



## The Application of Brain-Based Learning (BBL) Approach in Social Studies Learning at Junior High School Level (A Survey on Social Studies Learning in Junior High Schools in South Tangerang City)

### *Aplikasi Pendekatan Brain-Based Learning (BBL) pada Pembelajaran IPS di SMP (Survei Pembelajaran IPS di SMP Se-Kota Tangerang Selatan)*

Jakiatin Nisa<sup>1</sup>, Wildan Insan Fauzi<sup>2</sup>, Dedi Irwandi<sup>3</sup>

Social Studies, UIN Syarif Hidayatullah Jakarta, South Tangerang<sup>1</sup>

History Education, Universitas Pendidikan Indonesia, Bandung<sup>2</sup>

Chemistry Education, UIN Syarif Hidayatullah Jakarta, South Tangerang<sup>3</sup>

[jakiatin.nisa@uinjkt.ac.id](mailto:jakiatin.nisa@uinjkt.ac.id)

#### ARTICLE INFO

##### Keywords:

brain-based learning; neuro pedagogics; social studies learning; social studies teacher; South Tangerang

#### ABSTRACT

This research examines the application of brain-based learning (BBL) elements in social studies learning in Indonesia. It focused on social studies teachers in junior high schools in South Tangerang City and collected data from 100 social studies teachers. This research focused on social studies teachers in junior high schools in South Tangerang City. Each school is represented by one social studies teacher, so data is collected from 100 social studies teachers. The primary data collected in this study was obtained through the distribution of the questionnaire carried out via Google Form by utilizing the MGMP IPS in South Tangerang. The results show that the implementation of BBL in South Tangerang City did not run optimally because of two things: first, most of the BBL aspects had not been carried out optimally by teachers. Teachers rarely do many components of brain-based learning systems. Second, the survey results show that the five aspects of BBL are not carried out in harmony in social studies learning. BBL is a harmony learning pattern, where the five elements are carried out simultaneously, practically, and harmoniously because one part supports the other. If one part is too dominant, it will negatively impact learning outcomes.

#### INFO ARTIKEL

##### Kata kunci:

brain-based learning; guru IPS; neuropedagogi; pembelajaran IPS; Tangerang Selatan

#### ABSTRAK

Penelitian ini mengkaji penerapan elemen-elemen Brain-Based Learning (BBL) dalam pembelajaran IPS di Indonesia. Penelitian ini difokuskan pada guru-guru IPS di sekolah menengah pertama di Kota Tangerang Selatan. Penelitian ini bertujuan untuk melihat sejauh mana pendekatan BBL diterapkan oleh guru-guru IPS di Indonesia, khususnya di Kota Tangerang Selatan. Sampel penelitian ini adalah guru IPS SMP se-Kota Tangerang Selatan. Setiap sekolah diwakili oleh satu guru IPS. Data diperoleh melalui teknik penyebaran kuesioner melalui Google Formulir dengan responden 100 guru IPS yang tergabung dalam MGMP IPS di Tangerang Selatan. Hasil penelitian menunjukkan pelaksanaan BBL di Kota Tangerang Selatan tidak berjalan optimal karena dua hal. Pertama, sebagian besar aspek-aspek BBL belum dijalankan oleh

*guru. Masih banyak komponen sistem pembelajaran berbasis otak yang jarang dilakukan oleh guru. Kedua, lima aspek BBL tidak dijalankan secara harmoni dalam pembelajaran IPS. BBL adalah pola pembelajaran harmoni, lima unsur dijalankan bersamaan secara praktis dan harmonis, karena satu bagian mendukung bagian yang lain. Jika salah satu bagian terlalu dominan akan berdampak buruk pada hasil belajar.*

<https://doi.org/10.5614/sostek.itbj.2023.22.1.6>

## Introduction

One of the perennial problems facing educators and policymakers is determining the best way to meet students' complex cognitive, academic, behavioral, and psychological needs (Walker et al., 2019). On the other hand, some advances in neuroscience in the last few decades have led to a better understanding of the correlation between the human brain and behavior. Therefore, it is unsurprising that educators have actually made some efforts to integrate what they have found in their studies in neuroscience into education (Alferink & Farmer-Dougan, 2010). In a few recent years, neuroscience and brain-based approaches have been used in the education world and become the reason behind the radical reformation of education, either in terms of policies or practice (Kitchen, 2020).

One of the educational research domains rapidly expanding and fully funded throughout Europe and the United States is brain based learning (BBL) (Baker, 2015; Kitchen, 2020). As a result, BBL comes as an approach influencing the development of curriculum and pedagogy in the two areas (the US and Europe). For the last fifteen years, teacher education programs in the United States and a few other countries have adopted BBL. What makes it interesting is that a number of countries around the world, including Turkey, Chile, and England, also use the technique in their schools (Connel, 2009). The revised North Ireland curriculum, designed and implemented since 2003, has also taken the BBL approach (Kitchen, 2020). In Europe, a report entitled Neuroscience and Education: Issues and Opportunities was issued in 2007 by the Teaching Learning Research Program (TLRP), revealing statements on the possibility of neuroscience and brain-based learning as an alternative learning approach in education (Kitchen, 2020).

There have been 1.73 million active researchers in neuroscience and brain-based studies since 1996, and there have also been about 1.79 million articles in neuroscience and brain-based studies issued between 2009 and 2013 (Walker et al., 2019). This literature boom has rewritten the old assumption on the relation between brain behavior and its impact on student achievement and behavior at school (Walker et al., 2019).

In Iran, BBL has been adopted as a computer system named BEBLIC (Brain Emotional Learning Based Intelligent Controller), where it is a mammal limbic system-based computational model for controlling technical applications (Lucas et al., 2004). Providing educators with brain literature instruction enables them to design a better curriculum, teach content, and manage behavior (Walker et al., 2019). In the United States, teachers consistently follow some trainings on the application of neuroscience in education (Walker et al., 2019).

In Singapore, participants coming from public and special schools significantly improve their knowledge, skills, and points of view after joining brain literature courses, though further studies related to their impacts on the teaching and learning process at school as well as on the students are required (Walker et al., 2019). The Singapore Ministry of Education has established the 21<sup>st</sup> century core competencies, i.e., the core values of respect, responsibility, integrity, care, resilience, and harmony that may support the social and emotional competencies (self-awareness, self-management, social awareness, relationship management, and responsible decision-making), civic literacy, global awareness, and cross-cultural skills; critical and inventive thinking; communication; collaboration; and information skills (Hairon & Chai, 2017).

Brain-based education is an approach used to support the vision and missions of an organization (Hairon & Chai, 2017). In fact, Singapore has developed MBP (mindfulness-based practices)-based education since the 1970s. However, it has not been perfectly implemented, formally and informally, at Singaporean schools.

Thailand has also used the BBL technique at schools since the early 2000s (Connel, 2009). In that country, the BBL program is related to the development of emotional quotient as developed by the Department of Mental Health of the Ministry of Public Affairs of Thailand.

Malaysia has a vision of realizing education policies with some liberalization leading to democratization, privatization, and decentralization of the state education system (Lee, 1999). There has been an education reform in mass education where primary and secondary school curricula were revised heavily emphasizing the school-based development of individual competencies, basic skill acquisition, management, and teachers, while the private sector is encouraged to perform an active role in facilitating higher education (Lee, 1999). Malaysia started to implement BBL to improve their English teaching quality at primary schools (Hardman & A-Rahman, 2014). In Malaysia, BBL refers to the Brain-Based Teaching Approach (BBTA), which is much used in handling comprehension issues in science learning (Saleh, 2012).

Those previous studies show that it is interesting to study the implementation of BBL elements in social studies learning in Indonesia. In Indonesia, there have been different studies conducted on BBL in the learning of either science, social studies, or the humanities (Adiansha et al., 2018; Handayani & Corebima, 2017; Sani et al., 2019). However, there have not been any studies discussing its impact on education and curriculum policies. As a big country, Indonesia should not be far behind in terms of educational development, i.e., the one involving recent methods. This study is aimed at observing to what extent the BBL approach has been implemented by Indonesian social studies teachers, particularly in South Tangerang.

Social studies learning at secondary school has an important role in preparing students to have different abilities in developing some values like being hardworking, economical, and honest, as well as having a forward-looking view. In order to improve the quality of the learning process as well as the outcome, experts in education have suggested the use of the constructivist learning paradigm in teaching learning at school.

Considering the issues revealed in social studies learning, it can be said that brain-based learning is able to contribute to the improvement of learning effectiveness. Using different methods, including those involving cognitive psychology and neuroscience, we can also study 'why' and 'how' to learn (Calhoun, 2012). If social studies educators and researchers have more opportunities to cooperate, there will be more educational studies to conduct. Brain-based learning is a part of modern education that offers wider opportunities to understand how to learn by using the brain and following how it works to improve learning, including that of social studies (Trníková, J. 2013). This study is mainly limited to "How are the brain-based learning principles implemented in social studies learning at the junior high school level in South Tangerang?"

This article tries to capture the aspects of BBL that have been done by teachers and those that have not been done by teachers. This research is descriptive and serves as initial research before further developing a learning model based on the BBL approach. This is because in the field, social studies teachers have not applied BBL as an approach, method, or model. In fact, some teachers do not understand BBL as an approach that can be used to make social studies learning more interesting, fun, and effective. In this case, Indonesia is lagging behind countries that have advanced in the world of education.

## Method

The method used in this study is the survey method. The population of the study is social studies teachers at the junior high school level in South Tangerang of Banten Province, which includes 249 teachers comprised of 25 teachers serving in public junior high schools and 224 teachers serving in private junior

high schools. The research sample is taken in reference to Slovin's calculation with Confidence Level = 95% and Margin of Error = 10%, where 100 teachers are accordingly taken as the samples. The data collected in this study is primary data collected via Google Form and distributed through MGMP IPS (*Musyawarah Guru Mata Pelajaran Ilmu Pengetahuan Sosial*), the Subject Teacher Association of Social Studies in South Tangerang.

The study takes construct validity as the measurement validity test, where the test is valid in reference to the theoretical conformity of the measured attribute and the test content (Silalahi, 2009). The validity test used is the corrected item-total correlation coefficient. The validity of a research instrument with an ordinal score is tested using the Product Moment item-total correlation coefficient.

The research instrument reliability test is conducted using internal consistency. The research instrument reliability test is conducted using the single administration method with the Alpha Cronbach formula.

**Table I Validity and Reliability Test Results**

Constructs	Number of item	Number of valid item	Cronbach Alpha	Remarks
Social studies Learning Issues	14	14	.924	Reliable
Emotional Learning System	16	16	.955	Reliable
Social Learning System	7	7	.870	Reliable
Cognitive Learning System	9	9	.892	Reliable
Physical Learning System	7	7	.932	Reliable
Reflective Learning System	14	14	.964	Reliable

Source: Primary Data Processing Results, 2021

It can be seen from Table I that all items in each construct have already had a correlation value above 0.3, so it can be said that the items are valid and are able to measure what they are supposed to.

Besides, the Cronbach Alpha of all constructs shows a value above 0.7, reflecting that the instrument is reliable or consistent in the measuring process.

## Results and Discussion

In the teaching-learning process, it is important for a teacher to make an optimum effort in adopting different learning approaches, including BBL. On the other hand, the learning process is also determined by students' ability to make use of those approaches. This section will elaborate on the results gained from the survey on the implementation of BBL in social studies learning conducted by social studies teachers in South Tangerang.

25% of the respondents are male social studies teachers, and the rest, 75%, are female. Therefore, most of the respondents are female. Table 4.2, however, shows that 60% of the respondents serve in public junior high schools and the rest, 40%, serve in private junior high schools. Data shows that only 30% of the respondents have an academic background in social studies education, while the majority (52%) have degrees in economics education, history education, geography education, or sociology education. 9% of the teachers were not graduates of an education study program or major. It is understandable since most of the bachelor programs for the Social Studies Education major just started to open in 2008–2010 at different universities. Social studies teachers who graduated from History Education, Geography Education, and Economics Education majors are commonly senior teachers. It can be seen from Diagram 1 in Figure 1 below that 33% of the respondents are teachers with more than 15 years of experience.

The data shows a balanced number of respondents in terms of teaching experience, as 33% of the teachers are junior teachers, 34% of them are teachers with 6–15 years of teaching experience, and 33%

of them are senior teachers (having more than 15 years of teaching experience). This state of balance is needed to see brain-based learning in practice, whether it is revealed in those three teaching experience categories or not.

Using range ( $r$ ) = 5.00–1.00 (the average of the highest scores minus the average of the lowest scores) and the number of criteria ( $k$ ) = 5, the class length ( $p$ ) =  $r/k = 4/5 = 0.8$  was then obtained. A clearer picture of the criteria for the average scores can be seen in the following table:

**Table II Criteria for The Average Scores**

Average Scores	Criteria
1.00 – 1.80	Very Low
1.81 – 2.60	Low
2.61 – 3.40	Medium
3.41 – 4.20	High
4.21 – 5.00	Very High

Source: Primary Data Processing Results, 2021

### Problems in Social Studies Learning

Several problems in social studies learning frequently found by teachers are difficult students, noisy class, sleepy students, unresponsive students, underestimating students, creativity, passiveness, anti-social issues, being uncomfortable with the social studies learning as well as having low responsibility. Most of the problems faced by teachers are related to students’ internal characters. Survey results show that the problems faced by social studies teachers in South Tangerang are as follows:

**Table III Problems in Social Studies Learning Faced by Teachers**

No	Problems	Average Scores	Interpretation
1	Students’ Minimum Mastery Criteria are below the average score	3.33	Medium
2	Difficult students	3.96	High
3	Students do not do the tasks given	3.24	Medium
4	Students are noisy	4.09	High
5	Students do not pay attention when teacher explain the learning materials	3.24	Medium
6	Students are sleepy	3.82	High
7	Students are less enthusiastic following social studies lesson	3.70	High
8	Students believe that social studies will not be in national examination so that it is not important	3.70	High
9	Students’ creativity is not revealed within the teaching learning process	3.95	High
10	Students are rarely set to learn in group	3.25	Medium
11	Students are only a passive knowledge receiver	3.80	High
12	Teaching learning process shows an anti-social atmosphere	4.27	High
13	Social studies learning does not create a nice atmosphere	3.94	High
14	Social studies learning does not build a self-direction learning	4.06	High

Source: Primary Data Processing Results, 2021

Table III shows that cognitive aspects like Minimum Mastery Criteria do not trouble the teachers. However, it also shows good scores for several attitudes, including task completion, group work, and paying attention to teachers’ explanations.



Five components of brain-based learning, either cognitive, emotional, social, physical, or reflective ones, have been commonly conducted by social studies teachers with high intensity in their teaching learning, as it can be seen in the following table.

**Table IV The Average Scores of Five Components of Brain-Based Learning System**

No	Components of brain-based learning	Average Score	Interpretation
1	Emotional Learning System	4.16	High
2	Cognitive Learning System	3.92	High
3	Social Learning System	4.19	High
4	Physical Learning System	4.11	High
5	Reflective Learning System	4.13	High

Source: Primary Data Processing Results, 2021

There is a unique finding revealed in Table IV above: the component of the cognitive learning system has the lowest average score. It is a little surprising as social studies is identical to memorizing, emphasizing the cognitive aspect. A further analysis will be delivered in the following section. Social and emotional learning are the learning aspects with the highest average scores. It is quite heartening as it indicates that teachers have started to emphasize the importance of the aspects of emotion and cooperation in the teaching and learning process of social studies.

### The Application of Emotional Learning System

Social studies teachers have been familiar with concepts like building students' confidence, inspiring passion for learning, encouraging self-regulation in learning, understanding the learning process, and implementing what students have learned in their daily lives. Teachers had tried to stimulate emotional elements in social studies learning by encouraging the students to express their feelings, to explore their points of view as well as their feelings when they tried to do a role-play pretending to be a particular historical figure, and to explain some materials related to a particular historical figure as well as heart-touching incidents that may encourage students to appreciate historical figures. The following is the table of intensity for the implementation of the emotional learning system in social studies learning performed by social studies teachers in South Tangerang.

**Table V The Intensity of The Application of Emotional Learning System**

No	Components of Emotional Learning System	Average Score	Interpretation
1	Teachers try to increase students' confidence to face their future (C)	4.59	Very High
2	Teachers help students to find their passion for learning (Passion)	4.47	Very High
3	Social studies learning runs seriously but relaxingly	4.37	Very High
4	Social studies learning encourages students to accomplish their task individually	4.38	Very High
5	Social studies learning encourages students to improve their creativity	4.40	Very High
6	Social studies learning is useful for daily life	4.55	Very High
7	Social studies learning encourages students to express their feelings	4.23	Very High
8	Social studies learning encourages students to explore their points of view and feelings when trying to become a particular historical figure	4.16	High
9	Social studies learning is designed to be meaningful so that students can take some lessons from that	4.42	Very High

10	Teachers explain materials related to historical figures and heart-touching incidents that may touch students' feelings	4.16	High
11	Teachers share their life experience full of past time emotional memory	3.63	High
12	Teachers tell some incidents to make the students appreciate historical figures in social studies	4.06	High
13	Teachers use mind map in the learning of social studies	4.19	High
14	Teachers use caricature in social studies learning	3.24	Medium
15	Teachers use humor in social studies learning	3.89	High
16	Teachers use If history to stimulate students 'imagination	3.82	High

Source: Primary Data Processing Results, 2021

Table V shows that there are some things that teachers don't do as well as they could. For example, they don't share their emotional life stories or use humor, caricatures, or a history strategy when teaching social studies.

Humor is important and should be attached internally to an educator or teacher along with his or her professional abilities so that students may feel happiness because of it. Rigid boundaries between teachers and students, either those related to the gap in level of knowledge or those related to different attitudes, as if they are all disappearing and melting down because of humor. Humor has a good role to play in breaking the ice and breaking down barriers in learning communication. Humor is like lubricant that may cool down the learning tense as well as reduce frictions that may happen to be more conducive, as stated by Lemke (1987) that humor may have a role like lubricant in smoothing out the teaching learning process. Humor can increase students' retention, and laughter can increase retention because humor may create some positive feelings that increase the possibilities for students to memorize what they have learned (Sousa, 2012).

If history is, however, full of short questions asking the readers to explain what will happen to history, it is different from reality. This column teaches students to think critically and creatively. Critical thinking is a reflective thinking activity focused on efforts in deciding what should be believed and done (Supardan, 2008). Thinking critically can also be defined as a disciplinary thinking process used to assess facts: statements, stories, news, arguments, research, etc. (Supardan, 2008).

Data shows that female teachers are more intensive when performing emotional learning patterns compared to male teachers. It is understandable due to the emotional tendency females particularly have, though there is an interesting fact that female teachers are "low" in using humor and caricature compared to male teachers. On the other hand, male teachers are more intensive in using mind maps to explain history compared to female teachers. The other data shows that there are no significant differences revealed in the performance of the emotional learning system related to the academic background, reflected in either those who graduated from social studies education and other social studies education or those from non-education majors. However, teachers who graduated from economics education are the lowest in terms of intensity, i.e., emotion-based learning. Table 5 also shows that there is no significant difference related to teaching experience correlated with the intensity of performing emotional learning, reflected in either those who have been teaching recently or those who have been teaching for years.

The core component of brain-based learning is emotion, which can affect our ability to learn. Our brain may always try to make connections between intellectuality and emotion. Emotion hastens thoughts and lets us remember our body's reaction towards the world (Jensen, 2011). Furthermore, emotion contributes to attention, understanding, memory, and problem solving (Jensen, 2011). Emotional aspects are expected to encourage students to find inspiration, creativity, and hope.

## The Application of Cognitive Learning System

Some aspects of the cognitive learning system frequently performed by teachers are contextual learning, problem-based learning, and active learning. All of the aspects are supported by the use of mind mapping and memorizing techniques. It helps students understand social studies materials full of facts to memorize. The following is a table of the teachers' average scores in the implementation of cognitive learning systems in social studies learning.

**Table VI The Application of Cognitive Learning System**

No	Cognitive Learning System	Average Score	Interpretation
1	Social studies learning correlate what is learned with the real life	4.58	Very High
2	Social studies learning provides some challenges in a form of real problem solving	4.29	Very High
3	Social studies learning stimulates students to deliver their opinions	4.39	Very High
4	Social studies learning trains students memorizing technique	4.10	High
5	Teachers give some quotes in social studies learning	3.85	High
6	Teachers provide Timeline in social studies learning	3.84	High
7	Teachers provide mind map to help students understand social studies materials comprehensively	4.03	High
8	Teachers provide Caricature in social studies learning	3.16	Medium
9	Teachers provide social studies materials full of controversy and debate	3.17	Medium

Source: Primary Data Processing Results, 2021

Table VI shows that there are still a small number of teachers who have used quotes, timelines, caricatures, and controversial issues in social studies learning. Cognitive learning aspects can be more optimal if those aspects are frequently used by social studies teachers.

Data from the table shows that male teachers (84%) are more intensive in performing cognitive learning patterns compared to female teachers (78%), though the percentages are slightly different. There are 21% female teachers who rarely implement creative learning systems, while the males are only 16%. It is different from what has been revealed in previous tables on the emotional learning system, where female teachers are more intensive in using the system.

Male teachers (84%) are more intensive in using the cognitive learning system compared to female teachers (78.6%), though it is not significantly different. It is also supported by the data that the number of female teachers who did not use the cognitive learning system is higher (21.3%) than that of male teachers (16%). Table 6 shows that there is no significant difference resulting from differences in academic background related to the intensity of performing the cognitive learning system. The other data shows that fresh graduate and senior teachers are those who most intensively perform cognitive learning systems. Teachers with 6–15 years of experience are relatively rare in the cognitive learning system.

## The Application of Social Learning System

The social learning system aspects frequently used in social studies learning are that teachers encourage students to cooperate, understand and accept existing differences, as well as have a good social interaction. The following is a table of teachers' average scores in implementing social learning systems in social studies learning.



**Table VII The Application of Social Learning System**

No	Social Learning System	Average Score	Interpretation
1	Social studies learning encourages students to cooperate with their friends in solving problems	4.39	Very High
2	Social studies learning encourages students to focus on their strengths	3.78	High
3	Teachers tell stories related to historical figures and incidents full of lessons and how to handle failure and misfortune	4.06	High
4	Teachers encourage students to accept differences	4.43	Very High
5	Teachers encourage students to acknowledge diversity	4.27	Very High
6	Teachers encourage students to understand politics	3.65	High
7	Teachers encourage students to well interact	4.63	Very High

Source: Primary Data Processing Results, 2021

Table VII shows that there are several social learning aspects with low scores, namely that teachers have not yet encouraged students to understand politics and that they do not encourage students to focus on their own strengths as well as learn from failure and misfortune.

Data shows that there is no significant difference between male and female teachers related to the implementation of social learning patterns. However, female teachers are more numerous (10%) compared to male teachers (4%) in terms of performing social learning patterns. Research data shows that there is no significant difference related to the correlation of teaching experience and academic background with the intensity of the social learning system. However, senior teachers are in the category of lowest intensity (12%) in performing social-based learning.

### The Implementation of Physical Learning System

Physical learning system aspects frequently performed by teachers in social studies learning. In this stage, teachers encourage students to actively participate in class and encourage them to keep moving to be successful in the future. Table 8 below shows that there are some social learning aspects gaining a lower score, including the fact that teachers do not give challenging academic tasks, as well as not allow students to be physically active in class and active in doing problem sets and tasks, and they do not offer brain gym.

**Table VIII The Application of Physical Learning System**

No	Physical Learning System	Average Score	Interpretation
1	Social studies learning encourages students to do challenging academic tasks	3.96	High
2	Social studies learning trains students to actively participate in reaching success	4.32	Very High
3	Social studies learning motivates students to reach success	4.32	Very High
4	Social studies learning supports students to actively participate in reaching success	4.33	Very High
5	Social studies learning provides some assignments of answering problem sets or accomplishing tasks	4.16	High
6	Social studies learning encourages students to be physically active either in or outside the class	4.04	High
7	Teachers train brain gym in social studies learning	3.50	High

Source: Primary Data Processing Results, 2021

The data collection shows that there is no significant difference between male and female teachers in performing physical learning patterns. Besides, female, and male teachers rarely used the learning pattern, showing almost the same percentage (16% and 17%). The research data shows that there is no significant difference related to the teaching experience or the academic background that correlates with the intensity of a physical system. The physical learning system is used very intensively by both senior and junior teachers, with or without a background in social studies education.

In the physical education system, teachers do not much provide challenging academic tasks but ask students to be physically active in class, do problem sets and tasks as well as do brain gym. Therefore, it can be concluded that physical movement in social studies learning is very minimal. Given's (2007) study shows the importance of a healthy body, nutritious food, physical touch, brain gym, and physical movement in supporting a good thinking pattern as well as stable emotion and comfortability. Social studies teachers can be more creative in reactivating the physical learning system by using either props, games, or brain gym. Teenagers need at least 30 minutes of physical activities that stimulate the brain (Jensen, 2008). Physical movement, including sports, may stimulate the body to produce neurotrophin hormone, which can increase the growth rate, affect mood, save memories, and make an interneuron connection.

### The Application of Reflective Learning System

There are five aspects of reflective learning frequently performed by teachers in social studies learning, namely: well developing thinking skills, growing open-mindedness and objectivity in assessing any points of view, developing opinions, and maintaining a positive attitude towards different points of view. Table IX below shows several reflective learning aspects with low intensity, including that teachers do not much encourage students to contemplate the meaning of life, to make some interpretations, to have some points of view, to acknowledge their own strengths and weaknesses, to draw some conclusions from what they have read, to develop opinions, and to consider different alternative views.

**Table IX The Application of Reflective Learning**

No	Reflective Learning System	Average Score	Interpretation
1	Social studies learning encourages students to contemplate the meaning of being alive and of life	4.16	high
2	Social studies learning teaches how to do a positive internal dialogue	3.86	high
3	Social studies learning teaches students to accept their own strengths and weaknesses	4.10	high
4	Social studies learning teaches students to take their time to solve problems	4.04	high
5	Social studies learning develops open-mindedness	4.21	Very High
6	Social studies learning teaches students to consider any different points of view objectively	4.22	Very High
7	Social studies learning encourages students to make different interpretations and points of view	4.15	high
8	Social studies learning encourages students to make some conclusions after reading	4.15	high
9	Social studies learning trains students to develop some opinions	4.34	Very High
10	Social studies learning trains students to think in pattern	3.91	high
11	Social studies learning trains students to consider different alternative points of view	4.03	high
12	Social studies learning trains students to think well	4.43	Very High

13	Social studies learning trains students to know long-winded and unnecessary thoughts	3.34	Low
14	Social studies learning trains students to maintain positive attitude on different points of view	4.27	Very High

Source: Primary Data Processing Results, 2021

Table IX also shows that there are several aspects that are infrequently performed by teachers in the classroom, including teaching positive self-talk, how to recognize long-winded and unnecessarily deep thoughts, and how to think in patterns. From all of the brain systems, the ability to do some reflection is the one that requires the most careful attention; this system helps humans to control the other systems, and it is also the medium for other systems to cross one another as well as distinguish publicly acceptable and unacceptable behavior. This system enables students to reach what can be reached, either emotionally, cognitively, physically, or metacognitively. Data shows that male teachers (92%) are more intensive in performing reflective learning patterns compared to female teachers (79%). There are 21% of female teachers who rarely perform the reflective learning system, while there are only 8% of male teachers in the same category.

Research data shows that there is no significant difference related to teaching experience or academic background correlated with the implementation of reflective learning. Either senior or junior teachers, with an academic background in education or not, intensively perform reflective learning.

## Conclusion

Brain-Based Learning (BBL) is commonly seen as a novel interdisciplinary focused on the teaching and learning mechanisms that take brain function into account. Apart from this general definition, the scientific literature has also introduced another way to understand neuropedagogy (Máčajová, 2013). One of the basic goals of neuropedagogy is to improve the educational process with reference to neurology. Neurology is seen as a field of knowledge integrating knowledge from different fields, where it is expected that it may lead to different approaches and guidelines in the teaching and learning process (Máčajová, 2013).

Most problems in social studies learning faced by teachers commonly relate to students' character. This condition is commonly due to some missing elements in the implementation of BBL aspects in the teaching and learning process, where many of the components of the BBL system have not been intensively performed yet by teachers. The five components of the BBL system have not been harmoniously implemented, where they should in fact be implemented synchronously, practically, and harmoniously since one element will support the other elements, and if an element seems to be dominant, it may have a bad impact on the learning outcomes.

This research only captures the learning that has been done by teachers and examines what aspects of BBL have been done by teachers in social studies learning. This study did not test a particular BBL learning model to measure its success and effectiveness. Thus, in the future, there needs to be researchers who develop learning models based on BBL in social studies learning and study to what extent its effectiveness in solving certain social studies learning problems has been studied in other countries in advance.

## References

- Adiansha, A. A., Sumantri, M. S., & Makmuri, M. (2018). Pengaruh Model Brain-Based Learning terhadap Kemampuan Komunikasi Matematis Siswa Ditinjau dari Kreativitas. *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, 8(2), 127–139.

- Alferink, L. A., & Farmer-Dougan, V. (2010). Brain-(Not) Based Education: Dangers of Misunderstanding And Misapplication of Neuroscience Research. *Exceptionality*, 18(1), 42–52. <https://doi.org/10.1080/09362830903462573>
- Azwar, S. (2012). *Reliabilitas dan Validitas Edisi IV (Reliability and Validity 4<sup>th</sup> Edition)*. Yogyakarta: Pustaka Pelajar.
- Baker, B. (2015). From “Somatic Scandals” To “A Constant Potential for Violence”? The Culture of Dissection, Brain-Based Learning, And the Rewriting/Rewiring of “The Child.” *Journal of Curriculum and Pedagogy*, 12(2), 168–197. <https://doi.org/10.1080/15505170.2015.1055394>
- Calhoun, C. F. (2012). *Brain-Based Teaching: Does It Really Work? Not yet published.*
- Connel, D. (2009). *The Global Aspects of Brain-Based Learning*. Educational Horizons Fall.
- Creswell, J. W. (2010). Mapping the developing landscape of mixed methods research. *SAGE Handbook of Mixed Methods in Social & Behavioral Research*, 2, 45–68.
- Dalton, J. C., & Crosby, P. C. (2009). Hoping in Hard Times: The Transformative Power of Hope in College Student Development. *Journal of College and Character*, 10(3), 1–6.
- Damasio, A. (1994). *Descartes Error: Emotion, Reason, and the Human Brain*. New York: Harcourt Press.
- Given, B. (2007). *Brain Based Teaching*. Mizan Media Utama.
- Glasser, W. (1999). *Choice theory: A new psychology of personal freedom*. HarperPerennial.
- Hairon, S., & Chai, C. S. (2017). The Learning Revolution: from Pedagogues to Designers of Learning. *Learning: Research and Practice*, 3(2), 79–84. <https://doi.org/10.1080/23735082.2017.1360631>
- Handayani, B. S., & Corebima, A. D. (2017). Model Brain-Based Learning (BBL) and Whole Brain Teaching (WBT) in Learning. *International Journal of Science and Applied Science: Conference Series*, 1(2), 153–161.
- Hardman, J., & A-Rahman, N. (2014). Teachers and The Implementation of a New English Curriculum in Malaysia. *Language, Culture and Curriculum*, 27(3), 260–277. <https://doi.org/10.1080/07908318.2014.980826>
- Jensen, E. (2008). *Brain Based Learning: Pembelajaran Berbasis Kemampuan Otak (Brain Based Learning: Learning Based on Brain Capacity)*. Yogyakarta: Pustaka Pelajar.
- Jensen, E. (2011). *Pembelajaran Berbasis Otak (Brain-Based Learning)*. Jakarta: PT. Indeks.
- Kaplan, R. M., & Sacuzzo, D. (1993). *Psychological Testing Principle, Application, and Issue*. California: Brooks/Cole Publishing Company.
- Kerlinger, F. N. (2003). Translated by Landung R. Simatupang. *Asas-Asas Penelitian Behavioral (Principles in Behavioral Study)*. Yogyakarta: Gajah Mada University Press.
- Khng, K. H. (2018). Mindfulness In Education: The Case of Singapore. *Learning: Research and Practice*, 4(1), 52–65. <https://doi.org/10.1080/23735082.2018.1428120>
- Kitchen, W. H. (2020). Neuroscience and the Northern Ireland Curriculum: 2020, and the Warning Signs Remain. *Journal of Curriculum Studies*, 1–15. <https://doi.org/10.1080/00220272.2020.1779350>
- Knowles, M. C. (2006). Report From the Asian Applied Psychology International-Regional Conference, Bangkok, Thailand. *International Journal of Psychology*, 41(5), 423–429. <https://doi.org/10.1080/00207590600891999>
- Lee, M. N. N. (1999). Education in Malaysia: Towards Vision 2020. *School Effectiveness and School Improvement*, 10(1), 86–98. <https://doi.org/10.1076/sesi.10.1.86.3514>
- Lemke, J. L. (1987). *Talking Science: Content, Conflict, and Semantics*.
- Levine, A. C. (2013). The Sustaining Power of Hope: Perspectives of Public School Teachers. *Research in the Schools*, 20(1).
- Lucas, C., Shahmirzadi, D., & Sheikholeslami, N. (2004). Introducing Belbic: Brain Emotional Learning Based Intelligent Controller. *Intelligent Automation & Soft Computing*, 10(1), 11–21. <https://doi.org/10.1080/10798587.2004.10642862>

- Máčajová, M. (2013). Neuropedagogy And Brain Compatible Learning, Ideas for Education in the 21<sup>st</sup> Century. *Technologia Vzdelavania*, 21(3), 1–9.
- McDonald, N. M., & Messinger, D. S. (2011). The Development of Empathy: How, When, and Why. *Moral Behavior and Free Will: A Neurobiological and Philosophical Approach*, 333–359.
- Nasution, S. (1996). Metode penelitian naturalistic (Naturalistic Research Method). Bandung: Tarsito.
- Perkins, D. D., & Zimmerman, M. A. (1995). Empowerment theory, research, and application. *American Journal of Community Psychology*, 23(5), 569–579.
- Phelan, P., Davidson, A. L., & Cao, H. T. (1991). Students' Multiple Worlds: Negotiating The Boundaries of Family, Peer, and School Cultures. *Anthropology & Education Quarterly*, 22(3), 224–250.
- Phillips, J. (2014). *From Neurons to Brainpower: Cognitive Neuroscience and Brain-Based Learning*. Indiana University.
- Saleh, S. (2012). The Effectiveness of Brain-Based Teaching Approach in Dealing with The Problems of Students' Conceptual Understanding and Learning Motivation Towards Physics. . . *Educational Studies*, 38(1), 19–29. <https://doi.org/10.1080/03055698.2011.570004>
- Sani, A., Rochintaniawati, D., & Winarno, N. (2019). Using Brain-Based Learning To Promote Students' Concept Mastery In Learning Electric Circuit. *Journal of Science Learning*, 2(2), 42–49.
- Silalahi, U. (2009). *Metode Penelitian Sosial*. Bandung: Refika Ekatama.
- Sousa, D. A. (2012). *Bagaimana otak belajar (How Brain Learns)*. Jakarta: Indeks.
- Supardan, D. (2008). *Pengantar Ilmu Sosial, Suatu Kajian Pendekatan Struktural (Introduction to Social Studies, A Structural Approach Study)*. Jakarta: Bumi Aksara.
- Trníková, J. (2013). Brain-Based Learning Strategies and Inclusive Education. *Technologia Vzdelavania, Technology Education/Professional Journal on Education*.
- Tze, V. M., Daniels, L. M., & Klassen, R. M. (2016). Evaluating The Relationship between Boredom and Academic Outcomes: A Meta-Analysis. *Educational Psychology Review*, 28(1), 119–144.
- Walker, Z., Hale, J. B., Chen, S. H. A., & Poon, K. (2019). Brain Literacy Empowers Educators to Meet Diverse Learner Needs. *Learning: Research and Practice*, 1–15. <https://doi.org/10.1080/23735082.2019.1674910>