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Methods of musical education for the development of the musical memory of music students

Métodos de la educación musical para el desarrollo de la memoria musical de los estudiantes de música

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ABSTRACT

Musical memory is the ability to remember what is heard in the order and appropriate sequence in real or delayed time, in music education it plays an important role, since it serves to learn the different forms of praxis that are developed in the classroom, understand them and remember them; ability that the students of the first semester fail to develop in their basic environment, therefore our objective is to specify the level of retention in musical memory of different rhythmic sequences, intoned and spoken, according to the application of three methods: Dalcroze, LenMus, and Color Sound Ratio. The approach is quantitative, since the research is quasi-experimental, for this the 41 students of the Musical Language I course were taken and we divided them into two groups (experimental and control). The results obtained show that the three methods applied are effective in solving the different combinations of rhythmic, melodic dictation and note recognition on the staff. Concluding that the degree of retention in musical memory of different rhythmic sequences, intoned and spoken, according to the application of three methods is significant at an expected level of achievement.

Keywords: Learning of musical language, hearing, auditory memory, musical memory and musical thought.

RESUMEN

La memoria musical es la habilidad para recordar lo oído en el orden y secuencia apropiada en un tiempo real o diferido, en la educación musical cumple un rol importante, ya que sirve para aprender las diferentes formas de praxis que se desarrollan en el aula, comprenderlas y recordarlas; habilidad que los estudiantes del I semestre no logran desarrollar en su entorno básico, por consiguiente nuestro objetivo es precisar el nivel de retención en la memoria musical de diferentes secuencias rítmicas, entonadas y habladas, según la aplicación de tres métodos: Dalcroze, LenMus, y Relación Sonido Color. El enfoque es cuantitativo, ya que la investigación es cuasi experimental, para ello se tomó a los 41 estudiantes del curso de Lenguaje Musical I y los dividimos en dos grupos (experimental y control). Los resultados obtenidos evidencian que los tres métodos aplicados son eficaces para resolver las diferentes combinaciones de dictado tanto rítmico, melódico y de reconocimiento de las notas en el pentagrama. Concluyéndose en que el grado de retención en la memoria musical de diferentes secuencias rítmicas, entonadas y habladas, según la aplicación de tres métodos es significativo en un nivel de logro esperado.

Palabras clave: Aprendizaje del lenguaje musical, audición, memoria auditiva, memoria musical y pensamiento musical.

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INTRODUCTION

Memory is basically a brain function, the human being has been able to develop it allowing a complex evolution of its species (Pino, 2011). This function allows the organism to encode, store and retrieve information (Feldman, 2005), all of which is the product of the complex repetitive synaptic connections between neurons, in the central nervous system of the human brain (Córdoba, Albert, & López, 2010); Memory is an indispensable element for the development of the human being, therefore, "it is the ability to remember past events in beings endowed with consciousness and it is also the ability to previously repeat what has been learned" (Royal Spanish Academy, 1995).

Musical memory is fundamental in musical formation, it allows the individualization of the elements of music in the brain, achieving better assimilation, contributing to the development of an excellent career as a concert player and performer (Velásquez, 2010); expert musicians achieve high-level experiences thanks to the practice and education acquired in their field, since they use the same strategies of experts from other areas that require memorizing large amounts of information (Noice, Jefferey, Noice, and Chaffin, 2008).

The development of auditory competence, education or formation of the musical ear through memory, is a slow but firm process, therefore, successful, when simultaneously working on reading, writing, listening and musical performance through singing or of the interpretation of a musical instrument. The application of a software produces a development in the musical thought manifested by the awareness in the sound or auditory images, when the physical sound is not present (Martinez, 2008).

Riera (2011) in his research carried out the integration of music and painting through sound and color, as well as the different aspects related to perception, to the cognitive processes for the interpretation, creation and appreciation of art as an experience. kinesthetic, where the correspondence between musical notes and colors is established to create a link between the musical scale and the color scale in order to represent a melody of a piece of classical music in order to identify the musical tones and the rhythm in the pictorial work.

On the other hand, Sandoval (2015) as a product of his research, states that music has a transforming effect on the development of working memory in children of transition level 2, especially regarding its phonological nature, promoting significant changes in children. Likewise, Sanches, Flores and Aravena (2003) state that children with visual disabilities manage to develop their short-term memory through audio, for which the researchers presented an "Audiomemorice" software, the purpose of which is that sound constitutes a powerful interface to stimulate the memory development of blind children.

In this understanding, Herrera and Cremades (2012) in the results of their investigation show that the most appropriate model for developing memory work is the combination of visual, auditory, kinesthetic and analytical memory, as well as activities of ludic, motivating and creative character (Berrón, Balsera, and Monreal, 2016).

The approach of this work is based on the fact that the entrants to the Music program of the National University of the Altiplano present a pre-basic level in their audio perceptual training (Musical Language) since only 10% of the entrants meet the minimum requirements for start their professional career, these data are evidenced in the final results of the course, managing to pass only 30%, (survey applied to incoming students 2018 II), in relation to this the objective of specifying the level of retention in memory is set musical of different rhythmic sequences, intoned and spoken, according to the application of three methods: Dalcroze, LenMus, and Color Sound Relationship.

THEORETICAL FRAMEWORK

Musical Memory

Musical memory is a special capacity to preserve and remember a series of musical sounds, when they are presented to us, as a melody or a harmonic progression (Shinn, 1984) that manifests itself in different characteristics: power, ease, tenacity, volubility and ordering. , are classified into three grades: *quick musical memories to retain*, but which easily forget what he calls "writing in sand". *Musical memories that require more effort*, but are strongly preserved, what he calls "Stone engraving". *Unstable musical memories*, which present data that is not required and push them to the expression inopportunely or have messy contents, with a slow contribution when the

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opportunity to use them has already passed, what he calls "vanes in the wind" (Barbacci, 1965).

Music compromises our brain as a whole (Clynes, 1982), all humans have an innate ability to process music (Ibarra, 2009), where the right hemisphere coordinates musical memory and perception, which increases cerebral blood flow in the right temporal lobe, which is the one that participates in hearing (Bowers, 2003), it is so that music covers many areas distributed throughout the brain, including those that are normally involved in other types of knowledge (Weinberg, 2006) Thus, we can state that musical perception arises from the interaction of activity on both sides of the brain (Cromie, 1997).

Chaffin and Imreh (2002), in a study of an expert pianist, found that auditory and muscular memory associated with conceptual memory, when the auditory and muscular graphs are brought together, create automation in movements during performance, while the conceptual memory is used to locate itself, that is, to know what part of the work is being executed. On the other hand, Chaffin and Logan (2006), affirm that, if there is a hierarchical organization of memory, since the experts manage to use a mental map of the work, thus we can manifest that of all the gifts with which individuals may be endowed, none arises earlier than musical talent (Gardner, 1994).

Janata and Grafton (2003) state that the regions of the human brain responsible for perceiving music are: a) rostromedial prefrontal cortex, remembers and processes tones - responsible for learning musical structures. b) right temporal lobe basic sound processing - separates musical harmony from other auditory stimuli. c) limbic system, responsible for perceiving emotions - maintains communication with the temporal lobe and therefore music impacts feelings.

Music is made of a large number of small chained fragments and the perception of this is simply the concatenation of a series of perceptual acts on such fragments (Sloboda, 1985) from which auditory intelligence derives, in this sense for Willems (2001) , auditory intelligence can be understood as an abstract synthesis of sensory and affective experiences, this translates into understanding music. He also affirms that musical reading and writing are intellectual means to fix and transmit sonorous musical thought, where musical intelligence is configured through memory, inner hearing, creative imagination, chords, relative and absolute hearing.

To be a good musician, good listening must be developed, which implies having developed the auditory competence to recognize it through memory; For music students, ear training is fundamental in their professional training, because when listening to any melody they can transcribe it, considering that transcribing is encoding the signs of musical language, the latter is what a composer does when he creates music in his mind and then writes it down, where the role of the interpreter is to play or sing that music for the listener to enjoy, that is, it is the means of communication between the composer and the audience (Alvarado, 2013). Auditory competence is developed by means of **auditory warm-up** which is to train the ear in the basic aspects - dictating the key, the beat, the intervals, the rhythm, the melody and the harmony, the initial sound, the type of beginning, the number of bars that the dictation has (Martinez, 2008).

From a linguistic perspective, "hearing" is a biological phenomenon, which is associated with the ability to distinguish sounds; "listening" belongs to the domain of language where social interactions with others are constituted; the difference is that when we listen we enter the interpretive world, which implies compression (Echeverría, 2002).

According to Paney (2007), hearing or auditory training is a direct association between the ear and the brain in the sense of the ability to understand music from an auditory perspective, it is based on Hedges to affirm that the theory of writing involves the encoding and decoding of music conceptually, while the theory of hearing involves the encoding and decoding of music perceptually.

Dalcroze method

The Dalcroze method is based on the idea that the student must experience music physically, mentally and spiritually, with the development of the inner ear as the main goals, as well as the establishment of a conscious relationship between mind and body to exercise control during the musical activity. The method is applicable to an age spectrum that ranges from 3-4 years to adulthood. In the specific case of musicians, it is important to highlight the auditory work through

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the discrimination of the different parameters of the sound (height, duration, intensity, timbre), as well as the different tones and modes, through its own methodology (Ráez, 2013).

The Dalcroze method divides musical training into three aspects that are closely related to each other: ***Eurythmy***, (good rhythm) enters the student's body to consciously feel the muscular sensations of time and energy in their manifestations in space, the body becomes into an instrument and executes or transforms into movement some aspect of the music. Dalcorzian ***solfege***, development of the inner ear in the student to listen musically and sing in tune. ***Improvisation***, motivates the student to express their own musical ideas by stimulating the powers of concentration and the ability to listen and imagine creating feelings of satisfaction and achievement (Jaques, 1999).

LemMus method

Phonascus, in Latin "the music teacher", is a software for learning the musical language, which can be used to improve the skills to read scores, to improve the musical ear or, simply, to learn the fundamental principles of language and music theory (Salmerón, 2013).

LenMus is useful for ear education, intonation, and music dictation, identifying intervals, scales, and chords is difficult, and almost impossible to practice without a teacher playing the piano. LenMus Phonascus is always there for you and you don't need a piano. LenMus includes the following exercises: interval comparison, interval identification, note identification, chord identification, scale identification, cadences identification, key identification.

Color Sound Relationship Method

It is characterized by providing visual support through colors that represent each of the musical sounds used, the theory of sound and its relationship to color is based on Isaac Newton's experience of the passage of light through the prism and the result was the seven colors of the rainbow, in the same way a relationship is established by way of analogy, with the musical sounds of the scale. (Cidoncha, 2011).

The seven sounds are represented by the seven colors of the prism or the rainbow according to Isaac Newton's color theory. (Lopez, et al., 2005*)*.

Table 1.
Musical Note and Color Tone Data Analyzed.

Sound λ (nm)	Sound Nota	Sound *f* (Hz)	Color λ (nm)	Color *f* (THz)
16.504	Eo	20.601	780	384
11.670	Ao#	29.134	755	397
8.252	E1	41.202	730	411
5.835	A1#	58.268	705	425
4.126	E2	82.404	680	441
2.918	A2#	116.537	655	458
2.063	E3	164.808	630	476
1.459	A3#	233.074	605	496
1.032	E4	329.616	580	517
0.729	A4#	466.147	555	540
0.516	E5	659.232	530	566
0.365	A5#	932.295	505	594
0.258	E6	1318.464	480	625
0.182	A6#	1864.590	455	659
0.129	E7	2636.928	430	697
0.091	A7#	3729.179	405	740
0.064	E8	5273.856	380	789

Source: Color and Music: Physical Relationships between Color Tones and Musical Notes. (Perez and Gilabert, 2010).

The letters that represent the sounds are E and A# and are equivalent to Mi and La #. The suffixes go from 0 to 8 and indicate the height of those notes, 0 would be the value with the lowest frequency (deepest) and 8 with the highest frequency (high-pitched). When the values go from E0 to E1 the distance is one octave (eight notes from Mi to Mi) which we can see in figure 1.

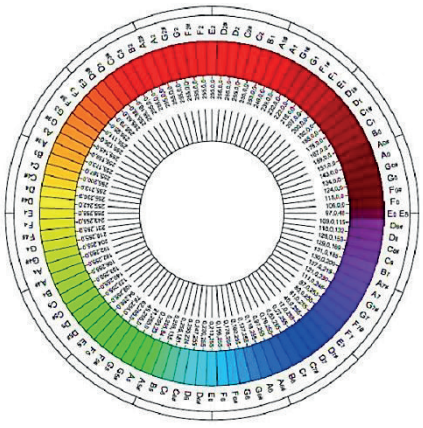

Figure 1. Pure and Applied Optics
Source*:* Color and Music: Physical Relationships between Color Tones and Musical Notes. (Perez and Gilabert, 2010).

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According to Aschero, *numerophony* starts from the relationship between image and sound, from the link between the most powerful senses that are sight and hearing. This is an interactive code of the physico-mathematical areas, of Pythagorean origin, which has been developed with scientific thinking, integrating optics, acoustics, geometry and arithmetic, in a unique model of symbolic representation, as we appreciate in the figure 2 (Aschero, 2012).

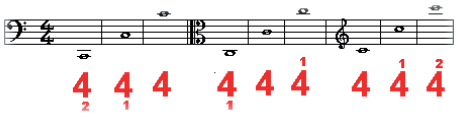

Figure 2. Numerophony of Sounds in C
Source: Numerofonia (Aschero, 2012).

Color indicates the height of the sound, for example, red is the C Sound. The scale used by Aschero has twelve sounds just like the chromatic scale of a piano, hence the colors make up the chromatic scale of color in direct relation to the chromatic scale of musical sounds as indicated in Table 2.

Table 2.
Sound Color Relationship According to Aschero

N°	Note	Color
12	B	Purple
11	B flat or A sharp	Magenta
10	A	Violet
9	A flat or G sharp	Blue
8	G	Cobalt
7	G flat or F sharp	Cyan
6	F	Emerald
5	E	Green
4	E flat or D sharp	Lime
3	D	Yellow
2	D flat or C sharp	Orange
1	C	Red

Source: Numerofonia (Aschero, 2012).

MATERIALS AND METHODS

The research paradigm in which the work is framed is the positivist one, because it is based on data analysis procedures such as those established in the exact sciences, just as the laws that explain natural or physical phenomena do (Cohen and Manion, 2003). Within this paradigm, quantitative research is positioned, where it uses the collection of information to test or test hypotheses through the use of statistical strategies based on numerical measurement (Hernández, Fernandez, & Baptista, 2014).

Research design

The design used in the research is quasi-experimental, since the subjects are not randomly assigned to the groups nor do they match, because such groups already existed, which are called intact groups, (Campbell and Stanley, 1996), of two groups (control and experimental), with entrance test (Pretest) and Exit (Postest). The treatment was applied to the experimental group, where the design is represented as follows:

Tabla 3.
Research Design Representation

G.E.	Y1	X	Y2
G.C.	Y1	-	Y2

DESCRIPTION:

G.E. = Experimental Group
G.C. = Control Group
Y1 = Entry Test (Pretest)
Y2 = Exit test (Postest)
X = Experiment (applied methods)

Technique

The Survey was used, this technique is widely used, because it allows data to be obtained and processed quickly and efficiently, in addition to serving to collect data from the units of analysis (Barraza, 2006) and they are classified according to those who request and provide the information, that is, according to the subjects involved (Rodriguez, 1996).

Instruments

The measurement instruments were the entrance test (Pretest) and exit (Postest), supported by observation and the field diary. Cerda (1993), states that the instruments allow access to the information needed to solve the problem or check the hypothesis.

Pretest: It was used to collect the first information about the degree of retention in the musical memory of the students and was made up of 3 essential parts of the musical language that are Rhythmic, Overtone, Speech solfege. Posttest: It served to collect the final information about the degree of retention in the musical memory of

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the students and was made up of 3 essential parts of musical language that are Rhythmic, Tuned, Spoken solfege. To hierarchize the knowledge obtained we based on the following table.

Table 4
Memory retention level

Category	Punctuation
Expected Achievement	18-20
Planned Achievement	14-17
In process	11-13
In Start	00-10

Source: Academic Performance Scale

Field diary: It was used to record the events that took place in the classroom, school and community. Especially in the pedagogical practice of the research professor.

Population

The population was made up of the students of the first semester of the Music Program, of the Musical Language course, ranging in age from 17 to 24 years old, being a total of 41 students, where 95% were male and 5% were female, all admitted to UNAP through a vocational aptitude test and a general knowledge test for the 2018-II academic year. It is worth mentioning that 90% of students come from the provinces of the Puno region and 67% had their musical training in their schools (band, student and choir workshops), developing only the basic part of theory, instrumental performance, and some aspects of music theory or listening training. 77% do not read music on a staff, 84% play their instrument by ear, and 74% of them play from memory. (Source: survey made to students of Musical Language I, academic year 2018 II).

Sample:

For our study we use the diverse samples or with maximum variation: these samples are used when seeking to show different perspectives and represent the complexity of the phenomenon studied, or to document diversity to locate differences and coincidences, patterns and particularities. (Hernández et al., 2014). It was formed as follows:

Table 5.
Sample of Musical Language Course Students

Cicle	Group	Number
I	Experimental	20
	Control	21
Total		41

Source: table 5

Data collection

The instruments for data collection were explained to the experimental group and how they should be applied to the research. In turn, this group received an experimental treatment of the learning sessions according to the proposed methods in order to consolidate their Musical language. For the control group, the musical language learning activities were developed routinely as it was done in the previous semesters.

Formulation of the statistical hypothesis

- **Ho:** The average of marks obtained in the Pretest by the students of the experimental group is similar to those obtained by the control group.

$$Xe = Xc$$

- **Ha:** The average of marks obtained in the Postest by the students of the experimental group is different from those obtained by the control group.

$$Xe > Xc$$

- **Determination of the level of significance**
  It was used $\alpha = 0{,}05$, which means 5% error and the degree of significance is 95%.
- **Student's t test to compare means**
  The student's t-test was used, the formula of which serves to establish differences that have occurred in the experimental group, through which the retention level in the musical memory of the students of the first semester of the musical language course was established.

Where:

t = t calculated
$Y_1\ Y_2$ = Arithmetic mean
$SC_1\ SC_2$ = Variance
$n_1\ n_2$ = Sample

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$$t = \frac{\bar{Y}_1 - \bar{Y}_2}{\sqrt{\frac{SC_1 + SC_2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

RESULTS AND DISCUSSION

The pre-test consisted of three parts; the assigned percentage was in relation to the weight of the questions. The first part was made up of rhythmic sequences, (comprehension) number of figures, combinations and rhythmic designs, it was assigned 40%. The second part corresponds to the intoned sequences (reproduction), height of the sounds in the staff and assimilation of the sound, it was assigned 30%. The third part corresponds to the spoken sequence (assimilation) recognition of the notes on the staff, it was assigned 30%, after tabulating the results of the two groups, the following was obtained:

Table 6.
Pretest GE Test Average

N° Est.	G. Experimental Pretest							
	O1		O2		O3		Total	
	fi	%	fi	%	fi	%	fi	%
1	9	47%	7	33%	11	55%	9	45%
2	9	47%	11	53%	14	68%	11	56%
3	11	53%	8	38%	10	50%	9	47%
4	11	57%	4	18%	19	93%	11	56%
5	14	70%	4	20%	14	70%	11	53%
6	9	47%	9	45%	3	15%	7	36%
7	8	38%	8	38%	14	70%	10	49%
8	7	33%	4	20%	10	50%	7	34%
9	10	48%	7	33%	19	95%	12	59%
10	14	68%	9	45%	10	48%	11	54%
11	16	82%	13	63%	10	50%	13	65%
12	11	53%	15	73%	8	40%	11	55%
13	6	28%	9	45%	2	8%	5	27%
14	15	75%	19	93%	14	70%	16	79%
15	6	28%	10	48%	10	50%	8	42%
16	16	78%	9	45%	5	23%	10	49%
17	4	20%	7	33%	12	60%	8	38%
18	12	58%	4	20%	13	63%	9	47%
19	13	65%	14	70%	11	55%	13	63%
20	3	13%	18	88%	7	35%	9	45%
AVERAGE	10	50%	9	46%	11	53%	10	50%

Source: Pretest GE test results

Table 6 shows the results of the application of the pretest test of the three objectives of the experimental work group, where we can see that the group has been able to achieve an average of 10 out of 20 points, which is equivalent to 50%.

The level of retention of the musical memory of the experimental group is in **the start**, since in order to reach the competences of the Musical Language course, it must be further developed; This test is corroborated with the analysis of the field diaries, where we observe that the students do not have a full development of the musical memory. On the other hand, we can affirm that the students do manage to solve some simple exercises. In the experimental group, the highest score that was obtained in the pretest test is in location n°14 with 16 of 20 points, equivalent to 79%, this means that the student managed to answer 15 of 20 questions, and the lowest score that is had is of the student in location n°13, with 05 of 20 points equivalent to 27%, which means that they only managed to answer 2 of 20 questions. Results that are corroborated with Berrón, Balsera, and Monreal (2016), a conscious work of attention and memory retention capacity contributes to students in their learning.

Table 7.
Promedio de la Prueba Pretest GC

N° Est.	G. Control Pretest							
	O1		O2		O3		Total	
	fi	%	fi	%	fi	%	fi	%
1	7	35%	16	74%	10	48%	11	52%
2	7	35%	9	43%	7	33%	8	37%
3	16	78%	4	19%	10	48%	10	48%
4	5	25%	18	86%	14	64%	12	59%
5	8	40%	12	57%	11	50%	10	49%
6	13	63%	6	26%	6	26%	8	39%
7	15	71%	4	19%	13	62%	11	51%
8	14	67%	6	26%	13	62%	11	52%
9	7	35%	9	40%	10	48%	9	41%
10	14	65%	7	31%	8	38%	9	45%
11	8	40%	8	38%	13	60%	10	46%
12	7	35%	8	38%	20	93%	12	55%
13	8	40%	13	60%	9	40%	10	47%
14	5	22%	12	57%	13	60%	10	46%
15	8	38%	12	57%	12	57%	11	51%
16	10	46%	13	62%	17	81%	13	63%
17	16	75%	7	33%	8	36%	10	48%
18	3	14%	10	45%	8	38%	7	33%
19	7	35%	12	57%	10	45%	10	46%
20	9	43%	7	33%	8	36%	8	37%
21	6	27%	11	52%	15	69%	10	50%
AVERAGE	9	44%	10	45%	11	52%	10	47%

Source: Pretest GC test results

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Table 7 shows the results of the application of the pre-test of the three laid out objectives of the control work group, where we can see that the group has been able to achieve an average of 10 out of 20 points, which is equivalent to 47%.

The level of retention of the musical memory of the control group is **in the start**, since in order to reach the competences of the course, it must be further developed, this test is corroborated with the analysis of the field diaries, where we observe that the students they do not have a full development of musical memory. On the other hand, we can affirm that the students do manage to solve some simple exercises. In the control group, the highest score that was achieved in the pretest test is that of the student who is in location n°16 with 13 of 20 points equivalent to 63%, this means that the student managed to answer 11 of 20 questions , and the lowest score is in location n°18, with 7 of 20 points equivalent to 33%, which means that they only managed to answer 5 of 20 questions. Results that are corroborated with Garcia (2016), who indicates that students and teachers must be aware of the study of musical memory, if they do not know this, they will always opt for low results in learning music in general.

The posttest test consisted of three parts to which the assigned percentage was in relation to the weight of the questions. The first part of rhythmic sequences (figures, combinations and rhythmic designs) was assigned 40%. The second part corresponds to the tuned sequences (intonation of the notes and short melodies), it was assigned 30%. The third part corresponds to the spoken sequences (recognition of the notes on the staff), 30% was assigned. After tabulating the results of the three groups, the following was obtained:

Table 8.
Promedio de la Prueba Postest GE

N°	G. Experimental Postest							
	O1		O2		O3		Total	
	fi	%	fi	%	fi	%	fi	%
1	16	80%	18	90%	18	88%	17	86%
2	17	85%	18	88%	18	88%	17	87%
3	17	83%	20	98%	19	93%	18	91%
4	15	77%	19	93%	19	93%	17	87%
5	17	85%	19	95%	19	93%	18	91%
6	19	95%	20	98%	18	88%	19	94%
7	18	92%	19	93%	19	95%	19	93%
8	18	88%	18	88%	19	95%	18	90%
9	18	90%	18	90%	20	100%	19	93%
10	19	93%	18	88%	19	95%	18	92%
11	17	83%	19	9 3%	18	90%	18	89%
12	17	87%	18	88%	19	93%	18	89%
13	19	93%	18	88%	17	83%	18	88%
14	19	93%	18	90%	19	93%	18	92%
15	16	82%	18	88%	19	93%	17	87%
16	19	95%	19	93%	17	85%	18	91%
17	17	83%	18	88%	18	90%	17	87%
18	17	85%	19	93%	19	93%	18	90%
19	18	92%	19	95%	17	85%	18	91%
20	17	83%	19	95%	18	88%	18	89%
AVERAGE	17	87%	18	91%	18	91%	18	90%

Source: Postest GE test results

Table 8 shows the results of the application of the post-test of the three laid out objectives of the experimental work group, where we can see that the group has been able to achieve an average of 18 out of 20 points, which is equivalent to 90%.

The level of retention of the musical memory of the experimental group is in **expected achievement**, demonstrating that they already have the skills of the course, in turn the test is corroborated with the analysis of field diaries. On the other hand, most of the students manage to solve the simple exercises using musical memory. In the experimental group, the highest score that was obtained is in location

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n°6 with 19 of 20 points, equivalent to 94%, this means that the student managed to answer 18 of 20 questions, and the lowest score that is obtained. it belongs to the student in location n°1, with 17 out of 20 points equivalent to 86%, which means that I manage to answer 16 of 20 questions. Results that agree with Balo (2015), where he indicates that in order to correctly carry out the different types of dictation, the development of two capacities is required: memorizing what has been heard and writing it down on paper using the codes proper to literacy.

Table 9.
Posttest GC Test Average

N°	G. Control Postest							
	O1		O2		O3		Total	
	fi	%	fi	%	fi	%	fi	%
1	11	52%	16	74%	18	86%	15	71%
2	14	68%	16	74%	16	74%	15	72%
3	12	59%	13	60%	13	62%	13	60%
4	16	76%	16	74%	14	67%	15	72%
5	11	54%	14	67%	16	74%	14	65%
6	14	68%	16	76%	12	57%	14	67%
7	12	56%	11	52%	15	71%	13	60%
8	15	73%	11	52%	16	74%	14	66%
9	11	52%	13	62%	17	79%	14	64%
10	11	51%	15	69%	12	55%	12	58%
11	14	65%	13	60%	17	81%	14	69%
12	19	89%	12	55%	12	55%	14	66%
13	12	59%	16	74%	15	69%	14	67%
14	12	57%	17	79%	14	64%	14	67%
15	13	62%	15	71%	15	69%	14	67%
16	12	57%	14	67%	14	67%	13	64%
17	11	54%	16	74%	13	60%	13	63%
18	15	70%	12	55%	16	76%	14	67%
19	11	54%	12	57%	15	71%	13	61%
20	14	65%	13	62%	13	62%	13	63%
21	12	57%	15	71%	17	81%	15	70%
AVERAGE	13	62%	14	66%	15	69%	14	66%

Source: Postest GC test results

Table 9 shows the results of the application of the post-test of the three laid out objectives of the control work group, where we can see that the group has been able to achieve an average of 14 out of 20 points, which is equivalent to 66%.

It can be stated that the level of retention of the musical memory of the control group is in **planned achievement**, since they have a greater development to reach the competences of the course, this test is corroborated with the analysis of field diaries. On the other hand, we can affirm that most of the students manage to solve the simple exercises. In the control group, the highest score that was achieved is that of the student in location n°2 with 15 of 20 points equivalent to 72%, this means that the student managed to answer 15 of 20 questions, and the lowest score that was obtained it is of the student in location n°10, with 12 of 20 points equivalent to 58%, which means that he managed to answer 11 of 20 questions.

The Results Obtained are similar to the studies carried out by Martinez (2008), where he concludes that the development of auditory competence, education or training of the musical ear through memory, is a slow but firm process, therefore successful, when reading, writing, listening and musical performance is worked simultaneously through singing or playing a musical instrument.

Another study by Velásquez (2010), concludes that musical memory is an indispensable element in the formation of a musician, since it allows the individualization of the elements of music in the brain, achieving a better assimilation of all the musical elements.

Table 10.
Paired Sample Statistics

		Mean	N	Standard deviation	Standard error mean
Par 1	exp_pretest_fi	10,0000	20	2,42899	,53005
	exp_postest_fi	17,9048	20	,62488	,13636

Source: Statistical Test.

Table 11.
Correlation of paired samples

	N	Correlation	Sig.
Par 1 exp_pretest_fi & exp_postest_fi	20	,066	,777

Source: Statistical Test.

Table 10 and 11 describe the measurements to be compared and present the correlation between them in the experimental group, where we observe that the mean for the pretest is 10.00 and for the posttest is 17.90, the standard deviation it is 2.42 for the pretest and 0.62 for the posttest, where the mean error for the pretest is 0.53 and for the posttest it is 0.13 and the degree of correlation is 0.66 with a significance level of 0.77. This indicates that indeed there is a high level of significance.

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Table 12.
Testing of paired samples

		Paired differences					t	gl	Sig. (bilateral)
		Mean	Standard deviation	Standard error mean	95% confidence interval of the difference				
					Lower	Upper			
Par 1	exp_pretest_fi - exp_postest_fi	-7,90476	2,46789	,53854	-9,02813	-6,78139	-14,678	19	,000

Source: Statistical Test.

Table 12 presents the statistical test itself, which describes the difference from the mean, the standard deviation of the differences, the standard error of differences, and finally the *t*-test. of the experimental group in the application of the pre and posttest and it is stated: that we did find differences in the level of retention of musical memory of different sequences, between the measurement of the beginning (pretest) and the measurement made at the end of the intervention (posttest) , since a *t* value of -14.6 *gl* = 19 degree of freedom and p = 0.000 is observed, less than 0.05, so the level of musical memory retention of different sequences is different between the first (pretest) and the second (posttest) measurement; therefore the H_o hypothesis is rejected and the H_a hypothesis is accepted.

Validation of the general hypothesis

From the data obtained of 2.09>1.72; that is to say that: $X_e > X_c$ the alternative hypothesis is accepted and the null hypothesis is rejected, then it is concluded that the level of retention in musical memory in the experimental and control group is different after the experimental treatment.

CONCLUSIONS

The level of retention in musical memory of different rhythmic, tuned and spoken sequences of musical notes, according to the application of three methods: Dalcroze, LenMus, and the Color Sound Relationship has improved significantly, since the majority of students (80%) in the post-test they were placed on the **Expected Achievement** scale, compared to the pre-test, where the majority of students (45%) were placed on the **In Start** scale, the students who underwent obtained the development of their musical memory with the help of the methods used, managing to solve the different combinations of dictations, both rhythmic, melodic and of recognition of the notes in the staff, thus overcoming the level of retention in musical memory.

The level of retention in the musical memory of rhythmic sequences, according to the application of the Dalcroze method, is significant at a level of **Planned Achievement**, since the majority of students (45%) managed to internalize the rhythm through movement, develop the ear through listening to various rhythmic combinations, mastering the combinations of the main rhythmic patterns between quarter note and half note, quarter note and eighth note to assimilate and then reproduce them, compared to the pretest test that the majority of students (55%) were in a **In Start** level of their learning.

The retention level in the musical memory of tuned sequences, according to the application of the LenMus method, is significant at an **Expected Achievement** level, since the whole students (100%) managed to solfe with the appropriate intonation, recognize the intervals of second and third major and minor fourth fair, compared to the pretest test that most students (75%) were at a **In Start** level of their learning.

The level of retention in musical memory of spoken sequences, according to the application of the Color Sound Relationship method, is significant at an **Expected Achievement** level, since the majority of students (85%) managed to recognize the musical notes and their dynamics in the staff through colors, for their assimilation and reproduction, compared to the pre-test where the majority of the students (50%) were at **In Start** of their learning.

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Conflicts of interest

The group of researchers has no conflict of interest.

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