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DIDACTIC MEDIATION MODEL APPLIED TO THE SUBJECTS OF ENGINEERING IN INFORMATION AND COMMUNICATIONS TECHNOLOGIES AT THE NATIONAL TECHNOLOGICAL INSTITUTE OF MEXICO

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Abstract: The mediation process when the didactic concretion is carried out could be systematized if the Honey and Alonso Learning Styles inventory is applied, and through David Kolb's experiential learning cycle the necessary learning activities and evidence are established that allow the development of the desired competencies and with the authentic evaluation, the mapping of the process of modification of styles and the development of competencies can be carried out and, this way, the dosage of activities is carried out that allows the development of the desired level of execution of the competence. This article shows the results of applying this Mediation process in groups of the Information and Communications Technology Engineering degree at the ``Tecnológico de Apizaco`` of the ``Tecnológico Nacional de México``.

Keywords: Learning Styles, Experiential Learning, Didactic Concretion, Pedagogical Mediation

INTRODUCTION

This work shows the process of using a mediation model, based on the characteristics of the Learning Styles that the group has and which was applied in nine courses of the Engineering in Information and Communications Technologies Degree, to which the Honey and Alonso Learning Styles Inventory - CHAEA - was applied to them and learning strategies were defined according to David Kolb's learning cycle model, carrying out the corresponding reinforcement in those areas in which there were low results and comparing the evaluations with the perception of the group that was recorded in the application of the inventory of styles, this allowed a mediation process to be carried out by contrasting the resulting graph and taking the relevant actions, the work is addressed first with a review of the Learning Styles proposed by Catalina Alonso, then

the learning experience is reviewed, next we propose the methodology, later the data of the profile obtained from Learning Styles of one of the courses is shown, in the mediation model section the graph of styles and the results obtained by topic to later make the conclusions.

LEARNING STYLES

Catalina M. Alonso carries out a review of different authors about what a learning style is and considers Keefe's (1988) definition to be more complete, which establishes that:

"Learning Styles are the cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact, and respond to their learning environments."

She considers that Learning Styles can give teachers relevant data about individual and group learning, to be able to appropriately lead the development of competence in the classroom.

Review Honey and Mumford's questionnaire and the Learning Styles that they describe as:

ASSETS

Like those spontaneous people, who enthusiastically carry out new tasks. They are people of the here and now and they like to live new experiences. They think that at least once you have to try everything.

REFLECTIVE

They like to consider experiences and observe them from different perspectives. They gather data by analyzing it carefully before reaching any conclusions. They break problems down into their parts and their philosophy is; be prudent.

THEORISTS

They review problems in logical stages, like to take things with formal notations, and are deep in their thinking systems to establish principles, theories, and models. They seek to be rational and objective.

PRAGMÁTICOS PRAGMATISTS

They like the practical application of ideas. They like to experiment and their philosophy is; You can always do better by applying theories and principles and if it works it is good.

With this, Catalina carried out an assessment of Honey's questionnaire - Alonso's CHAEA Learning Styles - in order to validate it (Alonso, Gallego, & Honey, 1997) and that is why we chose it to carry out our application as a mediation model, combining it with activities from David's experiential learning cycle

-Kolb.

EXPERIENTIAL LEARNING

David Kolb (Kolb, 1984) considers experiential learning as that process in which knowledge is created through the transformation of experience. Knowledge is the result of the combination of the experience of capturing and transforming.

Considers two ways of extracting experience, which are concrete experience (CE) and abstract conceptualization (AC), and two ways of transforming experience, which are reflective observation (OR) and active experimentation (EA). And this is integrated into a cycle where we start from a concrete experience that serves as a basis for making a reflective observation. These reflections are assimilated and transformed into abstract concepts from which new implications can be obtained to put them into practice. The cycle can be represented as shown in Figure 1.

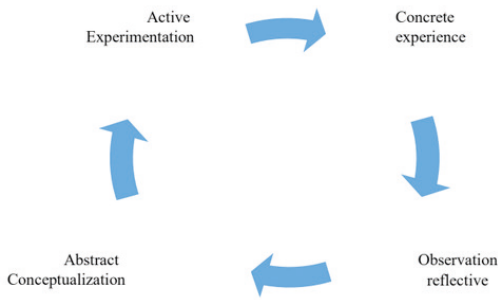


Figure 1. David Kolb's Experiential Learning Cycle.

METHODOLOGY

The model was applied in the subjects of the Information and Communications Technology Engineering Career of the courses in the period January-June 2018: Database Workshop, Human-Computer Interaction and two groups of WEB Programming, as well as the course Research Workshop given in the summer and the courses of the August-December 2018 period: two groups of Distributed Databases and two groups of Mobile Application Development.

The Catalina Alonso and Peter Honey Learning Styles (CHAEA) inventory was applied to the students (Alonso, Gallego, & Honey, 1997), with which the learning activities were established, considering David's Experiential Learning cycle. Kolb (Kolb, 1984) as shown in Table 1.

The decision on which activities to apply to the group was made by comparing the evaluation of the activities and contrasting with the group's perception of their learning style. This way, if the result was low, reinforcement was carried out with activities consistent with the style. This not only allows the development of skills, but also seeks metacognitive development, achieving the formation of strategies for autonomous learning.

John Biggs believes that "Expert teachers continually reflect on how they can teach even better" (Biggs, 2010). Perrenoud points out as

one of the criteria that respond to high-level professional training: "A didactic transposition based on the analysis of practices and their transformations"

GROUP LEARNING STYLES

In the Database Workshop course that was held in January - June 2018, the frequency histogram shown in Figure 2 was obtained from the 21 students as a result of the Active learning style, where it can be seen that The lowest value of active points was in the range of 4-6, with only 1 student and the highest was in the range of 16 - 18 with a total of 3 students and the range 12-14 with the highest number of 6. students, the average in active learning was 11.19.

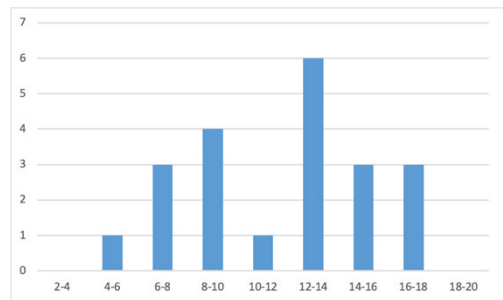


Figure 2. Active Style Histogram.

In the Reflective style, as shown in Figure 3, the smallest interval was 8-10 with 1 student and the largest was the interval 18-20 with 4 students and the interval 16-18 had the largest number with 7 students obtaining a reflective average for the group of 14.85.

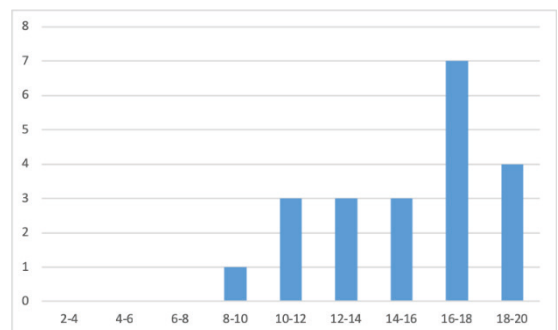


Figure 3. Reflective Style Histogram

Learning Style	Characteristics	Activities	Experiential Learning
Asset	1.- Animator 2.- Improviser 3.- Discoverer 4.- Risky 5.- Spontaneous	Treasure hunt Exhibition Preparation Topic Research Study cases Brainstorming	Concrete experience
Reflexive	1.- Weighted 2.- Conscientious 3.- Receptive 4.- Analytical 5.- Exhaustive	Exhibition of Topics Commented Reading Discussion Forums Problem analysis and practical cases	Reflective Observation
Theoretical	1.- Methodical 2.- Logical 3.- Objective 4.- Critical 5.- Structured	Synthesis essays Conceptual maps Comparative tables Time lines	Abstract Conceptualization
Pragmatic	1.- Experimenter 2.- Practical 3.- Direct 4.- Effective 5.- Realistic	Software installation Carrying out internships Program Development Application of the 6 D's Mobile learning	Active Experimentation

Table 1. Mediation through experiential learning strategies on Learning Styles

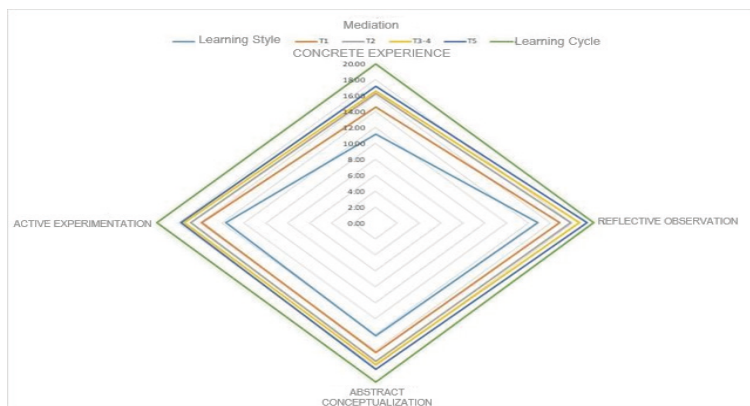


Figure 7. Contrast graph between Learning Style and achievement by Topic.

In the Theoretical style, according to Figure 4, there was a minimum value in the interval 6-8 with 1 student and the maximum interval was 18-20 with 4 students and the interval 14-16 had the highest number of students with 7, obtaining an average of 14.4 for the group.

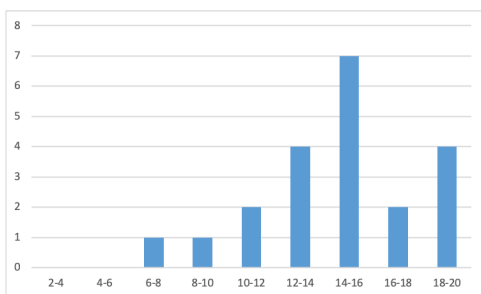


Figure 4. Theoretical Style Histogram

In the Pragmatic style, according to Figure 5, the lowest value is in the interval 6-8 with 1 student, the largest interval is 16-18 with 6 students and the interval with the highest number of students is that of 12-14 with 8 students and an average in this style of 13.66 was obtained

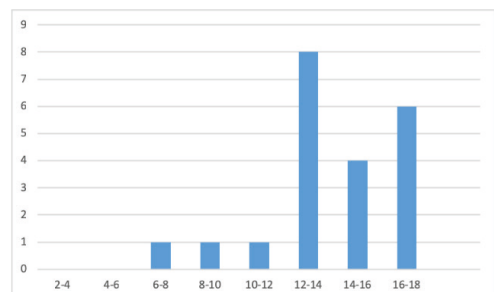


Figure 5. Pragmatic Style Histogram

Finally, the graph generated for the group, with the averages obtained in the different styles, is as shown in Figure 6. It must be noted that the maximum value that can be obtained in a quadrant is 20.

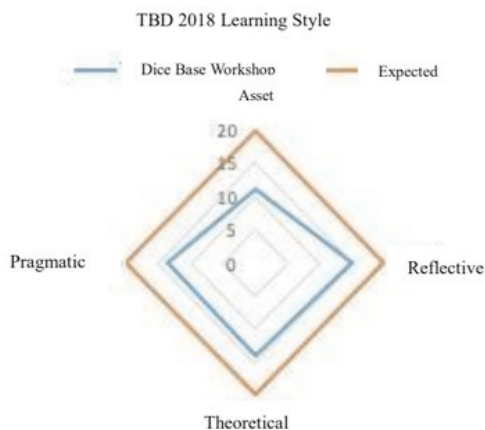


Figure 6. Learning Styles Chart.

MEDIATION PROCESS

In the graph in Figure 7, you can see how for each topic, the activities of the Kolb cycle were carried out, which had a correspondence with the learning style obtained in Honey and Alonso's inventory and for this the grades were mapped to a score of 20 for contrast with the style. It can be seen how growth was achieved with each topic in which the

greatest growth was achieved in the activities of reflective observation and abstract conceptualization, with lesser achievements being obtained in Concrete Experience and Active Experimentation.

The reflection that allows enriching teaching practice will only be useful to the extent that this practice is formalized and the possibility of analyzing it objectively, with data and results obtained and recorded in an appropriate manner (Biggs, 2010).

CONCLUSIONS

In the nine courses in which the model was applied, better results were obtained and the failure rate was reduced. Therefore, we can conclude that the mediation process, considering the Learning Styles of the students, provides a tool that contributes to the holistic formation of competencies, since the activities can be dosed according to the different styles and allow the generation of adequate development of skills, in addition to promoting autonomous learning by influencing the metacognitive development of the student, and contributing to the improvement of styles that are not mastered.

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