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IMPORTANCE OF LEARNING STYLES AS A TEACHING STRATEGY, IN A PRIVATE UNIVERSITY IN MEXICO

IMPORTANCIA DE LOS ESTILOS DE APRENDIZAJE COMO ESTRATEGIA EN LA ENSEÑANZA, EN UNA UNIVERSIDAD PRIVADA, EN MÉXICO

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ABSTRACT

This research seeks to identify the predominant learning styles to propose the best teaching strategies that promote meaningful learning and improve academic performance, by identifying the learning styles of a sample of first-semester university students, who were apply the Honey – Alonso Learning Styles Questionnaire (CHAEA). The sample consists of 24 participants. The focus of the study is quantitative and qualitative. The data obtained were analyzed using the statistical tools of Microsoft Excel. After processing the results, it was determined that the predominant learning style is reflective with 42%, with a moderate preference. In second place, the pragmatic style with 21%; in third place, the active style with 12.5% and lastly the theoretical style with 4%. With a percentage of 79%, the participants showed a unique learning style and 21% a combined style. All learning styles are present in the student sample. It was also identified that a student with less developed learning styles can obtain higher grade point averages than those students with more developed learning styles. With these results, some didactic strategies are proposed (concept maps, research work and case method, in the case of the reflective style), so that they are implemented according to the learning characteristics of the students and improve their academic performance. For future research, it is recommended to interview teachers, increase the size of the sample, and work with probabilistic sampling.

Palabras clave:

RESUMEN

Esta investigación busca identificar los estilos de aprendizaje predominantes para proponer las mejores estrategias de enseñanza que promuevan el aprendizaje significativo y mejore el rendimiento académico, mediante la identificación de los estilos de aprendizaje de una muestra de estudiantes universitarios de primer semestre, a los cuales se les aplica el Cuestionario Honey – Alonso de Estilos de

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estilos de aprendizaje, estrategias didácticas, rendimiento académico, educación superior.	Aprendizaje (CHAEA). La muestra consta de 24 participantes. El enfoque del estudio es cuantitativo y cualitativo. Los datos obtenidos fueron analizados utilizando las herramientas estadísticas de Microsoft Excel. Luego del procesamiento de los resultados, se determinó que el estilo de aprendizaje predominante es el reflexivo con 42%, con una preferencia moderada. En segundo lugar, el estilo pragmático con 21%; en tercer lugar, el estilo activo con 12.5% y en último lugar el estilo teórico con 4%. Con un porcentaje de 79%, los participantes mostraron un estilo de aprendizaje único y un 21% un estilo combinado. Todos los estilos de376prendízaje están presentes en la muestra de estudiantes. También se identificó que un estudiante con estilos de aprendizaje menos desarrollados puede obtener promedios de calificaciones más altos que aquellos estudiantes con estilos de aprendizaje más desarrollados. Con estos resultados, se proponen algunas estrategias didácticas (mapas conceptuales, trabajo de investigación y método de casos, para el caso del estilo reflexivo), para que sean implementadas según las características de aprendizaje de los estudiantes y se mejore su rendimiento académico. Para futuras investigaciones se recomienda entrevistar a docentes, incrementar el tamaño de la muestra y trabajar con muestreo probabilístico.

Introduction

As a result of the pandemic caused by the Covid-19 health crisis around the world, and Mexico was no exception, students and teachers at all educational levels had to move to online education. As mentioned in "Volvemos a clase, el impacto del confinamiento en la educación", research conducted in 2020 in Spain by Fundación SM and the Instituto de Evaluación y Asesoramiento Educativo, the pandemic and the confinement generated a new, unexpected, complex and difficult situation in the teaching-learning processes: learning at a distance without previous experience. None of the actors in the process were prepared for this new experience.

Today, despite more and better access to technology and a wide range of educational offerings, this is not reflected in improved student performance, which translates into academic failure. Failure to meet learning objectives is a consequence of the absence of appropriate teaching strategies.

According to Medina-Gual (2021) the most serious thing that happened in education as a result of the 2020 health crisis is that student learning was affected because few hours were dedicated to learning activities. From the main findings of the research that was conducted during the pandemic, it was identified that to interest students, broaden their knowledge and enable them to use the available information more effectively through the use of technology. These studies suggest that learning methodologies should combine the use of technology with active and collaborative learning strategies, in which students work together to solve problems.

Although much has been said that during the pandemic the level of learning was low, (Medina-Gual, 2021) and Arnove (2020) mention that what matters is not the greater or lesser amount of knowledge deposited in the minds of the students, but the value of what they learned for their lives.

This value is appreciated if the student improves his or her academic performance. In fact, Bustinza, Durán and Quintasi (2006) mention that, in order to improve academic performance, it is important to adapt the learning process to the personal characteristics of each student. For this reason, it was necessary to carry out this research, since it allows to know the different ways that students have to carry out their learning and from this, to be able to propose teaching strategies that add value to the academic and personal life of young students.

Nowadays it is common to find teachers who teach with strictly theoretical or expository teaching strategies, where for them the most important thing is a blackboard, a screen, a projector and a power point presentation to teach their students. This situation can be demotivating for a certain group of students, resulting in a marked lack of interest in learning.

Since students' learning processes are not the same, the strategies designed by teachers should not be the same for all students. (Aragón García and Jimenez Galán, 2009). Because of this, it is convenient for teachers to consider learning styles as a fundamental element in the design of teaching-learning strategies. Today it is essential to understand how the new generations learn. This will allow us to identify the best teaching methods and strategies that adapt to their profile and needs and to reinforce those aspects necessary to achieve meaningful learning, and at the same time, improve their academic performance.

The specialized literature promotes the idea that strategically aligning learning styles and didactic strategies could generate meaningful learning and maximize students' academic performance.

The concept of Learning Styles is reviewed and analyzed in specialized literature in this research. The Honey-Alonso Questionnaire of Learning Styles (CHAEA) is applied to a sample of 24 participants to identify their learning styles. The objective of this research is to identify the learning styles of first semester undergraduate students through the application of the CHAEA questionnaire in order to propose the best teaching strategies for each style.

The present research has a combined design of both approaches (quantitative and qualitative). The predominant learning style is identified as reflective with 42%, with a moderate preference. In second place, the pragmatic style with 21%; the active style with 12.5% in third place and in last place the theoretical style with 4%. Seventy-nine percent of the participants show a single style and 21% a combined style. All learning styles are present in the sample group. Based on the results obtained, some teaching-learning strategies are proposed, according to the predominant learning style of the students, to facilitate their learning.

Method

Design

Mixed approach research (quantitative and qualitative). A descriptive, quasi-experimental, correlational-causal methodology was chosen. Data were collected through the application of the Questionnaire of Learning Styles (CHAEA) to identify the predominant learning styles of the students. With a descriptive design, which aims to specify the characteristics and profiles of the people under analysis. For this specific research, the learning styles of a group of incoming university students are explored in a qualitative way, as well as a quantitative analysis was carried out.

According to Flick (2015), the goal of qualitative research is often to produce knowledge that is relevant to practice, meaning knowledge relevant to generating solutions to practical problems. For this research, the qualitative approach means proposing options aimed at strengthening the teaching-learning process, and above all, considering those teaching practices that do not take into account the importance of learning styles, this with the objective of favoring the learning and academic performance of higher education students.

Participants

The sample with which we worked was an intact group; that is, it was an already constituted group, which means that no random selection of the participating subjects was made. They were the same as those considered for this study because they were enrolled in the Introduction to Entrepreneurship course, in the period January-May 2022. The group of students has the following characteristics:

Table 1
Characteristics of the sample group

School Cycle	January - May 2022
Subject and Key	Introduction to Business - ADM1401
Semester	First
Group key (NRC)	90865
Total students enrolled	27

Note. Source: own elaboration with data from Banner System, UAQ, 2022

Considering the didactic and academic purposes associated with this group, the sample is considered significant. The distribution of the sample by gender is presented in table two.

Table 2
Distribution by gender

Genre	Frequency	Percentage
Female	15	56%
Male	12	44%
Total	27	100%

The distribution of the sample by race and gender is shown in Table 3.

Table 3
Distribution of the sample according to career

Career	Number of students	Percentage	Men	Women
Business Management and Administration	12	44	7	5
Management of Entertainment Companies	3	11	1	2
Finance and Public Accounting	2	7	2	0
Strategic Marketing	6	22	0	6
Information Technology and Digital Business (engineering)	4	15	2	2
Total students enrolled	27	100	12	15

Regarding the number of men and women in each professional career, there are notable differences in the case of Strategic Marketing (6 women and 0 men), this is due to the fact that in this professional career there is a greater number of women enrolled. As

can be seen in Table 3, the study subjects were of very diverse profiles, which favored the research, since they had different learning styles.

Sampling

In this research, the sample was not selected through a formal random procedure, as it followed a logic of sampling by accessibility and convenience. It was decided to work with a group of incoming students, enrolled in the Introduction to Business, in the period January-May 2022.

The CHAEA questionnaire was applied to 89% of the students (24 out of 27) -since 3 of them did not attend the session on the day of application- in order to know which learning style they use and predominates in them. This facilitates having group results to address the learning needs of this particular group without the intention of making generalizations.

Instruments

Designed by Catalina Alonso, Domingo Gallego and Peter Honey (1994), the instrument used to characterize the variable Learning Profiles, the Honey Alonso Questionnaire of Learning Styles (CHAEA), derived from Honey & Mumford's Learning Style Questionnaire, belongs to the family of questionnaires that consider learning styles as relatively stable and flexible learning preferences. (Coffield, Moseley, Hall, and Ecclestone, 2004)

This questionnaire adapted for Spanish-speaking university students is widely validated, both in Spanish-speaking countries in general (Rodríguez, 2006) and for being the most widely used in Spanish-speaking countries (Garcia Cué, Santizo Rincón and Alonso Garcia, 2009), in addition to allowing the statistical analysis and correlation of variables, with a limited number of variables, as an exploratory approach to the problem.

This questionnaire consists of 80 dichotomous response items, 20 of which correspond to each learning style and are randomly distributed in such a way that the maximum score that can be obtained is 20 points for each style. The dichotomous score described is: agree (+ sign), or disagree (- sign). The absolute score that each subject obtains in each group of 20 indicates the level reached in each of the four styles. The abbreviated general scale of learning style preferences developed by Alonso was used to classify style preference. This scale facilitates the meaning of each of the scores, since it makes it possible to know who is in the average, who is above and who is below.

Data collection

For data collection, authorization was requested from the corresponding authorities of the Universidad Anáhuac Querétaro to have access to the students, who participated on a voluntary basis.

An explanation was given to the students on ethical and confidentiality issues, explaining the purpose of the questionnaire that was applied, agreeing on a date and time with the University's directors. Thus, the CHAEA Questionnaire was applied to 24 students of the first semester group who took the subject Introduction to Business and who agreed to participate in the research, explaining to the students the professional and academic interests in order to identify the learning styles of each one of them. The questionnaire was administered in 25 minutes. It was not necessary to eliminate any of the questionnaires due to incomplete responses.

After the fieldwork, the general data of the participants (name and professional career) as well as the results obtained in the application of the CHAEA questionnaire were

captured using the Excel program version 2017, in which the data were tabulated and descriptive statistical techniques (averages, frequencies, variance, etc.) were performed

Data analysis

Table 4 shows the scores of each participant for each learning style, the predominant style and its intensity (cumulative total). There is a predominance of a single learning style for most of the participants; however, there are some cases that share 2 styles.

Table 4

Learning style scores and predominant learning style

#	Genre	Career	A	R	T	P	Predominant Style	Total Accumulated
1	F	DAE	10	9	6	7	A	32
2	F	TIND	12	16	13	16	R-P	57
3	M	DAE	11	13	11	12	R	47
4	M	DAE	19	12	12	15	A	58
5	F	DAE	11	13	15	15	T-P	54
6	M	TIND	8	19	15	11	R	53
7	F	DEE	14	13	14	15	P	56
8	F	ME	13	12	12	13	A-P	50
9	M	TIND	12	14	12	11	R	49
10	F	ME	18	15	14	11	A	58
11	F	ME	15	16	15	14	R	60
12	F	ME	12	16	15	12	R	55
13	F	TIND	13	15	16	17	P	61
14	F	ME	10	18	18	13	R-T	59
15	M	DAE	10	14	10	16	P	50
16	F	DEE	10	10	8	13	P	41
17	M	DAE	12	15	14	14	R	55
18	M	FICO	10	15	13	12	R	50
19	M	DAE	13	16	14	16	R-P	59
20	M	DAE	9	17	15	10	R	51
21	F	DAE	12	14	15	11	T	52
22	F	DAE	11	10	12	15	P	48
23	M	DAE	12	16	12	10	R	50
24	F	DAE	13	16	15	13	R	57

Note. DAE (Business Administration and Management); DEE (Entertainment Business Management); FICO (Finance and Public Accounting); ME (Strategic Marketing) and TIND (Information Technology and Digital Business); Active (A); Reflective (R); Theoretical (T); Pragmatic (P); Reflective-Pragmatic (R-P); Theoretical-Pragmatic (T-P); Active-Pragmatic (A-P); Reflective-Theoretical (R-T).

Cronbach's alpha coefficient was used to measure the internal consistency of the scale. The alpha coefficient obtained for the total number of records was 0.54, which is considered acceptable for this research. Cronbach's alpha offers the possibility of evaluating how much the reliability of the test would improve or worsen if a certain item were excluded.

Results

Once the scores of each of the participants were obtained, the predominant style of each student by professional career was determined. The criterion for determining the predominant learning style was: 1) higher score and 2) equal (higher) scores.

Table 5
Scores for learning styles by career path

Career	Learning Styles							
	A	R	T	P	R-P	T-P	A-P	R-T
DAE	2	5	1	2	1	1	0	0
DEE	0	0	0	2	0	0	0	0
FICO	0	1	0	0	0	0	0	0
ME	1	2	0	0	0	0	1	1
TIND	0	2	0	1	1	0	0	0
Total	3	10	1	5	2	1	1	1

Interpreting the data in Table 5, we obtain: 3 students with active style (12.5%); 10 students with reflective style (42%); 1 student with theoretical style (4%); 5 students with pragmatic style (21%); 2 with combined reflective-pragmatic style (8%); 1 with combined theoretical-pragmatic style (4%); 1 with combined active-pragmatic style (4%) and 1 with combined reflective-theoretical style (4%).

For Business Management and Administration students, the predominant style is Reflective, the same as for Finance and Accounting students, Strategic Marketing students and Information Technology and Digital Business students; while for Entertainment Management students the predominant learning style is Pragmatic.

Seventy-nine percent of the total students who participated showed a single learning style, and 21% showed a combined style.

The predominant style of most students is reflective, followed by pragmatic and active. This information was taken into account when selecting didactic strategies to be implemented in the classroom according to the learning styles identified.

Table 6 shows the predominant learning style by gender:

Table 6
Learning style by gender

Genre	Learning Styles							
	A	R	T	P	R-P	T-P	A-P	R-T
Female	2	3	1	4	1	1	1	1
Male	1	7	0	1	1	0	0	0
Total	3	10	1	5	2	1	1	1

It can be observed that the predominant learning style in the female gender is pragmatic (28.5%), while the male gender has a greater preference for the reflective style (70%).

Regarding preferences, Alonso, Gallego and Honey (1994) propose the scores for each of the learning styles for each of them, as shown in Table 7:

Table 7
General scale of preference in learning styles

	10%	20%	40%	20%	10%
			Preference		
	Very Low	Download	Moderate	High	Very High
Active	0-6	7-8	9-12	13-14	15-20
Reflective	0-10	11-13	14-17	18-19	20
Theoretical	0-6	7-9	10-13	14-15	16-20
Pragmatic	0-8	9-10	11-13	14-15	16-20

Note. Source: Alonso, Gallego and Honey (1994).

According to the results of the questionnaire applied, the students who participated in the study have the following preferences in each of the learning styles, as shown in Table 8.

Table 8
Preference and learning styles

Learning styles	Media	Standard deviation	Preference
Active	12.08	2.55	Moderate
Reflective	14.33	2.49	Moderate
Theoretical	13.16	2.61	Moderate
Pragmatic	13	2.41	Moderate

According to the above, it is observed that, on average, the participants have mostly made use of the reflective style (14.33), with a moderate preference, according to the Baremo, with a dispersion with respect to its average value of 2.49. On the other hand, the active style (12.08) is the least used by the participants. It is important to note that the 4 learning styles are not mutually exclusive.

For this research it is also important to identify that a student with less developed learning styles can obtain higher grade point averages than those students with more developed learning styles. Also, the fact that a student has more developed learning styles does not directly imply better academic performance, expressed through grades.

In this sense, the degree of development of learning styles is not a determining factor in students' academic performance. The above is shown in Table 9, which considers only 13 of the 24 students in the group, to exemplify the situation.

Table 9
Learning style and academic performance

#	Genre	Career	Predominant learning style	Cumulative total	Intersemester Evaluation	Final Evaluation
1	F	DAE	Active	32	9.8	10
2	F	DEE	Pragmatic	41	9.0	9.4
3	M	DAE	Reflective	47	9.2	9.1
4	F	DAE	Pragmatic	48	9.5	9.4
5	M	TIND	Reflective	49	9.3	9.7
6	F	TIND	Reflective - Pragmatic	57	8.5	9.8
7	F	DAE	Reflective	57	9.8	9.4
8	M	DAE	Active	58	6.7	9.1
9	F	ME	Active	58	8.4	8.5
10	F	ME	Reflective - Theoretical	59	9.1	9.2
11	M	DAE	Reflective - Pragmatic	59	6.3	7.9
12	F	ME	Reflective	60	9.3	9.1
13	F	TIND	Pragmatic	61	9.5	9.4

During the January-May 2022 semester, 2 evaluations were applied (inter-semester and final). The student labeled #1 has the lowest cumulative total of the sample of participants, yet his average scores are the highest. On the other hand, the student labeled #11 has one of the highest figures in the cumulative total, however, his average grades are lower than the rest of the students presented in the table. Same situation with student #8.

In this research it was found that the predominant learning style in most of the participating students is reflective (42%), followed by pragmatic (21%), active (12.5%) and, finally, theoretical (4%). Seventy-nine percent of the total students who participated showed a single learning style, and 21% showed a combined style. Similar to other research, all 4 learning styles are present in the entire participant sample. In addition, there are 4 combinations of two different styles.

The sample means allow placing the four learning styles in a moderate preference, which can be interpreted as the possibility of becoming high or low, depending on the teaching strategies implemented in the classroom by the teacher and the learning strategies used by the students.

In the research "Strengthening learning styles to learn to learn", prepared by Rodríguez Carracedo and Vázquez Carro (2013), the authors conclude that it is essential for teachers to know the predominant learning styles of their students and thus adapt, as far as possible, their teaching style to the learning style of each of their students and the group in general.

In his analysis of some pedagogical aspects that are key to optimize learning, González Peiteado (2013) argues that an efficient teaching action begins by reducing the differences between teaching styles and learning styles and therefore, it is imperative that teachers know the ways to approach their students' learning.

With the results obtained in this research, it is considered that students with a preference towards a specific learning style learn better when teaching strategies integrate activities appropriate to their predominant style.

Table 10 shows some examples of teaching strategies suitable for different styles.

Table 10

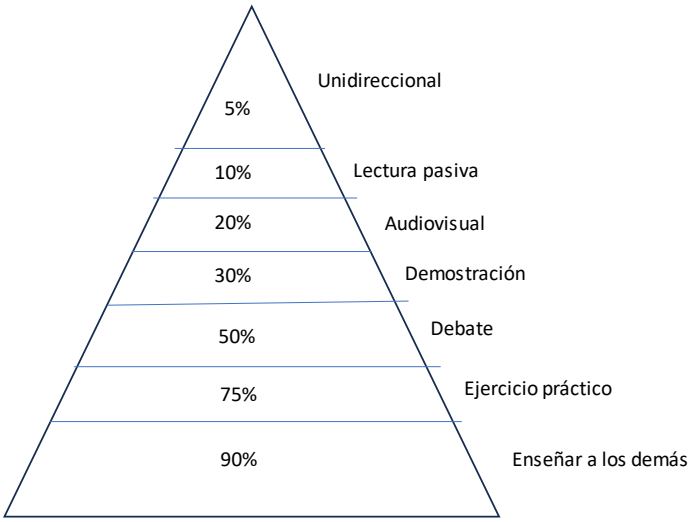
Teaching strategies and learning styles that favor

Teaching Strategy	Learning Style that favors
Brainstorming Allows the free presentation of ideas, without restrictions or limitations, in order to generate original ideas or new solutions	Active
Case Method Written description of an event that occurred in the life of a person, group or organization, which may be real or hypothetical, but constructed with characteristics analogous to those presented in reality	Active, Reflective and Theoretical
Problem-Based Learning The teacher presents to the group a situation taken from reality and related to the contents of the course that is expected to be addressed by the students or as a group. The key to this strategy is the way in which students can identify what they need to address the problem situation and the skills they develop to solve it	Pragmatic
Exhibition Presentation of a logically structured topic, where the main resource is oral language, although it can also be written text. It provides structure and organization to cluttered material and can extract the important points from a wide range of information.	Pragmatic, Active and Reflective
Research Work Personal or group work that helps to raise and seek solutions to problems that arise in real life. In this part, the student collects, analyzes and reports the following information	Active, Reflective, Theoretical and Pragmatic
Internet search Students find online sources of information through search engines	Active, Reflective, Theoretical and Pragmatic
Concept Mapping As a means of representation that allows visualizing the concepts and propositions of a text, as well as the relationship between them	Active, Reflective, Theoretical and Pragmatic
Use of Educational Platforms Students, in different geographic locations, can access all course materials in any modality and interact with their teachers and classmates	Active, Reflective, Theoretical and Pragmatic

Note. Source: own elaboration with information taken from Garcia Cué, Sánchez, Jiménez and Gutierrez (2012, p. 8-9).

To reinforce the above, Figure 1 shows the learning pyramid, which represents the learning rate as a function of the teaching method.

Figure 1
The learning pyramid



Note. Source: National Training Laboratories of Bethel (year not available)

Reflecting on what the learning pyramid shows, we can comment that the more a didactic strategy helps to improve learning, the more effective it is considered to be. In other words, one teaching strategy is considered more effective than another if it results in better assimilation of the material presented.

Discussion and conclusions

In this research, the learning styles of a sample of incoming higher education students were identified. The predominant learning style is reflective, secondly, pragmatic, followed by active, and in last place of preference, the theoretical style. All learning styles are present in the group of participating students. Seventy-nine percent of the total students who participated showed a single learning style, and 21% showed a combined style.

Individuals have a preference for certain learning styles and for learning to be effective, they require a teaching style that is appropriate to their way of learning. Knowing students' learning styles can improve teaching effectiveness.

With the results obtained, we have that students with a tendency towards a learning style, if appropriate didactic strategies are implemented, their learning is better. Identifying students' learning styles serves as a starting point towards a contextualized didactic planning adapted to the different learning styles of the students, which consists of identifying the learning styles of the students from the beginning of the course, since it allows the teacher to know how they learn. This is fundamental in order not to design didactic strategies focused only on the teacher's interest and style.

Likewise, the educational level, the duration of the cycle, the learning objectives, the thematic contents, the evaluation criteria, as well as the educational model of the institution must be considered, so that all these elements can be strategically aligned in order to integrate a set of effective and adequate didactic activities for each learning style.

Higher education institutions should promote active pedagogies that foster meaning-directed learning styles, based on critical thinking and student autonomy, which in turn will enhance academic achievement. The university professor must foster learning environments that encourage dialogue, interaction among students, and timely feedback, so that the student is responsible for and actively participates in his or her learning.

The reports found in the specialized literature support the idea that a teaching-learning strategy adapted to the predominant learning style of the students is more likely to promote meaningful learning than a task or activity irrelevant to the cognitive structure of the students.

The teaching strategies and styles employed influence learning, therefore it is recommended that teaching styles be modified to benefit all students. Active learning techniques, oriented to learning styles, allow the learner to develop better interaction and cooperation.

In the teaching-learning process, the teacher is fundamental, the cornerstone, but the student is the protagonist. Understanding that the classroom is a system of interaction and communication implies understanding that the teacher is not there to perform monologues, expecting respect and silence from his students; but, on the contrary, to understand that, as teachers, we enter the classroom expecting answers and questions from our students.

The class is a worthwhile experience. The university is a place of knowledge construction. What we do in class is worthwhile when it connects us with others who put into action an expression of the practice of their professional work. The classroom experience is fulfilled when real-time interactions take place in creative contexts, both in and out of the classroom. The moral decision to educate and build knowledge is a mark that must sustain the teacher's life. And that every time you enter the classroom you start that experience that both teachers and students want to live. Contemporary didactics that addresses the construction of knowledge through teaching practices in the complex world in which we live, is the path to follow that will lead us to reinvent the university classroom.

The students of the "future" will be students from much more diverse backgrounds than today's students. The number of foreign students will increase. International exchange programs will be growing and students will face increasing globalization. This evolution towards greater diversity and mobility will mean many challenges for the teacher, so adapting pedagogical methods to the different learning styles of students will be crucial in the teaching job.

If as teachers we are able to dream, imagine, design, think, anticipate, co-create and invent, we will understand that true learning is possible. When all young people can access and complete university and receive a quality education that allows them to create a more just world, we will know that the effort will have been worthwhile.

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