

# ***Alternativa didáctica para la dinámica semipresencial de los estilos de aprendizaje en la asignatura Fitotecnia General***

## ***Didactic alternative for the blended dynamics of the learning styles in the General Plant Technology subject***

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Recibido: 8 de marzo de 2018

Aceptado: 5 de octubre de 2018

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**Resumen:** El proceso de enseñanza en la asignatura Fitotecnia General no considera la diversidad cognitiva existente en el tercer año de la carrera Ingeniería en Procesos Agroindustriales del Centro Universitario Municipal San Luis, lo que limita la apropiación de contenidos profesionales por los alumnos. Se propone una alternativa didáctica centrada en las tareas docentes para la dinámica semipresencial de los estilos de aprendizaje. Se emplearon los métodos análisis-síntesis, revisión documental, histórico-lógico, sistémico - estructural y estadístico.

**Palabras clave:** Estilos de aprendizaje; Tareas docentes; Clase encuentro; Dinámica semipresencial

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**Abstract:** The teaching process in the General Plant Technology subject does not consider the existing cognitive diversity in the third year of the Agroindustrial Processes Engineering career of San Luis Municipal University Center, which limits the appropriation of professional contents by the students. A didactic alternative focused on teaching tasks for the blended dynamics of learning styles is proposed. The methods analysis-synthesis, documentary review, historical-logical, systemic-structural and statistical were used.

**Keywords:** Learning styles; Teaching tasks; Class meeting; Blended dynamics

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## **Introduction**

The process of professional training in Cuba has been characterized by transformations of high impact and social significance, for this reason "the fundamental thread of this set of transformations is the idea of the universalization of higher education" (Horruitinier, 2008, p.25). Consequently, the above validates the conception of a blended educational system that responds to changes and socioeconomic transformations that are materialized in current Cuban society, hence it remains a necessity "(...) achieve revolutionary , educated,

competent, independent and creator professionals, so that they can perform successfully in the various sectors of the economy and society in general "(Ministry of Justice, 2018, p.648).

On the other hand, in order to achieve this goal, blended learning also assumes the process of training professionals from the Municipal University Centers (CUM), therefore, the presence of students with their teachers is reduced in the planned teaching activities, being this pedagogical conception is reaffirmed as:

An educational system or process in which the student does not attend the class daily, only once a week or a month at the study center (...) with the singularity that he / she will not "receive classes", but rather receive guidance from the teacher on those topics or contents that have given rise to doubts or concerns or require a more extensive explanation. (Valenzuela, 2006, p.4)

This form of management, and especially the one developed by the Agroindustrial Processes Engineering course at the Municipal University Center (CUM) San Luis of the Eastern University, was not accepted by the pedagogical group due to the fact that most of its members were formed in a traditional educational model where the content of education was the main thing, and therefore were not prepared to assume a different way of directing and invigorating the teaching process.

An educational model that stops Valenzuela (2006):

It has its pedagogical basis in the so-called constructivist tendency, that is, where the student or apprentice is the one who is building his own knowledge, based on his previous knowledge. Hence the importance that the teacher knows the different strategies both teaching and learning whose purpose is to activate the prior knowledge of their students and, at the same time, provide tools to facilitate learning with meaning. (p.12)

On the other hand:

The class meeting is the type of class whose objectives are to clarify the doubts corresponding to the contents and activities previously studied by the students; discuss and

exercise those contents and evaluate their compliance; as well as explain the essential aspects of the new content and clearly and precisely guide the independent work that students must do to achieve an adequate mastery of these. (Ministry of Justice, 2018, page 687).

Unlike the ones expressed by Ortiz (2006), the pedagogical practice of the different blended encounters developed in the General Plant Technology subject does not take as a focus the learning activity that these develop, so that teachers do not structure it from the personal experience of each of them, nor do they take into account the real situations of the social environment in which they learn for their subsequent personalization; hence, this complex process occurs spontaneously and automatically, which means that didactic alternatives are not used to design teaching tasks that consider the individual modes and preferences used by the subjects involved in the learning process.

On the other hand, the insufficient didactic - methodological training of the pedagogical group sharpens the efficient management of the modes and preferences that students use to learn through the encounter class because all the planned cognitive activities are conceived in the same way for the learning of the individuals based on the criterion that all students learn in the same way.

This leads to the self-preparation developed by the students to face the different moments of the class meeting in the blended learning model is not effective because of the inability to self-manage and appropriate the knowledge system through individual study to respond to the demands and requirements of independent work as an activity and work method, which affects academic failure and desertion.

Due to this, there is an urgent need to transform the blended pedagogical practice in the General Plant Technology subject for the Agroindustrial Engineer. It is necessary to enhance learning and its styles through the different phases through which the class encounters within this educational model.

In the present article a didactic alternative is proposed through the teaching task for the blended dynamics of the learning styles of third year students of the Agroindustrial

Processes Engineering career of the CUM San Luis from the essential contents of the General Plant Technology subject that favors the process of direction, appropriation and fixation of professional knowledge.

## **Development**

### **The Learning Styles as an attention center of blended learning in General Plant Science at the CUM San Luis**

The theory about learning styles has great theoretical and practical significance for those who have the responsibility to direct the process of appropriation of professional content in different spaces and scenarios and, given their importance, dissimilar meanings that in the field of pedagogical and psychological sciences have granted various researchers.

Cabrera (2004) argues that, in order to overcome the predominantly cognitive vision prevailing in different theories of learning styles, he proposes conceptualizing it as people's preferred ways of perceiving and processing information, but also of orienting oneself in the fulfillment of their goals and interpersonal communication.

On the other hand, for Gallego and Alonso (2008) "it is the way people can think, learn, teach or talk" (p.24). While for Bertel, Torres and Iriarte (2010) the term learning style refers to the fact that "each person uses its own method or preferences to learn and although preferences vary according to what it is wanted to learn, each one is inclined to develop certain global trends that define a learning style "(p.285).

As evidenced, current trends around the concept of learning styles coincide in that it is a process of personalized character where the individual assumes a particular and an interacting with the object of learning way for the appropriation and internalization of knowledge, skills and values as essential elements of the content.

There are many ways and preferences for learning that the General Plant Technology teacher should take into account when planning the teaching tasks for each blended encounter. In the Alonso, Gallego and Honey (2005) consideration these styles are classified as active, reflective, theoretical and pragmatic.

It is worth mentioning that a student with an active learning style learns better the phytotechnical content when the teacher is able to offer teaching tasks that are a challenge to solve, giving him the possibility to make mistakes and try something new as an alternative to obtain this knowledge.

On the other hand, in order to satisfy the cognitive needs of a student with a reflective learning style, the teaching tasks should not lead to a process of improvised appropriation in which the student does not have enough time to gather the requested information; there should not be any pressure for the student to analyze, assimilate and prepare the oriented phytotechnic situations with the expected quality.

The student with a theoretical learning style has preference for teaching tasks that guide him during the self-management of phytotechnical knowledge to search for solid and valuable knowledge, and the method they will use to obtain it.

While a student with a pragmatic learning style could better learn the phytotechnical contents when faced with teaching tasks that offer sufficient practical and concrete indications based on real problems that give them the possibility of practicing and experimenting.

It must be keeping in mind that it cannot be achieved optimal learning of the professional content of General Plant Technology if the designed teaching tasks respond to a single way of learning and other forms of cognitive complementation are not offered to the student. It is necessary that in its conception greater importance be given to the cognitive diversity that converges in the different learning scenarios, because as the student masters more styles, the fixed learning of the phytotechnical contents and therefore higher academic results will be higher.

### **Learning styles diagnosis of the third year group of the Agroindustrial Processes Engineering career of the San Luis CUM**

For Alonso (2008) "The theories of learning styles have offered a good number of diagnostic tools" (p.10), therefore, the proposal of the Honey and Alonso Questionnaire on

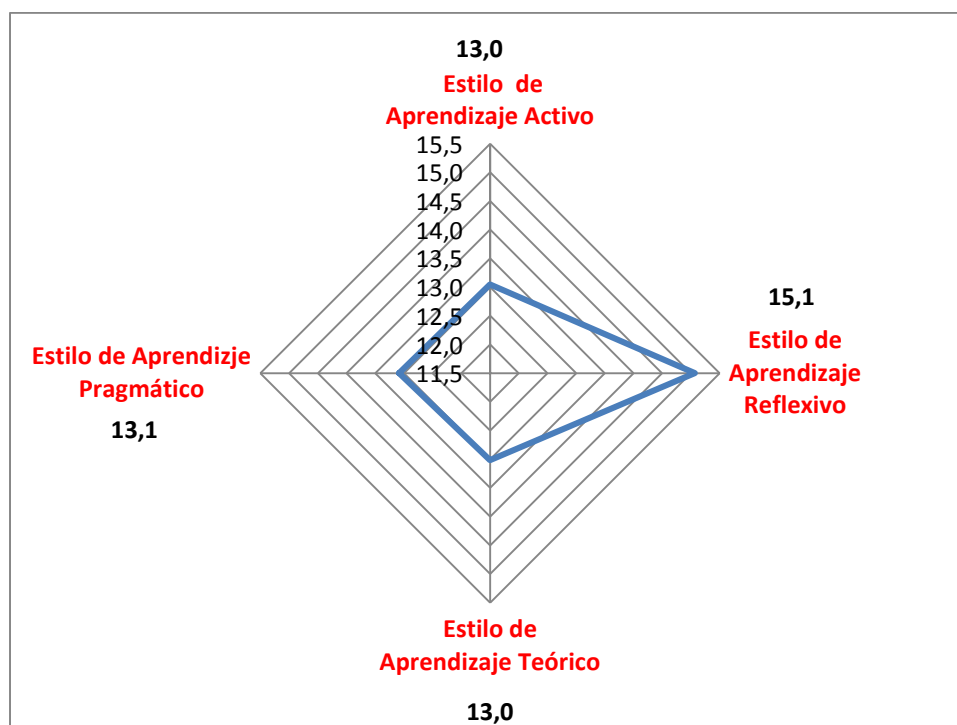
Learning Styles (CHAEA) (Alonso, Gallego and Honey, 2005), allows through 80 questions (20 for each style) to identify the preferred styles to learn.

We proceeded to evaluate the behavior of the learning styles in a sample of 17 students involved in blended management of the phytotechnical contents in the Agroindustrial Processes Engineering course at the San Luis CUM . The scores and trends obtained by each of them in the different learning styles are shown in Table 1.

**Tabla 1:** Scores obtained by students in each Learning Style as a result of CHAEA diagnosis

Students	Active Style	Reflexive style	Theoretical style	Pragmatic style
1	11	16	12	10
2	13	15	11	11
3	6	13	14	11
4	10	11	10	12
5	15	20	17	16
6	15	16	18	14
7	14	17	14	16
8	17	15	11	14
9	14	12	13	13
10	15	19	14	16
11	11	15	13	14
12	18	17	11	17
13	16	13	14	15
14	12	11	10	9
15	19	19	18	20
16	11	16	14	9
17	12	16	12	11

**Source:** self made



**Figure 1:** Average score and group tendency obtained in each Learning Style as a result of CHAEA diagnosis

**Source:** self-made

As shown in Figure 1, in the group of the third year of the Agroindustrial Processes Engineering career, the reflective learning style predominates with an average score of 15.4 points in eight students, which represents 47.06%; then the active learning style appears with an average score of 13.0 points in five students, representing the 29.41%; then there is the theoretical learning style with an average score of 13.1 points in two students, which represents 11.76%; and finally the pragmatic learning style with an average score of 13.1 points in two students, which represents 11.76%.

The interpretation of the scores obtained by the 17 students is relative, since it does not have the same meaning in one style as in another; so that we assume the Scheme of Abbreviated General Scale of Preference of Learning Styles proposed by Alonso, Gallego and Honey (2005) where the ranges and values for each form of learning and the levels of preferences that correspond to them are indicated.

**Table 2:** General Preference in Learning Style

<b>Levels of preferences and rating ranges by learning styles</b>					
<b>Learning styles</b>	<b>Very low</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Very high</b>
Active Learning Style	0-6	7-8	9-12	13-14	15-20
Reflective Learning Style	0-10	11-13	14-17	18-19	20
Theoretical Learning Style	0-6	7-9	10-13	14-15	16-20
Learning Pragmatic Style	0-8	9-10	11-13	14-15	16-20

**Source:** Adapted from Alonso, Gallego and Honey (2005)

As can be seen, Table 3 also constitutes a General Scale of Learning Styles where the students of the 3rd year of the Agroindustrial Processes Engineering career were located in the CUM San Luis attending to the levels of preferences and ranges of scores that it offers, and the results obtained in the individual order for each of these were taken into account in the CHAEA Diagnosis initially applied.

The aforementioned corroborates that of a total of 17 students diagnosed through the CHAEA, eight assume a reflective learning style for the appropriation of the phytotechnical contents, of them two with high preference and five with moderate); followed by active learning style with five students, three with very high preference, one with high preference and one with moderate preference); then the theoretical learning style with two students, one with very high preference and one with high preference; and finally two students with pragmatic learning style, one with very high preference and one with moderate preference.

**Table 3:** Location of the students in the General Babel of Learning Styles Preference according to scores obtained in the CHAEA diagnosis

<b>Levels of preferences by students according to scores obtained in CHAEA</b>					
<b>Learning styles</b>	<b>Very low</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Very high</b>
Active			14	9	8,12,13
Reflexive			1,2,7,11,16,17	5,10	
Theoretical				3	6
Pragmatic			4		15

**Source:** Self made

**Didactic alternative for the blended dynamics of Learning Styles through the teaching task in the General Plant Technology subject**





**Source:** Self made

As evidenced in figure 2, the didactic alternative has as a primary element the results of the CHAEA diagnosis applied to students, then it goes through three fundamental moments:

- I. Blended learning dynamics through the class meeting orientation.
- II. Blended learning dynamics of the learning styles through the exercise meeting class.
- III. Blended dynamics of learning styles through the generalization class encounter.

These moments constitute essential levels of appropriation of the phytotechnical contents in which the students will need new forms of appropriation that accompany their favorite one since in gradual way the levels of complexity of the phytotechnical contents are increasing.

To be effective this dynamic, three fundamental types of teaching tasks are proposed:

Type I teaching tasks: those that the teacher designs to satisfy the cognitive needs of the preferred learning styles in the students through blended learning orientation. As shown below, table 4 reflects four types of favorite styles that must be worked on and the number of students that represent each one of them based on the diagnosis made.

**Table 4:** Preferred learning styles for teacher task conception type I

<b>Favorite learning styles</b>			
Active	Reflexive	Theoretical	Pragmatic

**Source:** Self made

Teaching tasks type II: those that combine two or three learning styles in the student with the intention that this assumes and dominates other forms of appropriation of the phytotechnical content. As shown below, tables 5 and 6 reflect the possible combinations that can be worked through the teaching tasks in the case of exercise meeting.

**Table 5:** Combination of learning styles for the conception of teaching tasks type II

<b>Combinations of learning styles (Variant A)</b>	
<b>Favorites</b>	<b>Complementary 1</b>
Active	Reflexive
Reflexive	Theoretical
Theoretical	Pragmatic
Pragmatic	Active

**Source:** Self made

**Table 6:** Combination of learning styles for the conception of teaching tasks type II

<b>Combinations of learning styles (Variant B)</b>		
<b>Favorites</b>	<b>Complementary 1</b>	<b>Complementary 2</b>
Active	Reflexive	Theoretical
Reflexive	Theoretical	Pragmatic
Theoretical	Pragmatic	Active
Pragmatic	Active	Reflexive

**Source:** Self made

Type III teaching tasks: those that combine four learning styles with the intention that the student assumes and dominates other forms of appropriation of the phytotechnical contents. As shown below, table 7 also reflects the possible combinations that can be worked in the order of preference through the teaching tasks in the generalization meeting class.

**Table 7:** Combination of learning styles for the conception of teaching tasks type III

<b>Combinations of learning styles.</b>			
<b>Favorites</b>	<b>Complementary 1</b>	<b>Complementary 2</b>	<b>Complementary 3</b>
Active	Reflexive	Theoretical	Pragmatic
Reflexive	Theoretical	Pragmatic	Active
Theoretical	Pragmatic	Active	Reflexive
Pragmatic	Active	Reflexive	Theoretical

**Source:** Self made

Proposal of teaching tasks for students with reflective learning styles (eight students)

- Observe how the preparation process is carried out in a base of production unit for a determined crop of agricultural interest.
- Reflect on the final result of soil preparation in a productive unit of San Luis locality.
- Exchange opinions with other students regarding the final result of a soil preparation process carried out in a local production unit
- Gather information regarding the soil preparation process that takes place in a specific base unit.
- Gather information about how the soil preparation process develops for the same crop in different productive units of the locality.
- Visualize a video related to the soil preparation process.

- Carry out a detailed analysis of the main causes that negatively affected the soil preparation process of a local production unit.

Proposal of teaching tasks for students with active learning styles (five students).

- Finding difficulties in the soil preparation process that a productive unit of the town is carried out.
- Participate in various forms of soil preparation.
- Participate in the correction of a soil preparation process.
- Risk to perform soil preparation work.
- Make a presentation about the results of soil preparation in a productive unit in a given period.
- Lead a debate on the technological processes of soil preparation.
- Propose solutions to transform the soil preparation process into a productive unit.

Proposal of teaching tasks for students with pragmatic learning styles (two students).

- Evaluate the implementation of technical standards in the development of the soil preparation process of a base unit.
- Watch a video of how the soil preparation process for a given crop is carried out.
- Simulate how a soil preparation process is carried out.
- Check how the steps in the soil preparation process in a production unit are fulfilled.
- Give examples related to the preparation of soils for a specific crop.
- Participate in a soil preparation process under the advice of an experienced operator.

Proposal of teaching tasks for students with theoretical learning styles (two students).

- Read a text related to soil preparation processes.
- Make summaries about soil preparation processes.
- Questioning a soil preparation process carried out in a productive unit.
- Register all the actions of a specific soil preparation system.
- Listen to an expert's conference related to soil preparation processes.
- Propose interesting ideas that contribute to improving the soil preparation process in a productive unit.
- Analyze the development of a soil preparation process.

- Methodically explore the steps to follow for a soil preparation system.

## Conclusions

The literature review shows that learning styles are of great importance for the blended pedagogical practice that is developed in the course General Plant Science.

The CHAEA diagnosis applied to the students of the third year of the Agroindustrial Process Engineering career showed a marked preference towards the reflective learning style during the appropriation of the essential phytotechnical contents.

The elaborated didactic alternative improves the management and direction of the teaching process in the General Plant Technology subject because it proposes a set of teaching tasks that consider different modes and preferences to learn, which allows the personalization of the cognitive activities carried out by the students.

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