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Graphic organizer: Methodological strategy for meaningful student learning

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ABSTRACT

The complexity of explaining and describing educational phenomena poses a significant challenge for educators, who must convey information effectively through pedagogical mediation and structured methodologies. This study investigates the impact of graphic organizers as a methodological strategy to enhance meaningful learning in Educational Management. Employing a quantitative quasi-experimental design, the research utilized observation and surveys as data collection techniques, with a checklist and the ACRA Scale on Learning Strategies as instruments. The study involved 57 students, divided into an experimental group (n = 29) and a control group (n = 28), who underwent pre-test and post-test evaluations. Findings indicate a statistically significant difference between the two groups, supporting the alternative hypothesis. The experimental group exhibited substantial improvements across conceptual, procedural, and attitudinal learning dimensions, reinforcing the effectiveness of graphic organizers in fostering structured knowledge acquisition and cognitive development. The post-test results demonstrated higher retention rates and deeper comprehension among students who utilized graphic organizers. The study concludes that graphic organizers enhance meaningful learning by providing visual structures that facilitate information processing and conceptual connections. These findings underscore the importance of integrating structured pedagogical tools in higher education to stimulate critical thinking, improve content retention, and promote autonomous learning. Future research should explore the long-term effects of graphic organizers across diverse academic disciplines to validate their broader applicability in educational settings.

Keywords: meaningful learning, knowledge, methodology strategy, information, mediation

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INTRODUCTION

Nowadays, teachers have become mediators. The main problem with this type of learning is that students do not learn effectively because they are used to repeating their knowledge to explain the evaluation process. The information representation becomes a mental and internalization process due to an increase in the learning process of means of creation, organization, and transfer of information.

Teachers play an essential role in the learning guidelines and students' teaching. Therefore, teachers need to include a set of strategies in their heritage education that help the students gain knowledge, considering their abilities and skills. Thus, knowledge development means greater involvement in thought processes in this type of teaching and cognitive expansion.

According to Vargas-Murillo (2020), graphic organizers are the best method to teach thinking skills because they are visual representations of concepts, explanations, or templates of information (synoptic tables) useful for visual and semantic coding of concepts. Humans have always kept in touch with images, graphics, and visual elements, causing admiration and attention, but they may affect some reflective, speculative, critical understanding, etc. In today's society, it

is reflected in television programs, movies, YouTube, magazines, mockups, crosswords, posters, image advertising, the internet, etc. (Munayco-Medina, 2018).

Those who deeply study learning mediation consider that the mental and visual graphic organizers are resources teachers use as an educative strategy to carry out the teaching process and promote meaningful learning in students through developing thinking skills. A study by López González et al., 2018 establishes that a mind map directs the attention of both the student and the teacher to a series of important ideas to focus on learning tasks.

Graphic organizers are educational resources that promote ideas and show various information so the students can clarify and organize their ideas. The teachers systematize and prioritize the information to develop new knowledge. Therefore, it is important in the educational field because they contribute valuable experience to enhance teaching.

Mendoza Machado (2021) shows that it is a constructive process like mental analysis exercises, comparison, and imagination, and as an interactive process, produces information exchange between what is already known and what will be known. The teacher's interest in addressing the approaches and demands of the socio-educational context allows them to discover techniques and strategies related to brain focus and knowledge development.

According to García Franco et al. (2020), learning this strategy early promotes intellectual skills development and necessary mental operations to assimilate content. Therefore, its development did not start from scratch; rather, it is based on knowledge developed from mental structures achieved. The graphic organizer aimed to activate the reader's previous knowledge and promote coding strategies that ultimately lead to higher retention (Tayo-Haro, 2018).

To improve the students' cognitive process, it is necessary to participate actively in knowledge development. Therefore, the training activities must be focused on the design of learning objects using graphic organizers. These tools facilitate the understanding and assimilation of contents and the creation of meaning.

In recent years, the acquisition of graphic reproduction skills has caught the attention of many experts who consider that graphic organizers are a powerful tool to achieve meaningful learning. Knowledge cannot be created without an individual constructive mental activity that addresses the internal needs associated with evolutionary development.

Poso & Gómez-Crespo and Romero & Quesada (Guerra Reyes, 2018) indicate that the full awareness of the importance of students' preconceived ideas, reflections, and questions about their origins allows teachers to understand better how they develop knowledge. Therefore, "Facilitating effective planning approaches and strategies promotes a meaningful learning of scientific concepts and theories".

A question arises: How does the graphic organizer impact students' meaningful learning in the subject Educational Management at High School Education of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga)?

With that in mind, the present study aimed to determine the impact of graphic organizers as a methodological strategy in meaningful learning for the students in the subject Educational Management at High School Education of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga)

METHOD

From a paradigmatic perspective, the data were collected directly from the subjects in the context under study because the work presented corresponded to quantitative studies in the field. The hypothetical-deductive method confirmed the research's hypothesis based on a structured design that sought objectivity.

It is a quasi-experimental research design with variables measured at two different times and in two different groups: a control group and an experimental group. The study aims to determine the impact of graphic organizers as a methodology strategy in the meaningful learning of students in the subject of Educational Management. Longitudinal designs are the most effective tool in the social and behavioral sciences in this field.

The study population comprised 413 students at the Professional School of High School Education of the School of Education Sciences of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga).

Since the sample groups were randomly selected, the researchers considered that each population group had the same opportunity of being selected by a non-stochastic sample. The sample comprised 57 students, all enrolled in educational management during the 200I semester at the Professional School of High School Education of the School of Education Sciences of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga). They were distributed as follows: 29 students from group No. 02 in the experimental group and 28 from group No. 01 in the control group.

The data collection techniques were observation and experimentation. The checklist and the experimental module were used as instruments. Before its application, the instrument was adapted to a total of 30 items.

The instrument's reliability was obtained through Cronbach's alpha coefficient, and for data analysis, descriptive and inferential statistics were used in the SPSS version 22 statistical program.

In all quasi-experimental research, the main aim is to infer causal relationships between variables under study.

Variable 1: Graphic organizers. The teacher uses visual, illustrative, motivational schematic representations to show in an organized and sequential way the content to be developed. For the aim of this study are considered the following:

Variable 2: Meaningful learning. Personal process in which the student develops skills and attitudes to gain knowledge.

H0. The graphic organizers impact the meaningful learning of students in the subject of Educational Management during the 200-I semester at the Professional School of High School Education of the School of Education Sciences of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga)

FINDINGS AND DISCUSSION

Findings

The following are the results from the data collected after the intervention of the students in the subject of Educational Management during the 200-I semester at the Professional School of High School Education of the School of Education Sciences of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga) with the graphic organizers, as well as the analysis and interpretation of these results. First, the conceptual content learning level results are shown (Table 1).

Table 1 shows that in factor (X1), 42.9% of students in the control group in the pre-test obtained a minimally satisfactory level of learning and 57.1% moderately satisfactory. Meanwhile, in the post-test, 28.6% of them have a minimally satisfactory level, and 71.4% are moderately satisfactory, showing a relative increase.

In (X2), 44.8% of students in the experimental group in the pre-test obtained a minimally satisfactory level of learning and 55.2% moderately satisfactory. In the post-test, 82.8% of them got a moderately satisfactory level, and 17.2% had a satisfactory level, showing a significant increase.

For (X3), in the pre-test, 42.9% of students in the control group had a minimally satisfactory level, while 57.1% achieved a moderately satisfactory level. Likewise, the experimental group obtained a minimal satisfaction level of 44.8% and 55.2% moderately satisfactory, which means that the students of both the control group and the experimental group got relatively equal learning levels, so there is no difference between the two groups.

Seeing (X4) in the post-test, 28.6% have a minimally satisfactory level and 71.4% moderately satisfactory. In contrast, the experimental group obtained a moderately satisfactory level with 82.8% and 17.2% of the satisfactory level, indicating that the experimental group performed better in the post-test, so there is a significant difference between the two groups. Table 2 shows the statistics of procedural learning content.

Table 2 shows that in factor (X5), the control group, the mean in the post-test increased by 1 unit compared to the pre-test, and the minimum and maximum scores barely increased by 2 and 3 units, respectively, which means that there are no differences between the two groups.

Table 1. Conceptual content learning levels

Factors	Learning level	Control group		Experimental group	
		f	f%	f	f%
X1 Conceptual Content Learning Levels (pre-test)	Unsatisfactory (10–17)	0	00.0	0	00.0
(post-test)	Minimally satisfactory (18-25)	12	42.9	8	28.6
	Moderately Satisfactory (26-33)	16	57.1	20	71.4
	Satisfactory (34-40)	0	00.0	0	00.0
Control group	Total	28	100.0	28	100.0
	Unsatisfactory (10-17)	0	00.0	0	00.0
X2 Learning level of conceptual content (pre-test)	Minimally satisfactory (18-25)	13	44.8	0	00.0
(post-test)	Moderately Satisfactory (26-33)	16	55.2	24	82.8
	Satisfactory (34-40)	0	00.0	5	17.2
Experimental group	Total	29	100.0	29	100.0
X3 Learning level of conceptual content (pre-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
	Minimally satisfactory (18-25)	12	42.9	13	44.8
	Moderately Satisfactory (26-33)	16	57.1	16	55.2
	Satisfactory (34-40)	0	00.0	0	00.0
Control and experimental group	Total	28	100.0	29	100.0
X4 Learning level of conceptual content (post-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
	Minimally satisfactory (18-25)	8	28.6	0	00.0
	Moderately Satisfactory (26-33)	20	71.4	24	82.8
	Satisfactory (34-40)	0	00.0	5	17.2
Control and experimental group	Total	28	100.0	29	100.0

Table 2. Conceptual learning content statistical

X5	Statistics of conceptual learning content. (pre-test) (post-test) Control group		Pre. T	Post. T
		Mean	25.82	27.29
		Standard deviation	2.681	2.580
		Minimum	20	22
		Maximum	30	31
X6	Statistics of conceptual learning content. (pre-test) (post-test). Experimental group.		Pre. T	Post. T
		Mean	25.55	32.17
		Standard deviation	3.531	2.001
		Minimum	18	28
		Maximum	31	36
X7	Statistics of conceptual learning content. (pre-test) Control and experimental group		Pre. T	Post. T
		Mean	25.82	25.55
		Standard deviation	2.681	3.531
		Minimum	20	18
		Maximum	30	31
X8	Statistics of conceptual learning content. (post-test) Control and experimental group		Pre. T	Post. T
		Mean	27.29	32.17
		Standard deviation	2.580	2.001
		Minimum	22	28
		Maximum	31	36

(X6) of the experimental group in the post-test increased the mean by almost seven units. Similarly, the minimum and maximum scores also increased by 10 and 5 units, respectively, which means that the differences between the post-test and pre-test are significant.

Concerning (X7), it is perceived concerning the learning of conceptual contents that in the pre-test, the statistics of both the control and experimental groups are equal, so there are no differences between them. About (X8) in the post-test, the statistics show a difference between the experimental and control groups. Likewise, the minimum and maximum scores also differ by five units, respectively. These results are indicators of the difference between the two groups.

Table 3. Procedural content learning levels

	Learning level	Control group		Experimental group	
		f	f%	f	f%
Y1. Level of learning of procedural contents (pre-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
(post-test).	Minimally satisfactory (18-25)	13	46.4	8	28.6
Control group	Moderately Satisfactory (26-33)	15	53.6	20	71.4
	Satisfactory (34-40)	0	00.0	0	00.0
	Total	28	100.0	28	100.0
Y2 Level of learning of procedural contents (pre-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
(post-test).	Minimally satisfactory (18-25)	12	41.4	0	0.00
Experimental group.	Moderately Satisfactory (26-33)	17	58.6	19	65.5
	Satisfactory (34-40)	0	00.0	10	34.5
	Total	29	100.0	29	100.0
Y3 Level of learning of procedural contents (pre-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
Control and experimental group	Minimally satisfactory (18-25)	13	46.4	12	41.4
	Moderately Satisfactory (26-33)	15	53.6	17	58.6
	Satisfactory (34-40)	0	00.0	0	00.0
	Total	28	100.0	29	100.0
Y4 Level of learning of procedural contents (post-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
Control and experimental group	Minimally satisfactory (18-25)	8	28.6	0	00.0
	Moderately Satisfactory (26-33)	20	71.4	19	65.5
	Satisfactory (34-40)	0	00.0	10	34.5
	Total	28	100.0	29	100.0

In Table 3, the following results are: in factor (Y1), the students of the control group in the pre-test got 46.4% for a minimally satisfactory level of learning, while 53.6% for moderately satisfactory. However, in the post-test, 28.6% of students presented a minimally satisfactory level, and 71.4% placed in a moderately satisfactory level, showing a relative increase. According to (Y2), the students of the experimental group in the pre-test got a satisfactory level of learning, as 41.4% reflected according to the table and 58.6% moderately satisfactory. In the post-test, 65.5% presented a moderately satisfactory level and 34.5% satisfactory level, showing a significant increase.

According to factor (Y3), the control group in the pre-test shows that 46.4% of students reached a minimally satisfactory level, while 53.6% had a moderately satisfactory level. Likewise, in the experimental group, the level of minimally satisfactory was obtained, with 41.4% and 58.6% moderately satisfactory. This means that the students of both the control group and the experimental group obtained relatively equal learning levels, so there is no difference between the two groups. While the control group (Y4) in the post-test got 28.6% for a minimally satisfactory level and 71.4% for moderately satisfactory.

In the experimental group, 65.5% of the students showed a moderately satisfactory level. In comparison, 34.5% had a satisfactory level, which implies that those in the experimental group had better learning levels in the post-test, so there is a significant difference between the two groups. Table 4 shows the statistics of procedural learning content.

Table 4. Procedural learning content statistics

Y5	Procedural learning content statistics. (pre-test)		Pre. T	Post. T
	(post-test) Control group	Mean	26.00	27.57
		Standard deviation	2.611	2.471
		Minimum	21	24
		Maximum	30	32
Y6	Procedural Learning Content Statistics. (pre-post)		Pre. T	Post. T
	(post-test). Experimental group.	Mean	25.86	32.72
		Standard deviation	3.642	2.103
		Minimum	19	29
		Maximum	32	37
Y7	Procedural Learning Content Statistics (pre-post) Control and experimental		Pre. T	Post. T
	group	Mean	26.00	25.86
		Standard deviation	2.611	3.642
		Minimum	21	19
		Maximum	30	32
Y8	Procedural Learning Content Statistics (pre-post) Control and experimental		Pre. T	Post. T
	group	Mean	27.57	32.72
		Standard deviation	2.471	2.103
		Minimum	24	29
		Maximum	32	37

Table 4 shows that in the factor (Y5), the mean for the control group in the post-test increased by 1.6 concerning the pre-test, and minimum and maximum scores presented an increase of 2 and 3 units, respectively, so there are differences, but they are not significant between the two groups. Likewise, according to the factor (Y6), the experimental group in the post-test visualizes an increase of the mean by almost seven units. Similarly, the minimum and maximum scores increased by 10 and 5 units, respectively, so the differences between the post-test and pre-test are significant.

In (Y7), the statistics of both the control and experimental groups are almost equal in the pretest. However, there are differences that are not significant between the two groups. The statistics show a difference between the experimental and control groups for (Y8) in the post-test since the mean differs by 5.15 units. The minimum and maximum scores also differ by five units, respectively. These results are indicators of the difference between the two groups. Table 5 shows the levels of attitudinal content learning.

Table 5 shows the following results: (N1) For 100% of students of the control group in the pre-test, 21.4% got a minimally satisfactory level of learning, and 78.6% had a moderately satisfactory level of learning. While in the post-test, 10.7% of students had a minimally satisfactory level and 89.3% a moderately satisfactory, observing an increase but not significant (N2) shows 34.5% of students in the experimental group in the pre-test got a minimally satisfactory level of learning and 65.5% a moderately satisfactory. In the post-test, 55.2% of students had moderately satisfactory levels and 44.8% had satisfactory levels, showing a significant increase.

For (N3), 21.4% of students in the control group got a minimally satisfactory level and 78.6% moderately satisfactory in the pre-test. Likewise, 34.5% of the experimental group got a minimally satisfactory level of learning, and 65.5% were moderately satisfactory. This implies that students in both the control and experimental groups got relatively equal levels of learning, so there is no noticeable difference between the two groups.

(N4) In the post-test, 10.7% of students in the control group got a minimally satisfactory level and 89.3% moderately satisfactory. In the experimental group, 55.2% got a moderately

satisfactory level and 44.8% a satisfactory level, which implies that those in the experimental group had better learning levels in the post-test. There is a significant difference between the two groups. Table 6 shows attitudinal learning content statistics.

Table 5. Procedural content learning levels

	Learning level	Control group		Experimental group	
		f	f%	f	f%
N1. Procedural Content Learning Levels (pre-test) (post-test) Control group	Unsatisfactory (10-17)	0	00.0	0	00.0
	Minimally satisfactory (18-25)	6	21.4	3	10.7
	Moderately Satisfactory (26-33)	22	78.6	25	89.3
	Satisfactory (34-40)	0	00.0	0	0.00
	Total	28	100.0	28	100.0
N2 Procedural Content Learning Levels (pre-test) (post-test). Experimental group.	Unsatisfactory (10-17)	0	00.0	0	00.0
	Minimally satisfactory (18-25)	10	34.5	0	0.00
	Moderately Satisfactory (26-33)	19	65.5	16	55.2
	Satisfactory (34-40)	0	00.0	13	44.8
	Total	29	100.0	29	100.0
N3 Procedural Content Learning Levels (pre-test) Control and experimental group.	Unsatisfactory (10-17)	0	00.0	0	00.0
	Minimally satisfactory (18-25)	6	21.4	10	34.5
	Moderately Satisfactory (26-33)	22	78.6	19	65.5
	Satisfactory (34-40)	0	00.0	0	0.00
	Total	28	100.0	29	100.0
N4 Procedural Content Learning Levels (post-test) Control and experimental group.	Unsatisfactory (10-17)	0	00.0	0	00.0
	Minimally satisfactory (18-25)	3	10.7	0	0.00
	Moderately Satisfactory (26-33)	25	89.3	16	55.2
	Satisfactory (34-40)	0	00.0	13	44.8
	Total	28	100.0	29	100.0

Table 6. Procedural Learning Content Statistics

N5	Attitudinal learning content statistics (pre-test)		Pre. T	Post. T
	(post-test)	Mean	27.25	28.61
	Control group	Standard deviation	2.810	2.629
		Minimum	21	23
		Maximum	32	33
N6	Attitudinal learning content statistics. (pre-test)		Pre. T	Post. T
	(post-test)	Mean	26.69	33.17
	Experimental group	Standard deviation	3.444	2.122
		Minimum	20	29
		Maximum	33	38
N7	Attitudinal learning content statistics. (pre-test)		Pre. T	Post. T
	Control and experimental group	Mean	27.25	26.69
		Standard deviation	2.810	3.444
		Minimum	21	20
		Maximum	32	33
N8	Attitudinal learning content statistics (post-test)		Pre. T	Post. T
	Control and experimental group	Mean	28.61	33.17
		Standard deviation	2.629	2.122
		Minimum	23	29
		Maximum	33	38

Concerning (N5) in the control group, Table 6 shows that the mean of the post-test increased by 1 unit for the pre-test; likewise, the minimum and maximum scores also increased by 2 and 1 unit, respectively, which means that there are differences, but they are not significant between the two groups. The mean in (N6) of the experimental group in the post-test increased by 1.3 units, concerning the mean in the pre-test; in the same way, the minimum and maximum scores also increased by 9 and 5 units respectively, which means that the differences are significant between the post-and pre-test results. (N7) shows that in the pre-test, the statistics of both the control and experimental groups are almost the same, which means that, although there are differences, they are not significant between the two groups. For (N8) in the post-test, the statistics differ between the experimental group and the control group, for example, the mean differs by 4.56 units. Likewise, the minimum and maximum scores differ by 6 and 5 units, respectively. As can be seen, these results are indicators of the difference between the two groups. Finally, Table 7 visualizes the level of meaningful learning obtained by the students before and after the intervention.

Table 7 (Z1) shows in the pre-test that 28.6% of students in the control group obtained a minimally satisfactory level of learning and 71.4% moderately satisfactory. While 37.9% of students in the experimental group got a minimally satisfactory level of learning and 62.1% moderately satisfactory. (Z2) In the post-test, 14.3% of students in the control group got a minimally satisfactory level of learning and 85.7% moderately satisfactory. Meanwhile, 58.6% of students in the experimental group obtained a moderately satisfactory level, and 41.4% achieved a satisfactory level. These results reveal that there is a significant difference between the scores of the experimental group and the control group. (Z3) in the pre-test presents an increase in the mean of approximately 1 unit, while the control group's scores are more homogeneous than those of the experimental group. Likewise, both groups' minimum and maximum scores are not distant, meaning minimal differences exist. However, considering the range of the data, they are not representative, so the two groups do not show significant differences.

Table 7. Meaningful Learning

	Learning level	Control group		Experimental group	
		f	f%	f	f%
Z1 Meaningful learning level (pre-test)	Unsatisfactory (10-17)	0	00.0	0	00.0
Control and experimental group	Minimally satisfactory (18-25)	8	28.6	11	37.9
	Moderately Satisfactory (26-33)	20	71.4	18	62.1
	Satisfactory (34-40)	0	00.0	0	00.0
	Total	28	100.0	28	100.0
	Unsatisfactory (10-17)	0	00.0	0	00.0
Z2 Meaningful learning level (post-test)	Minimally satisfactory (18-25)	4	14.3	0	00.0
Control and experimental group	Moderately Satisfactory (26-33)	24	85.7	17	58.6
	Satisfactory (34-40)	0	00.0	12	41.4
	Total	28	100.0	29	100.0
			Con. G.		Exp. G.
	Statistics Meaningful learning level (pre-test)	Mean	79.11		78.10
	Control and experimental group.	Standard deviation	7.950		10.455
Z3		Minimum	63		57
		Maximum	92		95
			Con. G.		Exp. G.
		Mean	83.46		98.07
	Statistics Meaningful learning level (post-test)	Standard deviation	7.471		6.029
Z4	Control and experimental group.	Minimum	70		87
		Maximum	96		110

Concerning (Z4), in the post-test, the experimental group's mean increased by 15 units, respectively, to the control group. Likewise, the scores of the experimental group are more homogeneous than those of the other group. The minimum and maximum scores also increased by 17 and 14 units, respectively, which implies that there are differences at the level of the two groups, so these differences are significant.

Discussion

The research aimed to fulfil the purpose of the study, and the educational achievement test was applied to the experimental and control groups as a preliminary test to make the groups uniform in terms of educational achievement. The sample population collected information about the impact of graphic organizers as a methodology strategy in the meaningful learning of students in the subject of Educational Management. Therefore, the obtained results allow to:

In terms of conceptual contents, when the student's t-test calculation processed the data, the calculated alpha value was less than the significant level (αc=0,000 < 0,05). Also, the calculated (Tc) t value was higher than the (Tt) t value in the table. (Tc) (8.007 > (Tt) 1.6707), so both the control group and the experimental group differ from each other significantly in terms of measurement. Therefore, the alternative hypothesis was accepted, and the null hypothesis was rejected. Meanwhile, "the organizers have a high impact on the learning process" of the students (Corrales, 2019; Suhandiah et al., 2022).

In terms of conceptual contents, the Student's t-test showed a value less than the significant level (αc=0,000 < 0,05) regarding the calculated alpha value. Also, the value of (Tc) t calculated was higher than the value of (Tt) t in the table, (Tc) (8.489 > (Tt) 1.6707), which means that both the control group and the experimental control differ from each other significantly in terms of measurement. Therefore, the alternative hypothesis was accepted, and the null hypothesis was rejected.

According to Leiva Guerrero and Collao Donoso (2015), the purpose of this content is that students learn not only the cognitive (or declarative) contents but also the metacognitive ones, which are the action methods and abilities that make possible access to the formative knowledge. The skill is understood as an aptitude, expertise, or ability to determine an individual action (observe, compare, classify, among others).

Regarding the attitudinal contents, the student's t-test was lower than the calculated alpha's significance level value (αc=0.000 < 0.05). Also, the calculated (Tc) t value was higher than the (Tt) t value in the table. (Tc) (7.225 > (Tt) 1.6707), which means that both the control group and the experimental one differ from each other significantly in terms of measurement. Therefore, the alternative hypothesis was accepted, and the null hypothesis was rejected (Pérez-García & Loyaga-Domínguez, 2015) point out that the application of organizers as a methodological strategy determines the effectiveness and predisposition of students in educational action, significantly increasing the level of learning of the contents.

On the other hand, the relationship between graphic organizers and meaningful learning shows that the calculated alpha value was less than the significance level (αc=0,000 < 0,05). Also, the calculated (Tc) t value was higher than the (Tt) t value in the table. (Tc) (8.136 > (Tt) 1.6733), so both the control group and the experimental group differ from each other significantly in terms of measurement. Therefore, the alternative hypothesis was accepted, and the null hypothesis was rejected, which gives us a certain validity for the research hypothesis.

Pedagogical mediation plays an important role in learning, where their resources and materials are complemented with the information and the experiences with an ethical dimension and human conditions (Rodríguez-Cortés & Peña-Estrada, 2020; Suyitno et al., 2019). Within the pedagogical mediation, the evaluation becomes a monitoring, guidance, correction, and self-study evaluation tool. The concepts and the mind maps are important tools in the learning process. Also, the digital resources available online facilitate the elaboration of these representations.

However, according to Vargas-Murillo (2020), active participation in educational development significantly improves the teaching and learning process quality. The knowledge varies constantly with the individual's behavior, thoughts, and affections (MINEDU, 2018).

It is important to mention that despite the importance of graphic organizers, no studies related to the subject were found. Therefore, it is recommended to make other studies similar to this one to confirm the results.

CONCLUSION

It was determined that graphic organizers enhance the meaningful learning of students in the subject of Educational Management during the 200-I semester at the Professional School of High School Education of the School of Education Sciences of Universidad Nacional de San Cristóbal de Huamanga (National University of San Cristobal de Huamanga) getting a mean pre-test score of 78.10% and a mean post-test score of 98.07%, which makes a mean difference of 19.07% units respectively.

The level of meaningful learning of students in terms of Educational Management before the intervention with the graphic organizers, the highest percentage achieved was 55.2%, which is satisfactory for the level of meaningful learning of the students about the conceptual concept. After the application, the highest percentage in the level of achievement was obtained at 82.8%, achieving a Moderately Satisfactory level of achievement in the learning of conceptual concepts. Regarding procedure content, 58.6% were obtained before the application and 65.5% after the intervention with the graphic organizers for a moderately satisfactory level. The level of meaningful learning of the students in the experimental group concerning the attitudinal content of the pre-test was 65.5%. However, after applying the graphic organizers, 55.2% were satisfactory at the moderate level, and 44.8% reached a satisfactory level. By comparing the levels of meaningful learning before and after the use of graphic organizers, it was concluded that they are used as methodological strategies that define the conceptual, procedural, and attitudinal contents, stimulate meaningful learning, and, consequently, develop capabilities.

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