



The Harmonic Mind Map in the Comprehension of Narrative Texts in University Students

El Mapa Mental Armónico en la comprensión de textos narrativos en estudiantes universitarios

Pedro Félix Novoa Castillo*  Universidad César Vallejo, Lima, Perú.
Universidad Nacional Mayor de San Marcos, Lima, Perú.
ORCID: <https://orcid.org/0000-0003-2186-7458>

Rosalinn Francisca Cancino Verde  Universidad de Ciencias y Humanidades, Lima, Perú
Universidad Nacional Federico Villareal, Lima, Perú.
ORCID: <https://orcid.org/0000-0003-0249-5345>

Willian Sebastian Flores Sotelo  Universidad Nacional Federico Villareal, Lima, Perú.
ORCID: <https://orcid.org/0000-0003-3505-0676>

José Nieto Gamboa  Universidad Nacional Mayor de San Marcos, Lima, Perú.
ORCID: <https://orcid.org/0000-0002-1844-8765>

Carlos Oswaldo Venturo Orbegoso  Universidad César Vallejo, Lima, Perú.
ORCID: <https://orcid.org/0000-0002-7465-8687>

Received on 4-17-18 Reviewed on 5-20-18 Approved on 8-20-18 Online on 9-20-18


*Correspondence

Email: pnovoa@ucv.edu.pe

Cite as:

Novoa, P., Cancino, R. Flores, W., Nieto, J., & Venturo, C. (2018). The Harmonic Mind Map in the Comprehension of Narrative Texts in University Students. *Propósitos y Representaciones* 6(2), 541-606. Doi: <http://dx.doi.org/10.20511/pyr2018.v6n2.243>

© Universidad San Ignacio de Loyola, Vicerrectorado de Investigación, 2018

 This article is distributed under license CC BY-NC-ND 4.0 Internacional (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Summary

This article deals with the effect of the Harmonic Mind Maps (HMM) in the comprehension of narrative texts of university students. To achieve this purpose, a quasi-experimental research was carried out within the quantitative approach. From a population of 1500 students belonging to the I Semester of university, a sample of 83 students was taken, and they were divided into two groups: one of control (43) and the other one experimental (40). For the collection of data, adaptations of the PISA Test, 2015 were used. After the application of the HMM, it is concluded that its use positively influences the comprehension of narrative texts.

Keywords. Reading comprehension, narrative texts, mind maps, university students, harmonic mind mind maps.

Resumen

El presente artículo trata sobre el efecto de los Mapas Mentales Armónicos (MMA) en la comprensión de textos narrativos de estudiantes universitarios. Para lograr este propósito se realizó una investigación cuasi-experimental dentro del enfoque cuantitativo. De una población de 1500 alumnos pertenecientes al I Ciclo de una universidad, se tomó una muestra de 83 estudiantes distribuidos en dos grupos: uno de control (43) y otro experimental (40). Para la recolección de datos se utilizó adaptaciones de la Prueba PISA, 2015. Luego de la aplicación de los MMA, se concluye que su uso influencia de manera positiva la comprensión de textos narrativos.

Palabras clave. Comprensión lectora, textos narrativos, mapa mental, estudiantes universitarios, mapa mental armónico.

Introduction

In recent years, the problem of reading comprehension has become more acute that international organizations such as UNESCO and the OECD have interpreted that low reading comprehension results entail an unfair disadvantage of educational and socioeconomic opportunities. According to Washer (as cited in Guerra & Guevara, 2017), comprehension has acquired global significance as it is considered one of the most relevant generic competences in education. It is also included in both national and international performance assessments (p.97).

Some studies have believed that the origin of the problem lies at school level. Consequently, PISA Tests and other local and international programs were promoted to diagnose the world educational scenario. The 2012 PISA results were less than discouraging for Latin America and Spain, and in 2015 the situation remained critical with some signs of improvement for some countries. Differences were even observed in the results both in gender (men and women) and in certain geographical areas, associated with sociological conditions, according to León (2013, p.14) from the results of the PISA tests.

In this context, alternative pedagogical solutions are proposed, such as Larrañaga and Yubero (2015), who came to the conclusion that the most appropriate way to approach the problem of reading comprehension was with a global, creative and personalized strategy. In the same vein, Zumaeta-Arista, Fuster-Guillen, and Ocaña-Fernández (2018) and Fabián (2013) reinforce the idea of the importance of didactics to solve specific problems such as reading comprehension to solve math problems, without making distinctions related to regional origin. Years later, Larrañaga, Yubero and Elche (2018) reiterated that personalization, creativity and the global were essential characteristics for a strategy that seeks to improve reading comprehension of narrative texts. Finally, Márquez (2014), Reyes (2017) and Barreto, Jacobo and Ruiz (2017) agreed that the adequate strategy with the previous characteristics was the Mind Map since they proved that its application had a substantial influence on the reading comprehension of narrative texts.

It was important to reflect on the problem at school level because it was observed that the problem persisted at university level: the university student was a fickle, lazy reader who preferred to read summaries or short hand-outs than to read entire books. It was supposed and speculated about the negative influence of technology, the supremacy of video and the declining image of books. The truth was that reading comprehension continued to be poor. Gonzáles (1998) confirmed this with a study that determined that Peruvian university students' reading comprehension level was cause for concern since 85% did not understand what they were reading. Pizarro (2008) confirmed that university students began their studies exhibiting low-level reading comprehension, and proposed the Mind Maps as an alternative solution.

Mind Map

Before defining the Harmonic Mind Map (HMM), the work takes into account the Mind Map, a visual organizer created by Tony Buzan as a visuographic representation of information. Its constitutive parts are a central element (radiant thinking) and branches that stem from this point and can form other connection nodes and more bifurcations. The Mind Map is a type of representation that involves words, images, colors, etc. in its construction and that activates both the left and right hemispheres of the brain. Its construction logic is based on the neuron form, for that reason, it prefers wavy lines instead of straight lines, due to the idea that the brain assimilates better these forms rather than the rigid and geometric shapes of other visual organizers of information.

According to Tony Buzán (1996): "It is a method of analysis that enables thoughts to be easily organized and mental capacities to be used to the maximum. A mind map is the easiest way to manage the flow of information between your brain and the outside because it is the most effective and creative instrument for taking notes and planning your thoughts" (p.26). As already mentioned before, the Mind Map is an organizer that uses two cerebral hemispheres, unlike other organizers that only activate the left one.

According to Ardila and Ostrosky-Solis (1991, p. 14) brain functions would be arranged as follows:

Table 1.

Brain Functions by Hemispheres.

Brain Functional Organization	
Left Hemisphere	Right Hemisphere
Codes sensory information based on linguistic description	Codes sensory information in terms of images
Temporal analysis	Spatial synthesis
Makes conceptual comparisons regardless of the linguistic content	Makes visual matching without making conceptual comparisons
Perceives details	Perceives form
Lacks a gestalt synthesizer	Lacks a phonological analyzer
Verbal communication	Deals with spatial relations and analyzes parts in relation to the whole
Linguistic and numerical processing	Perceptual recognition of things
Analytical and sequential thinking	Nonverbal thinking

A Mind Map is made up of the following constituting elements:

- A Basic Ordering Idea (BOI): It radiates new ideas that will expand. The generating idea associated with a main topic or issue is expressed in a central creative image, from which the other sections of the topic radiate. The use of color makes it more attractive and pleasant, focuses the attention on eyes and brain, reinforces mental representation, and stimulates memory and creativity. It can be an image or a word (Ontoria, 2006, p. 55).
- Branches: They are a kind of net or loom similar to a neural structure that is formed from the central word, idea or key image, turning into subtopics or sections or categories. These main branches come out of the center, “radiate” in a branched form. (Ontoria, 2006, p. 55).
- Associations - Secondary Ideas: From the keyword or central image “radiate” secondary words or synthesized associations in keywords (adjectives, nouns, and verbs), eliminating prepositions or

connectors (Ontoria, 2006, p.55). Words are written in print, using color, dimension and images to highlight them more. At the same time, these secondary ideas can serve as the center for the creation of other Mind Maps (Buzan, 1996, p. 119).

- Codes, symbols, colors, etc. Codes can be known by the author (when the map is for the author itself) or widely accepted (when it is for a group: percentage, arithmetic mean, currency symbols, etc.). Codes enable immediate connections to be established between the different parts of a Mind Map. They can take the form of signs such as crosses, circles, triangles, and underlines, and save time in expressing ideas (Buzan, 1996, p. 118). Verbal and numerical symbols, reliefs, arrows, geometric figures, and three-dimensional figures can also be used to help us organize different ideas, sequence the hierarchical order of the concepts, and establish associating links or connections (Ontoria, 2006, p. 57).
- Images: Images already made or constructed according to the designer's judgment can be included: a smiling face, a hand, a lamp, a computer, a road, etc. will contribute to good reading comprehension.

The importance of Mind Maps lies in the fact that they are powerful psychological operators for reading, even writing as well. Very similar to the previous classification, Tapia (as cited in Pizarro, 2008) prefers to call "operations" and not "processes" since they consider reading to be a complex cognitive, psycholinguistic and socio-cultural process that goes beyond the translation of graphic signs into sounds of oral language and the interpretation of their manifest or literal meaning. He also defines reading as a dynamic and interactive process of construction and reconstruction of meaning (Comprehension). Moreover, as a dynamic process, reading would involve the following operations: Cognitive operations: recognizing words and associating them with concepts stored in the memory, developing meaningful ideas, relating and integrating the information contained in the

text to the existing cognitive structures, inferring, valuing and assessing in an evaluative way. And psychological operations: Comparison, classification, analysis, and synthesis, analogical reasoning, deductive hypothetical reasoning, abstraction, generalization, etc.

Pizarro (2008) tells us that according to Smith (1995) two essential sources of information are involved in the reading process: Visual information and non-visual information. Visual information is that information that the brain receives through the eyes, i.e. in print. In this sense, reading depends on certain information going from the eyes to the brain. Non-visual information is that information which is behind the eyes and which involves the knowledge of the language, the knowledge of the subject matter of study, the knowledge of how to read. Reading as a cognitive process also includes decoding and comprehension. Decoding is the unravelling of the printed letter, i.e. the operational matching of the graphemic pattern of the word with the phonological pattern in a process at signifier level. Decoding is the process that must be automated in reading and serves as the basis for text comprehension (González, 1998, p. 45).

Harmonic Mind Map (HMM)

This study uses the notion of Mind Map proposed by Tony Buzan that is understood as a powerful visual organizer of information that, through radiant thinking, associates surrounding information using codes and iconic and chromatic symbolization. However, a hidden characteristic of the Mind Map is questioned, which would be its involuntary tendency to the cluttered. This feature, when accentuated, can cause in a short time the confusion of the own author of the map. Thus, the notion of harmony has been added to the actual design and creation of the Mind Map. This addition will single out the proposal and will seek the harmonic design of the maps. The fact that they are harmonic and not asymmetric, as they generally are, will have in their favor to be more pleasant to sight and therefore more understandable than the classic cluttered maps. In exercising and practicing the use of the Mind Maps, it was observed that a hidden characteristic was added to this powerful

organizer that was “the cluttered”. The branches were very confusing and, to some extent, caused an involuntary unintelligibility where only the creator could understand the Mind Map, but not others. Even the creator itself, after a while, no longer interprets its own map in the same fluent way.

Thus, this study sought to replace the hidden characteristic of “the cluttered” with “the harmonic”. This new characteristic understood from the viewpoints offered by architecture and aesthetics as the use of symmetrical forms that provoke pleasant sensations in the spectator since the spectator feels in front of something that is beautiful because it is harmonic. The association of harmony and beauty dates back to classical and Renaissance times: “the Greeks examined the matter in connection with the works of art; hence the Renaissance artists and thinkers considered symmetry and harmony to be the essential elements of beauty” (Konstan, 2015, p. 2). This characteristic makes the schemes not only more understandable, but lasting in time, in the sense that they can be read upon making the Map in the short term, and the fact that their harmonic form and their design symmetry produce certain self-sufficiency in the form which makes their interpretation more fluent.

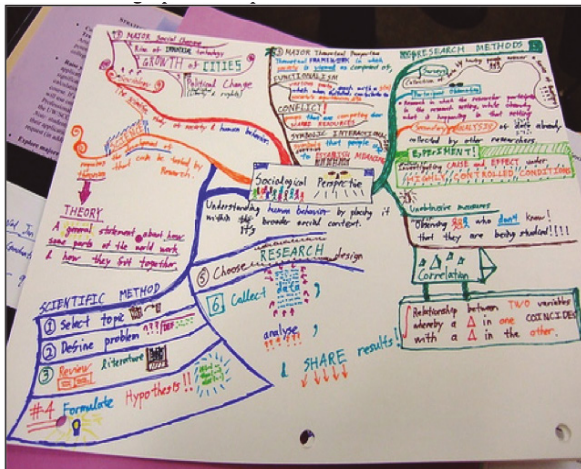


Figure 1. Traditional Mind Map (Research)¹.

1 Retrieved from: http://1.bp.blogspot.com/-CxLynmSrFwE/TyFQmnp_0GI/AAAAAAAAA70/zwu9VMGL4GQ/s1600/mind-mapping.jpg

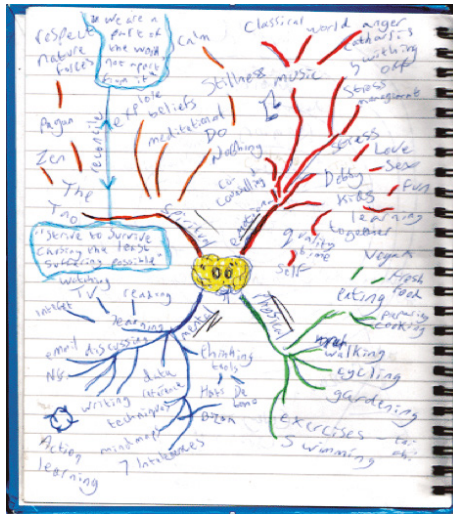


Figure 2. Traditional Mind Map²

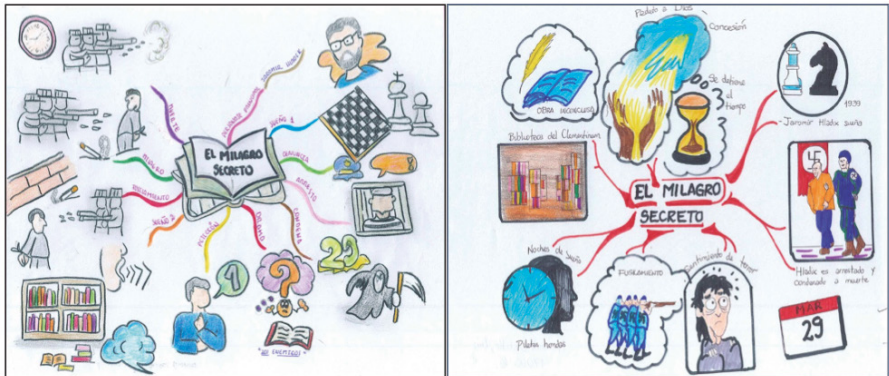


Figure 3. Harmonic Mind Maps³

Characteristics of the Traditional Mind Map and the Harmonic Mind Map.

Buzán (1996) establishes the BOI (Basic Ordering Idea) as the central element of “radiant thinking”, from where branches are radially radiated to

2 Retrieved from: http://1.bp.blogspot.com/-CxLynmSrFwE/TyFQmnp_0GI/AAAAAAAAA70/zwu9VMGL4GQ/s1600/mind-mapping.jpg

3 Harmonic Mind Maps prepared by university students AGQC and LMC.

establish new nodules and relations freely similar to neuronal functioning. Ontoria (2006) highlights in the Mind Map the ability to think by means of texts and images (the latter activates creativity and imagination), the ability to memorize visually and comprehensively, and the ease of hierarchy and categorization of concepts. McCarthy (1991) identifies that a Mind Map uses specific words (names or verbs) to associate them in a non-linear way (this is how the brain would work) with other key terms (González, Pareja and Gea, 2016, pp.137-139). However, as already mentioned before, there is a hidden characteristic, which is the cluttered. A negative attribute that this research work proposes to replace it with a harmonic information organization that will offer an alternative change to improve the Mind Mapping technique.

Table 2.

Comparative Table of the Mind Map and the Harmonic Mind Map.

Mind Map (traditional)	Harmonic Mind Map
Uses the BOI (Basic Ordering Idea)	
Organizes using nodes (words or verbs), branches and bifurcations	
Symbolizes (chromatic codes, images, colors)	
Accumulates information (hidden characteristic)	Harmonizes information (proposed characteristic)

Comprehension of Narrative Texts

It is the process whereby a reader comprehensively understands (literal, inferential and evaluative) a narration, which is understood as a story or a novel (only short story for the purpose of this study), where a sequence of events is developed by characters (plausible or not). This research work uses the Harmonic Mind Map after reading and uses not only the reading itself, but also of the socio-cultural background of the reader. Solé (as cited in Mila-Estrada, 2018):

said that text comprehension depends on previous knowledge. As the student interacts with his or her environment, he or she constructs representations about reality, about the constitutive elements of our culture, thus shaping the schemes of knowledge that can be more or less developed, present a higher or lower number of relations between them, or a variable degree of internal organization that represents a given moment in the history of his or her knowledge that is relative and always expandable (p. 19).

Text comprehension is the process whereby a human being is able to produce a set of meanings through the assimilation of relevant ideas from a given text and relate them, in turn, to other ideas that one already had about the same subject. Likewise, Anderson and Person understand the reading activity as an interactive activity (as cited in Peralta, Aguilar and Mejía, 2017) where the reader has a dynamic relationship with the text where the message affects the subject and the subject, in turn, is also reinterpreted by the subject (p.250). In this same coherence, reading is usually related as an interactive process where the reader has no longer a passive role, on the contrary, it is an active entity that assumes the task of regenerating the meaning and sense of what he is reading. A process that seeks a superficial and literal understanding until the author's intentions are revealed (Alliende & Condemarín, as cited in Gaona, Santos & Coronado, 2016, p. 2).

As for the narrative text, the recent PISA tests (OECD, 2015) understand it as the type of text where the content refers to the passage of time and seeks to answer questions such as when it happened, how the sequences were developed, and why the characters played certain roles in the story told (p. 61). Thus, narrative text comprehension is considered a complex cognitive process whereby a particular text is grasped, interpreted and valued in the mind.

Dimensions of Narrative Text Comprehension

There are several theoretical positions that divide text comprehension into levels. Zorrilla (2005, pp.123-124) points out the reading comprehension levels as a process that is much more than just decoding words and chaining their meanings; there is a series of models that explain the processes involved in reading comprehension, and that coincide in considering that this is a process that is developed taking into account several levels, that is, that the text must be analyzed at various levels ranging from graphemes to the text considered as a whole.

A correct text comprehension entails that the reader goes through all the reading levels (Langer, as cited in Zorrilla 2005) to achieve global comprehension, gather information, interpret, and reflect on the content of a text and its structure.

Many authors have pointed out different comprehension processes that are involved in reading. According to Mullis et al. (2006, pp.4-7): a. Literal comprehension: The reader recognizes and recalls textual elements such as details of location, time, names, characters, and facts, as well as textual ideas and cause-effect relationships present in the reading. b. Reorganization of the information: The reader reorganizes the information through classifications and synthesis. c. Inferential comprehension: The reader adds to the reading his or her personal experience to make conjectures, hypotheses, and implications. d. Critical reading or value judgment: The reader evaluatively the reality and fantasy referred to in the reading that include facts and characters. e. Reading assessment: The reader makes various inferences regarding reasons, causes and other textual references.

The PISA report (2015) summarizes all this in three levels and establishes them as follows: a. Obtaining information: Obtaining information is defined as the location of one or more fragments of information in a text. b. Text interpretation: Text interpretation is defined as the construction of meanings and the creation of inferences from one or more sections of a text. c. Reflection

and assessment: Reflection and assessment are defined as the ability to relate a text to one's own experience, knowledge, and ideas.

This theory has also been assumed by the Manual for Teachers of the Ministry of Education, Peru; where reading comprehension can be assessed at three levels: Literal level: The student knows the characters, places and other details that appear literally in the text. Inferential level: Deductions or inferences are made from the text read. Evaluative level: After reading and inferences are made, value judgments validated by arguments can be made in this level. Levels that allow us to infer what the student knows and can do. Likewise, it is considered that a student should be able to interact with various types of texts in different communicative situations.

This idea of three levels is understood as a dynamic back and forth process between the text and the reader. Idea taken from Strang, Jenkinson, and Smith (as cited in Gordillo and Flores, 2017): literal comprehension level is where the reader identifies basic words of the text in a reconstructive way that, without being mechanical, allows specific and explicit ideas, the evocation and recognition of the sequence of events; it recognizes characteristics of characters, times or places; it identifies the main and secondary subjects. In the inferential level, the implicit is detected between lines; it interprets the connotative and the figurative, it is more abstract; it explains more broadly: it adds data and experiences compatible with the reading; it relates with previous information; it formulates hypothetical suppositions, conjectures, and new ideas; and it essentially seeks conclusions. In the evaluative level, value judgments are made about the reading in a clear and argued manner. (pp. 97-98).

In 2015, the PISA tests breaks down into specific processes and establish, according to the informative website of the Learning Measurement Office, "Obtain information, develop global understanding, interpret, reflect and assess the content of the text, reflect and assess the form of the text" (UMC, 2016, p.43).

According to the PISA Report (OECD, 2015), this type of text falls within the continuous texts, understood as those texts composed of sentences and arranged in paragraphs and which, in turn, can form essay chapters, short stories, reviews, letters, even kindle and other electronic publications (p.60).

Narrative Text Comprehension

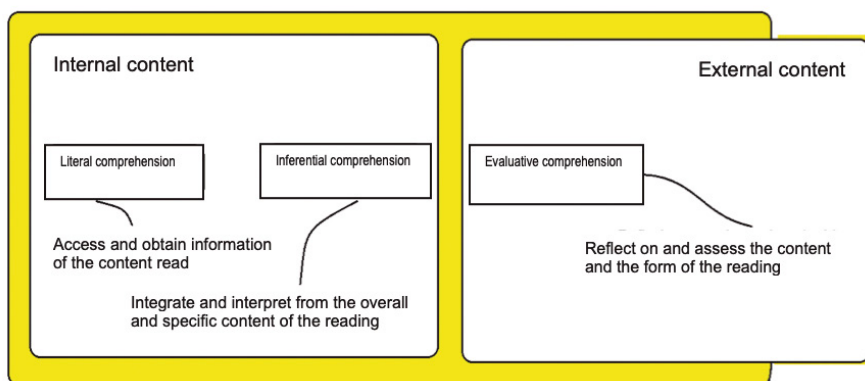


Figure 4. Dimensions of Narrative Text Comprehension

Based on the above, the study used the HMM, a variant of the Mind Map (Buzán, 1996), to improve reading comprehension. And narrative texts were chosen due to their tacit or explicit undervaluation in research works, as expressed by Neira, Reyes and Riffo (2015): “only in narrative text reading, there are no significant differences between skilled and less-skilled readers, which could be also explained by the nature of the literal structure, which is more common in everyday life” (p. 239). Thus, the aim is to determine the effect of the use of HMMs in narrative text comprehension in university students.

Methodology

Design and Procedures

This study used a quasi-experimental design. From a population of 1500 students (Semester I), a sample of 83 students was taken, divided into two

groups: a control group (43) and an experimental group (40). PISA 2015 Test Adaptations were used for data collection. Both groups were given a pre-test, whose results indicated that there were no significant differences between the two groups, at the beginning of the study. Then, we worked with the experimental group on the theoretical and practical aspects of the use of HMM, a variant of the traditional Mind Map that proposes a symmetrical layout of branches, symbols, and figures. This variation was proposed from the analysis of a hidden characteristic of the traditional Mind Map: the cluttered. The fact that branches and bifurcations also became, besides copious, confused when attempting, as stated by Buzan (1996), to express radiant thinking: “[...] starting from a central point to form other ad infinitum connections in an intricate neuronal network” (p. 67). This artificial ambition to resemble the neuronal causes an involuntary disorder in its design and conception. Thus, the proposal was to eliminate this characteristic by replacing it with another: the harmonic, trying to propose symmetry in the line and its corresponding bifurcations. This reformulated map was familiarized during four 90-minute sessions throughout a week. At the end of these activities, both groups were given a post-test. The results were statistically processed and compared. After the respective descriptive and inferential analyses, it was concluded that there were significant differences in the results of the control group and the experimental one, confirming that the use of Harmonic Mind Maps has a positive effect on university students’ narrative text comprehension.

Instrument

The narrative text comprehension variable was measured using a PISA 2015 test adaptation for higher education. Thus, two stories written by Borges were chosen.

Expert judgment was used to check the validity, and a pilot test (PISA-adapted type) was applied to 40 students to prove the reliability of the instruments, and the KR-20 was used.

Table 3.

Narrative Text Comprehension Instrument Reliability.

Variable	KR20	Number of Items
Narrative Text Comprehension	.700	31

Source: Pilot Test Database

Results

Table 4.

Narrative Text Comprehension Results of the Control Group and the Experimental Group according to Pre-Test and Post-test.

Narrative Text Comprehension	Group			
	Control (n=43)		Experimental (n=40)	
	Pre-test			
	<i>f</i>	%	<i>F</i>	%
Low	1	2.3%	0	0%
Medium	24	55.8%	30	75.0%
High	18	41.9%	10	25.0%
	Post-test			
	<i>f</i>	%	<i>f</i>	%
Low	0	0%	0	0%
Medium	26	60.5%	4	10.0%
High	17	39.5%	36	90.0%

The initial results of the students' narrative text comprehension range between medium and high, and the low category is almost non-existent. Likewise, it can be observed that there is a difference between the levels, but in short, they do not exhibit a determining differentiation.

It is concluded that the control group and the experimental group show similar conditions, i.e. there are no significant differences between the two groups.

After applying the Harmonic Mind Maps, it is observed that the control group's and the experimental group's final Narrative Text Comprehension

results are markedly different, where 90% of the experimental group reaches the maximum (high) comprehension level.

It is concluded that the control group and the experimental group show marked significant differences.

Table 5.

Mann-Whitney U Test to confirm the general hypothesis according to ranges and comparison statistics.

Ranges					Comparison Statistics ^a	
Group Test	N	Average Range	Sum of Ranges			
Narrative text comprehension	Pre-test -Control	43	45.37	1951.00	Mann-Whitney U	715.000
					Wilcoxon W	1535.000
	Pre-test -Experimental	40	38.38	1535.00	Z	-1.341
					Bilateral asymptotic Sig; p.	.180
	Post-test -Control	43	27.53	1184.00	Mann-Whitney U	238.000
					Wilcoxon W	1184.000
	Post-test -Experimental	40	57.55	2302.00	Z	-5.723
					Bilateral asymptotic Sig; p.	.000

Note: Grouping Variable: Test and Group^a

From the results shown in Table 5, there are no significant numerical differences in the average range and in the sum of the ranges between the control and experimental groups for *Narrative Text Comprehension*.

Likewise, in the study groups' statistics for the *Narrative Text Comprehension* variable, the value of significance *Sig; p.* = 0.180 is higher than $\alpha=0.05$ (*Sig; p.* > α), and *Z* = -1.341 is higher than -1.96 (critical point).

Thus, it is concluded that at the beginning students show similar results not only for *Narrative Text Comprehension*, i.e. there are no significant differences between the control and experimental groups for each variable.

In the results shown in Table 5, significant numerical differences can be observed in the *Narrative Text Comprehension* variable, in the average range (27.53 and 57.55) and in the sum of ranges (1184.00 and 2302.00) between the control and experimental groups. And in the study groups' statistics, it is observed that the significance value *Sig; p.* = .000 is lower than $\alpha=.05$ (*Sig; p.* < α), and $Z = -5.723$ is lower than -1.96 (critical point). Therefore, the null hypothesis is rejected and the H_1 is accepted, i.e. there are significant differences between the control and experimental groups.

Therefore, it is confirmed that the Harmonic Mind Maps improve undergraduate students' narrative text comprehension.

Discussion

This study proved that the use of the Harmonic Mind Maps (HMM) is an adequate technique to improve university students' narrative text comprehension. Their high compatibility with reading comprehension lies in the fact that the HMM allows a panoramic reading comprehension, a kind of holistic comprehension, and simultaneously, a hierarchical comprehension through branches and sub-branches that are expanding outwards.

The HMM subdivisions are enriched with graphic and chromatic encodings that allow the designer to establish thematic and narrative significance roles that will later be retrieved. These emphases and hierarchies will then be related to literal, inferential and evaluative data.

The common denominator of previous studies has been to propose a means, technique or strategy that solves the reading comprehension problem. This is why, the suitability of mediation through a visual information organizer, and the choice of a narrative text and not another one, are called into question. The choice of the Harmonic Mind Maps can be understood

as the acceptance or rejection of Buzán's original proposal. Narrative text comprehension has no levels, but components that are not necessarily exclusive or sequential one after the other.

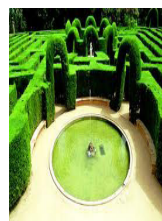
References

- Barreto Perez, L., Jacobo Olivares, L., & Ruiz Ruiz, V. (2017). *Aplicación de la técnica Mapas Mentales para mejorar la Comprensión Lectora en los estudiantes del 2° "A" de Educación Secundaria en la I.E N°80824 "José Carlos Mariátegui"* en El Porvenir. (Tesis de licenciatura). Universidad Nacional de Trujillo, La Libertad.
- Buzán, T. (1996). *El libro de los mapas mentales*. Barcelona: Editorial Urano.
- Fabián, G. (2013). Efectividad de un módulo de resolución de problemas matemáticos en estudiantes de secundaria del Callao. *Propósitos y Representaciones*, 1(1), 87-105. doi: <http://dx.doi.org/10.20511/pyr2013.v1n1.8>
- Gaona, L. P. G., Santos, A. E. G., & Coronado, E. M. (2016). La comprensión lectora en los alumnos de nuevo ingreso caso: Ingeniero En Gestión Empresarial. *ANFEI Digital*, 1(2). Recuperado de: <http://anfei.org.mx/revista/index.php/revista/article/viewFile/111/449>
- González Moreyra, R. (1998). *Nivel de comprensión lectora en los universitarios iniciales*. (Tesis de maestría), Universidad Nacional Mayor de San Marcos, Lima, Perú.
- Gordillo, A., & Flórez, P. (2017). Los niveles de comprensión lectora: hacia una enunciación investigativa y reflexiva para mejorar la comprensión lectora en estudiantes universitarios. *Actualidades Pedagógicas*, 63. Recuperado de: <http://revistas.lasalle.edu.co/index.php/ap/article/view/1048>
- Guerra, J. & Guevara, C. (2017). Variables académicas, comprensión lectora, estrategias y motivación en estudiantes universitarios. *Revista electrónica de investigación educativa*, 19(2), 78-90. Doi: <https://doi.org/10.24320/redie.2017.19.2.1125>
- Konstan, D. (2012). El concepto de belleza en el mundo antiguo y su recepción en Occidente. *Nova Tellus* 30(1), 133-148.

- Larrañaga, E., Yubero, S., & Elche, M. (junio y julio 2018). El desarrollo de estrategias para la comprensión de textos narrativos. *Revista Literatura en Debate*, 11(21), 162-179. Recuperado de: <http://revistas.fw.uri.br/index.php/literaturaemdebate/article/viewFile/2711/2289>
- Larrañaga, E., & Yubero, S. (2015). Evaluación de las estrategias metacognitivas de comprensión de textos narrativos. *Ocnos: Revista de Estudios sobre Lectura*, 14, 8-27. Doi: http://dx.doi.org/10.18239/ocnos_2015.14.02
- León, F. (2013). Diferencias de sexo en matemática y comprensión lectora según poder femenino, urbanización y habilidad. *Propósitos y Representaciones*, 1(1), 11-37. Doi: <http://dx.doi.org/10.20511/pyr2013.v1n1.1>
- Márquez Caro, O. J. (2014). *Influencia de los mapas mentales en la comprensión lectora de los alumnos de educación primaria de educación básica regular*. (Tesis doctoral). Universidad Nacional Enrique Guzmán y Valle, Lima.
- McCarthy, M. J. (1991). *Domine la era de la información*. Barcelona: Robinbook.
- Mila-Estrada, J. C. (2018). La expresión oral en estudiante del nivel medio superior con trastorno del espectro autista. *Ciencia & Futuro*, 8(1), 86-100. Recuperado de: http://revista.ismm.edu.cu/index.php/revista_estudiantil/article/view/1517
- Mullis, Ana et al. (2006). Estudio Internacional de Progresos en Comprensión Lectora PIRLS 2006. Marcos teóricos y especificaciones de evaluación. Segunda Edición. Asociación Internacional para la Evaluación del Rendimiento Educativo (IEA), Ámsterdam, Países Bajos: INECSE Ministerio de Educación y Ciencia. Publicado en español por acuerdo con la IEA. p. 7.
- Muñoz González, J. M., Hinojosa Pareja, E. F., & Vega Gea, E. M. (2016). Opiniones de estudiantes universitarios acerca de la utilización de mapas mentales en dinámicas de aprendizaje cooperativo. Estudio comparativo entre la Universidad de Córdoba y La Sapienza. *Perfiles educativos*, 38(153), 136-151.
- Neira, A., Reyes, F., & Riffo, B. (2015). *Experiencia académica y estrategias de comprensión lectora en estudiantes universitarios de primer año*, 31, 221-244. Recuperado de: <https://scielo.conicyt.cl/pdf/lyl/n31/art12.pdf>

- OECD (2015) Marcos y pruebas de evaluación de PISA 2015. Recuperado de: https://www.mecd.gov.es/inee/dam/jcr:61dd106f-9ec1-4bc6-95ad-177f1848096e/PISA2015_Marcos%20ESP.pdf
- Ontoria, A. (2006). Los mapas, otra forma de aprender. *Revista Magisterio*, 18, 10-13.
- Ostrosky-Solís, F., & Ardila, A. (1991). Un esquema de diagnóstico neuropsicológico: efectos socioculturales y su aplicación en el diagnóstico del daño cerebral. *Salud Mental*, 14(4), 17-24.
- Peralta, T. T. A., Aguilar, P. E. C., & Mejía, S. A. (2017). Calidad Educativa en la Educación Colombiana: Visiones compartidas en el proceso de aprendizaje. *Gestión, Competitividad e Innovación*, 5(2). Recuperado de: <https://pca.edu.co/investigacion/revistas/index.php/gci/article/viewFile/111/111>
- Pizarro Cherre, F. (2008). *Aplicación de los mapas mentales en la comprensión lectora en estudiantes del ciclo I de instituciones de educación superior*. (Tesis de maestría). Universidad Nacional Mayor de San Marcos, Lima, Perú.
- Reyes Melón, N. (2017). *Aplicación de mapas mentales basado en el enfoque constructivista para mejorar la comprensión de textos narrativos en los estudiantes de educación primaria en la IE N° 88151 Multigrado del Caserío de San Martín, en el Año 2016* (Tesis de maestría), Universidad Católica Los Ángeles, Chimbote.
- Smith, F. (1995). *Comprensión de la lectura. Análisis psicolingüístico de la lectura y su aprendizaje*. México: Trillas.
- Zorrilla, M. J. P. (2005). Evaluación de la comprensión lectora: dificultades y limitaciones. *Revista de educación*, 126, 121-138. Recuperado de: http://www.ince.mec.es/revistaeducacion/re2005/re2005_10.pdf
- Zumaeta, S., Fuster, D., & Ocaña, Y. (2018). El afecto pedagógico en la didáctica de la matemática-Región Amazonas desde la mirada fenomenológica. *Propósitos y Representaciones*, 6(1), 409-462. Doi: <http://dx.doi.org/10.20511/pyr2018.v6n1.200>

Appendices



Test 01: The Garden of Forking Paths (Borges)

Student: Semester:.....

University - School..... Date:

Literal Comprehension

1. Identify the protagonist in the story and his role in the story: (Ind. 1)

- A German spy who wants to deliver a message to his homeland.
- A captured Chinese soldier who tries to escape to kill a man.
- A Japanese spy who betrays his homeland and the Germans.
- A Chinese spy who seeks to inform the Germans about the location of a secret base.
- A British general who seeks to free himself from his German oppressors.

Identify the supporting character and his respective relationship in the story (Ind. 1)

- Richard Madden is an Irishman under the service of England.
- Ts'ui Pén is Yu Tsun's great-grandson.

- Hans Rabener, alias Victor Runeberg, is who captures the protagonist.
- Stephen Albert, a Korean soldier who serves the Germans.
- Lidell Hart is a sinologist who knows the Eastern culture.

3. Mark True or False as appropriate to the events in the story: (Ind. 2)

- The protagonist planned to murder a person whose surname coincided with the name of the city that the Germans were supposed to attack ().
- The protagonist finds the perfect name by chance in some old notes ()
- Ts'ui Pen relinquish power to write a novel and build a labyrinth where all men would get lost. ()

IV. The protagonist has a spy partner who made him escape ().

- a) I(T), II(T), III(T), IV(T)
- b) I(F), II(F), III(T), IV(F)
- c) I(T), II(T), III(F), IV(F)
- d) I(T), II(F), III(T), IV(F)
- e) I(T), II(F), III(F), IV(T)

4. Put the following events in the same order as they appear in the story (Ind. 2)

- I. Before being murdered, the victim recognizes the protagonist as the great-grandson of a Chinese writer.
- II. Encounter of the protagonist with his victim.
- III. Reference to a supposed book.
- IV. Escape planning and search for a name in a telephone directory.
 - a) III, I, IV, II b) I, IV, III, II
 - c) III, IV, II, I d) I, III, IV, II
 - e) II, III, I, IV

5. Recognize the event that does not correspond to the development of the story: (Ind. 2)

- a) History of War is a book from which the narrated story is supposed to have been taken.
- b) At no time it is said that the story told is incomplete or lacks information.
- c) The events take place in Staffordshire and Ancre, both English locations.
- d) It is told that it took Ts'ui Pen thirteen years to write his novel.
- e) The novel and a labyrinth were the same as they set parallel realities.

6. The story is contextualized in: (Ind. 3)

- a) 1946, during the World War II.
- b) 1939, at the end of World War I.
- c) 1919, in the middle of World War I.
- d) 1916, during the World War I.
- e) 1959, during the beginning of the postwar period.

7. Mark the incorrect information on the reading text: (Ind. 2)

- a) In the enigmatic novel there were some supposed incoherencies such as the death of some characters and then their reappearance in later chapters.
- b) Albert tells his murderer that he never criticized his eastern ancestors and that he did not deserve to die.
- c) Albert reveals the secret of the enigmatic novel: the book is the labyrinth, and the labyrinth is not spatial but temporal.
- d) The word not mentioned in the novel The Garden of Forking Paths is "time".
- e) Finally, Albert is killed because he would be used for a greater plan.

8. Mark which couple of intellectuals are mentioned in the story: (Ind. 1)

- a) Freud and Nietzsche
- b) Nietzsche and Newton
- c) Einstein and Descartes
- d) Hegel and Marx
- e) Newton and Schopenhauer

Inferential Comprehension

9. It can be concluded from the use of omissions and/or gaps that the author proposed: (Ind. 1)

- a) To create suspense in the readers.
- b) To encourage the readers to fill these gaps with their own interpretation.
- c) To leave necessary loose ends as it is a police plot.
- d) To show that even with these gaps the story is understandable.
- e) To explain the idea of the spatial labyrinth within the story itself.

10. It is inferred that trying to bifurcate times implies the possibility of(Ind. 2)

- a) realistic – denying all possibilities.
- b) absurd - questioning time linearity.

- c) fantastic - embracing all possibilities.
- d) obvious - living parallel worlds in time.
- e) contradictory - correcting possibilities in time.

11. The Garden of Forking Paths is deemed to be of.....: (Ind. 3)

- a) a comparison - of infinite spaces.
- b) a direct reference - of multiple spaces
- c) a symbol - multiple times.
- d) an exaggeration - parallel spaces.
- e) a similar projection - the chaotic nature of time.

12. The fact that the victim recognizes his murderer is simply explained by: (Ind. 2)

- a) The planning.
- b) The error.
- c) The suspicion.
- d) The fate.
- e) The guess.

13. Because of its structure and certain thematic elements, this story could be considered: (Ind. 3)

- a) costumbrist and realist
- b) horror and fantastic
- c) suspense and realistic
- d) self-help and psychological
- e) police - fantastic

14. The main theme of the text is: (Ind. 3)

- a) Multiple time.
- b) Temporal circularity.
- c) Time stopped.
- d) The chaos and fate of time.
- e) Temporal linearity.

15. One of the main ideas of the text is that the labyrinth is also..... where the... must..... (Ind. 4)

- a) existence – human being - deny the claim of the sense.
- b) writing - writer - produce a sense
- c) reading - reader – find a sense
- d) life - man - imagine a sense
- e) reality – mankind - annul nonsenses.

16. One of the following secondary ideas of the text is not deduced from the reading text: (Ind. 2)

- a) Randomness is involved to give us a surprising destiny.
- b) Time is linear and predestines man.
- c) Times are different although the man is the same.
- d) The labyrinth is the representation of all the possibilities we have in life.
- e) The man can live parallel times.

Evaluative Comprehension

17. How would you assess the protagonist’s attitude in deciding to kill a man for his espionage purposes? Briefly justify your answer. (Ind. 1)

- a) Exemplary b) Absurd
- c) Obvious d) Surprising
- (e) Irrelevant

Justify:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Test 02: The Secret Miracle



Student:.....Semester:.....

University - School..... Date:

Literal Comprehension

1. Identify the protagonist of the story and the initial action that is narrated: (Ind. 1)

- a) The Jewish priest Jaromir Hladik plays a chess game, although he does not know the rules of the game.
- b) The poet Jaromir Hladik dreams of a chess game, although in the dream he has forgotten the rules of the game.
- c) The Jewish priest Jakob Boehme dreams of a chess game, although in the dream he has forgotten the rules of the game.
- d) The poet Jaromir Hladik imagines that he wins a chess game, even though it was endless.
- e) The Jewish priest Jaromir Hladik imagines a chess game that is endless.

2. Identify the supporting character and his/her respective relationship in the story (Ind. 1)

- a) Julia de Weidenau is the youngest daughter of the protagonist.
- b) Jakob Boehme is a converted Jew who is a Gestapo spy.
- c) Julius Rothe is one of the chiefs of the Gestapo of the Third Reich.
- d) Jaromir Hladik is the author of a comedy called The Enemy.
- e) Jaroslav Kubin is brother of Julia de Widenau.

3. Mark True or False as appropriate to the facts of the story: (Ind. 2)

- I. It was raining on the execution date ().
- II. The form of the shooting so many times imagined happened just as in reality. ()
- III. The execution was carried out by half a dozen riflemen ()
- IV. The protagonist agreed to smoke before the execution ().

- a) I(T), II(T), III(T), IV(T)
- b) I(F), II(F), III(T), IV(F)
- c) I(T), II(V), III(F), IV(F)
- d) I(F), II(F), III(T), IV(T)
- f) I(T), II(F), III(F), IV(T)

4. Put the following events in the same order as they appear in the story (Ind. 2)

- I. The protagonist is arrested for being Jewish and then sentenced to death.
 - II. The protagonist asks for a year of life to finish his unfinished work.
 - III. The protagonist is awakened by the noise of Nazi tanks.
 - IV. The twenty-ninth of March at 9 a.m. is set as the date of the execution of the protagonist.
- a) III, I, IV, II b) I, IV, III, II
c) III, IV, II, I d) I, III, IV, II
e) II, III, I, IV

5. Recognize the event which does not correspond to the protagonist of the story: (Ind. 2)

- a) He twice redoes the third act of his work.
- b) For a moment he thinks to see Flaubert's face in one of the riflemen.
- c) When time stops, he can move and manage to go home.
- d) Four bullets were fired at him, which finally killed him.
- e) He dies two seconds later than the initial sentence.

6. The story is contextualized in: (Ind. 3)

- a) The end of World War II, during the Nazi invasion of Paris.
- b) During the bomb attack of the Nazi aviation to Guernica.
- c) The beginning of World War I, during the Nazi invasion of Russia.
- d) During the course of World War I, during the unconditional surrender of France.
- e) The beginning of World War II, during the Nazi invasion of Prague.

7. Mark the incorrect information on the reading text: (Ind. 1)

- a) Hladik is a Jew roughly over 40 years old.
- b) The protagonist agrees to smoke even though it was not his habit.
- c) The work of the protagonist respects the classic space-time-action units.
- d) The randomness, the labyrinth, library and time are the subjects dealt with.
- e) The protagonist only dreams once in the story.

8. Mark which group of writers are mentioned in the story as an intertextual tribute: (Ind. 1)

- a). Virgilio and Homero
- b).Dante and Virgilio
- c). Dostoievski and Homero

- d) Virgilio and Flaubert
- e) Flaubert and Dante

Inferential Comprehension

9. It can be concluded from the equivalence of two minutes and one year, the main idea of the story, that time: (Ind. 1)

- a) does not go in a linear fashion.
- b) is relative according to the circumstances.
- c) is not susceptible to retrospective.
- d) is necessarily interrupted.
- e) is circular and chaotic.

10. It is inferred that the protagonist represents the obsession of a with(Ind. 2)

- a) Writer - his work. b) Man - destiny.
- c) Poet - a book. d) Jew - salvation.
- e) Prisoner - his freedom.

11. The interpretation of the role of dreams in the story would be to serve as.....: (Ind. 3)

- a) Corroboration of the facts of the past.
- b) Prolongation of what has been lived in the present.

- c) Sublimation of the desires of the protagonist.
- d) Repression of the frustrations of the protagonist.
- e) Anticipation to later events.

12. The librarian who tells the protagonist that he went blind looking for God symbolizes: (Ind. 3)

- a) Human frustration about the search for knowledge.
- b) Man's ambition to overcome God.
- c) The arrogance of erudition for trying to achieve the impossible.
- d) Longing for knowing the divinity.
- e) The artist's attempt to achieve perfection.

13. God saying to the protagonist: "The time for your work has been granted" implies that: (Ind. 2)

- a) The protagonist's life is about to end.
- b) He will have time to finish his drama.
- c) He will finally stop working.
- d) He will have no hope to finish his work.
- e) Finally, he will write again as before.

14. The central theme of the text is: (Ind. 4)

- a) The work of a writer b) The literary vocation
- c) Supportive immolation d) The misfortune of a poet.
- e) The incomprehension of the artist.

15. The relationship between chronological and psychological times is (Ind. 1)

- a) Equal and conclusive.
- b) Relative and contradictory.
- c) Dissimilar and irreconcilable
- d) Parallel and harmonic
- e) Conclusive and incomplete.

16. One of the following secondary ideas of the text is not deduced the reading text: (Ind. 2)

- a) Fiction always overcomes reality.
- b) Imagination can mold what is real.
- c) Literary obsession overwhelms the existence of the writer.
- d) Physical time and thinking stop.
- e) The completion of a work cannot be postponed.

Evaluative Comprehension

17. How would you describe the attitude of the protagonist towards his literary creation? Briefly justify your answer. (Ind. 1)

- a) Exemplary
- b) Absurd
- c) Obvious
- d) Surprising
- e) Irrelevant

Justify:

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

18. How would you describe the end of the story? Briefly explain your answer. (Ind. 2)

- a) Surprising
- b) Predictable
- c) Incredible
- d) Imprecise
- e) Ambiguous

Explain:

.....
.....
.....
.....
.....

19. Which part of the story did you find the most interesting?

Explain (Ind. 3)

.....
.....
.....
.....
.....

20. In general, what did you think about the story? Briefly explain your reasons. (Ind. 2)

a) Very good b) Good

c) Regular

d) Boring e) Very bad

Explain:

.....
.....
.....
.....
.....