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ORIGINAL

Conceptual maps using Cmap Tools and student learning at a National Intercultural University Fabiola Salazar Leguía of Bagua

Mapas conceptuales utilizando el Cmap Tools y los aprendizajes de los estudiantes de una Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua

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ABSTRACT

The objective of this research is to determine the relationship between the use of concept maps using Cmap Tools and student learning at the National Intercultural University of Bagua in the year 2023. This is a basic study of non-experimental nature, of cross-sectional and correlational design. The population will be composed of 106 students belonging to the Faculty of Social and Business Sciences, from which a sample of 35 students of the technological education career of the I cycle will be selected. Likewise, a questionnaire with Likert scale was used as an instrument of data collection which has allowed us to arrive at the results where the existing relationship between the variables is established in such a way that the degree of existing significance is verified. In addition, the camp tools software facilitates the students' achievement of competences making the pedagogical activity interactive and motivating, allowing them to understand the specific topic in order to organize the ideas and concepts at a comprehensive and analytical learning level.

Keywords: Concept Map; CmapTools; Learning; Teaching; Innovative.

RESUMEN

El objetivo de esta investigación es determinar la relación entre el uso de mapas conceptuales mediante Cmap Tools y el aprendizaje de los estudiantes en la Universidad Nacional Intercultural de Bagua en el año 2023. Se trata de un estudio básico de naturaleza no experimental, de diseño transversal y correlacional. La población estará compuesta por 106 estudiantes pertenecientes a la Facultad de Ciencias Sociales y Empresariales, de la que se seleccionará una muestra de 35 estudiantes de la carrera de educación tecnológica del I ciclo. Así mismo se empleó un cuestionario con escala de Likert como instrumento de recolección de datos el que nos ha permitido llegar a los resultados donde se establece la relación existente entre las variables de tal forma que se compruebe el grado de significación existente , además el software camp tools facilita al estudiantes su logro de competencias haciendo la actividad pedagógica interactiva y, motivadora permitiendo entender el tema específico para organizar las ideas y conceptos a nivel de aprendizaje comprensivo y analítico.

Palabras clave: Mapa Conceptual; CmapTools; Aprendizaje; Enseñanza; Innovador.

INTRODUCTION

Technology has acquired great importance in its applicability in various aspects of our society, highlighting its importance in the educational field. This is because it facilitates the integration of innovative and stimulating resources that promote an interactive learning process and achievement. As a result, our students reach significant educational achievements.

Thus, technology has allowed us to innovate pedagogical processes and introduce innovative resources in our pedagogical practice.

Similarly, it has impacted other areas related to education in schools, universities, and colleges, which has required adopting new strategies and creativity to address the challenges caused by the pandemic. As a result, digital media have been introduced in various educational centres as a teaching and learning approach. (Ordorika, 2020).

The National Institute of Statistics and Informatics (2022) specifies that in families where university students have 100 % access to some technological tool.

Mainly, within higher education, teachers are constantly challenged to foster learning among their students. Autonomy in this process is considered fundamental for teaching at this educational level since the acquisition of knowledge is not limited only to the teacher's instruction but also depends on the student's skills. And the empowerment of technological tools.

The University under study has students in the Technological Education career, where difficulties are evidenced for the identification and assimilation of learning in the various subjects, as well as the development of visual organizers, which makes it difficult not to achieve significant learning in the development of the pedagogical process, they are unaware of the use of innovative materials that motivate and facilitate their learning. Therefore, it is important to innovate the resources that allow motivating the students in the acquisition of their learning; that is why the use of CmapTools in the elaboration of concept maps will be a technological resource that allows them to manage the learning process and to consult information in order to use it in their work or study in a beneficial way,

In the case of the university teacher, it possesses a resource that will make it possible to collect the feeling of the pedagogical activity and the degree of capacities that the students are acquiring to carry out the feedback and the accompaniment of their learning to their students.

The research proposes using technological tools to create concept maps using Cmaptools. According to Forte (2010), concept maps increase students' ability to study in a meaningful way by integrating concepts and information, support learning by explicitly connecting new knowledge with previous knowledge, improve the stages of representation and selection of options to solve problems, and the use of ICT encourages self-learning.

The following were investigated: To establish the relationship between concept mapping using Cmap Tools and students' learning at the National Intercultural University of Bagua - 2023.

The research's general objective: is to determine the relationship between concept maps using the Cmap Tools and students' learning at the National Intercultural University Fabiola Salazar Leguía of Bagua, 2023. Likewise, the specific objectives are To determine the relationship between the organization of information and the learning of the students of the National Intercultural University of Bagua - 2023, to determine the relationship between the hierarchy of information and the learning of the students of the National Intercultural University of Bagua - 2023, to determine the relationship between the visual representation of the scheme and the learning of the students of the National Intercultural University of Bagua - 2023, to determine the relationship between the visual representation of the scheme and the learning of the students of the National Intercultural University of Bagua - 2023, and to determine the relationship between the visual representation of the scheme and the learning of the students of the National Intercultural University of Bagua - 2023.

The study is supported by antecedents within the international, national and local levels, which will be detailed later, so addressing such research, below are those conducted in the international context having Manso & Garrido (2020) the purpose is to delve into the use of concept maps in the teaching of medical sciences. A descriptive observational methodological approach was used. A Likert-type scale was used to evaluate the attitude of students and teachers towards the use of concept maps in medical instruction. It was concluded that the integration of concept maps in the development of pedagogical activity allows for modernizing the pedagogical models and aligning them with the current trends of pedagogy in the university field of medical sciences, besides providing teachers with new pedagogical tools for teaching medicine.

Valero et al. (2021) objective was to evaluate the effectiveness of concept maps as a learning tool. The quantitative methodological approach used a single-group pre-experimental design with pre-and post-tests. The sample consisted of 35 students selected through non-probabilistic criteria. The instruments used were pre and post-tests w, which corresponds to an entry and exit evaluation, and content analysis using a rubric. It was concluded that concept maps are an important means for effective student learning development.

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Chambi (2020), whose research purpose was to determine the perceived usefulness of concept maps in university students. The methodological approach was quantitative, using the Concept Mapping Questionnaire (CMQ) in Spanish, administered to 70 students during the 2019-I academic period. The conclusion reached is that most students consider concept maps useful to some extent, mainly because they help them clarify the relationships between the contents of the subject, think independently and improve their understanding of learning.

It is important to consider that concept maps are visual instruments designed to structure and present information. They represent concepts, usually within shapes such as circles or squares, and the connections between them, shown by connective lines that link two concepts (Novak & Cañas, 2008).

Likewise, Baca (2018) refers to CmapTools, a freely available open-source software for creating concept maps. This tool's main objective is the creation of graphical representations that allow organizing knowledge in the form of concept maps, which facilitates students' analysis of topics or expressions of their experiences and everyday situations through graphics that convey a message. In addition, it contributes to improving reading comprehension, a crucial aspect of the development of learning achievement in learners.

Huamán (2015) explains more about concept maps; there are cognitive theories that contribute more to the topic, such as dual coding theory. According to the author, it is argued that people process information verbally and nonverbally. If attention is paid to both formats, retaining and remembering information would be easier. This approach would be achieved through the use of concept maps. Schema theory explains that there are structures or networks of information in human memory. Using concept maps would help students to connect previous knowledge with new knowledge and cognitive load theory; according to this theory, we are informed that human memory has a limit as to the amount of content or data it can assimilate; if this limit is exceeded, the assimilation process in learning will be affected. By using concept maps effectively, the cognitive load can be reduced, and more knowledge can be generated.

Furthermore, according to Garcia et al. (2015), the conception of learning has shifted from a behavioural approach to a more skill-oriented one, which incorporates several cognitive aspects. In this way, it is possible to focus the interest of learning on constructivist elements, recognizing that knowledge is achieved through social interaction, personal effort and active elaboration of topics by initiative.

On the other hand, Ausubel, Novak and Hanesin (1997), based on theories related to learning, emphasize that these theories are interrelated and not mutually exclusive, which facilitates the understanding of the close link with theoretical and practical aspects of education.

Rodriguez (2010) considers the kinds of theories related to learning as follows: Theory The behaviourist perspective, the theory formulated by Skinner, highlights that learning results from a behaviour change, which is observable and identifiable due to intrinsic motivation. This change in behaviour leads to a relative transformation reflected in the person's cognitive ability. It is important to note that positive impacts of actions tend to reinforce learning, while negative ones are avoided to avoid repeating them. Learning is part of growth in a dynamic way, which implies continuity in the accumulation of data. Information processing theory.

The understanding of data began to impact educational research in the mid-1970s. In this theory, artificial intelligence and research in the field of cybernetics, which influence the cognitive abilities of human beings, are highlighted. In addition, declarative intellect arises, forming part of knowledge, considering that using semantic networks guides acquiring this knowledge. On the other hand, procedural knowledge contributes to the knowledge of "how"; this type of knowledge is modelled through the application of creations with double meaning about conditional actions.

METHOD

It is basic research, also referred to as pure or theoretical research. Basic research seeks to discover laws or fundamental principles and deepen the concepts of a discipline, serving as an initial starting point for the study of phenomena (Escudero & Cortez, 2018).

The research is non-experimental, cross-sectional, and correlational. The research is non-experimental because its study variables were not manipulated (Hernández & Mendoza, 2018).

According to the definition by Oseda (2008), the population refers to a group of people who share at least one characteristic in common; the research context comprises 106 Faculty of Social and Business Sciences students corresponding to the following professional schools.

The sample will consist of 35 students corresponding to the professional career of technological education of the I cycle.

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RESULTS

Table 1. General hypothesis testing

Data	Components	Conceptual_maps	Learning
Conceptual_maps	Pearson correlation	1	,800**
	Sig. (bilateral)		,000
	N	34	34
Learning	Pearson correlation	,800**	1
	Sig. (bilateral)	,000	
	N	35	35

Note: **The correlation is significant at the 0,01 level (bilateral).

Interpretation

As the significance level is less than 0,05 (0,80 >0,05), we accept the alternative hypothesis and reject the null hypothesis to conclude that concept maps are related to learning at a significance level of 0,05.

Null hypothesis

There is no relationship between organization and learning.

Alternative hypothesis

There is a relationship between organization and learning.

Table 2. Contrast between organization and learning

Data	Components	Organization	Learning
Organization	Pearson correlation	1	,697**
	Sig. (bilateral)		,000
	N	35	35
Learning	Pearson correlation	,697**	1
	Sig. (bilateral)	,000	
	N	35	35

Note: **The correlation is significant at the 0,01 level (bilateral).

Interpretation

As the significance level is less than 0,05 (0,697 >0,05), we accept the alternative hypothesis and reject the null hypothesis, so we can conclude that at a significance level of 0,05, that organization is related to learning.

Table 3. Correlation between hierarchization and learning

Data	Components	Hierarchization	Learning
Hierarchization	Pearson correlation	1	,723**
	Sig. (bilateral)		,000
	N	35	35
Learning	Pearson correlation	,723**	1
	Sig. (bilateral)	,000	
	N	35	35

Note: **The correlation is significant at the 0,01 level (bilateral).

Interpretation

As the significance level is less than 0,05 (0,723 >0,05), we accept the alternative hypothesis and reject the null hypothesis, so we can conclude that at a significance level of 0,05, Hierarchization is related to learning.

Table 4. Correlation between visual representation of information and learning

Data	Components	Representation	Learning
Representation	Pearson correlation	1	,703**
	Sig. (bilateral)		,000
	N	35	35
Learning	Pearson correlation	,703**	1
	Sig. (bilateral)	,000	
	N	35	35

Note: **The correlation is significant at the 0,01 level (bilateral).

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Interpretation

As the significance level is less than 0,05 (0,703 >0,05), we accept the alternative hypothesis and reject the null hypothesis. At a significance level of 0,05, representation is related to learning.

DISCUSSION

The following is a discussion of the results considering the theoretical framework related to the study variables and the empirical evidence obtained through the respective application of the instruments:

Based on the results obtained in the research, it has been determined that there is a significant relationship between the variables of study (Concept maps and learning) and results that agree with other national and international studies; thus, we have the study of Delgado (2015). It refers to using concept maps to generate student learning that propitiate the analysis, understanding and much more with technology.

CONCLUSIONS

- It was determined that information organization is significantly related to the learning of the National University of Bagua - 2023 students.
- It was determined that the information hierarchy is significantly related to students' learning at the National University of Bagua - 2023.
- It was determined that the visual representation of the scheme is significantly related to student learning at the National University of Bagua - 2023.

RECOMMENDATIONS

- To the institution's authorities, it is suggested that training in technological tools and implementing technologies that innovate the pedagogical process of teachers be developed.
- To the teachers, it is important to use strategies that allow the organization of information using digital tools accompanied by concept maps.
- To the students to apply software that allows them to achieve visual organizers to achieve significant learning that will strengthen their professional training

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CONFLICT OF INTEREST

None.

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