

Evaluating The Academic Enhancement and Curricular Development of Students Using Brain Stamina® to Meliorate Cognitive Skills and Learning Abilities

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Abstract— Cognitive Abilities play an extremely vital role in the overall enhancement of learning abilities ergo creating a ripple effect on the academic performance of a child. Brain Stamina® is an Cognitive Brain Enhancement Interactive Animation Software which is designed to develop 45 Identifiable Cognitive Abilities utilised by children while acquiring knowledge in schooling system worldwide. In this research we have identified a target group of 457 Students in Madhya Pradesh who have experienced Brain Stamina® over a year and try and co-relate their academic achievements pre and post program.

Index Terms— Psychology, Cognitive Abilities, Testing, Evaluation, Learning Adaptability, Education, Education India, Academic Development Tools, Learning Enabling Softwares, Early Education Enablers.

I. INTRODUCTION

Cognitive Abilities is an extremely complex concept in Psychology and has been recently dealt with in greater depth by researches across the World. Cognitive Abilities as defined by Iranian School Dr. Mahmoud Talkhabi and Dr. Ali Nouri of Tehran University, Iran have defined cognitive abilities in their 2011 International Paper presented at 4th International Conference of Cognitive Sciences 2011 as “Cognitive education may be defined as an approach to education that is based on cognitive science studies (mind and brain researches) and focused upon acquiring, developing, and applying cognitive processes to realize qualified learning. Historically, cognitive education is most pronouncedly expressed in the writings of great thinkers such as Jan Piaget, Leo Vigotsky, Jerome Bruner and the large group of their followers. However, the current approach principally lies in the intersection of mind/brain and education studies, and some institutions around the world, including in Iran, have established cognitive education departments for a better understanding of learning

and teaching in order to design and develop more effective educational programs and policies. In addition, there are some special journals (e.g., *Journal of Cognitive Education and Psychology*, and *Journal of Mind, Brain, and Education*) that support publishing studies related to cognitive education. Methodologically, cognitive education is a wide field embracing a rich variety of different methodologies, from laboratory experimental methods to qualitative methods. As the field is highly interdisciplinary, research often cuts across multiple areas of study, drawing on research methods from psychology, neuroscience, linguistic, artificial intelligence, and philosophy. While cognitive education has its specific concepts, tenets, history and methodology, it is a multidisciplinary field which supported by cognitive science foundation. Although cognitive education nourished from other cognitive sciences (such as neuroscience, psychology, philosophy of mind, linguistic, and artificial intelligence), cognitive education has some implications and applications for cognitive sciences too. It means that a full understanding of mind requires attention to all of these multiple-interrelated facets and it is certainly obvious that cognitive education has posed questions about how minds actually work.

Hence, cognitive science could in principle, and in practice, improve our understandings of brain, mind, and learning, and the education profession could benefit from embracing rather than ignoring cognitive sciences. Consequently, educators should be actively contributing to the research agenda of future cognitive science research. It could be hoped that this article to be considered as a primary step in this way, since to reach an inclusive overview, firstly, it should be reviewed and deducted some important aspects in cognitive education such as its conceptual definition, historical development, research methodology and its relationship with cognitive science.”

Academic performance can be important for a child. Better academic performance may open doors for academic success later in life and for a better education. This is why it is important to understand what factors may contribute to a good

academic performance. One of these factors is developed cognitive skills

One of the most comprehensive research ever conducted on the impact of Cognitive Brain Development on Academic Achievements was by Dr. J P Guilford whose Theory of Intellect has played pivotal role in shaping the current studies being conducted in the field of cognitive education. Dr. Greg Wallace, PhD, Psychology one of the students of Dr. Guilford later developed and implemented an advanced learning assessment and intervention tool specially designed students aged 7 to 19 known as Brain Stamina ® designed to augment their cognitive abilities.

Cognitive skills are important both for school and for life. People with better cognitive skills tend to find it easier to face different cognitive tasks and tend to have a better ability for doing school-related tasks. Children who have better skills, like memory, learning, attention, and others tend to do better in school. In recent years, traditional education and cognitive skills training has been supplemented more and more by digital education. Games, programs, and apps are being used more and more to help children develop sustainable cognitive skills

Brain Stamina ® is a interactive animation program designed to assist regular learners to enhance their learning abilities and develop a holistic learning approach.

II. OBJECTIVES OF THIS PAPER

The core objective of this paper is evaluate and meliorate the academic progress of students who have undergone the Brain Stamina ® Program comparing their performance improvements as against their previous track record in New Siddharth Public School (NSPS), Indore, Madhya Pradesh.

The objectives of the paper are:

- To analyze the effectiveness of The Brain Stamina Program
- To evaluate the benefits derived by the Students
- To evaluate the impact on academic performance
- To analyze student satisfaction and parental response to the Program

III. COGNITIVE EDUCATION IN SCHOOLS

Cognitive Education is largely a neglected area and schools either CBSE, ICSE or State Boards aren't able to provide

justifiable time to assist students develop their cognitive faculties.

Cognitive skills are the core skills the brain uses to process information, learn, remember, and focus. It involves processes that are used every day and that play a big role in a formal learning process too. There are different cognitive skills. Some of these are associated with attention, like selective and sustained attention. Selective attention allows an individual to focus on a task without paying attention to the distractions, while sustained attention is associated with the ability to stay focused for a significant period of time. Cognitive skills are associated with memory too. There is long-term memory, which allows people to recall events and ideas, and working memory, which allows someone to keep in mind the things they are working with while they are using them. Another skill is processing speed that determines how quickly the person can perform tasks.

A study done with over one thousand 8th grade students found that cognitive skills predicted academic performance. The study also found that schools did not improve cognitive skills, although they could improve academic performance (Finn et al., 2014). Another study considered working memory and attention control and their link to emergent literacy and numeracy in pre-kindergarten children. The study found that working memory and attention control predicted the development of these skills and the achievements the children showed upon entering kindergarten. Cognitive skills were found to contribute significantly to academic learning from an early age (Welsh et al., 2010).

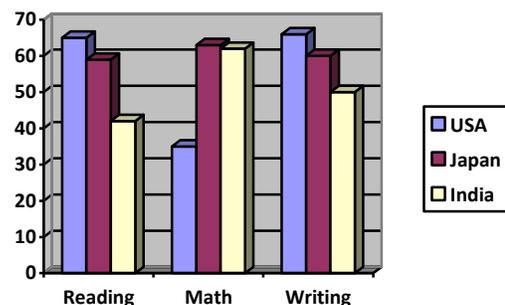


Figure 1: Performance of Students in Vital Academic Parameters

Source: Welsh et al. (2010).

Cognitive Skills and Academic learning. Glasgow

A recent study conducted by Psychologists across G-20 Nations has concluded that countries that have invested on formative education in terms of developing of cognitive skills have witnessed sustained growth in the overall development of

the child's faculties. While US & Japan featured at the top of the list on almost all parameters, India only managed to match Japan in Math Skills trailing everywhere else. For instance Reading and Writing skills which form the crux of long term education lacked in almost 75% students in NSPS as compared to US or Japan standards pre Brain Stamina®. Enhancement in Reading and Writing skills being the expected outcome or measure of achievement which would be witnessed in the academic growth however to essentially develop Reading and Writing Skills, cognitive skills like Visual Comprehension (VC), Visual Sustained Attention (VSA) need to be developed. Measuring the students opting for Brain Stamina® Program Post-Program evaluation of their Reading and Writing Skills showed a remarkable 45% increase as compared to their previous levels.

EVALUATION OF BRAIN STAMINA® IMPACT IN NSPS SCHOOL PRE AND POST PROGRAM

A recently conducted study explored the use of the iPad and other computer devices to enhance literacy skills. It was done with around 60 children. The study showed that the use of the iPad helped enhance the development of literacy skills in children. The use of technology could also promote social interaction that contributed to the learning (Oladunjoye, 2013).

Brain Stamina® is a Computer Aided Cognitive Skills Development Program aimed at augmenting 45 Key Cognitive Skills of a child to enable whole brain development. Key Skills that are said to be developed in students undergoing the program include:

SR.NO	FACULTIES	COGNITIVE SKILLS
1	ATTENTION	FLEXIBLE ATTENTION, DIVIDED ATTENTION
2	MEMORY	SHORT TERM MEMORY, LONG TERM MEMORY
3	THINKING	PROBLEM SOLVING, STRATEGIC THINKING
4	VISUAL	DIRECTIONALITY, VISUALISATION
5	AUDITORY	AUDITORY SEQUENCING, AUDITORY PROCESSING SPEED
6	KINESTHETIC	TIMING, MOTOR INTEGRATION

Chart 1: Key Faculties and Cognitive Skills Developed by Brain Stamina®

Source: Dr. Greg Wallace et al. (2017). Brain Stamina® Program Module

Designed by renowned Psychologist Dr. Greg Wallace (PhD Psychology) and Dr. Yi Ling (PhD Psychology) specifically with an objective of helping students develop their cognitive skills at home or at school without the need for a

psychologist or a cognitive skills expert. The program works on 45 Key Cognitive Skills divided amongst 6 Faculties in a Gamified Format having thousand's of algorithm based question for the kids to unravel. This program was specifically designed for Brain Stamina® India which is a India Based Educational Software Enterprise.

NSPS had agreed for the pilot program for implementation of Brain Stamina® in its' school for students between 4th Standard to 7th Standard. The participants were as under:

SR.NO	STANDARD	TOTAL	BOYS	GIRLS
1	III	102	73	29
2	IV	107	67	40
3	V	96	49	47
4	VI	80	53	27
5	VII	72	46	26
TOTAL		457	288	169

Figure 2: Students undergoing Brain Stamina® in NSPS Indore, Madhya Pradesh

Source: NSPS, Indore (2017).

Brain Stamina® Program Module

The students were monitored before, during and after the program on academic as well as cognitive parameter's to evaluate their progress.

IV. IMPACT OF BRAIN STAMINA® PROGRAM ON ACADEMIC PERFORMANCE

Introduced in May 2016 the Program was executed for a complete academic year for 457 students who witnessed sustained development of their cognitive skills. Some of the notable findings of the pilot were:

- Increment in Academic Scoring 5%* to 10%*
- Increased Interest in Studies by 90%*
- Increased Retention across students by 60%*
- Increase in Alertness & Focus by 85%*

The most impressive finding of the program was the increment in academic scoring of students with an average increment noted as under:

SR.NO	STANDARD	TOTAL	AVERAGE INCREASE IN ACADEMIC SCORES
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Source: NSPS, Indore (2017).

Brain Stamina® Program Module

1	BOYS	288	6.2%
2	GIRLS	169	7.4%

Figure 3: Increment in Student Academic Score for students using Brain Stamina®
Source: NSPS, Indore (2017).
Brain Stamina® Program Module

Having conducted a pre and post program evaluation of the student using the Linkert Scale of Satisfaction to measure non-quantifiable response of students on following parameters were recorded:

- Alertness
- Focus & Concentration
- Interest

Was recorded and the findings are graphically represented as under:

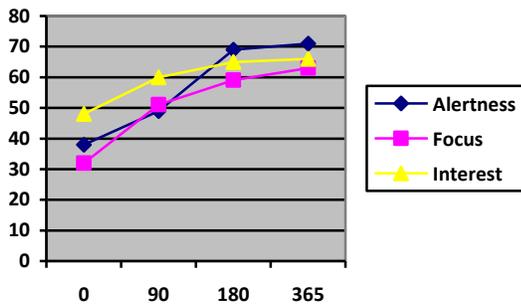
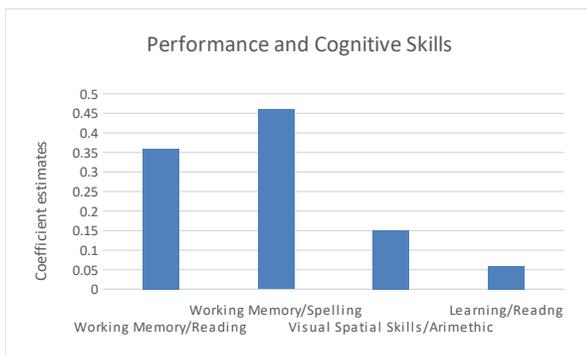


Chart 2: Satisfaction Survey of Students using Brain Stamina® on Linkert Chart
Source: NSPS, Indore (2017).
Brain Stamina® Program Module



On the vital cognitive parameters the students fared as under:

Chart 3: Vital Cognitive Skills Evaluation Matrix

Overall, there is significant evidence to suggest that cognitive skills predict academic performance. Specific skills are associated with better performance at different ages and even in cases where overall brain function has been affected. Cognitive skills can predict performance in relation to math skills or reading in younger children.

On a similar framework, A study done in Ghana found that those children who used the computer and the Internet showed gains in cognitive skills, such as memory, spatial and logical problem solving, abstraction, comprehension, critical thinking, and concentration. The Internet could provide knowledge and promote language and literacy development. Computer games, especially puzzle-solving and adventure games, contributed to learning and better skills (Quarshie, 2012).

V. CONCLUSION

The Brain Stamina® Program has considerably contributed to the overall Brain Development of the Child. Children, Teachers and Parents have unanimously shared a similar opinion.

A internal survey of Teachers (53), concluded that 89% Teachers were extremely delighted with the results, 96% agreed that programs such as Brain Stamina® should be included in modern day schooling; echoing a similar sentiment Parents who agreed to be a part of the survey (269) of which 97% agreed that they saw visible improvement in attention span of their child with respect to academics, 100% agreed that they believe Brain Stamina® has helped their child increase his academic scoring and every single parent surveyed reinforced need for program's like Brain Stamina® to complement modern day schooling.

Overall, there is significant evidence to suggest that cognitive skills predict academic performance. Specific skills are associated with better performance at different ages and even in cases where overall brain function has been affected. Cognitive skills can predict performance in relation to math skills or reading in younger children, but are also associated with performance in adolescents. Cognitive skills appear to help significantly throughout an individual's life. This suggests that cognitive skills are associated with academic performance as seen in specific aspects, like reading, and with standardized test scores. Developing cognitive skills can be a way to improve academic performance and enhance the child's academic experience.

While some research has linked video games to negative outcomes, like aggression, there is also research to suggest that video games in general, not just educational games, can also

contribute to cognitive skills development. Games could contribute to specific skills, like reasoning and memorization, which could make them beneficial. Games tend to increase motivational aspects as well, so schoolchildren might feel more motivated to play a game that enhances learning. In addition to this, specially designed video games are often used for learning and training in different areas, suggesting they can be used as teaching tools in addition to having positive effects on cognitive skills (Rebetz, & Betrancourt, 2007). Even action video games have been associated with cognitive benefits. Figure 1 shows the results of a visual attention task. Action video game players outperformed the non-action video game players (the first two columns) and people who received action video game training showed significant improvements in the visual attention task (Eichenbaum, Bavelier, & Green, 2014).

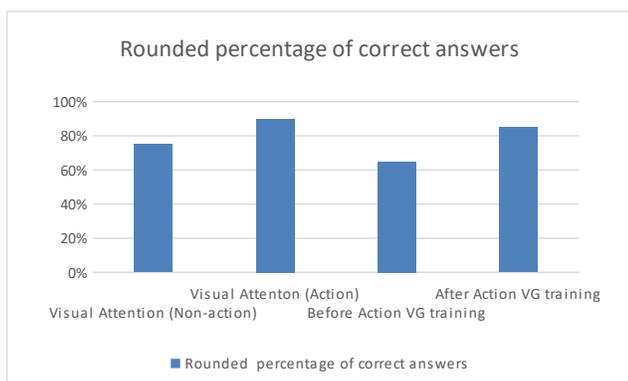


Chart 4: Impact of Video Games on Visual Attention
Source: (Eichenbaum, Bavelier, & Green, 2014).
Brain Stamina® Program Module

Literature shows that video games can work as learning tools for cognitive skills even if they were not made with that goal in mind. Video games, even commercial ones, have been found to enhance cognitive skills. Some of these involve sustained attention, visual selective attention, cognitive flexibility, and others (Eichenbaum, Bavelier, & Green, 2014). Overall, there is strong evidence to suggest that children can benefit from software and games that are meant to help develop cognitive skills. Results of software-based interventions have been successful, and, additionally, even commercial games can have positive effects on cognitive skills, suggesting that educational games can also have a positive effect on cognitive skills.

In conclusive we believe that Cognitive Brain Development plays an extremely important role in overall brain development

of the child to comprehend and assimilate today's schooling and real life needs. Brain Stamina® is a revolutionary tool which acts as a real time facilitator for school's, teacher's, parent's and educator's to assist students augment and develop their core cognitive skills. Developing these skills at the right age that is before completion of schooling (12th Standard in India) would have a sustained positive impact in the overall learning adaptability of the child. The real world situations and the increased academic pressure on children necessitates use of such modern age tools to meliorate learning styles and ensure that children learn and more importantly enjoy learning. The gamified format of Brain Stamina® has resulted in children not only enjoying the format but sub-consciously developing their latent cognitive skills. Development of these 45 Key Cognitive Skills has a ripple effect on the remaining 105 Skills which are dependent in nature and have residual incremental effect thereof as well. Proper Implementation of Brain Stamina® is definitely going to help the child score more academically while simultaneously ensuring sustained cognitive brain development.

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