologies (Mckim 2017). Despite the fact that using two research methodologies is more time consuming than using one research methods, it's shown clearly in this article that implementing the two methods adds more validity to the results of the study. It also expands and widens the knowledge and information of the researcher about a certain subject, this, will help the researcher to generate Ideas that will be useful for current and

future studies. Moreover, using two methodologies makes the researcher certain that the results are accurate (Mckim 2017).

In order to test the hypothesis, this research will go through three major phases. Phase I, which is the phase of preparing testing tools and other methodology components which will be at the same time the control phase where diagnosis for students' behavior and academic achievement will be recorded. Phase I will last for one or two months so mainly it is expected to be from September, 2017 to November, 2017.

Phase II, which will be starting from November, 2017 and will be the start of implementing three main Brain Gym[®] exercises for five minutes for four days per week, the exercises will be explained later in this section. End of phase II will also include doing additional exercises for one more period which will take place at the beginning of the English period as for five minutes five times per week. During this phase exercises will be implemented and also data will be collected by several tools which will be the initial survey to reflect students' respond to Brain Gym[®] exercises, data and observation recorded by the science and English teachers and also pre and post-implementation assessments grades comparison. The experiment will be done after an initial observation and diagnostic data which will be collected by grade six science and English teachers so one or two teachers will observe and write their observation down also grades of two quizzes will be collected before the experiment starts. This will allow the reader to compare actual results and data collection before and after the implementation of the experiment or the exercises. Phase III, is the final phase were experiments will stop and the final data collection will be made along with the data analysis that will be presented in the following chapter. Students will

conduct their last survey and express their opinions about Brain Gym®. This survey will mark the end of the practices as Ramadan -the month were some people usually prefer to fast for several hours- starts so all sorts of exercises in schools are preferred to stop due to the fact that some students will not have enough power to play if they follow unhealthy diet during the fasting month. May 16th 2018 will most probably mark the end Phase II and the beginning of phase III. So in total, students will be expected to do Brain Gym® exercises for almost sixty times in six months and a half. In addition, during the last month another Brain Gym® session will be added for five minutes during the English period five times a week, which will increase the total time of the session into ten minutes. Phase III will be mainly from May 16th until May 20th 2018.

The methodologies used to test the research hypothesis will make the research classified under the umbrella of the classroom management and educational fields and not under the medical-physiological field, because there are no medical approaches or laboratory equipments or examinations of specific samples or medical examinations of students and their brains to make the research recognized at the medical level.

Research Hypothesis: This research hypothesizes is that Practicing Brain Gym® everyday will lead to better behavioral and academic progress in the class.

This research is an Ethnographic Research at the first place where the research writer is the experiment implementer. The researcher is a science teacher who teaches grades six to eight and wants to test the validity of Brain Gym® exercises practicing in classroom as a beneficial classroom management method to facilitate education for the maximum number of students. So the research will design the data collection tools which are convenient to be applied every day with the students in the science periods.

Moreover, the English Language teacher -Miss Hind- showed a great interest in joining the process and adding her observation and evaluation.

The experiment will be done by practicing three of the Brain Gym® exercises with the students of grade six at the beginning of each science period for five minutes. Then teachers will observe the students' behavior and academic progress along with their reactions and collaboration with the teacher in class.

- Brain Gym Exercises Description

Due to the time limitation three Brain Gym exercises were chosen to be practiced in this experiment.

1. Brain Buttons: In this exercise students will use their fingers to press strongly on certain points on their chest placing the other hand on the stomach for two minutes. This two-minute movement is done when students press moderately their both hands simultaneously on a specific part of the chest and stomach (Beare 2014).

2. Cross Crawl: In this exercise students will cross their legs and cross their hands and twist it towards the chest again and stay still for one minute along with deep breath. During this motor exercise students will move their right elbow along with their left knee and allow both to touch in the middle (Beare 2014).

3. The Thinking Caps: Students in this exercise will massage their ears' cartilages then stretch them away from their heads then stretch the ears' cartilages away from the head for one minute. During the thinking caps session, students will rub and knead their ears' cartilage with their hands then extend the ears to its full length away from their heads. The duration is for one minute (Braingym.org 2018)

The students will be encouraged to drink water on regular bases every fifteen minutes and they will given the freedom to go to the washroom whenever they want so they will feel free to drink water as well as drinking water is the core of Brain Gym[®] practices. It will take this research nearly three weeks to set its' experimental plan and during this one month the students' behavior will be recorded in a sheet and also an interview will be conducted with the English teacher to cross match the observations with the researcher's observation. This phase will be the preparation phase of the research and at the same time it will the control period or the control variable which will be used later to compare and decide whether or not Brain Gym[®] works. So the data that will be collected in this period is the following:

3.1 Preparation phase/ Data collection for control purposes.

Phase 1.1: Quiz 1 and Quiz 2 marks will be collected to be compared later on with other quizzes [Quiz Marks were chosen on purpose because all other marks are under the teacher's control but the quiz is prepared by the HOD -Dr. Sajid Azmi- based on international assessment templates]

Phase 1.2: Behavior of the students will be observed by the science teacher and the English teacher and will be written down and noted on a check list.

Phase 1.3: A request to fix the science period timing will be proposed to the school in order to choose the time were students are active the most. The preferred time will be to fix the science periods for grade six section B1 right after the break time at 11:45 and for 6B2 to be the last period.

Phase 1.4: A proposal will be handled to the school leader for his acceptance and approval of all the research plan and process and also for marks access.

3.2 Experimental Sample and Conditions

- The Place where the search will be conducted: American International School- Dubai, United Arab Emirates. (School was chosen because the person who will conduct this study works there already as a science teacher; so getting an unlimited access to the school, conducting the whole research and issuing all permission will be facilitated)

- The Periods: The research work and data collection will take place starting from the first of March 2017 until the last day before [Ramadan] which was May 16th 2018.

- Sample details: Students in this research were only chosen from the boys section – Middle school – Grade six – [Conditions were ripe for the variable to be controlled as most schools in UAE tend to separate students based on their gender in two different sections (Boys' Section and Girls' Section) due to cultural consideration.

- Age: Students ranged in age from ten to thirteen years.

3.3 Sample size and variables:

- Two classes were will be chosen, the first class is 6B1 which has twenty-one students and the second one is 6B2 which has twenty-three students. The total number of students participating and making up this sample is forty-four students.

3.4 Variables:

A. Controlled variable:

- Students' Gender.
- Grade level.
- Exercises type.
- Number of exercises.

- Exercise duration

(5 minutes, 4 times per week at the beginning of every science period for 5 months.)

(5 minutes 5 times a week at the beginning for the English period for one month.)

B. Dependent variable: Students' performance during the Science and English periods

Quiz results and behavior observation before and after the exercises

C. Independent variables: Brain Gym® Exercises

D. Controlled group is presented by pre implementation tests:

3.5 Elements used to test the hypothesis

- Beginning of the year **survey** for all students 6B1 and 6B2 – Refer to appendix 2.
- End of the year **survey** for all student – Refer to appendix 4.
- Classroom observation during implementation by the English teacher – Observation was collected in a table of checklists given to the teacher at the middle of April 2018. Refer to appendix 6.
- Personal observation: Classroom observation by the person who wrote this paper who is the science teacher – Refer to appendix 7.
- (Ethnographic study) - Observation was collected in a table of checklists given to the teacher at the beginning of November 2018.
- An interview conducted with the English teacher – Refer to appendix 5.
- Exam marks before and after Brain Gym® sessions. (Quizzes before and after, midyear exams and final exams)

-The research tools

- Questions will be written by the writer and will be processed and distributed through the survey program (SurveyMonkey) <http://www.monkeysurvey.com>

- Students will get the link through three channels :
 - a. Cell Phones
 - b. Tablets, through edmodo application or website www.edmodo.com
 - c. Parents' devices

The research will use several tools to collect data based on the conditions of the classes. To collect the best possible data these tools were: surveys, classroom observations and Interview with teachers. Surveys will be used to collect students' responses all over the process. A survey is a common used technique of gathering information for carrying out a research. This information is related to the people's point of view about one or more variables in which the researchers wish to assess and examine (Evans & Mathur 2005). It also studied the relationships among these variables. Survey can be used to study the impact of an aspect or to understand the requirements of certain aspect (Evans & Mathur 2005). Collecting information through survey has many advantages which help the person who is conducting the survey achieves the goal of his/her research. First of all, questionnaire is a very simple method of getting information which does not require a lot of funds. It's cheaper than other methods. Second, it's very useful in collecting demographic information which helps identifying the population. In addition, through questionnaire you get the true and transparent opinion of people and what they really think or feel about the subject (Evans & Mathur 2005).

An Interview will be conducted as a primary research tool as well. It is used by many researchers who seek to get updated information about a certain problem. It comes under the head of qualitative research design. Interviews provide the basis to collect data in more systematic way through listening and speaking with people (O'Leary 2004). Usually

in interviews, interviewer has freedom of open questions and can add more questions during interviews if he finds necessary to cover the topic. During interview session, the researcher's personal opinion does not matter because the interviewee/respondent is the primary source for collection (O'Leary 2004).

Another main source of data collection is known as observation and widely used by researchers and observers. In this type of research the observer critically and explicitly observes the situation (Hartel 2003), where he/she from naked eyes seeing the actions and behaviors of people. Observation seems easy method of data collection but it is considered as complex one because the researcher has to play several roles simultaneously while utilizing all five senses. Observer should never forget his/her original role of being researcher and keeps himself/herself away from the situation neither provides any input in a given situation. These roles can be ranging from participant, moderator, active member and complete participant. Under participant method of observation the researcher relies more on his observation instead of participation and the level of involvement is considered low (Denzin & Lincoln 2002).

Chapter Four: Findings / Results / Analysis

This chapter will show the results collected during the experimental research process which started from September 11th 2017 until May 26th 2018. This includes the three phases I, II and III. Each group of results was collected and analyzed using scholarly articles or numerical data analysis software SPSS.

At the beginning of the process the English and the science teachers observed the students in both classes for fifteen days. The two teachers recorded their observations separately and met to discuss and write all the common concerns on the academic and behavioral levels for both classes.

Phase I: Initial observation results summary:

The initial observation included both the behavior and academic performances in each class which included students' interaction with each other, collaborative working and outcome along with the time taken to finish tasks and class participation. Grades 6B1 and 6B2 were observed by their English and science teachers for three weeks from Sept. 10th 2017 to Sept.28th from Sunday until Thursday. The English and the science teacher stated that for 6B1 the academic achievement in general was significantly low and their academic performance was very weak. The students also took longer time than the time required to finish their tasks. Moreover, students were aggressive towards each other and they tend to fight a lot which explains that they could not get along with each other in group work. For 6B2, the teachers stated that they are extremely talkative and they do not listen to the teacher when she addresses them. Instructions were not followed as they were said because students cannot listen while they are talking. Tasks also took longer time than usual with them. In both classes it took the teachers five to ten minutes to get the students to settle

down and listen to the teacher. Then this process was repeated three to four times at least to calm them down and get them to do the required task. This process last some times for the whole period. This directly affect the students' learning and standards achieving.

Phase II: The start of Brain Gym Exercises implementation.

4.1 First Survey Results Analysis

"Brain Gym" Exercises [First attempt] [Wednesday, November 1st 2017] – Refer to Appendix 2.

- Initial Survey results/ Analysis:

On November 1st 2017 the science teacher conducted the three Brain Gym[®] exercises for five minutes in both Classes at the beginning of the science period. The teacher introduced Brain Gym[®] exercises and simple movements that are done to check the students' opinions about them. Teacher also encouraged students to drink water throughout the day even if they were not thirsty. After conducting Brain Gym[®] the students were asked to take out their tablets and open a link to read and participate with their opinion about Brain Gym[®]. The survey was designed by the researcher and transferred into software by the survey application www.surveymonkey.com.

Brain Gym[®] was first introduced to the students as an exercise that they will do for five minutes at the beginning of every science period. Students were told that if they like these exercises they will continue with them. Brief training took place for ten minutes and after that, students did the three Brain Gym[®] exercises. After that they were asked to answer a survey of twelve questions. (Refer to appendix 2 for the original survey)

The students' responses on the twelve questions are shown in Tables (A) to (L).

Table (A) which represents the answers of question 1 in this survey, that all participants were boys. Conditions were ripe for the variable to be controlled as most schools in UAE tend to separate students based on their gender in two different sections (Boys' Section and Girls' Section) due to cultural consideration.

Table (A) Responses of students to question 1 – First Survey					
Q1: Kindly Choose Gender					
6B1 – A total of 21 students			6B2 - A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Male	100.00%	21	Male	100.00%	23
Female	0.00%	0	Female	0.00%	0
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>A bar chart showing the percentage of responses for 'Male' and 'Female' in section 6B1. The y-axis represents percentages from 0.00% to 150.00%. The 'Male' bar reaches 100.00%, and the 'Female' bar is at 0.00%. A legend indicates 'Responses'.</p>			<p>A bar chart showing the percentage of responses for 'Male' and 'Female' in section 6B2. The y-axis represents percentages from 0.00% to 150.00%. The 'Male' bar reaches 100.00%, and the 'Female' bar is at 0.00%. A legend indicates 'Responses'.</p>		
This research was done in the boys' section at the American International School where the forty-four participating students were males.					
Source of table (A): Author					

Table (B) which presents the answers of question 2, shows the ages of the students. It reflects the diversity of ages in grades 6B1 and 6B2. As shown in the table below students ranged in age from ten to thirteen years.

The table shows that not all students are of the same age. There is up to three years gap between some students. This explains the results of the initial observation as the

English and the science teachers reported that students spend time fighting in the class and the teacher also wastes time trying to separate them. According to Navarro, García-Rubio and Olivares (2015) schools believe that students who were born in the same year should be joining the same class according to the relative age effect (RAE). This might be one of the factors that lead to losing control and behaviour problems in 6B1 and 6B2 but not necessarily the main reason.

Table (B) Responses of students to question 2 – First Survey			
Q2: Kindly Choose Age			
6B1		6B2 - A total of 23 students	
Answer Choices	Responses	Answer Choices	Responses
10 Years Old	0.00% 0	10 Years Old	8.70% 2
11 Years Old	42.86% 9	11 Years Old	47.83% 11
12 Years Old	38.10% 8	12 Years Old	43.48% 10
13 Years Old	19.05% 4	13 Years Old	0.00% 0
14 Years Old	0.00% 0	14 Years Old	0.00% 0
	Answered 21		Answered 23
	Skipped 0		Skipped 0

Students' ages for all the 44 participants varied between 10 to 13 years old. Majority of the 44 students were 11 years old which was about 45.45% , nearly 40.91% were 12 years old, 9.09% were 13 years old and about 4.54% were 10 years old.

Source of Table (B): Author

On the other hand, the authors believe that the differences of ages within the same classroom can lead to learning enrichment. However, they mentioned that this effect increases when students are at young ages. Moreover, joining lower grades at younger ages

could create learning difficulties (Rodriguez 2015).

Table (C) presents the answers of question Three. The table reflects a real problem as most of the students responded that they do not tend to play sports on regular bases. This also explains the observation of the English and the science teachers at the beginning of the year as physical movement is directly related with high academic achievement and sharp cognitive skills (Davis 1997).

Table (C) Responses of students to question 3 – First Survey					
Q3: Do you play sports at least three times every week?					
6B1- A total of 21 students			6B2 - A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	38.10%	8	Yes	34.78%	8
No	61.90%	13	No	65.22%	15
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>A bar chart for 6B1 showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 100.00%. The 'Yes' bar is at 38.10% and the 'No' bar is at 61.90%. A legend indicates 'Responses'.</p>			<p>A bar chart for 6B2 showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 100.00%. The 'Yes' bar is at 34.78% and the 'No' bar is at 65.22%. A legend indicates 'Responses'.</p>		
A total of 44 students answered this question. 36.36% reported that they do play sports regularly during the week. 63.63% reported that they do not play sports on a regular basis.					
Source of Table (C): Author					

Table (D) Presents the answers of question 4. It reflects that most of the students do not tend to drink water regularly and that is not a good thing as drinking water is essential to have both the brain and body working effectively (Bar-David, Urkin & Kozminsky 2005).

Table (D) Responses of students to question 4 – First Survey					
Q4: I drink water several times everyday					
6B1- A total of 21 students			6B2 - A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	33.33%	7	Yes	39.13%	9
No	66.67%	14	No	60.87%	14
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>A bar chart for 6B1 showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 80.00%. The 'Yes' bar is at 33.33% and the 'No' bar is at 66.67%.</p>			<p>A bar chart for 6B2 showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 80.00%. The 'Yes' bar is at 39.13% and the 'No' bar is at 60.87%.</p>		
A total of 44 students answered this question. 36.36% reported that they drink water regularly during the day. 63.63% reported that they drink water every day.					
Source of Table (D): Author					

According to Bar-David, Urkin and Kozminsky (2005), Drinking less amount of water -than the minimum requirements- lead to many health complications and diseases including dehydration. There is a negative impact on the body caused by dehydration. One of the most important impacts is affecting the educational performance of the students as it adversely affects the cognitive functions in the brain (Bar-David, Urkin & Kozminsky 2005). There are several researches done to examine the relationship between dehydration and low cognitive performance of students in primary school. One experiment was

conducted in a primary school in which students were divided into two groups. One group were given more water to drink, other group were not given water. A test was given to both the groups. The results show clearly that the scores of the hydrated students were higher than the score of the dehydrated students (Bar-David, Urkin & Kozminsky 2005).

Table (E) Presents the answers of question 5.

Table (E) Responses of students to question 5 – First Survey					
Q5: Did you feel any pain in your head at the beginning of the special exercises?					
6B1- A total of 21 students			6B2- A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	71.43%	15	Yes	47.83%	11
No	23.81%	5	No	34.78%	8
I am not sure	4.76%	1	I am not sure	17.39%	4
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>A bar chart for group 6B1 (n=21) showing the percentage of responses for three categories: 'Yes' (71.43%), 'No' (23.81%), and 'I am not sure' (4.76%). The y-axis ranges from 0.00% to 80.00% in increments of 20.00%. The x-axis lists the categories. A legend indicates 'Responses'.</p>			<p>A bar chart for group 6B2 (n=23) showing the percentage of responses for three categories: 'Yes' (47.83%), 'No' (34.78%), and 'I am not sure' (17.39%). The y-axis ranges from 0.00% to 60.00% in increments of 20.00%. The x-axis lists the categories. A legend indicates 'Responses'.</p>		
59% of the students stated that they experienced pain in their head when they did the exercises for the first time. Around 29.54 % didn't feel any pain and 11.36 % could not distinguish their feelings.					
Source of Table (E): Author					

The table above indicates that most students do not play sports usually, this is why most of them felt uncomfortable. The answers of this question are also expected as most of the students indicated that they do not play sports regularly (Reneker et al. 2015).

Table (F) Presents the answers of question 6.

Table (F) Responses of students to question 6 – First Survey					
Q6: Did you feel dizzy at the beginning of the exercises?					
6B1- A total of 21 students			6B2- A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	71.43%	15	Yes	65.22%	15
No	23.81%	5	No	26.09%	6
I am not sure	4.76%	1	I am not sure	8.70%	2
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>Bar chart for 6B1 (n=21): The y-axis represents percentage from 0.00% to 80.00%. The x-axis lists 'Yes', 'No', and 'I am not sure'. The 'Yes' bar is at 71.43%, 'No' is at 23.81%, and 'I am not sure' is at 4.76%.</p>			<p>Bar chart for 6B2 (n=23): The y-axis represents percentage from 0.00% to 80.00%. The x-axis lists 'Yes', 'No', and 'I am not sure'. The 'Yes' bar is at 65.22%, 'No' is at 26.09%, and 'I am not sure' is at 8.70%.</p>		
68% of the 44 students reported that they felt dizzy when they did the exercises for the first time. 25% of the students didn't feel dizzy and 6.18% could not decide.					
Source of Table (F): Author					

The table above indicates that most students do not play sports usually this is why most of them felt uncomfortable this also explains their aggressive behavior sometimes towards each other as physical movements lead to less stress (Reneker et al. 2015).

Table (G) Presents the answers of question 7

Table (G) Responses of students to question 7 – First Survey					
Q7: did you feel pain in the chest at the beginning of the exercise?					
6B1- A total of 21 students			6B2- A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	19.05%	4	Yes	26.09%	6
No	76.19%	16	No	60.87%	14
I am not sure	4.76%	1	I am not sure	13.04%	3
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>A bar chart for 6B1 showing the percentage of responses for three categories: 'Yes' (19.05%), 'No' (76.19%), and 'I am not sure' (4.76%). The y-axis ranges from 0.00% to 80.00% in 20% increments. The x-axis lists the categories. A legend indicates 'Responses' with a blue square.</p>			<p>A bar chart for 6B2 showing the percentage of responses for three categories: 'Yes' (26.09%), 'No' (60.87%), and 'I am not sure' (13.04%). The y-axis ranges from 0.00% to 80.00% in 20% increments. The x-axis lists the categories. A legend indicates 'Responses' with a blue square.</p>		
Majority of the students 68% didn't feel any pain in their chest. 22% felt pain and the rest 9.1% could not decide.					
Source of Table (G): Author					

This question was asked to prevent students who have chest pain from conducting the exercises before having a medical reports.

Table (H) Presents the answers of question 8.

Table (H) Responses of students to question 8 – First Survey			
Q8: During the exercise, where you able to focus only on the movements you were doing?			
6B1- A total of 21 students		6B2- A total of 23 students	
Answer Choices	Responses		
Yes	76.19%	16	
No	14.29%	3	
I am not sure	9.52%	2	
	Answered	21	
	Skipped	0	
79.54% of the students reported that they were focusing on the exercises only. 13.63% were not able to focus while doing the exercises. 6.8% couldn't be able to decide.			
Source of Table (H): Author			

Results above show that Brain Gym[®] proved to have a positive impact on students' behavior during class and helped them focus and this is supported as well by many studies that prove the direct link between physical movements and increasing cognitive abilities to focus. (Rowan 2009). When majority of the students focus on one thing at the beginning of the period this will help the teacher to have a perfect start of the period, then, she will have the chance to move to the next step with the whole class. Having all the students to focus on their feelings during their physical movements made them temporary forget all the negative thoughts of others in the same room. Their tendency to

fight will reduce as they are thinking of something totally different related to them.

Table (I) Presents the answers of question 9.

Table (I) Responses of students to question 9 – First Survey			
Q9: Were you able to focus in class more after doing these exercises?			
6B1- A total of 21 students			6B1
Answer Choices	Responses		Responses
Yes	76.19%	16	76.19% 16
No	4.76%	1	4.76% 1
I am not sure	19.05%	4	19.05% 4
	Answered	21	Answered 21
	Skipped	0	Skipped 0
72.72% of the students felt that they could focus more. 4.54% of the students reported that the exercises didn't affect their focusing in class. 18.18% couldn't decide.			
Source of Table (I): Author			

Results above show that Brain Gym® had a positive impact on students' behavior during class and it helped them focus. Students stated that they were able to focus and were more aware of what they have to do in the class room.

Table (J) Presents the answers of question 10.

Table (J) Responses of students to question 10 – First Survey					
Q10: Did you feel an increase in your heartbeats?					
6B1- A total of 21 students			6B2- A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	66.67%	14	Yes	68.18%	15
No	19.05%	4	No	4.55%	1
I am not sure	14.29%	3	I am not sure	27.27%	6
	Answered	21		Answered	22
	Skipped	0		Skipped	1
<p>Bar chart for 6B1 (n=21): The y-axis represents percentage from 0.00% to 80.00%. The x-axis shows 'Yes', 'No', and 'I am not sure'. The 'Yes' bar is at 66.67%, 'No' is at 19.05%, and 'I am not sure' is at 14.29%.</p>			<p>Bar chart for 6B2 (n=23): The y-axis represents percentage from 0.00% to 80.00%. The x-axis shows 'Yes', 'No', and 'I am not sure'. The 'Yes' bar is at 68.18%, 'No' is at 4.55%, and 'I am not sure' is at 27.27%.</p>		
65.90% felt an increase in their heartbeats whereas 11.36% didn't feel any change in their heartbeat. 20.45% could not decide.					
Source of Table (J): Author					

This question was asked as indicator to know if students are really doing the exercises with the teachers and following instructions or not as playing sports usually lead to an increase in heartbeats (Reneker et al. 2015). Mainly students who answered by No were the ones who didn't do all the exercises.

Table (K) Presents the answers of question 11.

Table (K) Responses of students to question 10 – First Survey					
Q 11: By the end of the exercises, did you take a deep breath?					
6B1- A total of 21 students			6B2- A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	85.71%	18	Yes	86.96%	20
No	9.52%	2	No	8.70%	2
I am not sure	4.76%	1	I am not sure	4.35%	1
	Answered	21		Answered	23
	Skipped	0		Skipped	0
<p>A bar chart for 6B1 showing the percentage of responses for 'Yes' (85.71%), 'No' (9.52%), and 'I am not sure' (4.76%). The y-axis ranges from 0.00% to 100.00% in 20% increments. The x-axis lists the three response categories. A legend indicates 'Responses'.</p>			<p>A bar chart for 6B2 showing the percentage of responses for 'Yes' (86.96%), 'No' (8.70%), and 'I am not sure' (4.35%). The y-axis ranges from 0.00% to 100.00% in 20% increments. The x-axis lists the three response categories. A legend indicates 'Responses'.</p>		
86.36% of the 44 students felt that they want to take a deep breath at the end of the exercise and they took a deep breath. 9.09% Didn't take deep breath and 4.54% couldn't decide.					
Source of Table (K): Author					

Results showed that Brain Gym[®] helped students to breathe deeply which is a positive indicator. Due to the fast life style of the students, they breathe fast. It is very important to make sure that students eat healthy, play sports, drink water and breathe deeply. There are various methods and techniques to get rid of tension and stress. One of the most popular methods is deep breathing technique (Perciavalle et al. 2016).

The topic of deep breathing exercise is getting closer attention by researchers and scientists. It is considered fundamental for the development of the human being. It's a form of meditation which plays vital role in relaxing the body by reducing the tiredness, anxiety and stress. It also improves the function of the body organs. It helps maintaining a normal

blood pressure and heart rate and has a positive effect on mood state (Perciavalle et al. 2016). There are numerous advantages of the deep breathing activity including: relief of the emotional strain and tension, improve and modify the behavior, increase the attention and concentration, overcome academic difficulties and increase the students' performance in classroom and during exams. In addition, it helps in controlling the emotions and reactions. The deep breathing exercise takes more time than the normal breathing which allows the sacks in the lungs to absorb more oxygen which will lead to more level of oxygen in the blood. As a result of blood circulation more oxygen will reach the brain. Due to the crucial role of this exercise on the students, many schools and educational institutions are looking for ways to apply this technique in the classrooms (Perciavalle et al. 2016).

Table (L) Presents the answers of question 12.

Table (L) Responses of students to question 12 – First Survey			
Q12: Would you like to repeat the exercises again?			
6B1- A total of 21 students		6B2- A total of 23 students	
Answer Choices	Responses		Answer Choices
Yes	100.00%	21	Yes
No	0.00%	0	No
	Answered	21	Answered
	Skipped	0	Skipped
<p>A bar chart showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 150.00%. The 'Yes' bar reaches 100.00%, and the 'No' bar is at 0.00%.</p>		<p>A bar chart showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 100.00%. The 'Yes' bar reaches 86.96%, and the 'No' bar reaches 13.04%.</p>	
93.18% of the students would like to repeat the exercises again next year. 6.8% didn't want to repeat it again.			
Source of Table (L): Author			

Table (L) indicated that students enjoyed the period when Brain Gym® was conducted. This is a positive indicator that these exercises have positive impact on the students. Exercise is linked with excitement. They feel happy during exercising and get a relief from tension and stress. It also gives a feeling of success when learning new activity and being able to practice it skillfully. Moreover, practicing various exercises regularly is essential to the health (Corbin, Lindsey & Welk 2000).

In the previous survey students shared their opinion and feelings about Brain Gym. Generally, majority of the students got excited, felt they could focus more and took a deep breath. All of the previously mentioned comments support the fact that doing Brain Gym exercises is promising if done in the right way with continuously.


4.2 Assessments, Grades Results / Analysis

To check the progress of students' academic performance in the class room the best way is to check their assessments marks before and after the intervention. The tables below show the results of the quizzes and exam before and after Brain Gym®. The two quizzes' results that were done before Brain Gym® implementation will be compared with the post implementation quizzes results. Major exams grades before (Midyear Exam) were compared with the Major final exam that was done at the end of the year. Results are shown below in tables 1 and 2.

Table (1) shoes the marks of quizzes of grade 6B1. It was noticed clearly that grades averages of quizzes out of 10 dropped significantly by the end of Brain Gym® exercises which supports the null hypothesis more than the research hypothesis. However, a significant rise in the final exam was noticed in comparison to the mid-year exam which was out or 40 marks. Usually researchers take the major exams into consideration when it

comes to student's academic performance evaluation, more than the quizzes marks. Researches proved that the scores of the students' are higher when conducting major assessments, while the scores drop down during short quizzes. 56% of the students preferred major assessments, while only 33% preferred short quizzes. The research findings indicate that brain gym has a significant impact on students' performance and behaviors. On the academic level, the research finds brain gym results promising but more research to be done to proof it on the academic level (Weinstein & Wu 2009)

Table (1): Marks of quizzes and exams conducted before – during and after Brain Gym exercises were done. 6B1

American International School Science Department - Grade: <u>6B1</u> 2017-2018 						
Brain Gym [®] Implementation status	Before Brain Gym [®] Implementation		During Brain Gym [®] Implementation			After Brain Gym [®] Implementation
Date:	Oct. 4 th 2017	Oct. 23 rd 2017	Dec. 10 th 2017	Jan. 23 rd 2018	Feb. 29 th 2018	Jun. 12 th 2018
Students No.	Q1: 10	Q2: 10	Midterm Exam 40	Q1: 10	Q2:10	Final Exam 40
1	9	9	19	7	8	34
2	7	5	14	1.5	4	39
3	6	6	20	5.5	5	20
4	7	7.5	12	7	7	37
5	5.5	5	13	8	8	28
6	9	10	24	6	6	27
7	10	10	29	6.5	6.5	16
8	6	10	16	7	7	36

9	4.5	6	8	5.5	5.5	24
10	8.5	10	30	10	8	26
11	9	9	31	8	8.5	23
12	7.5	7	23	5	4	26
13	8	8	26	6.5	5	34
14	9	10	30	9	8	34
15	8	7.5	25	5	5	16
16	8	10	38	8	9	28
17	10	10	33	6.5	8.5	33
18	9.5	10	33	10	7	36
19	8	10	24	4	9	35
20	5	9	18	3.5	5.5	32
21	10	10	33	7	8	34

Source of the table: Author – American International School- Dubai, UAE.

T – Test Analysis


T – Test analysis has been done separately for midterm and final exams to find out the significant or insignificant impact of brain gym exercises. The t – tests have been calculated for both Grades 6B1 and 6B2 respectively and results have been displayed separately for better understanding.

Table (3): t-Test analysis for the average marks of the midyear and final : Two-Sample Assuming Equal Variances - <u>Grade 6B1</u>		
	<i>Midterm</i>	<i>Final Term</i>
Mean	23.76190476	29.42857143
Variance	67.59047619	46.15714286
Observations	21	21
Pooled Variance	56.87380952	
P(T<=t) two-tail	0.019453998	
Table (3) Source: Author		

The table in the previous page indicates the output of two sample t-test for the studying the significant difference in the midterm and final term marks of the students. His table shows the overall impact of Brain Gym[®] exercise on the students and it has been calculated through comparing midterm exams and final exams of the students. The p-value of the t statistics found in above table as 0.019 which is less than 5% level of significance, indicating that there is a significant difference in the marks of the midterm and final term showing a significant impact of the Brain Gym[®]. Although the marks of the quizzes before and after implementing Brain Gym[®] showed a significant drop, these quizzes have less value than major exams which showed a significant progress.

Findings were almost the same in 6B2. Averages of quizzes dropped while major exams showed a significant improvement.

Table (2): Marks of quizzes and exams conducted before – during and after Brain Gym[®] exercises were done. 6B2

American International School Science Department - Grade: <u>6B2</u> 2017-2018 						
Brain Gym [®] Implementation status	Before Brain [®] Gym Implementation		During Brain Gym [®] Implementation			After Brain Gym [®] Implementation
Date:	Oct. 4 th 2017	Oct. 23 rd 2017	Dec. 10 th 2017	Jan. 23 rd 2018	Feb. 29 th 2018	Jun. 12 th 2018
Students No.	Q1: 10	Q2:10	Midterm Exam40	Q1: 10	Q2:10	Final Exam40
1	9.5	8.5	29	9.5	9.5	34
2	9.5	10	38	9	10	39
3	9.5	7.5	28	9	9	20
4	10	10	32	9.5	10	37
5	8.5	6	29	9	10	28
6	6.5	8	20	7.5	8.5	27
7	6.5	6	13	2	3	16

8	9.5	8	35	8.5	9.5	36
9	9	6	18	7	6	24
10	8.5	9	36	8	6	26
11	9.5	7	16	4	10	23
12	8	6	27	6.5	5	26
13	9	8.5	31	9.5	10	34
14	9	10	34	8	8.25	34
15	9.5	7	14	6	5	16
16	6.5	8	23	7	8	28
17	8.5	10	27	6	9.5	33
18	9.5	9	26	8.5	8	36
19	9.5	10	28	10	10	35
20	9	10	28	9.5	9	32
21	9	10	31	8.5	9	34
22	6.5	4.5	17	2.5	3	18
23	9.5	10	40	10	8	37

Source table (2): Author –American International School- Dubai, UAE

Table (4) t-Test analysis for the average marks of the midyear and final : Two-Sample Assuming Equal Variances - <u>Grade 6B2</u>		
	<i>Mid Term</i>	<i>Final Term</i>
Mean	26.95652174	29.26086957
Variance	58.40711462	50.4743083
Observations	23	23
df	44	
P(T<=t) two-tail	0.295336024	
Table (4) Source: Author		

Table (4) indicates the output of two sample t-test for the studying the significant difference in the midterm and final term marks of the students. The p-value of the t statistics found in above table as 0.2953 which is more than 5% level of significance, indicating that there is an insignificant difference in the marks of the midterm and final term showing an insignificant impact of the Brain Gym®.

At the end of all Brain Gym® sessions a final survey was made. Refer to Appendix 4.

4.3 Final last survey: "Brain Gym®" Exercises [Last session] [Wednesday, May16th2018

Table (M) represent the answers of the students on question 1.

Table (M) Responses of students to question 1 – Final Survey					
Q1: What do you feel about Brain Gym® exercises at the end of the year?					
6B1 – A total of 21 students			6B2 - A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Poor - I didn't like it	0.00%	0	Poor - I didn't like it	5.26%	1
Good - It made me feel energized and awake	29.41%	5	Good - It made me feel energized and awake	47.37%	9
Excellent - I truly enjoyed it and I felt more focused after doing it	47.06%	8	Excellent - I truly enjoyed it and I felt more focused after doing it	47.37%	9
I cannot decide	23.53%	4	I cannot decide	0.00%	0
	Answered	1		Answered	19
	Skipped	4		Skipped	4
A total of 36 students out of 44 conducted the last survey relate to Brain Gym®. 2.8% of the 26 students didn't like the exercises. 38.9% Thought that Brain Gym® exercises were good.47.2% thought Brain Gym® was Excellent and 11.1% Couldn't decide.					
Source of Table (M): Author					

Most of the students reported that they liked what they were doing. Moving and exercises improve the shape and appearance of the body by keeping the body weight

normal which gives the child confidence. For the kids as well as adults, exercise is linked with excitement. They feel happy during exercising and get a relief from tension and stress. It also gives a feeling of success when learning new activity and being able to practice it skillfully. Moreover, practicing various exercises regularly is essential to the health (Corbin, Lindsey & Welk 2000).

Table (N) represent the answers of the students on question 2.

Table (N) Responses of students to question 2 – Final Survey			
Q 2: Do you think that Brain Gym® exercises had a positive effect on the class in terms of calming them down?			
6B1 – A total of 21 students		6B2 - A total of 23 students	
Answer Choices	Responses		
Strongly agree	41.18%	7	
Agree	29.41%	5	
I cannot decide	11.76%	2	
Disagree	17.65%	3	
	Answered	17	
	Skipped	4	
Among the 36 participants 44.4% strongly agreed that Brain Gym® calmed the class down. 33.3% agreed on that fact and 13.9% disagreed however 11.11% couldn't decide.			
Source of Table (N): Author			

It has been proven that being under stress and tension has a negative impact on the health and may be the cause of many diseases, such as depression, many diseases. Furthermore, emotional strain has a negative influence on the behavior and on the communication with others. It reduces the performance of the students in the classroom due

to the lack of concentration and attention. As a result, the academic record of the students who are under tension will be very low (Gupta et al. 2014).

Students' attitude and behavior in the classroom has a direct influence on the learning and teaching process. Misbehaving students in the classroom did not only affect their own academic performance but also deprived other students from understanding and focusing during the classroom which will negatively impact their academic performance. Students who are breaking the rules in the classroom also affected the instructor who will not be able to continue the lecture with these disruptive behaviors. The article mentioned various in-class misbehavior including but not limited to coming late, Shouting and arguing with other students, dominate the class discussions, eating, sleeping, talking with peers, showing disinterest and using smart phones (Douglas, Moyes & Douglas 2016). All these actions had adversely impacted the learning and teaching process. The reason is that the teacher had to stop the teaching process and focused on handling the incident of misbehavior as her/ she cannot just ignore such behavior. It is noticed that male students were more likely to misbehave and display an act of disruption more than females. In order to eliminate such attitude, there are several methods and techniques used with each behavior. Each behavior required a certain reaction from the teacher and should be dealt with in a different way (Douglas, Moyes & Douglas 2016). According to most of the students, Brain Gym had a positive impact on them in terms of calming them down which is directly related to stress relief thus more peaceful environment to learn.

Table (O) represent the answers of the students on question 3.

Table (O): Responses of students to question 3 – Final Survey					
Q3: Would you like to repeat your experience of Brain Gym® workouts next year?					
6B1 – A total of 21 students			6B2 - A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	76.47%	13	Yes	84.21%	16
No	23.53%	4	No	15.79%	3
	Answered	17		Answered	19
	Skipped	4		Skipped	4
<p>A bar chart for group 6B1 showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 100.00%. The 'Yes' bar is at 76.47% and the 'No' bar is at 23.53%.</p>			<p>A bar chart for group 6B2 showing the percentage of responses for 'Yes' and 'No'. The y-axis ranges from 0.00% to 100.00%. The 'Yes' bar is at 84.21% and the 'No' bar is at 15.79%.</p>		
80.5% of the 26 students liked the Brain Gym® exercise and would like to redo it again and 19.4% did like to repeat their experience.					
Source of Table (O): Author					

Results showed that students enjoyed the session which means that they were not stressed out. For the kids as well as adults, exercise is linked with excitement. They feel happy during exercising and get a relief from tension and stress. It also gives a feeling of success when learning new activity and being able to practice it skillfully. Moreover, practicing various exercises regularly is essential to the health (Corbin, Lindsey & Welk 2000).

Table (P) represent the answers of the students on question 4.

Table (P) Responses of students to question 4 – Final Survey					
Q 4: Do you advice other teachers to do Brain Gym® exercises with their students in school?					
6B1 – A total of 21 students			6B2 - A total of 23 students		
Answer Choices	Responses		Answer Choices	Responses	
Yes	75.00%	12	Yes	84.21%	16
No	25.00%	4	No	15.79%	3
	Answered	16		Answered	19
	Skipped	5		Skipped	4
<p>A bar chart for 6B1 showing the percentage of responses. The y-axis ranges from 0.00% to 80.00% in 20% increments. The x-axis has two categories: 'Yes' and 'No'. The 'Yes' bar reaches 75.00% and the 'No' bar reaches 25.00%. A legend indicates 'Responses'.</p>			<p>A bar chart for 6B2 showing the percentage of responses. The y-axis ranges from 0.00% to 100.00% in 20% increments. The x-axis has two categories: 'Yes' and 'No'. The 'Yes' bar reaches 84.21% and the 'No' bar reaches 15.79%. A legend indicates 'Responses'.</p>		
35 students answered this question and 80% of them reported that they would recommend Brain Gym® for the teachers and students. 20% would not recommend it.					
Source of Table (P): Author					

Students were very happy and exited during Brain Gym®. This is a positive indicator as students learn more in a positive environment that a stressful one.

Table (Q) represent the answers of the students on question 5.

Table (Q) Responses of students to question 5– Final Survey			
Q 5: Do you think Brain Gym® is a useful way to help you focus on what you are doing?			
6B1 – A total of 21 students		6B2 - A total of 23 students	
Answer Choices	Responses		
Strongly agree	41.18%	7	
Agree	29.41%	5	
Neither agree nor disagree	17.65%	3	
Disagree	5.88%	1	
Strongly disagree	5.88%	1	
	Answered	17	
	Skipped	4	
<p>36 students answered this question. 41.7% strongly agreed that Brain Gym® helped them to focus in class more and 30.5% agreed that Brain Gym helped them to focus. 22.2% couldn't decide and 5.5% disagreed that it could help them to focus.</p>			
Source of Table (Q): Author			

Majority of the students reported that they were able to focus on tasks after Brain Gym® and they were able to finish their tasks faster. This indicated that there are promising results from Brain Gym®.

For the last question students were asked to write about incidents that happened with them and they tried to do Brain Gym® in order to fix the situation. Students' answers varied as shown in the table below.

Table (R) represents the answers of the students on question 6.

Table(R) Responses of students to question 6 – Final Survey			
Q6: Tell us how Brain Gym® helped you on the personal level. Please write your comment it in the box below.			
6B1 – A total of 21 students		6B2 - A total of 23 students	
	Answered	13	
	Skipped	8	
<p>13 students wrote about their personal opinion about their experiences with Brain Gym® exercises and 8 students chose not to write.</p> <p>The first student stated that Brain Gym® helped him to improve in math and calculation. The second student said that Brain Gym® made him feel sleepy. The third student reported that he experienced no change what so ever. The fourth student stated that when he felt sleepy he practiced Brain Gym® at home and it helped him keep awake and finish his studies. The fifth student reported that Brain Gym® calmed him down in class. Sixth student reported that Brain Gym® helped him stay awake after he did it when he was</p>		<p>15 students out of 23 have shared their stories and opinions about Brain Gym. Three of them stated that Brain Gym had no effect on them at all.</p> <p>The forth student reported that he was able to focus more in class after doing Brain Gym. The fifth student stated that after practicing Brain Gym his focusing increased in general. The sixth student reported that Brain Gym helped him to stay awake to study. The seventh student stated that Brain Gym helped him to focus and relax.</p> <p>The eight student stated that whenever he does Brain Gym in class he feels he can focus more however when he did it alone at home he didn't feel so.</p>	

<p>sleepy. Seventh and eight students reported that they feel it is good. The ninth student reported that it helped him study better. The tenth student felt no change and stated that it didn't have any effect on his life. Student number eleven stated that it is funny and exciting. The twelfth student reported that his experience by saying “</p> <p>before yesterday at 11 pm, I felt sleepy once I remembered the Brain Gym® I did it and felt relaxed and focused”</p> <p>The last student responded by saying “</p> <p>In Ramadan it was 6.30 I wanted to sleep I did brain gym and it made me awake”</p>	<p>The ninth student stated that helped him stay awake when feeling sleepy. The tenth student stated that when he was extremely angry Brain Gym helped him to calm down and thought of solutions for his problems instead of shouting.</p> <p>The eleventh student said that his focusing level increased. And the twelfth student stated that he was not really doing it so he didn't see any difference. The rest of the students said that brain Gym® helped him to focus and wake up.</p>
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Source of Table (R): Author

In General, Students were positive in their opinion and they showed that in their responses towards their experience with Brain Gym®. Most students said positive responded especially when it comes to focusing and becoming active. At the end of phase II an interview was done with the English teacher. After that the researcher conducted an interview with the English teacher and her answers were all positive. Refer to Appendix 5.

4.4 Interview Results / Analysis

Interview with the English Language teacher Miss Hind:

An interview was conducted with Miss Hind the teacher of English language of grades 6B1 and 6B2.

Date: May 13th 2018.

Venue: American International School

Time: During the first break 10:10 to 10:30 AM

The first question was: Do you think that Brain Gym[®] exercises had an impact on grade 6 on behavioral level? Miss Hind agreed that the students have positively changed in terms of their behavior compared to their behavior at the beginning of the year. Miss Hind stated that students of 6B1 are more active in class participation and became more organized in doing tasks and they fought less than before where 6B2 became less talkative and more organized.

For the second question which was: Do you think that Brain Gym[®] can an impact on your student's academic level on the long term? Miss Hind strongly agreed on that as the students' focusing levels increased as distraction sources decreased so this will lead to more knowledge gained thus to an increase in the academic level.

Miss Hind was asked about the changes she noticed on the students and she said: "They became more focused and interactive in a manageable way" she added" Teaching them became fun and their outcome is amazing I am so happy with the results"

Miss Hind was also asked if she would recommend Brain Gym[®] for teachers as an effective classroom management strategy and she strongly recommended that.

4.5 Classroom Observation Results/ Analysis

- Class room observation results during the English language periods. Refer to Appendix 6.

The researcher conducted Brain Gym[®] with the students for five minutes during the English periods. The English Teacher stated that 60 % of the total numbers of her classes were amazing after Brain Gym[®]. Only 40 % of the classes were not successful. According to her observation the classes that had a good behavioral observation were having the best academic results. And the days were they did not seem to have a good behavior the academic performance was not that good.

- Class room observation results during the English language periods. Refer to Appendix 7.

According to the science teacher, students significantly changed in terms of behavior. They reported less fights during the classes that had Brain Gym[®]. Students also became more responsive and their willing to write increased. Students were very excited to do Brain Gym[®] and this was reflected in their responses once they saw the science teacher they ask about Brain Gym[®].

Students also started to take less time in doing tasks as they rescued arguing among the groups. Over all, Brain Gym[®] has a positive impact on students behavior thus it gave more space for them to listen to the instructions peacefully with no tension which in the science teacher's opinion lead to better academic performance.

The science teacher also agreed with the English teacher that during the classes were students quiet and ready to learn, academic performance increased.

Chapter 5: Conclusion

In conclusion, there are many factors that affect students' learning in the classroom. It is certainly the educator's responsibility to eliminate the negative effects of these factors by choosing the suitable educational intervention (Emilda 2015). This research was made to test the effectiveness of conducting Brain Gym® exercises -that were developed by Brain Gym® International Corporation- in class, in increasing the students' behavior and academic performance in class. To start with, a literature review was made to collect most of the topic-relatively closed articles and researches and view their methods, results, outcomes and conclusions. Articles varied between experimental-research based articles and reviewing types of articles some of which strongly agreed with Brain Gym® International ideas and believes and many of which strongly criticized and denied them.

To be able to develop a clear idea of the nature of Brain Gym® exercise and how it can help teachers in their inherent mission to facilitate the education of students in an atmosphere of pleasure and psychological comfort, away from the stress and boredom of the teachers and students, and away from the tense classroom atmosphere caused by some of the actions of the students and also due to the teacher's nervousness. As the researcher in the field of education should provide a clear picture of the solution provided as far from bias as possible, this research came out in the form of quasi-experimental empirical research. This paper aimed at testing the effectiveness of one of the educational intervention techniques that has been highly marketed nowadays which is Brain Gym®. To test the research Hypothesis and have answers for the research questions, this research was designed as an experiment research type with mixed methodology approach.

The research was conducted at the American International School, Dubai, UAE with the participation of 44 students from grade six. The researcher conducted three exercises of Brain Gym[®] for five minutes in every science period along with encouraging them to drink water and to breathe deeply.

The research was implemented for six months and data were collected pre and post implementing Brain Gym[®]. The data collected were qualitative and quantitative. Qualitative data included interviews conducting with other teachers of the same classes and also open ended questions to collect the students' opinion about practicing Brain Gym[®]. Moreover, classroom observation form was designed to be filled by the English and Science teachers to record the observation on a daily basis. These observations included behavioral and academic performance in the classroom.

Quantitative data were collected pre and post brain gym implementation. Quiz one and quiz two marks were collected before the implementation of brain gym and the results were compared with the two quizzes that were conducted after the implementation of Brain Gym[®].

Furthermore, the results of the major assessments which are the mid-year exam before the Brain Gym[®] exercises were compared with the results of the final exam after conducting the Brain Gym[®] exercises.

The research found out significant change on students' behavior as recorded by the teachers. The instructors noticed that after Brain Gym[®] sessions students seem to be more calm and ready to listen to the instructions. Moreover, less fighting incidents were reported

during the periods in which exercises were conducted. As a result, student's academic performance was improved.

Students' scores on the academic level varied between minor quizzes and major exams. The average of quizzes conducted before and after the Brain Gym® exercises did not show a significant change of the grades. However, major assessment showed big improvement in the scores after six months of practicing Brain Gym® exercises. The contradiction in results between quizzes and major assessments created a conflict in the final results. According to (Weinstein & Wu 2009), the comparison between the quizzes and long assessments shows that the major assessment is highly recommended as the results shows the following reasons, the students' number of readings is more before having a long assessment, while the readings was significantly low before short quizzes.

The research had four main questions. The first one was talking about the relevancy of Brain Gym® International Promises. Despite the fact that Brain Gym® International did not provide scientific researches to prove their hypothesis, hut results showed that Brain Gym® is highly effective at least at the behavioral level.

For the second question, teachers need to search for the best educational intervention that will be suitable with his or her class as no one intervention is perfect for all cases. The third question was about the problems in the classroom that can be solved by Brain Gym® and the answer is most behavioral and disruptive problems. Once students did Brain Gym® they showed clearly that they calmed down. This also helped them to have a peaceful learning environment.

5.1 Research Limitations

The main limitation was the short time of the period as the students had to conduct 5 minutes only of Brain Gym[®] because the period is 50 minutes length. According to Thyer, B. (2012) the larger the sample size is the more the chance to have a clear conclusion based on their results. This shows that the sample size of schools and students were relatively small compared to the total number of both schools and students in Dubai, the experiment was done with 44 students in Dubai however private schools in Dubai alone have 281,432 students. The research was done in one private school in Dubai which has 194 private schools according to the last KHDA inspection report. (Knowledge and Human Development Authority 2018).

It is also is worth mentioning that most of the articles the research referred in this section, -if not all of them- were taken from scientists and teachers who have been working on a personal level to write scientific research to verify the credibility of the promises entrusted to these exercises. As this research is especially interested in Brain Gym[®] exercise, it would be best to refer to the articles that were written by the developers of these exercises who published their articles in their own journal which is Brain Gym[®] Journal, but unfortunately it was difficult to find more than one article written in a scientific narratives, scholarly paper, or even containing sources and scientific references can be relied upon. For example, In Brain Gym[®] Journal which was published on July, 2015 only one out of six published articles was scientific and had a background research and references (Brain Gym Journal 2005). This also confirms the validity of the criticisms of Hayatt K. (2016) mentioned in chapter two.

5.2 Recommendations

More researches need to be done on a large scale of schools at the same time. Talking about one city only in the UAE (United Arab Emirates) such as Dubai, you will find 184 private schools. A large program can be established by the ministry of education in the UAE or by KHDA (Knowledge and Human Development Authority) as schools work under one of them. By that we ensure a large scale of schools.

As taking a permission was a big challenge for the boys chosen for the case study research, this research highly recommends Increase the awareness among parents about the importance of school researches and how it enhances the school performance and to encourage them to accept their kids to be part of educational researches

Medical test can be done to take the verification level into the next step

More attention should be given to interventions like Brain Gym[®] in school as it proved to have an impact on students' behavior. As schools in Dubai usually work under the instructions of the KHDA and the ministry of education it would be great if decision makers there plan to include motion based interventions as a part of the lesson plan so teacher will then have the change to explore these solutions and get motivated to try them.

It is highly recommended also for Brain Gym[®] developers to spend more effort in proofing their hypothesis scientifically at least by doing more scholarly and empirical papers. It could be hard for Brain Gym[®] instructors to go into classrooms and do it with the students but as per Braingym.org (2018) Brain Gym[®] International Cooperation has reached teachers in almost eighty seven countries around the world. If a hundred teachers around the world were hired in a Brain Gym[®] implementation program in schools then it would be

easy to ask for empirical data according to a clear scientific and research approach then Brain Gym educators will have rich empirical data to support their articles in Brain Gym® Journals and even other scientific journals.

It is also recommended to do a pool research, which means the ministry of education needs to assign a group of teacher in the whole city to study Brain Gym® together following the same method as parallels. By that, sample size will be huge and results will be more accurate.

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Appendices

Appendix 1: Approval Form for conducting the research and for collecting data.


www.buid.ac.ae

19-10-18

**To: Dr. Sajid Azmi
The Vice Principal of the American International School**

This is to certify that Ms.Dua Herbawi with Student ID number 2016101130 is a registered part-time student in the Master of Education offered by The British University in Dubai since September 2016.

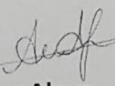
Ms. Herbawi is currently collecting data for her project (The effectiveness of Brain Gym® Exercises on Improving Students' Performance in classes of middle school boys in private schools in Dubai, UAE (Ethnographic study Conducted at the American International School))


She is required to gather data through conducting interviews that will help her in writing the final project. Your permission to conduct her research in your organisation is hereby requested. Further support provided to her in this regard will be highly appreciated.

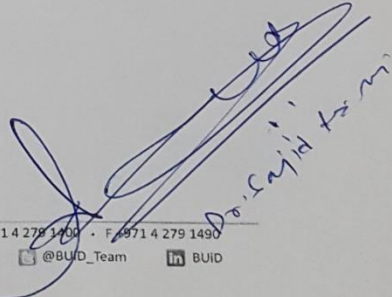
Any information given will be used solely for academic purposes.

This letter is issued on Ms.Herbawi's request.

Yours sincerely,


Dr. Amer Alaya
Head of Student Administration




Dr. Sajid Azmi

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Appendix 2: Initial Survey form – November 1st 2017

Beginning of the year survey for all students 6B1 and 6B2

Conducted by: Miss DuaaAlherbawi School: American International School – Dubai

Date: November 1st 2017

Grades: 6B1 and 6B2

Our Own "Brain Gym[®]" Exercises Time

[First attempt]

*This survey is an anonymous survey [Anonymous means that you don't need to write your name down so no one will know what you answered] you just need to go through the questions and answer them based on your own feelings as this survey is not for correction and does not have a mark.

*This survey must be filled right after doing "Brain Gym[®]" Exercises for 5 minutes.

1. Kindly Choose Gender.
Answer Choices
A. Male
B. Female
2. Kindly Choose Your Age
Answer Choices
A. 10 Years Old
B. 11 Years Old
C. 12 Years Old
D. 13 Years Old
E. 14 Years Old

3. I play sports at least 3 times per week
Answer Choices
A. Yes
B. No
4. I drink water many times every day
Answer Choices
A. Yes
B. No
5. Did you feel any pain or pressure in your head at the beginning of the exercises?
Answer Choices
A. Yes
B. No
C. I am not sure
6. Did you feel dizzy at the beginning of the exercises?
Answer Choices
A. Yes
B. No
C. I am not sure
7. Did you feel any pain in the chest at the beginning of the exercises?
Answer Choices
A. Yes
B. No
C. I am not sure
8. Where you able to focus only on the exercise?
Answer Choices
A. Yes
B. No
C. I am not sure
9. Did you feel an increase in your heartbeats?
Answer Choices
A. Yes
B. No
C. I am not sure
10. At the end of the exercises were you able to take a deep breath?
Answer Choices
A. Yes
B. No
C. I am not sure
11. Would you like to repeat the exercises again?
Answer Choices
A. Yes
B. No

Appendix 3: Classroom observation – Checklist Form.

Conducted by: Researcher – Science Teacher

School: American International School – Dubai

Date: From ----- to -----

Grades: 6B1 and 6B2

"Brain Gym®" Exercises – Class Observation

Please fill this table at the end of every period

<u>Date</u>	<u>Class</u>			
	<u>6B1</u>		<u>6B2</u>	
	<u>Behavioral Performance</u>	<u>Academic Performance</u>	<u>Behavioral Performance</u>	<u>Academic Performance</u>

NA: Not applicable due to a trip or other conditions where no classes were being conducted

A: Acceptable Period

E: Excellent Period

NA: Not acceptable Period

Appendix 4: End of the process survey. It Was done with the students at the end of all sessions.

Conducted by: Researcher - Science Teacher

School: American International School – Dubai

Date: May 16th 2018

Grades: 6B1 and 6B2

Our Own "Brain Gym[®]" Exercises Time

[Last attempt]

I

1. What do you feel about Brain Gym[®] exercises at the end of the year?
Answer Choices
A. Poor - I didn't like it
B. Good - It made me feel energized and awake
C. Excellent - I truly enjoyed it and I felt more focused after doing it
D. I cannot decide
2. Do you think that Brain Gym[®] exercises had a positive effect on the class in terms of calming them down?
Answer Choices
A. Strongly agree
B. Agree
C. I can't decide
D. Disagree
3. Would you like to repeat your experience of Brain Gym[®] exercises next year?
Answer Choices
A. Yes
B. No
4. Do you advise other teachers to do Brain Gym[®] exercises with their students in school?
Answer Choices
A. Yes
B. No
5. Do you think Brain Gym[®] exercises are a useful way to help you focus on what you are doing?
Answer Choices
A. Strongly agree
B. Agree
C. Neither agree nor disagree
D. Disagree
E. Strongly disagree

Tell us how Brain Gym[®] exercises helped you on the personal level. Do you have any comment or a story related to Brain Gym[®] exercises that you would like to share with us? Please write it in the box below.

----- -----

Appendix 5: Interview Conducted with the English Teacher Miss Hind.

**An interview about the effectiveness of Brain Gym® Exercises on improving the performance
in class of middle school boys in private schools in Dubai, UAE**

• **General Information:**

- Conducted with: Mrs. Hind – English Language Teacher – American International School, Dubai, UAE. Under the coordination of Dr. Christopher Hill

• **Interview details**

Conducted by: DuaaHerbawi – A students in British University in Dubai.

Conducted with: Mrs. Hind – English Language Teacher at the American International School

Type of the interview: Structured Case Study Interview

Date: Sunday, April 13th 2018

Time: 10:10 AM

School: American International School

• **Interview questions**

1. Do you think that Brain Gym® exercises had an impact on grade 6 on behavioral level?

yes in deed, great change was noticed in terms of their behaviour and performance in class-room. The class became calm

2. Do you think that Brain Gym® has an impact on your student's academic level on the long

term? Yes I do, before students use to talk and fight which prevented them from listening to instructions, now as they calmed down they can listen and

3. What are the changes you noticed on your students after applying Brain Gym®?

students became more focused on what they do, time taken to finish tasks was less, students' interaction and participation increase

4. Do you recommend Brain Gym® for teachers as an effective classroom management strategy?

for sure, liked the idea and will do it myself with him next time.

*Thank you
Hind*

Appendix 6: The overall general observation of the students' behavioral and academic performances collected by the English teacher from April 15th to May 16th 2018

Class room observation April 15th 2017 to May 16th 2018 – Observer: Done By: The English

Teacher

<u>Month/Week</u> <u>/ Total of 5 Period per week</u>	<u>Class</u>			
	<u>6B1</u>	<u>6B2</u>	<u>6B1</u>	<u>6B2</u>
	<u>Behavioral</u>	<u>Academic</u>	<u>Behavioral</u>	<u>Academic</u>
	<u>Performance</u> <u>Per Week</u>	<u>Performance</u> <u>(Class participation)</u>	<u>Performance</u> <u>Per Week</u>	<u>Performance</u> <u>(Class participation)</u>
<u>April 2018</u>	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0
Week 3: Sun. – Thur. 15 th April - 19 th April 2018. [Total of 5 teaching periods]	No. of E. P.: 5 No. N. P.: 0	No. of E. P.: 5 No. N. P.: 0	No. of E. P.: 5 No. N. P.: 0	No. of E. P.: 5 No. N. P.: 0
Week 4: Sun. – Thur. 22 nd April - 26 th April 2018. [Total of 5 teaching periods]	No. of A. P.: 2 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 3 No. N. P.: 0
Week 5: Sun. – Mon. 29 th April - 30 th April 2018. [Total of 2 teaching periods]	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 0
<u>May 2018</u>	No. of A. P.: 3	No. of A. P.: 3	No. of A. P.: 3	No. of A. P.: 3
Week 1: Tues. – Thur. 1 st May - 3 rd May 2018. [Total of 3 teaching periods]	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0
Week 2: Sun. – Thur. 6 th May - 10 th May 2018. [Total of 5 teaching periods]	No. of A. P.: 4 No. of E. P.: 1 No. N. P.: 0	No. of A. P.: 4 No. of E. P.: 1 No. N. P.: 0	No. of A. P.: 4 No. of E. P.: 1 No. N. P.: 0	No. of A. P.: 4 No. of E. P.: 1 No. N. P.: 0
Week 3: Sun. – Thur. 13 th May - 17 th May 2018. [Total of 5 teaching periods]	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 1	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 1	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 1	No. of A. P.: 1 No. of E. P.: 4 No. N. P.: 1

Source: Author

Appendix 7: The overall general observation of the students' behavioral and academic performances collected by the Science teacher from Nov. 1st 2017 to May 16th 2018

Class room observation Nov. 1 2017 to May 16th 2018 – Observer: The science Teacher

<u>Month/Week</u> <u>/ Total of 4 Period</u>	<u>Class</u>			
	<u>6B1</u>		<u>6B2</u>	
	<u>Behavioral Performance Per Week</u>	<u>Academic Performance (Class participation)</u>	<u>Behavioral Performance Per Week</u>	<u>Academic Performance (Class participation)</u>
<u>November 2017</u>	No. of A. P.: 1	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0
Week 1: Wed. Nov. 1 st Nov. – Thursday – Nov. 2 nd 2017 [2 Periods]	No. of E. P.: 1 No. N. P.: 0	No. of E. p.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0
Week 2: Nov. 5 th – Nov. 9 th 2017 [Total of 4 periods]	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 0 No. of E. p.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0
Week 3: Sun. – Thur. Nov. 12 th to 16 th Nov 2017. [Total of 4 periods]	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 4 No. of E. P.: 0 No. N. P.: 0	No. of A. P.: 4 No. of E. P.: 0 No. N. P.: 0
Week 4: Sun. – Thur. Nov. 19 th to 23 rd Nov 2017. [Total of 4 teaching periods]	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0
Week 5: Sun. – Thur. Nov. 26 th to 30 th Nov 2017. [UAE celebration days 29 th and 30 th November 2017] [Total of 2 teaching periods]	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 2	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 2	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 2	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 2
<u>December 2017</u>	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0
Week 1: Sun. – Thur. 3 rd Dec. -7 th Dec. 2017. [Sunday and Wednesday were holidays] [Total of 1 teaching period]	No. of E. P.: 1 No. N. P.: 3	No. of E. P.: 1 No. N. P.: 3	No. of E. P.: 1 No. N. P.: 3	No. of E. P.: 1 No. N. P.: 3
Week 2: Sun. – Thur. 10 th Dec. -14 th Dec. 2017. [Midyear Exams no classes]				

Source: Author

Week 3-4: Sun. – Thur. 17 th Dec. -31 st Dec. 2017. [Winter Break]				
January 2018				
Week 1: Mon. – Thursday 1 st Jan – 4 th Jan 2018. [Winter Break]				
Week 2: Sun. – Thur. 7 th Jan – 11 th Jan 2018. [Total of 4 teaching periods]	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0
Week 3: Sun. – Thur. 14 th Jan – 18 th Jan 2018. [Total of 4 teaching periods]	No. of A. P.: 3 No. of E. P.: 1 No. N. P.: 0	No. of A. P.: 3 No. of E. P.: 1 No. N. P.: 0	No. of A. P.: 3 No. of E. P.: 1 No. N. P.: 0	No. of A. P.: 3 No. of E. P.: 2 No. N. P.: 0
Week 4: Sun. – Thur. 21 st Jan – 25 th Jan 2018. [Total of 4 teaching periods]	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0
Week 5: Sun. – Wed. 28 th Jan – 20 th Jan 2018. [Total of 3 teaching periods] [Total of 3 periods]	No. of A. P.: 0 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 3 No. N. P.: 0
February 2018				
Week 1: Thursday Feb. 1 st 2018 [Trip] [Total of 4 teaching periods]	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 1	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 1	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 1	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 1
Week 2: Sun. – Thur. 4 th Feb. – 8 th Feb 2018.[MAP TESTS] [Total of 2 teaching periods]	No. of A. P.: 1 No. of E. P.: 1 No. N. P.: 2	No. of A. P.: 1 No. of E. P.: 1 No. N. P.: 2	No. of A. P.: 1 No. of E. P.: 1 No. N. P.: 2	No. of A. P.: 1 No. of E. P.: 1 No. N. P.: 2
Week 3: Sun. – Thur. 11 th Feb. – 15 th Feb 2018. [Total of 4 teaching periods]	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0
Week 4: Sun. – Thur. 18 th Feb. – 22 nd Feb 2018.	No. of A. P.: 1 No. of E. P.: 3	No. of A. P.: 1 No. of E. P.: 3	No. of A. P.: 1 No. of E. P.: 3	No. of A. P.: 1 No. of E. P.: 3

Source: Author

[Total of 4 teaching periods]	No. N. P.: 0	No. N. P.: 0	No. N. P.: 0	No. N. P.: 0
Week 5: Sun. – Wed. 25 th Feb. – 28 th 2018. [Total of 3 teaching periods]	No. of A. P.: 0 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 0
March 2018	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0
Week 1: Thursday 1 st 2018. [Total of 1 teaching periods]	No. of E. P.: 1 No. N. P.: 0	No. of E. P.: 1 No. N. P.: 0	No. of E. P.: 1 No. N. P.: 0	No. of E. P.: 1 No. N. P.: 0
Week 2: Sun. – Thur. 4 th March - 8 th March 2018. [Total of 4 teaching periods]	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 1 No. of E. P.: 3 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0
Week 3: Sun. – Thur. 11 th March - 15 th March 2018. [Total of 4 teaching periods]	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0
Week 4: Sun. – Thur. 18 th March - 22 nd March 2018. [Total of 4 teaching periods]	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0
Week 5: Sun. – Thur. 25 th March - 28 th March 2018. [Total of 4 teaching periods]	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0	No. of A. P.: 0 No. of E. P.: 4 No. N. P.: 0
April 2018	No. of A. P.: 1	No. of A. P.: 1	No. of A. P.: 1	No. of A. P.: 1
Week 1: Sun. – Thur. 1 st April - 5 th April 2018. [Total of 4 teaching periods]	No. of E. P.: 3 No. N. P.: 0	No. of E. P.: 3 No. N. P.: 0	No. of E. P.: 3 No. N. P.: 0	No. of E. P.: 3 No. N. P.: 0
Week 2: Sun. – Thur. 8 th April - 12 th April 2018. [Total of 4 teaching periods]	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0
Week 3: Sun. – Thur. 15 th April - 19 th April 2018. [Total of 4 teaching periods]	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 4	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 4	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 4	No. of A. P.: 0 No. of E. P.: 0 No. N. P.: 4

Source: Author

Week 4: Sun. – Thur. 22 nd April - 26 th April 2018. [Total of 4 teaching periods]	No. of A. P.: No. of E. P.: No. N. P.:	No. of A. P.: No. of E. P.: No. N. P.:	No. of A. P.: No. of E. P.: No. N. P.:	No. of A. P.: No. of E. P.: No. N. P.:
Week 5: Sun. – Mon. 29 th April - 30 th April 2018. [Total of 2 teaching periods]	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 0 No. N. P.: 0
May 2018	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0	No. of A. P.: 0
Week 1: Tues. – Thur. 1 st May - 3 rd May 2018. [Total of 2 teaching periods]	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0	No. of E. P.: 2 No. N. P.: 0
Week 2: Sun. – Thur. 6 th May - 10 th May 2018. [Total of 4 teaching periods]	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0	No. of A. P.: 2 No. of E. P.: 2 No. N. P.: 0
Week 3: Sun. – Thur. 13 th May - 17 th May 2018. [Total of 3 teaching periods]	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 1	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 1	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 1	No. of A. P.: 1 No. of E. P.: 2 No. N. P.: 1

Source: Author