LITERATURE REVIEWS

WHAT IS MUSIC?

In 1968, Dorthy Retallack investigated the effects of music on the growth of plants by using different music styles such as classical, jazz, pop, rock, acid rock, East Indian and country music. She found that jazz, classical and Ravi Shankar’s music facilitated their growth. Plants with rock music withered and died. The acid rock music also had a negative effect on plant growth.

The book “Mozart Effect” by Don Campbell brings out some of the beneficial effects of certain types of music such as: it increases the test scores, decreases the time to learn, helps to calm the hyperactive children and adults, decreases errors, enhances creativity and clarity of thoughts, heals the body faster, integrates both the hemispheres of the brain for more efficient learning and improves the IQ score by 9 points.

In a particular research study, rats were placed in two different boxes. Rock music was played in one of the boxes and Bach music was in the other. The rats were able to switch their boxes by means of a tunnel which connected both of them. Majority of the rats chose to go into the box in which there Bach music, even when the type of music was switched from one box to another.

Research has proved that memory can be affected by many factors one of which is music. It is music that stimulates the different parts of the brain.

Studies have proved that music enhances the memory of Alzheimer’s and dementia patients.

MUSIC AND SELF-ESTEEM.

Research has proved that music has a positive influence on the cognitive skills such as spatial reasoning and memory on the young minds. In one particular research
conducted by the “Nemours Foundation” founded by **Alfred Dupont**, to improve the health of children, it was found that children who actively participate in music related activities: do better in reading and mathematics, focus better, and develop higher levels of self-esteem.

In a pilot project which investigated music attitudes and self-esteem (*Nolin and Vander rk,1977*), It was found that students with music education, had significantly higher self-esteem score when measured by the Coppersmith Self-Esteem Inventory as compared to the non music students.

**MUSIC AND ACADEMIC PERFORMANCE.**

*Annette M.B (2006)* studied how background music affects the rate of language learning amongst students. The results indicated that background music has little effect on the amount of words learnt after a week. Music did not have any negative effect on language learning. It did not have any negative effect. Although the effect was found to be very little, it was found to have a positive effect.

According to **Bancroff (1985)**, music and musical instruments can be used for therapeutic purposes rather than aesthetic ones. It is believed that music training is a very potential instrument since it finds its way into the inward places of the soul.

*Bridgett and Cuevas* conducted a study to find out the effect of listening to Mozart’s music and Bach music, on the immediate performance of a mathematical test. 61 participants were randomly assigned either to the Mozart’s group or to the Bach group. The participants were then administered a mathematics pre-test, followed by listening to the selected music for 10 minutes and were then administered a mathematics post-test. Results indicated an increase in their score.

According to **Carma Haley Shoemaker**, music lessons enhance the links between the brain neurons and thus build new spatial reasoning says psychologists “Francis Rauscher” at the University of California- Irvine.
Cockerton et al (1997), through their research proved that background music facilitates the cognitive processes and that just passive listening to music can help to improve the cognitive performance.

Denie Riggs states that music study facilitates higher brain functions required for reading, mathematics, chess, science and engineering. Music helps to enhance the creative skills of an individual.

Dr George Lozanov invented a technique to teach foreign languages in a very short span of time. Using his technique, students learnt about one half of the vocabulary and phrases for the whole school term (which would come up to about 1,000 words or phrases in a day). Dr. Lozanov's technique used classical music from the baroque period which has a 60 beats per minute pattern. He showed that foreign languages could be learnt with 85-100% efficiency in only 30 days with the help of these baroque pieces. His students had a recall accuracy rate of almost 100% even after not reviewing the material for 4 years.

Research done by Dr K. A. Adalarasu et al (2011) proved that music affects the body and the mind. It positively influences the hormones and enhances concentration, enabling the brain to store more amount of information in a very short span of time, thus helping to boost the cognitive skills. Studies show that silence between the two musical notes triggers the brain cells and also the neurons that are responsible for the development of sharper memory.

Dr Laurel Trainor showed how music enables us to alter the brain responses in young children. Children taking music lessons showed improvement on the general memory skills such as literacy, verbal memory, visual spatial processing, mathematics and IQ as compared to those children who did not take music lessons.
In a study on cognitive content drawing of children, Gur (2009) stated that classical music has a positive impact on the cognitive ability in children.

Hallen, Price and Katsarou (2002) suggest that calming music has a better effect on the arithmetic and memory task performance of children as compared to non-music condition.

Kazan, Casey (2008) claimed that music has a tremendous effect on memory than images, words or fragrances. Results proved that more familiar the music helped to generate better memories. It was also found that the more pleasing a song is to a person, the better and faster is the recall.

Liapis, Giddens and Uhlenlorok (2008) examined the impact of lyrical and non-lyrical music on reading comprehension. Participants were divided into two groups. Each group was made to read the same comprehension under two different musical conditions: one group while listening to a song with lyrics (lyrical condition) and the other while listening to the same song without lyrics (non-lyrics condition). It was proved that participants in the non-lyrics condition obtained higher scores than those in the lyrical condition.

Lutz Jancke stated that music helps to evoke strong emotions which in turn enhance the memory processes. Music creates memories about episodes and information associated with a particular kind of music. It has been found that memories and emotions are often evoked while listening to musical pieces from one’s past.

Matanane, Justin.M. examined the effect of rhythm and tempo on recall. He wanted to find out if students could study better with or without music. Two different tempos of music were used. He proved that listening to music while studying helped the students to retain more information.
Merrell (2004) asserts that some sound frequencies have a positive impact on certain parts of the brain, leading to soothing effects to the students. The music that was played in the classroom brought about changes in body temperature, blood pressure, breathing rate and pulse rate of the students. Music made the children more calm and more obliging. Thus he believes that music can decrease the levels of anxiety and inhibition in learners.

Mora states that a child can imitate the rhythm and musical contours of a language much before he can actually speak words.

A Study conducted by Nasser Rashidi and Farman Fahan, on Iranian students in an English institute in Iran, to examine the effects of classical music (Mozart Sonata) on the reading comprehension. The students were divided into two groups, over a period of 3 months. The experimental group was taught reading comprehension with music in the background and the other group had no music played in the background. The results proved that the group that was taught reading comprehension with a music background outperformed as compared to the group that was taught with no music in the background.

Nina Kraus claims that music leads to several changes in the auditory system. Music training enables us to improve certain memory capacities such as the musicians show improvement in auditory visual memory and auditory attention, but not in visual memory and visual attention.

O’Donnell, Laurence conducted research on music and the brain. The article emphasized on the power of music on learning and memory. It was observed that people who study music are higher achievers than those who aren’t in music. It includes the fact that Hungary, Japan and Netherlands, the top three countries in the world, all place a great emphasis on music education and also participation in music.
Palxi Del Campo (1997), a Spanish music therapist, claims that in any oral interaction only 15% of the information corresponds to verbal language, while 70% of the message is generally through body language and the final 15% is the intonation, the musical character of language.

Ramos et al recorded the electrical activity of the left and right central, temporal and parital cortex, in 14 amateurs of classical music during silence, pleasant (a piece of music) and unpleasant (recording of an infant crying) stimulations. The theta relative power was found to be comparatively higher while listening to music and lower during crying. Beta relative power did not change across the conditions. No change was found in the inter-hemispheric correlations.

Rauscher et al (1993), examined the effect of music (Mozart Sonata) on the IQ of college students. It was found that the students who were exposed to 10 minutes of Mozart Sonata scored higher on spatial-temporal reasoning tasks.

In a similar study conducted by Rauscher et al (1998), Mozart music made rats complete the maze much faster and with fewer errors. This proves that classical music not only helps humans, but even rats to enhance their performance.

Regina Richards proves that music, rhythm and movement provide a link between the right brain’s processing of music and rhythm and the left brain’s processing of verbal information.

Retallack conducted a similar study on plants. He found that the plants exposed to soothing music grew more abundantly and were found to be extremely healthy.

Sara Kirkweg conducted an experiment to study the effects of music on memory. 60 subjects were exposed to three different conditions: the Season’s ie: Spring Movement by Haydn, the Holier Thou by Metallica and the White Noise. Each group was made to study a picture for 30 seconds with the specific music in the
background. It was found that in the white noise group least errors were made, while the Holier Thou group made more errors. The results obtained in this experiment contradicted a lot of research done on the effects of music and memory, for instance, it was found that the noise outside the testing area was not controlled. Besides the subjects were also talking to each other about the questionnaire while filling it up.

In a study by Schellenberg (2004), two groups of students were given two different lessons ie: music lessons and drama lessons. Before conducting the experiment, the IQ of the two groups was measured. After the music and drama lessons, when the IQ was measured again, the music group scored higher on IQ as compared to the drama group.

According to Stansell (2005), music therapists use both types of music: music to soothe or music to arouse and energize) in order to relieve different typed of psychological and physiological stressors.

Wetter et al (2009) showed that music training improves school performance. He found that students who study music have overall higher grades in every aspect except for sports. It was also found that students who did not study music received comparatively lower grades. Since studying music involves a lot of repetition and memorization, this activity in the brain may be transferred to the ability to memorize the information in school and thus receive higher grades.

In 1982, researchers from the University of North Texas performed a three-way test on post-graduate students to find out if music could help to memorize vocabulary words. The students were divided into three groups. Each group was given three tests-a pre-test, a post-test and another test a week after the first two tests. All the tests were identical. Group 1 had to read the words with the ‘Handel's Water Music’ in the background. They were also asked to imagine the words. Group 2 was made to read the same words with ‘Handel’s Water Music’ in the background, but were not asked to imagine the words. Group 3 had to only read the words. They were not
given any background music, nor were asked to imagine the words. The results from the first two tests showed that Group 1 and Group 2 had higher scores than Group 3. The results from the third test, taken a week later, indicated that Group 1 performed much better than Groups 2 and 3.

In an experiment, conducted at the University of California, at Irvine (1993), researchers asked the college students to listen for 10 minutes to either Mozart’s Music or a relaxation tape or silence. After 10 minutes of music or silence, the students were given a spatial reasoning test from the Stanford-Binet Intelligence Scale. It was observed that after listening to the Mozart tape the students scored much higher as compared to those listening either to the relaxation tape or silence. Researchers thus believed that memory improved because music and spatial reasoning, both tend to share the same pathways in the brain.

In 1996, the College Entrance Exam Board Service conducted a study on all the students appearing for their SAT exams. It was found that students who sang or played any musical instrument scored 51 points higher on verbal position and an average of 39 points higher on mathematics.

Research has proved that background music in itself is not a part of the learning process. It does not enter into memory along with the information that has been learnt. Recall is better when the same music used for learning, is used during recall. Also, tempo appears to be a key component and thus music has a tremendous effect on memory.

In another study to investigate how music improves memory and performance, it was found that Mozart’s music and baroque music with a 60 beat per minute pattern activates the left and the right hemispheres of the brain. The simultaneous left and right brain action maximizes learning and retention of information. Thus listening to music facilitates the recall of information.
According the Centre for New Discoveries in Learning, it was found that an individual's potential to learn can be enhanced to a minimum of 5 times by using this 60 beats per minute music.

**MUSIC AS A TECHNIQUE TO HELP CHILDREN WITH LEARNING DISABILITIES.**

Jenny Macmillan states that music is highly beneficial for dyslexic children. Music lessons have a positive effect on the various areas of academic achievement. Children with learning difficulties who learn music show both: cognitive as well as emotional development, improvement in co-ordination, language, concentration, attention and memory.

Register, Standly and Swedberg (2007) proved that music enables us to enhance the reading skills of students who have reading disabilities.

Another research also showed that music can aid children with learning disabilities. The study proved that music provides a soothing effect, which helps in relaxation. The lyrics in music can increase the child's vocabulary and help with speech. Songs can be used that incorporate academic lessons in music so that children will find the learning process more interesting, enjoyable and easier.

**MUSIC CAN HELP SLOW LEARNERS TO MEMORIZE BETTER.**

Music therapy is a time tested technique, especially to help children with special needs or even for slow learners.

Dr. P. K. Partheeban, Director of the Swabhimaan Trust in Chennai, explains that people with special needs have disturbed body-mind-soul relationships, which need to be strengthened through the introduction of rhythm into their lives. Rhythmic music that goes in conjunction to their heartbeat can be really soothing and rejuvenating. Good rhythmic music, whether it's drums, guitar, flute or veena, helps to stimulate the mind.
Dr. T. Mythily, a trained classical vocalist, cognitive neuropsychologist and music therapist at Apollo Hospitals, Chennai, has done extensive research on music therapy. Music therapy enables behavioural changes in autistic children, and also helps slow learners to enhance their concentration, creativity and intellect. She says that active music therapy helps decrease hyperactivity over a period of time, and improve fluency in those with speech difficulties. It also facilitates verbal memory (by listening to lyrics) and stimulates imagination.

WHAT IS CONCENTRATION?
Research has proved certain techniques used to enhance concentration skills can help to enhance performance on a particular task.

A) Mudras.
‘Mudras’ is one of the techniques that aids to enhance performance. The director (the Achaya) of the Vivekanand Yogashram in Delhi states that there is a tremendous flow of energy in our hands. Each of our fingers represent one of the five elements. The thumb is ‘agni’ or ‘fire’, the forefinger is ‘vayu’ or ‘air’, the middle -finger stands for ‘akash’ or ‘ether/sky’, the ring-finger is ‘prithvi’ or ‘earth’ and the little finger represents ‘jal’ or ‘water’. An imbalance in any of these elements is the root cause of all the problems or ailments. This can be corrected with the help of ‘mudras’.

In another study, Ramesh Shah claims that there is no fixed or essential posture to practice ‘mudras’. They could be performed either by standing, sitting or even while walking.

CONCENTRATION, MEMORY AND ACADEMIC PERFORMANCE.
Jeffrey Gitterman states that everything in this world is made of energy. The more tuned in you are to this source of energy in the universe, the more you can actually accomplish in life. The benefit of learning to disengage your attention through meditation and concentration techniques, from our thought stream, is that we can
apply our minds more readily towards more constructive things such as accomplishing one's tasks and goals in life.

In order to improve memory and performance Pat Wyman states that we can make use of stress buster techniques. Making use of meditation or relaxation techniques can help to boost memory processes. Certain concentration techniques can also be used to add to improved performance.

**MUSIC AND CONCENTRATION TOGETHER INFLUENCE ACADEMIC PERFORMANCE.**

According to Dr T. Mythily, music aids to enhance concentration and memory. The swaras/notes of the selected ragas are played in such that they activate the potential chemical agent. There are a number of chemical substances involved in the memory molecule. The ragas enable us to activate the neural circuit and enhance the concentration of the individual.