

Brain Training Activities as an Aid in Boosting the BAC 4-2 Score in the Philippine Constitution Mock Test

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Abstract: The objective of the study was to determine how well brain training exercises aided cognitive training in enhancing the score performance in a multiple-type mock test on the Philippine Constitution consisting of 100 items. Philippine Constitution is one of the topics under the General Information Part of the Civil Service Examination. The whole class of BAC 4-2 comprised 35 students who participated in the one-group pretest and posttest experimental research design. The results showed that after completing the brain training exercises, students' posttest scores considerably improved as compared to their pretest scores. It is surmised that using brain workouts helped students take the PH Constitution exam with greater test scores and better memory.

Keywords: brain train activities, Civil Service Exam, memory, mock test, Philippine Constitution, pretest, posttest, test scores.

1. INTRODUCTION

In the information era, our mental ability must also learn to adapt to the concurrent sources of knowledge that support our intellectual growth. Effective information management is essential to maximizing our cognitive potential. Our cognitive capability also requires training in order to develop our ability to take in and absorb information, just like any other body function that can be improved with practice.

Harvard Medical School (2021) claims that mental activities that exercise the synaptic connections of various brain regions are necessary in addition to physical activities to increase the capacity of the human brain. These mental activities are responsible for enhancing our attention, memory, intelligence, or even executive functions. Since a lack of these stimulating activities might result in cognitive decline, cognitive testing is recommended by science as a way to keep our minds active. The Brain Training Activity is the name of this procedure.

According to a 2013 study published in Psychological Science, older adults between the ages of 60 and 90 performed better on long-term memory tests when they engaged in novel and difficult activities for an average of 16 hours per week over the course of three (3) months than when they did more routine things. This is due to the fact that brain training exercises are made to test our ability to think critically and perceptively. As a result, it offers the benefit of delaying the age-related deterioration in our cognitive abilities, increasing productivity, and retaining,

Research has shown that keeping the mind active can prolong healthy brain performance and that it increases fundamental skills needed in everyday basic tasks which include memory recall, concentration, and problem-solving. A study in Psychological Science in 2013 revealed that older adults between the ages of 60 to 90 scored better on long-term memory tests by engaging in new and complex activities for an average of 16 hours per week in a span of three (3) months, compared to those who did more familiar activities. This is because brain training activities are designed to challenge our brains' capacity to think and perceive. As a result, it offers the benefit of delaying the age-related loss in our cognitive abilities, optimizing productivity, and retaining, restoring, and enhancing our efficacy in carrying out a task.

People can desire to pursue cognitive training for a number of reasons. These include: 1. delaying aging-related cognitive decline; 2. promoting adult independence; and 3. honing mental aptitudes required for daily living. Given that people frequently forget even their social media account passwords, cognitive training is effective in helping them remember more knowledge that will be helpful in all situations.

Additionally, Cherry (2021) said that mental abilities such as processing speed, reaction time, decision-making, short-term memory, and planning skills all tend to deteriorate with age. These skills may be strengthened and the possibility of some age-related memory problems decreased by cognitive training.

Furthermore, cognitive training has advantages like boosted self-confidence. For instance, when taking a test for college admission. It can be difficult to prepare for it; part of reviewing is to memorize all the terms required. It can occasionally be a cause of annoyance. However, by utilizing various methods of brain training and beneficial strategies, it is possible to increase retention and guarantee strong recall, thereby offering one the opportunity to get into their desired school.

Researchers have been examining the results of brain training for many years. But there is still a remarkable lack of consensus on the value of cognitive training (Cherry, 2021).

While some study indicates that specialized brain training exercises can boost some cognitive abilities, other studies have come to opposing conclusions. Despite the study's lack of consensus, the idea that playing these brain games may enhance one's mental capacity has given rise to an entire industry of applications, games, and other tools.

The purpose of this study is to look into how Brain Train Activities can help BAC IV–2 students perform better on the mock Philippine Constitution exam. The exercise was created to improve students' cognitive speed, working memory, and undivided attention—all of which have been suggested to be critically important for performing well on a test.

Statement of the Problem

This study was directed towards its main objective to assess the effectiveness of brain training activities in boosting the BAC 4-2 score in the Philippine Constitution Mock Test.

Specifically, it sought to answer the following questions:

1. What is the students' perception as regards getting a high score in the mock test on the Constitution of the Philippines before the pretest?
2. What is the students' perception as regards getting a high score in the mock test on the Constitution of the Philippines before the posttest?
3. How did the students apply the Brain Training activities in preparation for the re-taking of a mock test on the Constitution of the Philippines?
4. What is the students' score in the posttest as compared to their pretest?

Null hypothesis:

There is no significant difference in the pretest and posttest scores of the students.

2. REVIEW OF RELATED LITERATURE

Civil Service Examination

The Civil Service Commission conducts the Career Service Examination, also known as the Civil Service Examination (CSE), annually to determine who is qualified to work in the public sector. CSE is administered as a requirement for Filipinos who want to work in the government in order to choose future qualified government officials (Cruz, 2019).

There are two different types of examination that is given. These are the Sub-Professional Level and Professional Level Civil Service Exams. The Subprofessional Level exam is created for candidates applying for first-level government posts, including but not limited to administrative and clerical duties. The Professional Level, meanwhile, focuses on test takers who are interested in first- or second-level government posts. Additionally, candidates seeking professional-level positions must have completed a four-year college degree.

The Civil Service Exam in both the Professional level and Sub-Professional level covers topics on Vocabulary, Numerical Reasoning, Clerical Operations, and General Information. For the coverage of the Professional level exam, Analogy and Logic are also included.

Cueva (2022) claims that the Civil Service Examination is one of the most popular government tests in the Philippines and is also one of the most difficult exams, particularly the Professional level examination, which only about 10 to 12 percent of applicants succeed on. As a result, a number of Civil Service Examination Reviewers are being held to help and prepare candidates for the exam, especially for areas under General Information where questions about the Philippine Constitution are present.

It should be noted that the Civil Service Commission was conferred the status of a department by Republic Act No. 2260 as amended and elevated to a constitutional body by the 1973 Constitution. It was reorganized under PD No. 181 dated September 24, 1972, and again reorganized under Executive Order no. 181 dated November 21, 1986. Philippine Constitution

All educational institutions are required to include the study of the Constitution in their curricula, as stated in Article XIV, Section 3 of our constitution. This highlights the expectation that educational institutions educate the Constitution in order to instill ideals like nationalism and patriotism, love of mankind, and respect for human rights (Andaqui, 2019).

The Philippines' Constitution is recognized as the supreme law of the land. Since the Proclamation of Independence on June 12, 1898, the country has had six constitutions. Given the Philippines' constitutional revisions, it was remarkable that the 1935 constitution introduced a political system that allowed for a President to be chosen at large for a four-year term with one re-election. From the state of independence, re-elected President Ferdinand Marcos declared Martial Law and crafted the 1973 Constitution, which permitted him to remain in power for another 6-year term (Constitution.net, n.d.).

The Philippine Constitution of 1987 established a representative democracy with three

(3) distinct and independent government branches: the Executive, Legislative, and Judiciary.

In addition, three independent constitutional commissions were established: the Commission on Audit, the Civil Service Commission, and the Commission on Elections. It also includes a full Bill of Rights safeguarding fundamental civil and political rights, as well as free, fair, and periodic elections. Waqif (2018) notes that it is important to study these provisions in the

Constitution because it guarantees the individual's basic rights such as right to life, right to freedom, right to property and the right to participate freely in the democratic system.

It is not surprising that questions about the Philippine Constitution appear on both the Professional and Sub-professional levels of the Civil Service Exam. The Code of Conduct and Ethical Standards for Public Officials and Employees is also discussed, which is based on R.A. 6713; Issues and Concepts in Peace and Human Rights. Questions on environmental management and protection, basic facts, and current events are all included. Similarly, some of the most recent and recently implemented laws as well as environmental issues will be discussed. The most significant parts and sections of the Philippine Constitution and Republic Act 6713 should be known and understood.

Being the case, before taking the examination, the examinee should be prepared. This is where brain training activities come into play.

Effectiveness of brain exercises in memory enhancement

As stated by Legg (2021), brain exercises for cognitive training can be as simple as actively engaging the brain in everyday tasks. Others could be in form of targeted workouts for the brain, specifically designed to enhance memory, cognition, or creativity.

In addition to this, Creswell et al., (2013) noted that the ultimate goal of these exercises is to improve proficiency in cognitive and memory skills. Regardless of the effectiveness of these games, they tend to generate tasks that challenge the mind with a series of tests and training exercises intended for self-affirmation. In return, results from their study indicated that self-affirmation not only improved problem-solving, but also enhanced academic achievement in other tasks and protected the mind from chronic stress.

Additionally, according to Moreira et al., (2019), remembering previously studied information, or retrieval practice - , is more beneficial for long-term retention than restudying that same information. The results and acquired scores from the use of retrieval practice in classroom settings are favorable to the use of retrieval practice through the use of assessments such as free-recall to multiple-choice tests. This points to student effectiveness as a promising strategy for improving learning and test performance.

In an experiment entitled “Improving fluid intelligence with training on working memory” by Jaeggi et al., (2008), memory games as brain exercises were used in order to thoroughly test improvements in individual fluid intelligence levels within dynamic systems.

The said study defined fluid intelligence as solving problems with logic and solving new problems that are different from previously obtained knowledge stored in the brain. The study illustrated that the fluid intelligence increase was training-related and not due to the participants’ own working memory or intelligence level. Therefore, this study indicated that the brain games’ fluid intelligence improvement had a transfer effect, and the use of the improvement of the games was particularly high.

Owen et al. (2010) also conducted a study that is characteristic of the evidence ascertained against the effectiveness of brain games on cognitive abilities. The results of this study indicated that the tasks at hand had improved due to these brain games and that every participant trained with cognitive tasks improved their ability to complete the specific task given to them. The brain games improved their performance on the task, resulting in an increase in the individual's intelligence level.

In 2014, the AARP released a survey of 1,200 consumers aged 18 and over. Of those surveyed, 52% were aware of brain training, and of that subset, over 50% agreed that “brain training is exercises or activities that” do each of the following things: “improve memory,” “sharpen intellectual skills,” “help improve my attention span,” “help me think faster,” “prevent memory loss,” and “increase IQ” (David & Gelfeld, 2014).

In addition to the improvement of general cognitive function and memory enhancement, a study by Kesler et al., (2011) has been published to support the efficiency of memory games in remediating specific brain ailments. The results expressed an increase in cognitive flexibility, verbal and visual declarative memory scores, processing speed, and prefrontal cortex activation. This study points to the plasticity of the human brain as evidence for its ability for improvement through different training exercises.

Synthesis

The Civil Service Commission conducts the Civil Service Examination every year to identify and choose qualified candidates for public service who are interested in working for the government.

As it is common knowledge that one of the most challenging government exams in the Philippines is the CSE, particularly the Professional level exam, where only 10–12% of candidates pass. As a result, Civil Service Examination Reviewers are being conducted to help candidates get ready for the exam, particularly for subjects that demand a lot of memorization, including the Philippine Constitution.

Prior studies that aimed to delve into related areas of inquiry were cited in this study, which sought to examine how brain training activities would affect the students' scores as well as their perception of getting high scores on a pre and post-mock test that is primarily about the Philippine Constitution. The majority of linked studies sought to determine how brain exercises and cognitive training affect memory improvement.

It is deemed that thru the employment of brain training activities, students’ scores in the post-test would improve significantly.

3. METHODOLOGY

The researchers assessed the effectiveness of Brain Train activities in enhancing the scores of students from BAC 4-2 in the Philippine Constitution Mock Test multiple choice type of test consisting of 100 items. With this assessment, the researchers aimed to perceive the median of the perception levels of 35 students in the pretest and posttest, as well as the comparison and differences of scores in the pretest and posttest. In addition, the study examined the application of Brain Train Activities on the Philippine Constitution Mock Test. To achieve the study’s overall goal, a mixed method was employed.

For the quantitative part of the study, an experimental research design was used. According to Sugiyono (2009), experimental research is research that seeks to determine the cause-effect relationship between variables in a controlled environment. Under this design, the researchers used the one group pre-test post-test design, in which a single group is measured or observed not only after having been exposed to a treatment of some kind, but also before such exposure. As stated in Press Books, in a one-group pretest-posttest design the dependent variable is measured once before the treatment is implemented and once after it is applied.

On the other hand, for the qualitative part of the study, as regards the students' application of Brain Train activities in preparation for the re-taking of a mock test on the Constitution of the Philippines; the information gathered from the interviews were analyzed using thematic analysis. It is a method of analyzing qualitative data and is commonly applied to a set of text to closely examine the data and identify common themes that appear repeatedly. For this part, students were grouped into four where they were asked to analyze the thematic content of their brain train activities application.

A study by Braun & Clarke (2006) as cited by Kiger & Varpio, (2020) defined thematic analysis as a method for analyzing qualitative data that entails searching across a data set to identify, analyze, and report repeated patterns. In addition to this, descriptive coding was used in order to identify the topics that surface in the data. Furthermore, an inductive approach was utilized and followed the six-phase guide by Braun and Clarke in 2006. An inductive approach allowed the gathered data to establish themes.

The figure below shows the paradigm of the study.

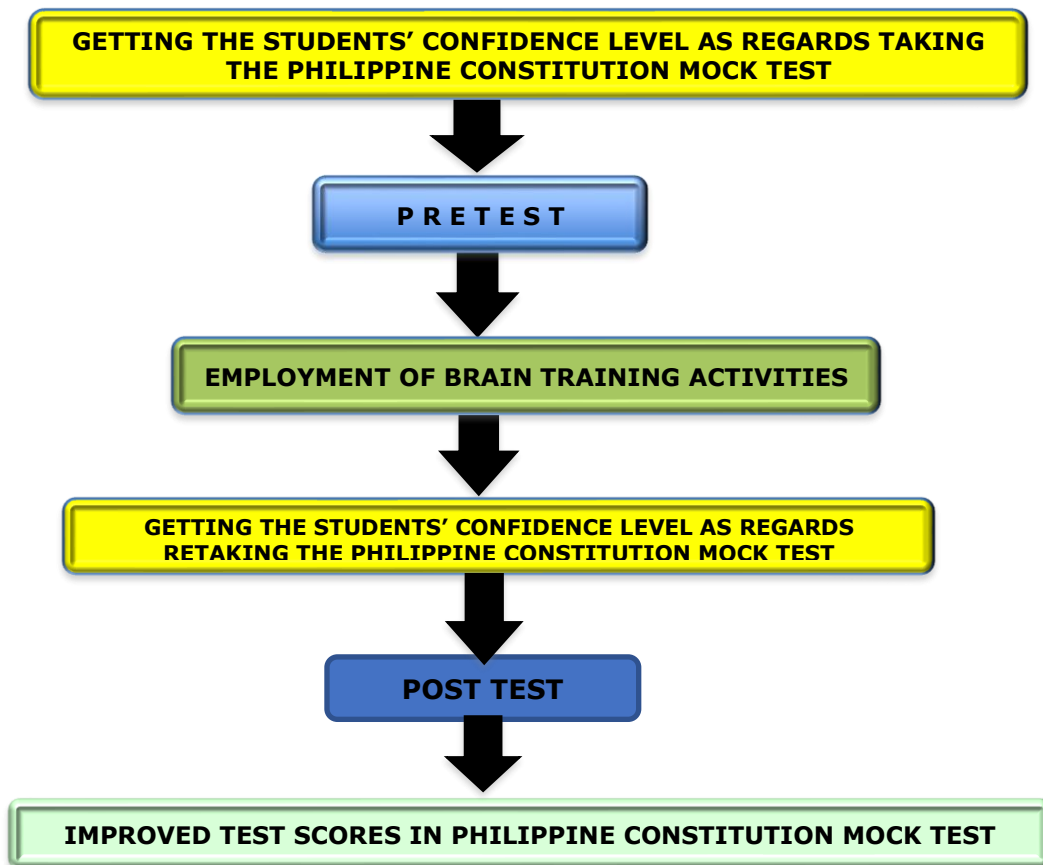


Figure 1: Paradigm of the Study

The entire class of BAC 4-2 comprising of 35 students were asked to give their perception rate as regards getting high score in the Philippine Constitution Multiple choice Mock Test comprised of 100 items before the actual taking of the test. Afterwards, they were taught Brain Train Activities which they would be employing as they retake the test.

Students then, reviewed for two weeks utilizing the Brain Train Activities techniques and as they are to retake the test, they were once again asked to give their perception rate as regards getting a high score in the test considering the preparations

that they made. The expected outcome is for students to have an increased score in their test result.

4. RESULTS AND DISCUSSION

Based on the statement of the problem, this section describes the computation, compilation, and analyses of the data collected from the respondents during the pretest and posttest on the 1987 Constitution Mock Test as well as the students' brain train application.

❖ Students' Perception as Regards Getting a High Score in the Mock Test on the Constitution of the Philippines before the pretest

The thirty-five (35) fourth-year students from Bachelor of Arts in Communication (BAC) block two (2) have provided their perceptions on getting a high score in the mock test on the Constitution of the Philippines before the pretest.

Table 1: BAC 4 - 2 students' perception as regards to getting a high score on the mock test on the Constitution of the Philippines before the pretest

Perception Levels	Interpretation	Number of Participants	
		F	%
1	Extremely Unlikely	0	0%
2	Unlikely	6	17.1%
3	Neutral	19	54.3%
4	Likely	10	28.6%
5	Extremely Likely	0	0%
Total		35	100%

The students' perception levels in the mock test before the pretest were presented in Table 1. A total of 35 respondents were surveyed. The majority of the respondents answered neutral with 54.3% responses, while there were 28.6% who answered likely. However, 17.1% of the respondents expressed unlikely. Meanwhile, none of the respondents answered extremely unlikely and extremely likely. Overall, this shows that the students' perception as regards to getting a high score on the mock test on the Constitution of the Philippines before the pretest was neutral. These results may be likened to the findings from the study of Berry (2008) entitled Pre-Test Assessment, in which it was stated that since pretest is used to measure the depth of understanding of prerequisite material, students may have average subject baseline knowledge on the Philippine Constitution. Hence, students have a neutral perception of getting a high score on the mock test.

In relation to the aforementioned, Mazana et. al (2018) stated that numerous elements, like students' attitudes toward the topic, teachers' instructional methods, and the school environment, have an impact on how well students learn and succeed in a subject.

❖ Students' perception as regards getting a high score in the mock test on the Constitution of the Philippines before the posttest

After taking the pretest the respondents have also provided their perceptions on getting a high score in the mock test on the Philippines Constitution before taking the post-test.

Table 2: BAC 4 - 2 students' perception as regards to getting a high score on the mock test on the Constitution of the Philippines before the posttest

Perception Levels	Interpretation	Number of Participants	
		F	%
1	Extremely Unlikely	0	0%
2	Unlikely	2	5.71%
3	Neutral	6	17.14%
4	Likely	25	71.43%
5	Extremely Likely	2	5.71%
Total		35	100%

Table 2 depicts the students' perception level on getting a high score before the posttest. Similar to Table 1, 35 respondents

were examined. 71.43% of the respondents answered that they were likely to get a high score on the mock test on the Constitution of the Philippines before the posttest. Meanwhile, there were 17.14% who responded neutral. This was followed by the responses unlikely and extremely likely which both garnered 5.71%. These results revealed that the majority of the respondents thought they were likely to get a high score on the posttest.

The study of Hackathorn et. al (2012) entitled *Examining exam reviews: A comparison of exam scores and attitudes* supports the above results. It was shown that t students’ exam scores were significantly higher for the exams following a review than for the exam following the practice test review. This suggests that compared to practice-test reviews, exam reviews can more effectively increase students’ exam scores.

❖ **Students’ Prepared Brain Train Activities in Preparation for the posttest on the Constitution of the Philippines**

After the pretest, the students made their personal Brain Train activities in order to remember the correct answers to the questions that were marked incorrect during the pretest in preparation for the posttest. The Brain Train activities provide different triggers that will make the students’ brain remember things easily. These triggers that were prepared and applied by the students were summarized in a thematic content analysis. Table 3 elucidates the common themes and the respective code within the themes that the students belonging to group 1 as composed of nine (9) members) used in their triggers.

Table 3: Group One’s Application of Brain Train Activities : Cultural and Basic Knowledge Theme

THEME	CODES
Culture	Celebrity Politician History Movie Brand Famous Quotes
Basic Knowledge	Nouns Abbreviations

The most common type of trigger the students used was the partial trigger wherein they use words that rhyme or sound alike to the word or statement they need to remember, and the approximate trigger wherein they divide the word into parts, shortening them. This resulted in a theme where the students used words related to culture and basic knowledge.

In terms of the cultural theme, this encapsulated triggers related to celebrities, politicians, history, movies, brands, and even famous quotes. The students used a trigger that is widely known in relation to the part of the constitution, making it easier to remember. The specifics are shown below.

The Celebrity Judy Ann Santos was prompted to remember the word judicial; the Politician Vice President Leni Robredo was used to remember the term Vice President; for History , President Rodrigo Duterte was associated to extrajudicial killings ; the Movie *Avengers Civil War* was utilized to remember the Civil Service Commission; the cellphone brand Oppo was employed for Ombudsman; and the Famous Quote - “No man is an island” was used to remember the phrase *whenever no law shall be passed*.

Another theme that came up from the triggers was the basic knowledge of a person. This included a variety of nouns that were used in forming a partial trigger that will sound like the word needed to be remembered. Some of the nouns were mixed together in order to form a trigger for words that needed definitions like elbow for Election and Politics, or anatomy, auto, astronomy just to remember the term autonomy. The students also used abbreviations that already exists like PH for the Philippines, AFP for the Armed Forces of the Philippines, and even COA which originally stands for Commission on Audit but was used for Commission of Appointments.

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All in all, the students prepared triggers that varied but all rooted down to using common and widely known words. In connection to what David Eagleman, PhD (2020) stated, the majority of Brain Train activities ended up involving real-word activities, even the silly ones. In this way, they will be able to incorporate words that they usually use or know well to remember facts under the 1987 Philippine Constitution.

As regards Group 2 composed of nine (9) members, they extracted from key sentences and phrases as the condensed meaning unit the codes and eventually the themes.

Table 4: Group Two’s Application of Brain Train Activities (Common Triggers)

Condensed Meaning Unit	Codes	Themes
<ul style="list-style-type: none"> For 1-2 word terms, I used partial triggers words that resonates the same sound of the answer using rhymes and syllables others were simple words that sound like the answer keys. 	Partial Brain Triggers	Partial Brain Triggers for short terms
<ul style="list-style-type: none"> When it comes to terms that I was not fully aware of or sound completely unique, I find a way to bend that term into something simpler for me. While for answers that has more than two words, I only focused between one to two words then pairing it with a different word 	Approximate Brain Triggers	Approximate Brain Triggers for longer and unfamiliar terms
<ul style="list-style-type: none"> For terms in long phrases, I used a combination of partial and approximate triggers to shorten these terms and to only give emphasis on parts Using rhyming words as well as chunking of words I used partial and approximate methods for key details, particularly from long winded questions. 	Combination of Partial and Approximate Brain Triggers	Combining Partial and Approximate Brain Triggers

Based on the results, there are six (6) common themes that emerged as methods of brain riggers for the key informants. The following are the said themes: 1) Partial Brain Triggers for short term, 2) Approximate Brain Triggers, 3) Combining Partial and Approximate Brain Triggers for key details and longer terms, 4) Personal Association as Brain Triggers, 5) Simple and Random Words as Brain Triggers, and 6) Translation as Brain Triggers. The first three (3) themes were based on the initial discussion on the types of Brain Triggers while the remaining themes sprang from the key informants themselves. Table 5 contains the three new themes.

Table 5: Group Two’s Application of Brain Train Activities (New Triggers)

Condensed Meaning Unit	Codes	Themes
<ul style="list-style-type: none"> something I personally relate to or found funny relate the answer keys to some of my personal interests. relate a familiar word which is similar to it. I associated some of the words that I personally relate to 	Personal Association	Personal Association as Brain Triggers
<ul style="list-style-type: none"> random words – the first things that come to mind. I simply put the closest word that can describe that phrase equivalent word seems nonsense at all yet it helped putting in the first thing that came to mind when I encounter words that are completely new to me first word or phrase that came to mind 	Initial Triggers	Simple and Random Words as Brain Triggers
<ul style="list-style-type: none"> memorizing the certain cues that are present within the translated braintrain words When dealing with long phrases, I translated the entire sentence 	Translated Words	Translation as Brain Triggers

Personal Association as Brain Triggers

Personal Association was also found to be a common technique that emerged from the key informants. They were able to associate personal memories and significance to the answers, thus allowing them to remember the terms well in the constitution mock test. Personal associations that are funny, relating to personal interests, and familiarity are main factors that the key informants were able to utilize in acing the said mock test.

Simple and Random Words as Brain Triggers

Some key informants answered that at times the Brain Triggers that they use are the first things or words that come to mind especially for new encountered terms. For phrases, they put simple words to describe them. Some words used were said to be nonsense but helped them in remembering the test answers.

Translated Words as Brain Triggers

As a bilingual or a person that speaks two languages, specifically Filipino and English, some of the key informants said that translating the words in the constitution mock test helped in remembering them. They have translated present words, phrases, and sentences as brain triggers. In this method, it enabled them to remember not only specific answers but also valuable information.

Through brain train exercises, connections in the brain are formed, allowing cells to communicate (Gregory, 2021). The method of Brain Triggers that the key informants used in their review could be seen as an activity that helped them connect correct answers to their corresponding questions easily. The Brain Train Activity functioned as the medium to which the students can answer the constitutional mock test easily. By using Brain Trigger methods that suit individual’s preference and capacity, the students were able to remember their review easily, hence getting better scores in the posttest.

Concerning Group Three as composed of eight (8) members, most of them have used partial brain triggers in their Brain Train Activity and reviewers as a method for easier recall of words.

Table 6: Group Three’s Application of Brain Train Activities: Extracting from Responses

RESPONSES EXTRACTS	CODES	THEMES
<ul style="list-style-type: none"> • Attributing writing those codes or terms in my own language • I made use of partial triggers as my primary brain train strategy • Using rhyming or what it sounds like by associating it with familiar words • I find partial trigger easier to apply to how I familiarize • It establishes a pattern • Easier to recall and more entertaining to listen to a reading that rhyme 	Partial Brain Triggers Use of rhyming words Ease of use	Partial Brain Triggers for Simpler Recall
<ul style="list-style-type: none"> • Partial trigger was used for shorter words • I was able to remember my answers mainly by breaking them down into easier concepts • Mainly used partial triggers to easily remember codes from those that consisted of one to three words • For the more lengthy terms, I used approximate triggers to cut down the phrases • I used partial and approximate triggers • Former mainly helped me think of terms that rhyme • Latter was used to items that were too lengthy 	Partial Triggers for short words Chunking lengthy phrases	The Use of Both Partial and Approximate Brain Triggers
<ul style="list-style-type: none"> • Associate with things I can easily recall • Associated with pre-existing phrases from some series that I’ve watched before. 	Symbol Brain Triggers Visual cues	Visual Association Through Symbols

Alongside the common triggers, there were also few who have utilized multiple brain triggers, notably partial, approximate, and evensymbol brain triggers depending on the length and complexity of the words that were needed to be reviewed from the Philippine Constitution. Regardless of the brain trigger used, each key informant is said to have applied one form of it as a method of preparation and improvement for the post-test.

The use of such review strategies can also be inferred in a research by Moreira et. al (2019), wherein they have stated that the practice of remembering previously studied information, or retrieval practice, is more advantageous for long-term retention than restudying that same information. Through the use of assessments such as free-recall to multiple-choice tests, the results and acquired scores from the use of retrieval practice are favorable to the use of retrieval practice in classroom settings. This suggests the effectiveness of students as a promising strategy to improve learning and test performance.

Based on the emerging themes formulated from the responses, there were three (3) generated themes rooted on the brain train triggers used by the students. In sequence, the themes are as follows: 1) Partial Brain Triggers for Simpler Recall; 2) The Use of Both Partial and Approximate Brain Triggers; and 3) Visual Association Through Symbols.

Partial Brain Triggers for Simpler Recall.

Partial brain triggers were primarily utilized by the students in their brain train review activities through the use of words that rhyme, or by associating familiar words to that of the key words from the Philippine Constitution test. This trigger was said to provide the most ease in reviewing and memorizing test notes because it easily resonates familiarity among short words and establishes a pattern, making it easier for students to recall exam answers.

The Use of Both Partial and Approximate Brain Triggers.

A combination of partial and approximate brain triggers were used by the students as there were cases wherein some of the key words they had to familiarize themselves with consisted of one to three words, whereas others consisted of a longer phrase. For the shorter words and items, familiarizing the terminologies through the use of rhyming words or words that sounds like the answer was done. For items that had longer words, students would chunk these into shorter codes or phrases to make it easier for themselves to familiarize the Philippine Constitution concepts with broken down words. By chunking down the more complex terms, it made the students recall these whilst taking the post-test exam.

Visual Association through Symbols.

Visual Association through Symbols was said to be another method applied by the students to familiarize themselves with the abstract and complex terms from the Philippine Constitution mock exam with the help of symbol brain triggers. By associating phrases or quotes from films, songs, television series, or other pop culture elements they are familiar with, then attaching them to relatable words on the exam, students were able to recall these complicated terms. Their personal attachments and familiarization with the help of symbol triggers provided another form of ease in memorizing answers in the test.

With regard to the Fourth Group as comprised of nine (9) members, as they understood that the first task was determining what was the repetitive way or style of the respondents in making their brain train activity for the Philippine Constitution Mock Test, these were coded and put into specific themes to identify what is the common and the least common theme used by the students.

Table 7: Group Four’s Application of Brain Train Activities

Themes	Codes
Stock Knowledge	1.1 Associate 1.2 Recollection 1.3 Defining
Trigger	2.1 Sounds like 2.2 Numerical interpretation

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	2.3 Abbreviation
	2.4 Illustration
Phrasing	3.1 Wording
Format	4.1 Numerical order
	4.2 Q&A
	4.3 Table

The first determined theme after coding when it comes to the brain train was *stock knowledge* wherein the students used their previous or collected knowledge to associate and recollect ideas that will define and give meaning to the answers in the Philippine constitution mock test which can help them remember the answer or the specific word needed. The students lean more towards associating the answers of the Philippine constitution mock test to their stock knowledge this helped them relate and recollect their memory, which was utilized by *Student A* as she applied the brain train to the question “According to Article II, Section VIII of the Constitution of the Republic of the Philippines, the country pursues a policy of freedom from what kind of weapons in its territory?”: which answers to *Nuclear* and the student associated it with the *alternative source of energy Nuclear plant*.

The theme Stock knowledge was also frequently used by defining a given word such as for *Student B* as she defined *Rates of services fees as Expense*, same was utilized by *Student C* as she defined *Rates of service fees into “Bayarin”*.

The second theme is *Trigger*, where the codes that are collected pertains to small details such as rhyming, illustrating an image, numerical interpretation, and specific way of abbreviating words that can help trigger the students memory. One of the most used styles was also the theme trigger when the students don't rely on their knowledge, they tend to stimulate their memory with their sense for sound and Illustration. The answers in the mock test that helps spark their memory is when they relate it to something that sounds like it, for example for *Student D* when she associates the phrase Death Penalty to Did penalties, this tactic was also used by *Student E* who associated Inviolable to in violin. Another way was abbreviating long terms such as what *Student F* did, in which she used the answer Personal, military & civil and then abbreviated it as PMC. Numbers were also commonly used when it comes to dates and article sections such as with *Student G* in the question How long is life imprisonment? And answers as 30 and one day to forty and were numerically interpreted as 30140.

The third theme is *phrasing*, here is where the students assign a particular wording or phrase for the given word for the brain train activity. This helps stimulate the respondents' memory and helps them remember what is needed. This was the least used by the students out of all the themes. Not all students have used this theme, unlike the other themes which were utilized by all. One of the students that used this was *Student H* who phrased Recall as I forgot, what to do?.

The last theme that was determined was the *format*. It is evident in the brain train activity of the students for the Philippine constitution mock test differs from one another. It can be seen that the students have different ways of organizing and formatting their brain train activity. Most of the students presented their brain train activity with the following sequence: numerical order, the answer to be interpreted then the application of the brain train activity. Few students have presented it completely with the question and answer followed by the associated word. And the rest have organized their brain train activity in a table format in which they separated it into two sections, the word to be interpreted and the associated word. This shows how differently they perceive what can help them remember the Philippine constitution mock test.

As the Brain Train Activity of the respondents was able to be coded and put into their respective themes, it indicates that the wavelength of the students matches with what is the most frequent style utilized when it comes to the brain train activity. The codes; *Associate, Recollection, Defining, Sounds like, Numerical interpretation, Abbreviation* and *Illustration* were used by 8 out of 8 students. While 5 out of 8 students were coded with *Wording* which was least used by the students. The theme *formatting* which has the codes *Numerical order* was utilized by 4 out of 8 students, then 2 out of the 8 students utilized the *Q&A* format and lastly the *table* which was used by the remaining 2 students. This indicates how differently the respondents visually see how the brain training activity can help them. While the similarity among these themes and codes justifies that the same style is commonly used by the students in doing a brain train activity.

❖ Comparison of Students’ Score in the Pretest and Posttest

The thirty-five (35) fourth-year students from Bachelor of Arts in Communication (BAC) block two (2) have answered the Philippine Constitution Mock Test. It was executed into two phases which are the pretest and posttest. The scores of the students have been compared to the test if there is a significant difference between the pretest and posttest scores.

Table 8: Students’ scores in the Pretest and Posttest

	Sum	Mean	Standard Deviation	Standard Error of the mean	N
Pre-test Scores	2506	71.6	10.64	1.8	35
Post-test Scores	2966	84.74	7.85	1.33	35

Table 8 presents the pretest and posttest scores of the students, as well as each of its corresponding summation, mean, standard deviation, standard error of the mean, and the total population number. The researchers see the mean as an appropriate measure of central tendency as it is typically referred to as the “average” and it uses all quantifiable variables in a dataset. Quantitative variables, such as the students’ pre-test and post-test scores, makes the mean the best measure of central tendency as a basis of comparing the two datasets as it takes into account the value of every observation and thus provides the most information of any measure of central tendency (Bhandari, 2022).

Using the mean as a measure of central tendency on a population consisting of 35 students, the researcher was able to determine the mean for the pre-test students’ scores to be 71.6 with a standard deviation of 10.64, whereas the post-test students’ scores’ mean was determined to be 84.74 with a standard deviation of 7.85. The mean most likely follows a normal distribution.

In the above scenario, the standard error of the mean was calculated to be 1.8 for the pre-test scores, and 1.33 for the post-test scores. Inferred from the data laid out on the summation of gathered scores between the pre-test and post-test by the students, it can be derived that there has been an improvement in the performance of students in their tests after applying the brain train review activities. The same results were shown in a study conducted by Balch (1988), wherein a practice group took a sample exam as a test and immediately afterward received an objective assessment of their performance by scoring the test according to a key showing both the questions and answers. A week later through personal assessment and review of the key answers, they scored significantly higher in a post-test conducted. This suggests that students at all levels of academic abilities benefit from an objective assessment of preparation for an exam. In order to obtain a better performance and score.

Table 9: Significant differences in the pretest and posttest Scores of the Students

α	0.05
p-value	4.122
z-score	5.879
Standard error of difference	2.235

Rooted from the data presented in Table 8 and as further indicated in Table 9, since the $p\text{-value} > \alpha$, the null hypothesis of the study is rejected. Comparing the average students’ scores, it can evidently be seen that the average scores from the post test 84.74, is considered to be not equal to the average scores when the students took the mock test, which had an average of 71.6.

In other words, the difference between the average of the post-test scores and the pre-test scores is big enough to be statistically significant. However, to have a statistical foundation on the data to figure out if results are valid or repeatable, a z-test is needed to be performed to check if the means of two populations are different or not provided the data follows a normal distribution. As stated in an article by Hartin (n.d.), the z-test is a statistical hypothesis test used to determine whether

two population means are statistically different and applies only to normally distributed populations with a size that is greater than or equal to 30.

The null hypothesis of a z-test can be rejected if the z-test statistic is statistically significant when compared with the critical value. As shown in Table 9, conducting the z-test determined the test statistic Z equals 5.879, a standard error of different amounting to 2.235, and a p-value that is equivalent to 4.122. This means that the chance of having a type 1 error, or a case of rejecting a correct null hypothesis, is small (Bhandari, 2021). This is because the bigger the p-value, the more it supports the alternative hypothesis. The observed standardized effect size is large, which indicates that the magnitude of the difference between the average and average is large.

5. SUMMARY OF FINDINGS

The explanations on the results that the researcher gathered are the following:

The perception of BAC 4-2 students on getting a high score on the mock test on the Constitution of the Philippines before the pretest is neutral, which indicates the impartial attitude of students towards academic performance. With this, the results obtained a total of 100%, wherein the neutral perception acquired 54.3%. While, likely obtained 28.6%, followed by unlikely with 17.1%. Meanwhile, extremely unlikely and extremely likely both got 0%.

The students' perception as regards to getting a high score in the mock test on the Constitution of the Philippines before the posttest is likely, which indicates positive attitude of students in their performance because of the execution of Brain Train Activities before taking the posttest. In connection with this, the likely perception obtained 71.43%. Followed by neutral perception with 17.14%. Meanwhile, both unlikely and extremely likely perceptions got 5.71% respectively. Furthermore, the score perception of extremely unlikely acquired 0%.

The respondents mostly used partial brain triggers as their Brain Train Activity to easily recall the words. It allowed them to develop a pattern for recalling the answers to the questions. Some people used both partial and approximation brain triggers, especially when reviewing lengthy terms. To easily acquaint themselves with the Constitution, they broke down each difficult word into shorter codes. Lastly, symbol brain triggers for visual association with phrases or quotes they are familiar helped them to recall the correct responses.

After applying and utilizing several brain train activities in their reviewer for the then-upcoming posttest, the students' scores have increased in the posttest in contrast to the scores they obtained in the pretest. The findings showed that the respondents had an average of 84.74 posttest score compared to an average of 71.6 pretest score. The results suggest that the brain activities were helpful in increasing the exam scores of students in retaking the Philippine Constitution exam.

The results from the pretest and the mock test showed significant differences in the average exam scores of the students. The pretest had an average of 71.6 while the posttest had 84.74. In terms of getting the p-value to evaluate whether to reject or accept the null hypothesis, a z-test was performed. The result showed that the p-value was 4.122 greater than the 0.05 level of significance, thus, rejecting the null hypothesis.

6. CONCLUSIONS

The data shown in the previous discussions allow the researcher to come up with a valid and reasonable conclusion to the study by answering given problems and accepting or failing to accept the research hypothesis.

Based on the results, the majority of the respondents did not have the confidence that they would be getting high scores in the mock test on Philippine Constitution as they chose "3" that has a score interpretation of neutral. Additionally, the reason why most students did not choose higher perception levels was because they have not yet engaged in any brain training activities prior to the pretest. With this, the students' perceptions of achieving a high score on the pretest allowed the researcher to assess whether the integration of any brain train activity is effective in raising the students' self-efficacy.

Likewise, majority of the respondents chose "4" that has a score interpretation of likely, before retaking the mock test. It can be concluded that the majority of the respondents have gained the confidence that they would be getting high scores after making use of brain train activities before the posttest. These results emphasized an important

aspect of employing brain training activities, which is that they are designed to enhance students' confidence in getting higher test results. In addition, results showed that the students who participated in brain training exercises might additionally assist in improving and making recalling information uncomplicated. Compound thoughts and topics can be isolated into simpler frameworks, allowing for greater memory and a more systematic and logical review process. Besides, brain training is a simple and straightforward strategy that an individual can use to aid them in planning such as trials, board exams, and other similar situations.

In similar manner, various brain triggers such as partial triggers, approximation triggers, and symbol triggers were used to recall the provisions of the Philippine Constitution. The application of triggers enabled them to form patterns, associate phrases, and symbols, particularly for long and difficult terms, which aided them in becoming familiar with the Constitution.

The researcher found out as well that there is a major difference in the respondents' scores in the posttest in contrast to their scores during the pretest. Thus, it can be concluded that the application of different brain train activities utilized by the respondents helped them correct their errors in the pretest and as a result, helped them improve their overall scores in the posttest.

The findings showed that there is an increase in the average scores of the students after applying the brain train activities for the posttest in Philippine Constitution. Furthermore, in terms of accepting or rejecting the null hypothesis, the results showed that the $p\text{-value} > \alpha$, whereby rejecting the null hypothesis. Therefore, it can be concluded that there is a significant difference between the pretest and posttest scores of students after applying the brain train activities.

7. RECOMMENDATIONS

First, to examine the factors that may affect the students' perception levels in getting a high score before the pretest, future researchers may consider obtaining data regarding the types of preparation being used by the students prior to the pretest. This may aid the researchers in drawing comparisons between the use of other types of traditional review as opposed to the use of brain training activities. Through this, the researchers can then investigate which of the various methods of cognitive preparation has the best chance of increasing the students' perception levels prior to the pretest.

Second, to determine whether brain train activities have a real effect on students' perceptions of getting a high score, future research may consider surveying two groups of students: those who used brain train activities and those who did not. A sampling or a group test is recommended since it is more time-efficient, such as an intelligence measure to many people rather than at once. Additionally, researchers recommend the inclusion of open-ended questions that would assess the students' reasons as regards to their chosen level of perception. Through this, the researchers will be able to further explain and support the data obtained on the likert scale. Finally, researchers recommend presenting and explaining brain train activities in easily digestible manners for the students.

Third, in order to properly execute the brain training activity, the researcher recommends that the students may first identify their strengths and weaknesses after the pre-test before taking the post-test. The students may create a table to visualize the answers in need of memorization or improvement. Afterwards, individually assign a corresponding trigger, word pattern or symbols to easily remember the answer upon taking the post-test.

Fourth, As it is proven in this study that the use of brain train activities improves pre-test scores, the researcher recommends the continuous application of this activity and allow the students to modify it in ways that match their studying habits to maximize its efficiency. In addition, brain train activities can also boost the interest of the students in reviewing their lessons, thus, being bombarded with information overload during their exams can be avoided. Lastly, through the continuous integration of brain train activities, the students will be encouraged to utilize it more and to maximize its use in non-academic related exams as well, like in the Civil Service Examination where memorization is highly required.

Lastly, The researcher recommends the inclusion of different brain train activities in the course syllabus of students as it is proven effective in increasing the recall of students especially to complex terms or ideas. This will allow professors and students to have engaging discussions that can give emphasis on various techniques and methods. In this way, it will be beneficial for the students to use and apply these activities to help them retain knowledge and remember information in general.

REFERENCES

- [1] Allen, M. (n.d.). *One-group pretest–posttest design*. Sage Research Methods. Retrieved June 22, 2022, from <https://methods.sagepub.com/reference/the-sage-encyclopedia-of-communication-research-methods>
- [2] Alt, A. (1998, August). *Memory Enhancement in Adult Learners*. <https://scholarworks.montana.edu/xmlui/bitstream/handle/1/8521/31762104212327.pdf;sequence=1>
- [3] Andaquig, J. P. (2019, June 24). *Strengthen Filipino, Panitikan, and Constitution instruction in basic and tertiary education*. IBON Foundation. <https://www.ibon.org/strengthen-filipino-panitikan-and-constitution-instruction-in-basic-and-tertiary-education/>
- [4] Balch, W.R. (1998). Practice versus review exams and final exam performance. *Teaching of Psychology*, 25, 181-184.
- [5] Berry, T. (2008). Pre-Test Assessment. *American Journal of Business Education (AJBE)*, 1(1), 19–22. <https://doi.org/10.19030/ajbe.v1i1.4633>
- [6] Bhandari, P. (2022, May 22). *What Is the Mean | How to Find It & Examples*. Scribbr. <https://www.scribbr.com/statistics/mean/>
- [7] Bhandari, P. (2021, January 18). *Type I and Type II errors*. Scribbr. <https://www.scribbr.com/statistics/type-i-and-type-ii-errors/>
- [8] Caulfield, J. (2022, May 5). *How to do thematic analysis: A step-by-step guide & examples*. Scribbr. Retrieved June 22, 2022, from <https://www.scribbr.com/methodology/thematic-analysis/>
- [9] Chamidy, T., Degeng, I., and Ulfa, S. (2020). The Effect of Problem Based Learning and Tacit Knowledge on Problem-Solving Skills of Students in Computer Network Practice Course. *J. Educ. Gift. Young Sci.* 8, 691–700. doi: 10.17478/jegys.650400
- [10] Cherry, K. (2021). *Can cognitive training really lead to lasting mental improvement?* Verywell Mind. <https://www.verywellmind.com/cognitive-training-long-term-improvement-2795014>
- [11] Collins, H. M. (2001). Tacit Knowledge, Trust and the Q of Sapphire. *Soc. Stud. Sci.* 31, 71–85. doi: 10.1177/030631201031001004
- [12] *Constitution Day | GOVPH*. (n.d.). Official Gazette of the Republic of the Philippines. <https://www.officialgazette.gov.ph/constitutions/constitution-day/#:~:text=The%20Philippines%20has%20had%20a,lasted%20from%201899%20to%201901.>
- [13] *Constitutional history of Philippines*. (n.d.). International IDEA. <https://constitutionnet.org/country/philippines>
- [14] Cueva, D. (2022, June 16). *CSC Civil Service Exam Reviewer (2022)*. Topnotcher. <https://topnotcher.ph/csc-civil-service-exam-reviewer/>
- [15] Creswell, D. J., Dutcher, J. M., Klein, W. P. R, Harris, P. R., & Levine, J. M., Self-Affirmation Improves Problem-Solving under Stress. *PLoS ONE*, 2013; 8 (5):e62593
- [16] David, P., & Gelfeld, V. (2015, January 20). 2014 Brain Health Research Study. Retrieved from <http://www.aarp.org/research/topics/health/info-2015/staying-sharper-study.html>
- [17] Doyle, T., & Zakrajsek, T. (2019). *Memory: It's a Process*. Oregon State University. <https://success.oregonstate.edu/learning/memory>
- [18] Eagleman, D. (2020, June 23). *10 Brain Exercises That Boost Memory*. Everyday Health. <https://www.everydayhealth.com/longevity/mental-fitness/brain-exercises-for-memory.aspx>
- [19] Fernandes, M., Wammes, J., & Meade, M. (2018, August). *The Surprisingly Powerful Influence of Drawing on Memory*. <https://doi.org/10.1177/0963721418755385>
- [20] FilCil. (n.d.). *The Civil Service Exam Scope, Coverage, and Passing Rate in the Philippines*. <https://filcil.com/civil->

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service-exam-scope-coverage-passing-rate-philippines/

- [21] Hackathorn, J., Cornell, K., Garczynski, A., Solomon, E., Blankmeyer, K., Tennial, R. (2012). Examining exam reviews: A comparison of exam scores and attitudes. *Journal of the Scholarship of Teaching and Learning*, Vol. 12, No. 3, pp. 78 – 87.
- [22] Hartin, T. (n.d.). *Calculating and Interpreting the Z-Test*. Study.com. <https://study.com/learn/lesson/z-test-formula-examples.html>
- [23] Harvard Health. (2021, February 15). *Train your brain*. Retrieved June 24, 2022, from <https://www.health.harvard.edu/mind-and-mood/train-your-brain>
- [24] Heiman, Sheila, "A Study on the Perception of Brain Games and their Effect on Memory and Cognitive Skills" (2014). HIM 1990-2015. 1575. <https://stars.library.ucf.edu/honorstheses1990-2015/1575>
- [25] Hernando-Malipot, Merlina. (February 8, 2020). Learners should have more exposure to Constitution - DepEd. Manila Bulletin <https://mb.com.ph/2020/02/08/learners-should-have-more-exposure-to-constitution-deped>
- [26] Hertzog, Kramer, Wilson, Lindenberger. (2008). *Enrichment Effects on Adult Cognitive Development: Can the Functional Capacity of Older Adults Be Preserved and Enhanced?* <https://pubmed.ncbi.nlm.nih.gov/26162004/>
- [27] Jaeggi, S. M., Martin, B., Jonides, J., & Perrig, W., J. (2008) Improving fluid intelligence with training on working memory. <https://doi.org/10.1073/pnas.0801268105>
- [28] Jedlicka, E. (2017, November). *LearningRx Cognitive Training for Children and Adolescents Ages 5–18: Effects on Academic Skills, Behavior, and Cognition*. <https://doi.org/10.3389/feduc.2017.00062>
- [29] Kesler, S., Hadi Hosseini, S. M., Heckler, C., Janelsins, M., Palesh, O., Mustian, K., & Morrow, G. (2013). Cognitive training for improving executive function in chemotherapy-treated breast cancer survivors. *Clinical Breast Cancer*, 13, 299–306. <https://doi.org/10.1016/j.clbc.2013.02.004>
- [30] Khodabakhshzadeh, H., Zardkanloo, R., & Alipoor, I. (2017, July). *The Effect of Mock Tests on Iranian EFL learners' Test Scores*. <https://files.eric.ed.gov/fulltext/EJ1153955.pdf>
- [31] Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No.131. *Medical Teacher*, 42(8), 846–854. <https://doi.org/10.1080/0142159x.2020.1755030>
- [32] Knowles, M. (1970). *The Adult Learning Theory - Andragogy - of Malcolm Knowles*. Elearning Industry. <https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles>
- [33] Larcombe, W., Tumbaga, L., Malkin, I., and Nicholson, P. (2013). Does an improved experience of law school protect students against depression, anxiety and stress: an empirical study of wellbeing and the law school experience of LLB and JD students. *Sydney Law Rev.* 35:407.
- [34] Legg, T. J. (2021). *22 brain exercises to improve memory, cognition, and creativity*. Medical News Today. <https://www.medicalnewstoday.com/articles/brain-exercises>
- [35] Lumley, T., & Stoneman, B. (2000). Conflicting perspectives on the role of test preparation in relation to learning'. *Hong Kong Journal of Applied Linguistics*, 5(1), 50-80.
- [36] Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2018). Investigating Students' Attitude towards Learning Mathematics. *International Electronic Journal of Mathematics Education*, 14(1). <https://doi.org/10.29333/iejme/3997>
- [37] Melone, L. (2020, June 23). *10 Brain Exercises That Boost Memory*. Everyday Health. <https://www.everydayhealth.com/longevity/mental-fitness/brain-exercises-for-memory.aspx>
- [38] Moreira, B. F. T., Pinto, T. S. S., Starling, D. S. V., & Jaeger, A. (2019). Retrieval Practice in Classroom Settings: A Review of Applied Research. *Frontiers in Education*, 4. <https://doi.org/10.3389/feduc.2019.00005>
- [39] Owen, A. M., Hampshire, A., Grahn, J. A., Stenton, R., Dajani, S., Burns, A. S., & Ballard, C. G. (2010). Putting brain training to the test. <https://doi.org/10.1038/nature09042>

- [40] Patel, Naina (October, 2013). Constitutional Awareness. [https://www.biicl.org/files/6646_burma_constitutional_awareness_booklet_-_english_version_\(2\).pdf](https://www.biicl.org/files/6646_burma_constitutional_awareness_booklet_-_english_version_(2).pdf)
- [41] Price, J. C. R. P. S. (2017, August 21). 8.1 One-Group Designs – Research Methods in Psychology. Press Books. <https://opentext.wsu.edu/carriecuttler/chapter/8-1-one-group-designs/>
- [42] Rezigalla, A., Eleragi, A., Elkhalfa, M., & Mohammed, A. (2019, August). *Comparison of student perception and exam validity, reliability and items difficulty: cross-sectional study*. <https://doi.org/10.1101/19002535>
- [43] Sala, G., & Gobet, F. (2017, November). *Is it possible to boost your intelligence by training? We reviewed three decades of research*. The Conversation. <https://theconversation.com/is-it-possible-to-boost-your-intelligence-by-training-we-reviewed-three-decades-of-research-86554>
- [44] Simons, D. J., Boot, W. R., Charness, N., Gathercole, S. E., Chabris, C. F., Hambrick, D. Z., & Stine-Morrow, E. A. L. (2016). Do “Brain-Training” Programs Work? *Psychological Science in the Public Interest*, 17(3), 103–186. <https://doi.org/10.1177/1529100616661983>
- [45] Sugiyono, S. (2009). Pemanfaatan Kawasan Borobudur. *Jurnal Konservasi Cagar Budaya*, 3(1), 59–65. <https://doi.org/10.33374/jurnalkonservasicagarbudaya.v3i1.67>
- [46] Tamzini, K. (2015). “Strategic Tacit Knowledge-Based Competitiveness,” in *Knowledge Management for Competitive Advantage During Economic Crisis*, eds P. Ordoñez de
- [47] Pablos, L. Turró, R. Tennyson, and J. Zhao (Hershey, PA: IGI Global), 140–163. doi: 10.4018/978-1-4666-6457-9.ch009
- [48] Terada, Y. (2019, March 14). *The Science of Drawing and Memory*. Edutopia. <https://www.edutopia.org/article/science-drawing-and-memory>
- [49] Thorne, G. (2006). 10 Strategies to Enhance Students' Memory. Metarie, LA: Center for Development and Learning. Retrieved Dec. 7, 2009, from http://www.cdl.org/resource-library/articles/memory_strategies_May06.php
- [50] Thorndike, E. L. (1906). *The principles of teaching based on psychology*. New York, NY: A.
- [51] G. Seiler. Waqif, P. (2018, December 3). *Why is the constitution important? - 7 reasons*. Airtract. <https://www.airtract.com/article/why-is-the-constitution-important--7-reasons->
- [52] Watanabe, Y. (2004). Methodology in washback studies. In L. Cheng, Y. Watanabe, & A. Curtis (Eds.), *Washback in language testing: Research contexts and methods* (pp. 19-36). Mahwah, NJ: Lawrence Erlbaum Associates.
- [53] Yang, Y., & Badger, R. (2015). How IELTS preparation courses support students: IELTS and academic socialisation. *Journal of Further and Higher Education*, 39(4), 438-465.
- [54] Zheyu, L., Weijin, C., Jihui, Z., Yuan, W., Ghani, U., & Zhai, X. (2021, July). Investigating the Influence of Tacit Knowledge Transformation Approach on Students' Learning Ability. <https://doi.org/10.3389/fpsyg.2021.647729>