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Effectiveness of Brain Gym Activities in Enhancing Writing Performance of Grade I Pupils

ABSTRACT: *There are many factors that influence academic performance of students. Some of these are related to personological, sociological, and psychological factors. In recent years, academic achievement and performance have been linked to several psychological factors. Two of these psychological factors, that may have direct impact or influence to academic performance, are curiosity and epistemological beliefs. In this study, the organization and legibility of the subjects' writing before and after the use of Brain Gym activities were described. The pre-experimental design, specifically the One Group Pre-test – Post-test, was utilized to examine the grade 1 pupils' writing performance in the areas of length of output. The respondents were composed of 4 pupils, who have a variety of writing concerns, ranging from getting started, organization, attention to details, and producing sufficient output or length of writing. It was concluded that Brain Gym, a movement-based learning exercise, was an effective activity for enhancing grade 1 pupils' writing concerns, specifically in terms of neatness, legibility, writing on and following blue-red-blue lines as well as correct spacing between letters and words. Pupils under the Brain Gym conditions tended to write more words. Brain Gym exercises brought excitement, cheerfulness, and relaxed mood among pupils. It is recommended that time be allotted for the use of Brain Gym exercises, due to it can be utilized as unfreezing activity for enhancement of writing performance among pupils.*

KEY WORD: Brain Gym; Writing Performance; Legibility; Length of Output; Organization; Writing Concerns.

RESUME: *"Efektivitas Kegiatan Senam Otak dalam Meningkatkan Kinerja Menulis Siswa Kelas I". Ada banyak faktor yang mempengaruhi prestasi akademik siswa. Beberapa di antaranya berkaitan dengan faktor personologis, sosiologis, dan psikologis. Dalam beberapa tahun terakhir, prestasi dan kinerja akademik telah dikaitkan dengan beberapa faktor psikologis. Dua faktor psikologis ini, yang mungkin berdampak langsung atau berpengaruh pada kinerja akademis, adalah keingintahuan dan kepercayaan epistemologis. Dalam penelitian ini, organisasi dan keterbacaan tulisan subjek sebelum dan sesudah penggunaan kegiatan Senam Otak dijelaskan. Desain pra-eksperimental, khususnya Pre-test – Post-test Satu Grup, digunakan untuk menguji kinerja tulis murid kelas 1 di bidang panjang dan luaran. Responden terdiri dari 4 siswa, yang memiliki berbagai masalah menulis, mulai dari persiapan, pengorganisasian, perhatian terhadap perincian, dan menghasilkan luaran atau lama penulisan yang cukup. Disimpulkan bahwa Senam Otak, sebuah gerakan berbasis pembelajaran, adalah kegiatan yang efektif untuk meningkatkan perhatian siswa kelas 1, khususnya dalam hal kerapian, keterbacaan, penulisan dan garis biru-merah-biru berurutan, dan jarak antara huruf dan kata yang benar. Siswa di bawah kondisi Senam Otak cenderung untuk menulis lebih banyak kata. Latihan Senam Otak membawa kegembiraan, keceriaan, dan suasana santai di kalangan siswa. Dianjurkan agar waktu diberikan untuk penggunaan latihan Senam Otak ini, sebab ianya dapat dimanfaatkan sebagai aktivitas tanpa henti untuk meningkatkan kinerja menulis di kalangan siswa.*

KATA KUNCI: Senam Otak; Kinerja Menulis; Keterbacaan; Panjang Luaran; Organisasi; Perihal Menulis.

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INTRODUCTION

The study sought to find out the distinct difference between the pupils' writing performance in the areas of length of output, organization, and legibility before and after the use of Brain Gym activities. To determine which students were appropriate for this study, the entire class participated in the ELA (English Language Aptitude) session. This activity was completed to set the standard for the students' listening skills, organizational skills, as well as written expression. Depending on the results, a suitable study group of 4 students were selected. Participants in the study were students who encountered difficulties in writing, ranging from getting started, organization, attention to details, and producing sufficient output or length of writing.

Using the *Brain Gym: Teacher's Edition*, the researchers had to devise a list of Brain Gym movement choices that were thought to support the above mentioned skill areas (Dennison & Dennison, 1994; and Twomey, 2002). A schedule was set up to teach these students the chosen Brain Gym activities. It was made clear among students that the benefit of using the Brain Gym activities was to reinforce their competence in writing and listening (Watson & Kelso, 2014).

Conceptual Framework. There are many factors that influence academic performance of students. Some of these are related to personological, sociological, and psychological factors. In recent years, academic achievement and performance have been linked to several psychological factors. Two of these psychological factors, that may have direct impact or influence to academic performance, are curiosity and epistemological beliefs (Belecina & Ocampo, Jr., 2016). Curiosity or psychological in nature, there have been questions on whether or not Brain Gym really makes sense (Stephenson, Carter & Wheldall, 2007).

Even in simple motor activities, the Brain Gym exercises have been tested. In fact, there was a finding that Brain Gym intervention did not have significant effect on throwing performance (Maskell, Shapiro

& Ridley, 2004). Some studies, however, revealed that Brain Gym exercise produced a significant effect on the performance of some instrumentalists, when they were playing their musical instruments. They felt the positive effect after they were coached and afterwards used the Brain Gym movements (Moore & Hibbert, 2005). Core skills, such as those in reading, writing, and arithmetic, are considered vital to every individual.

Along this line, a school as an institution is always expected to address issues that surround these skills. Moreover, when it comes to Arithmetic, J. Tagle, R. Belecina & J. Ocampo, Jr. (2016) opined that students and teachers need to appreciate that there can be a number of ways to visualize a problem, as well as number of ways to solve a problem non-visually (Tagle, Belecina & Ocampo, Jr., 2016). Some students might benefit from visualization more than others. Sometimes, students resist using visual models, when a solution is readily apparent to them.

P. Formosa (2009) said that there are many students who may easily receive information through the use of their senses, but they face various challenges in translating what they have in mind into written difficulties related to attention, focusing on test, comprehension, and spelling (Formosa, 2009).

In a study conducted by P. Klein (1999) and S. Graham & M.A. Hebert (2010), when students were pre and post tested through writing, a review and comparison showed that a distinct difference existed between the students' written expression and organization, particularly on note taking sections, spacing, and the way the left margin was used (Klein, 1999; and Graham & Hebert, 2010). The Brain Gym exercises could have brought positive change on their vision. Likewise, the exercises could have facilitated the capacity of the students to utilize their skills for listening; hence, improved their attention to details for the easy retrieval of information from their memory (Dexter, 1999). This equipped them with skills to recall more facts

and, therefore, enabled them to include more details on their activities in writing (Surburg & Eason, 1999). Because of Brain Gym movements, the learners experienced relaxing effect (Koestner, 2000); and they gained confidence in composing and expressing information.

In one of her studies, in which 218 school children participated, D. Hornbeak (2007) found out that the auditory limited profile represents an average of approximately 52% of the population. These are the students, who encountered listening difficulties (Hornbeak, 2007). Despite this reality, the traditional method of teaching, which is basically lecturing, remains the preference of many teachers. This suggests that half of the class would tend to suffer from not learning at all, because they are required to listen (*cf* Hornbeak, 2007; and Wolf & Stoodley, 2007).

Another point of underestimating the role of movements that would certainly improve learning is the fact that, as new technology becomes more popular, more parents continue to follow the lead of believing that their children, even at pre-school age, are being left to develop their skills for reading and arithmetic through the aid of computers. Jose M. Ocampo, Jr. (2015) said that Filipinos nowadays, even before turning 2 years old, are already engrossed using computer tablets or cellular phones (Ocampo, Jr., 2015).

For gadgets symbolize as a product of advanced knowledge, many parents may also think that these children would also gain academic prowess through them. J. Healy (1998) reviewed hundreds of studies on how computers could influence the education of young children. It was concluded that computers do not offer promising results to six years old or even younger children. She viewed, further, that computer applications are designed to limit their social interaction and creativity (Healy, 1998). Various studies were also used for meta-analysis just to find out the association between physical activity and cognitive function (Sibley & Etnier, 2003; and Pinilla & Hillman, 2014).

It was concluded that the positive relationship between the variables earlier stated were very much evident among children, particularly those in Grades 6-8 or 11-13 years old and younger (CDCP, 2010). Elucidating this further, a positive correlation existed between the time allocation for physical activity and time spent for reading. Teachers, therefore, should be very instrumental from encouraging learners to make a lot of movements in the classroom in order to maintain or regain concentration (Feldman, 2003; and Sibley & Etnier, 2003).

Brain Gym exercises can be introduced during regular classes. M. Ozar (2013) recommended that teachers as well as students can be given physical activities and brain gym exercises. If needed, experts in the field can be consulted for the proper conduct of the said exercise (Ozar, 2013). The Brain Gym activities can be considered whether in regular school curriculum or pre-service teacher education curriculum. This is in addition to what students usually do, whenever they participate in various sport and leisure activities (Hughes *et al.*, 2009).

Statement of the Problem. Specifically, it answered the following questions: (1) What is the pupils' writing performance in the areas of organization and legibility before and after the use of Brain Gym activities?; (2) What is the pupils' writing performance in the areas of length of output before and after the use of Brain Gym activities?; and (3) Is there a significant difference between the pupils' writing performance in the area of length of output before and after the use of Brain Gym activities?

Definition of Terms. To clarify the content of the words used in the study, the following terms are operationally defined:

Brain Gym Activities: these are the WBCH (Water, Brain buttons, Cross crawls, Hook-ups) and six additional movements, such as lazy 8s, the energy yawn, the owl, the thinking cap, the positive points, and the gravity glider which were employed for 10 meetings before the actual lessons started. The movements were taken from the *Brain Gym: Teacher's Edition* (Dennison &

Dennison, 1994).

Legibility: this is the degree or extent that the words or sentences written by pupils can be read or understood.

Length of Output: these are words or sentences which are correctly recalled, composed, or written by pupils and measured in number of minutes.

Organization: this refers to the pupils' note taking performance in terms of spacing, utilization of the left and right margins, the use of small and capital letters, as well as how the ideas are arranged in order.

Writing Concerns: this pertains to the pupils' difficulties starting from when and what to write, and producing concrete output of thoughts shown through writing.

Writing Performance: it is the manifestation of pupils' writing skills based on its legibility, organization, and length of output.

METHOD

A formal letter was sent to the principal and concerned teachers of the PNU (Philippine Normal University) Institute of Teaching and Learning asking their permission for the conduct of the study. The researchers also sought permission from the parents to allow the participation of their children in the experiment.

To determine who among the students were appropriate for this study, the entire class participated in the ELA (English Language Aptitude) session. This activity was completed to set the standard for the students' listening skills, organizational skills, as well as written expression. The pupils were all excited when they participated in the administration of the test (Anton & Lillibridge, 1995; Pollard *et al.*, 2000; Guay *et al.*, 2008; and Connors *et al.*, 2009).¹

However, there were pupils who took longer time to complete the test. Based on the observed behavior and test results, a suitable study group of 4 out of 35

pupils was selected. The 4 pupils were considered as those who have a variety of writing concerns, ranging from getting started, organization, attention to details, and producing sufficient output or length of writing.

The organization and legibility before and after the use of Brain Gym activities were described and compared. In the area of length of output, the researchers utilized the pre-experimental design (Shadish, Cook & Campbell, 2002; and Smith, 2013), specifically the One Group Pre-test - Post-test also known as $O_1 \times O_2$, where O_1 = Pre-test, X = Treatment, and O_2 = Post-test. The Brain Gym movement, WBCH (Water/Brain buttons/Cross crawls/Hook-ups), and 6 additional movements served as treatment or independent variable.

Data gathering procedure are, firstly, *Teacher's Training*. The teacher who handled the Reading subject was trained by the researchers on how and when to use WBCH and 6 additional movements. Secondly, *Dry-run of the Study*. Prior to the actual collection of data, a dry-run was conducted to some pupils other than the respondents. This served as the venue for the drill of the Brain Gym movements.

The flow of activities was conducted in order to have an advanced sight on how the actual experiment would take place. Potential problems, which might occur during the actual study, were identified and addressed at this stage. According to the class adviser, she first thought it would be easy for the pupils to learn and do the basic Brain Gym movements.

However, based on the dry-run, it took them more than 20 minutes to practice and perform the WBCH activities. She found out that the most difficult movement was Hook ups. Aside from WBCH, another set of movements was selected to be administered in the experiment. The adviser found it difficult to learn it before its inclusion in the dry-run. The pupils also experienced complexities in following such movements.

Gathering of Data. Once trained, the Brain Gym activities composed of WBCH (Water, Brain buttons, Cross crawls, Hook-

¹See also, for example, "Pupils in e-Twinning: Case Studies on Pupil Participation". Available online at: <https://www.etwinning.net/files/Case%20studies.pdf> [accessed in Manila, Philippines: 17th March 2017].

ups) and 6 additional movements were employed by the teachers before the Reading class started. This was done in 10 sessions. Since the experimental group remained in the class, WBCH and the 6 additional movements were employed to the whole class.

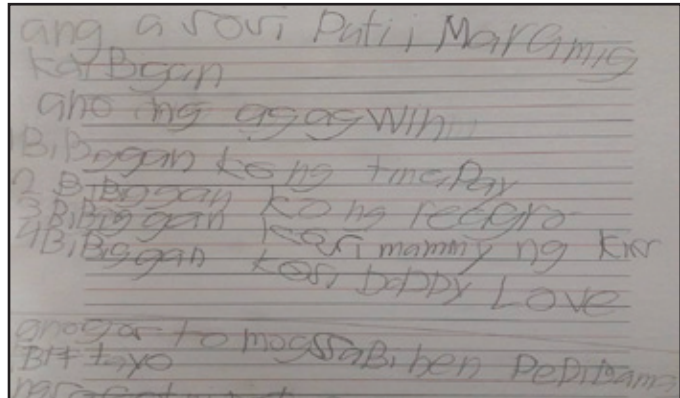
The pre-test was administered to the respondents comprised of 1 girl and 3 boys. A simple passage was read to them twice. After a while, they were asked to take note of what they have heard. Then, they were instructed to answer questions related to the passage. After the pre-test, Brain Gym movements were continuously done by the whole Grade I class. The treatment became part of their daily routine activities before they started the lesson for 10 days.

The researchers considered the 10-day period of experiment since other studies on the effects of Brain Gym on several variables, like mental and physical performance, were just conducted in a one-week time (Moore & Hibbert, 2005). Modeling all the movements and reminding her pupils on the positive effect of the said exercise helped the pupils perform the movements with ease during the succeeding days of the experiment period (Timperley *et al.*, 2007).

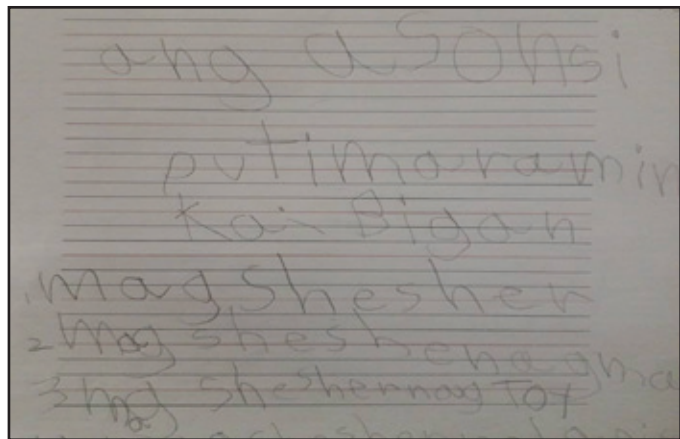
After the procedure, the pre-test and post-test performance of the experimental group were the only tests considered for comparison. The ELA (English Language Aptitude) was used for pre-test and post-test. With the instruction given by the teacher, along with the use of Brain Gym activities, the improvement of pupils' writing performance in the areas of length of output, organization, and legibility was the focus of data analysis (Gibbs, 2007).

RESULTS AND DISCUSSION

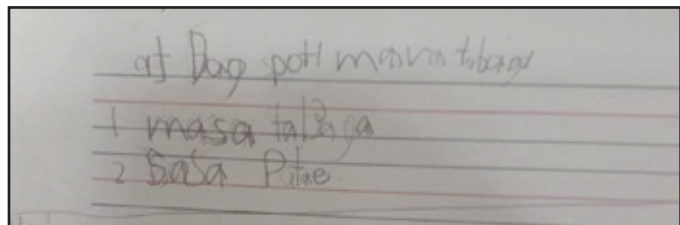
Pre-Test Result of Note Taking Portion (No Brain Gym Activity). The researchers made a casual inspection of the pupils' pre-test. Among the



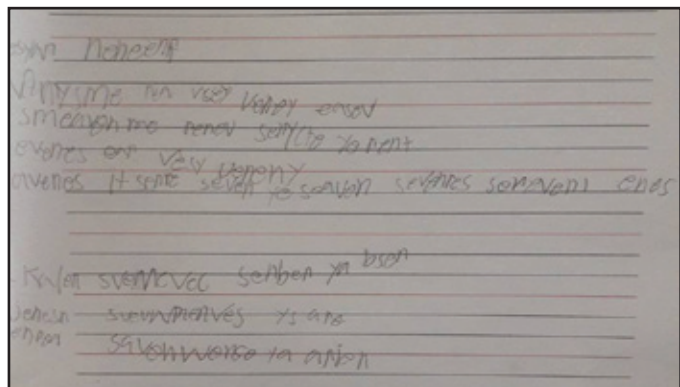
Pupil A



Pupil B



Pupil C



Pupil D

Picture 1:

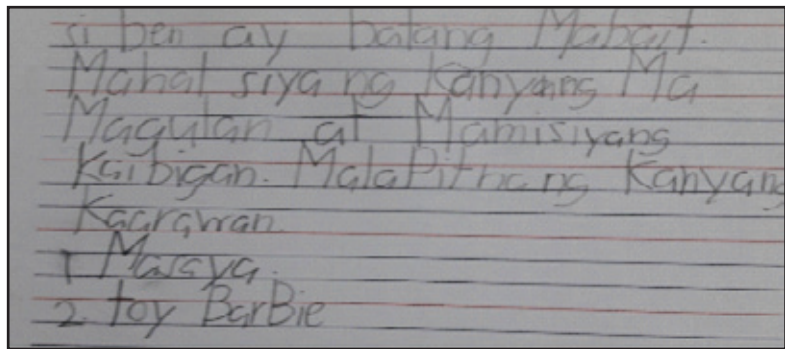
Pre-Test Result of Note Taking Portion for Pupils A, B, C, and D

4 subjects, Pupil D had the most organized note taking performance, especially with the spacing, and the utilization of the left and right margins. Pupil A showed inconsistencies in the use of capital letters and small letters. The same writing performance was noticed in pupil B's output.

The difference was that pupil B just wrote otherwise small letters in big prints, not necessarily an indication of his concept of capital letters. On legibility, it was only pupil D, whose writing could not be read. Despite showing his skill in the spacing and organizing, there was no thought in his written output. One could not even accurately recognize any word from his writing performance. See picture 1.

In general, the subjects need some improvement in their vision to facilitate their writing skill. It is, therefore, timely that this study was conducted. M. Benbow, B. Hanft & D. Marsh (1992) and S.J. Amundson & M. Weil (1996) suggested that, as early as possible, the handwriting problems exhibited by school children, like the cases involved in this study, needed to be addressed through an intervention (Benbow, Hanft & Marsh, 1992; and Amundson & Weil, 1996). Certainly, a need for the conduct of studies that would introduce remediation procedures has to be addressed in order that writing concerns of children would not get more complicated (Berninger *et al.*, 1997).

Post-Test Result of Note Taking Portion (Use of Brain Gym Activity). Pupil A was excited and happy during the post-test administration compared to her pre-test behavior. She can write legibly and with ease as shown in the stroke of each letter written on the lines. Her handwriting shows that she followed correctly the blue-red-blue lines in the first sentence. However, she missed following correctly the remaining set of sentences. Despite that, she was able to write neatly and legibly.



Pupil A

Picture 2:
Post-Test Result of Note Taking Portion
(Use of Brain Gym Activity) for Pupil A.

Her improved performance in writing may really need much deeper explanation to support teachers' interest to use the perceptual motor activities in the classroom. At least, for a South-East Asian country, like Philippines, the effectiveness of Brain Gym implies a welcome development in the area of brain-based research (Fischer, 2010; and ADB, 2015). See picture 2.

Despite negative attitudes on Brain Gym, various education departments, specifically in Australia and school authorities abroad, opt to provide directives for the use of the said physical exercise (Stephenson, 2009). But albeit this, Brain Gym is being used in more than 80 countries (Spaulding, Mostert & Beam, 2010).

In addition, the researchers also thought that pupil A only needs to improve the correct capitalization, which she might learn when already introduced to the correct usage of common and proper nouns. The expected answer from the question given by the researchers was answered and written correctly. Thus, her cognitive and perceptual skills were developed after the intervention. See, then, picture 3.

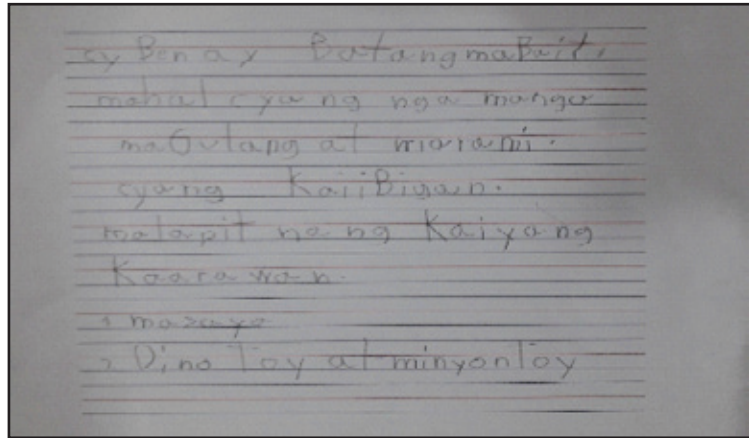
In handwriting performance, pupil B exhibited neatness and followed the blue-red-blue lines with correct spacing between letters and words. His sentence construction can be grasped and he was able to answer the given questions correctly. However, he needs practice on the correct strokes of letters, especially the letter Aa, as well as the correct usage of upper and lower case

letters in written words. Basically, his writing is visually good. He knows how to use punctuation marks and to write some words using invented spelling. He fully understood the passage read by the teacher.

The intervention must have had an effect on a child's performance towards listening and writing activities. This possible interrelatedness of mind, brain, and body is one issue that needs more scientific verifications. There is really a lot to be learned about how the human brain works (Hornbeak, 2007; and McCall, 2012). Brain Gym's effect on his writing behavior is something that can be appreciated, whether one may call it a myth or a fact. After all in a learning environment, the progress of the learner's potentials is always given primary importance. See, then, picture 4.

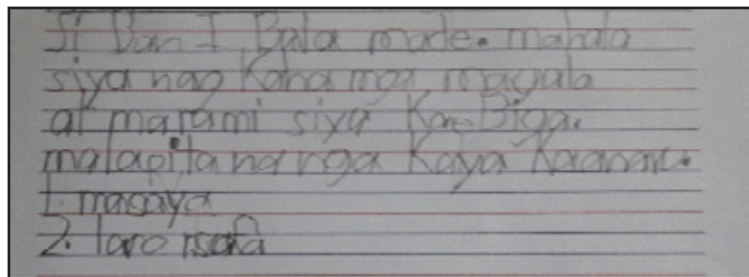
Pupil C knew how to use punctuation marks, though some words were not complete. He made an invented spelling to complete the sentence. He was also able to answer questions. This supports T. Dwyer *et al.* (2001) and M. Mahar *et al.* (2006), who concluded that physical activity had a lot of influence on the academic achievement of children, both boys and girls (Dwyer *et al.*, 2001; and Mahar *et al.*, 2006).

In this study, however, the researchers' view provides that there is a need for pupil C to improve his skill on line and word spacing as well as on correctly following the blue-red-blue lines. The content of what he wrote is not fully understandable. Context clues must be used in order to comprehend his written work (Zorfass, 2014). See, then, picture 5.



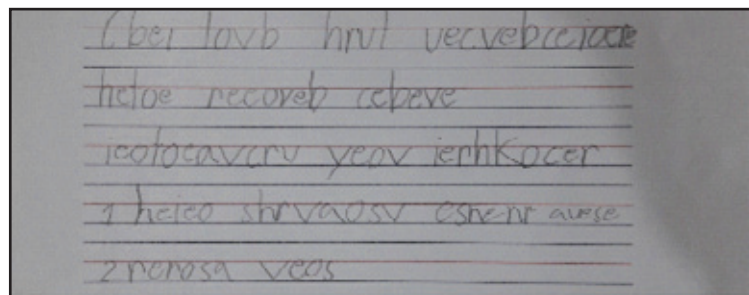
Pupil B

Picture 3:
Post-Test Result of Note Taking Portion
(Use of Brain Gym Activity) for Pupil B.



Pupil C

Picture 4:
Post-Test Result of Note Taking Portion
(Use of Brain Gym Activity) for Pupil C.



Pupil D

Picture 5:
Post-Test Result of Note Taking Portion
(Use of Brain Gym Activity) for Pupil D.

The researchers consider pupil D's neat writing performance as product of his enjoyment and relaxed mood. It may also have led him to follow the blue-red-blue lines and, hence, performed correct spacing. On the other hand, it reveals that although there was a change in behavior in doing the

Table 1:
Pupils' Length of Output (Note Taking Portion) Measured in Number of Minutes Before and After the Use of Brain Gym Activities.

Length of Output (Note Taking Portion)			
Pretest		Posttest	
Pupil A	15 minutes	Pupil A	5 minutes & 35 seconds
Pupil B	25 minutes	Pupil B	5 minutes & 30 seconds
Pupil C	30 minutes	Pupil C	10 minutes & 2 seconds
Pupil D	30 minutes	Pupil D	11 minutes & 10 seconds

Table 2:
Comparison of Test Results in Terms of Length of Output Before and After the Use of Brain Gym Activities.

Pair 1	Mean	N	Standard Deviation	t	df	p-Value
Pre-test	25.0000	4	7.07107	-	-	-
Post-test	7.9875	4	3.09634	6.909	3	0.00

task, what he wrote on the paper was not the passage dictated by the researchers. The content of his work could not be understood. To validate what was written on his paper, the researchers asked him to talk about his work. He did not utter any single word, but appeared obviously withdrawn and bowed down his head instead.

As concluded by D. Baker, B. Goesling & G. Letendre (2002) and also K.P. Feder & A. Majnemer (2007) for any child at his young age, it is vital that people surrounding him as those who have significant influence on his life, like his parents, have to be understanding and likewise supportive (Baker, Goesling & Letendre, 2002; and Feder & Majnemer, 2007). The withdrawn attitude reflects how a child develops doubt on himself and others, thus, decreasing his psychosocial skills (Tambychick, 2010). See, then, table 1.

The length of output was varied. Pupil A and pupil D wrote several words, while pupil B and pupil C wrote very few words. Pupil B got easily distracted and was bored during the pre-test. There was a noticeable change of behavior in his performance during the post-test administration. Nevertheless, he was full of energy and was full of gusto on the post-test. He worked a bit fast and full of energy, when he listened and wrote down the passage read by the researchers.

Pupil C demonstrated evident improvement in his post-test performance compared to the pre-test result. He was so afraid and worried back then. During the post-test administration, he talked a lot and was quite excited about what to do. He wrote faster than he did before the use of Brain Gym. Pupil D seemed to have enjoyed and felt relaxed during the post-test.

When P. Kariuki & H. Kent (2014) made a study on the effects of Brain Gym on comprehension performance among grade 4 students, they observed that during the use of Brain Gym before instruction, the students were excited and very strongly engaged in the exercises (Kariuki & Kent, 2014). This experience helped increase the students' scores on comprehension tests. See table 2.

The dependent-samples t Test, specifically the pre-test – post-test, was utilized to compare the length of output composed of words or sentences written by the pupil-respondents. The same respondents were tested twice, before receiving the experimental treatment, Brain Gym activities and, again, after the treatment. The time was recorded in number of minutes.

Based on table 2, the computed t is 6.909 and the p-value is less than 0.05. Two samples drawn from a population of identically treated respondents would

not be likely to differ this much. It implies, therefore, that the pupils probably do not represent such a population, but instead two different populations – no Brain Gym activities and with Brain Gym activities. There was significant difference between the two conditions. Pupils who had Brain Gym activities wrote more words and worked faster than when they did not have Brain Gym at all.

CONCLUSION

Brain Gym was an effective intervention for addressing Grade 1 pupils' writing concerns, specifically in terms of neatness, legibility, writing on and following blue-red-blue lines, as well as correct spacing between letters and words. Pupils under Brain Gym conditions (WBCH or Water, Brain-buttons, Cross-crawls, Hook-ups; and six additional movements such as lazy 8s, the energy yawn, the owl, the thinking cap, the positive points, and the gravity glider), tended to write more words.

Brain Gym exercises brought excitement, cheerfulness, and relaxed mood among pupils. Time can be allotted for the use of Brain Gym exercises before the actual lesson takes place. Such exercises can be utilized as unfreezing activity for enhancement of writing performance among pupils.²

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²**Statement:** Herewith, we affirm that this article is our original work and not a product of plagiarism, and that the article has not been submitted, reviewed, or published in another scholarly journal. Upon acceptance for publication, we will not withdraw our manuscript from the *SOSIOHUMANIKA: Jurnal Pendidikan Sains Sosial dan Kemanusiaan (Journal of Humanities and Social Sciences Education)*.

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Brain Gym and Pupils at School in the Philippines

(Source: <http://clsi.edu.ph>, 20/5/2017)

Brain Gym was an effective intervention for addressing Grade 1 pupils' writing concerns, specifically in terms of neatness, legibility, writing on and following blue-red-blue lines, as well as correct spacing between letters and words. Pupils under Brain Gym conditions (WBCH or Water, Brain-buttons, Cross-crawls, Hook-ups; and six additional movements such as lazy 8s, the energy yawn, the owl, the thinking cap, the positive points, and the gravity glider), tended to write more words.