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Entrepreneurship Education to Develop Self-Efficacy for Self-Regulated Learning: comparative study between teaching techniques in mexican undergraduate students

Educación Emprendedora para el Desarrollo de la Autoeficacia para el Aprendizaje Autorregulado: estudio comparativo entre técnicas de enseñanza en estudiantes universitarios mexicanos

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Abstract

Entrepreneurship Education faces great challenges. The main objective is to compare teaching techniques to promote skills development in Mexican undergraduate entrepreneurship students, for this purpose, 3 teaching techniques were compared to develop skills: project-based learning, gamification and master class. In the methods section, an experimental design was proposed through a randomized student's sample with the dependent variable, self-efficacy, and the independent variable, self-regulation for learning. Afterward, the quantitative data was collected with a survey and analyzed with factor analysis and structural equations. It was found that the use of project-based learning shows an impact on the measured construct. In the discussion, active techniques favor skills development, but not all techniques have the same impact on all constructs.

KEYWORDS: learning; education; undergraduate education; entrepreneurship education

CLASSIFICATION JEL: O310, M130, I230, I200

Resumen

La Educación Emprendedora se enfrenta a grandes desafíos. El objetivo principal es comparar técnicas de enseñanza para promover el desarrollo de habilidades en estudiantes mexicanos de pregrado en emprendimiento, para ello se compararon 3 técnicas de enseñanza para desarrollar habilidades: aprendizaje basado en proyectos, gamificación y master class. En la sección de métodos, se propuso un diseño experimental a través de una muestra de estudiantes al azar con la variable dependiente, autoeficacia, y la variable independiente, autorregulación para el aprendizaje. Posteriormente, los datos cuantitativos se recolectaron con una encuesta y se analizaron con análisis factorial y ecuaciones estructurales. Se encontró que el uso del aprendizaje basado en proyectos muestra un impacto en el constructo medido. En la discusión, las técnicas activas favorecen el desarrollo de habilidades, pero no todas las técnicas tienen el mismo impacto en todos los constructos.

PALABRAS CLAVE: aprendizaje; educación; educación de pregrado; Educación Empresarial

CLASIFICACIÓN JEL: O310, M130, I230, I200

1. Introduction

Entrepreneurship Education (EE) today faces great challenges, going from stereotype teaching practices to new practices and students whom some sometimes conclude that after entrepreneurship education this is not for them (Lackéus, 2025). In addition, there are other factors, such as the institutional context or the role of the entrepreneurship education administrator, that can impact teaching, at a time when there is still debate about whether it is possible to teach skills, which increases complexity (Lane & Newbery, 2024).

But despite how difficult it seems Entrepreneurship can be taught, and can be taught as a method. A method "represents a body of skills and techniques", i.e., entrepreneurship can be taught by developing certain skills and teaching certain techniques, but for this to happen, learning must be experiential and active (Neck & Greene, 2011); in contrast to passive learning could be better to develop theoretical knowledge (Kozlinska, 2023). In this sense, active learning is based on Piaget's (1950) theory, which states that student learns through iteration and reflection.

In general, there are three general approaches can be found in teaching Entrepreneurship Education (EE): Education about (theoretical concepts), Education for (practical orientation tools), and Education through (attitudes and skills) (Gangi & Sirelkhatim, 2023). Entrepreneurship courses should include the delivery of all approaches to cover all audiences (Gibb, 2002;

cited by Winsor & Hanlon, 2016). However, the latter approach, which seeks to build skills, often appears to be the most complex.

Within this complexity, training skills becomes a challenge, besides, attitudes generated through this teaching type are fundamental in the entrepreneurial and innovative process, and for this reason, they are usually widely studied and in turn encompassed in the so-called *mindset*, defined as the "mental perspective that precedes our actions and feeds our emotions, allowing us to innovate" (Kuratko et al., 2020).

In this sense, several teaching techniques emerge to favor this type of active and experiential learning to develop skills. For example, the Flipped Classroom technique allows to development of skills and not only teaches knowledge (Bergmann & Sams, 2014), but it can be powerful in combination with other active learning techniques such as play and project-based learning, among others.

For this research, the main objective is to compare teaching techniques to improve skills development in entrepreneurship students. Seeking to understand the impact on their entrepreneurial mindset, specifically in the self-regulation and self-efficacy constructs, after being subjected to master class (CONF) technique and the flipped classroom teaching technique combined with playful activities (LUD) and project-based learning (PBL).

An experimental design was proposed, through a randomized sample of students of the Entrepreneurship and Innovation course at Universidad Anáhuac México, selected from the literature the construct self-efficacy as a dependent variable, and self-regulation for learning as an independent variable. A post-intervention instrument was used to collect data. Subsequently, the collected data were subjected to statistical treatment using factor analysis and structural equations.

This paper begins with a literature review to know the state of the art, followed by an explanation of the experimental design and methodology used, the

presentation of results, and, finally, the discussion and conclusions obtained, indicating the main lines of research to follow, as well as the contributions of the article to the literature.

2. Literature review

Constructivism places the student at the center and encourages learning to change from individual work to cooperative work; but doesn't eliminate elements such as individual responsibility and group processing, with the development of collaborative skills and positive interdependence; through the research process which favors knowledge discovery (Woolfolk, 2023). This learning type, meaningful and by autonomous discovery, is based on the presence of previous ideas or cognitive structures, to relate them to new knowledge (Ausubel, 1983).

In this sense, the active role of the entrepreneurship student becomes fundamental in the teaching-learning process (Gangi & Sirelkhatim, 2023), in this teaching type, the educator must encourage a process of formulating hypotheses, collecting data, and drawing conclusions and reflections, which brings us closer to the constructivist approach of Piaget (1993) and Vygostky (2013).

For learning to be meaningful, the student doesn't remain at the level of knowledge, it is not something rote that is learned by coercion but makes a relationship with his personal experiences and interests and learns it for pleasure (Wibowo et al., 2025). In this sense, various analyses arise on how this type of teaching potentiates certain constructs of the entrepreneurial mindset, which are detailed below.

2.1. Active teaching techniques in Entrepreneurship Education to develop entrepreneurial mindset.

The use of active teaching techniques in EE has shown an impact on the entrepreneurial mindset. Previously, the effect on some specific variables has been empirically studied, demonstrating the use of active learning techniques

over traditional techniques has a positive relationship with the increase in main entrepreneurial skills such as self-efficacy, entrepreneurial intention (Mukesh et al., 2020; Ripollés & Blesa, 2024) or students' interest in entrepreneurship (Taneja et al., 2023), amoung others. However, the impact level of the selected teaching technique can vary according to the maturity level of the students (Neck & Corbett, 2018) or even according to the cultural background of the students (Ismail et al., 2018).

Previous research has demonstrated the positive effect of specific learning techniques such as gamification (Fatemeh, 2025; Pérez-Macías et al., 2025), project-based learning (Lykourentzou & Vratimos, 2025) or flipped classroom (Bergmann & Sams, 2014; Horng et al., 2020), simulations and challenge-based learning (Rosário & Raimundo, 2024), amoung others, in entrepreneurial mindset skills. It's important to highlight that the majority of the research is focus on project-based learning, a teaching technique that faces students with real problems to try to solve them (Rosário & Raimundo, 2024).

In general, there is a vast literature of experimental and theoretical studies that specifically analyzes whether the type of teaching technique selected has any type of impact on the entrepreneurial intention, using various variables as mediators, in the most of the cases with focus in self-efficacy and finding in these studies a positive relationship in the impact of the use of these techniques on these constructs (Mukesh et al., 2020; Ripollés & Blesa, 2024; Fatemeh, 2025; Pérez-Macías et al., 2025).

However, most studies focus on students from the West, specially USA and Spain (Rosário & Raimundo, 2024), it seems important to have the contribution of Latin American student's metrics by construct and teaching technique because previous studies show a greater impact of EE with active techniques, but in Western students, in the opposite direction, in students from Asian regions, the traditional technique has better results, apparently due to cultural aspects (Ismail et al., 2018).

In addition to the above, it's important to understand which of these teaching techniques are better to develop certain skills. Also, most of them can be

applied mixed with others, for example, the Flipped Classroom technique allows to development of skills and not only teaches knowledge (Bergmann & Sams, 2014) and it can be powerful applied in combination with other active learning techniques such as gamification, a fun and playful learning technique (Fatemeh, 2025); among others.

Finally, there are some comparative experimental o quasi-experimental studies trying to compare the impact between teaching learning techniques and finding the impact of some teaching learning techniques such as project based learning on the self-efficacy and entrepreneurial intention constructs, (Fatemeh, 2025) but also only for west students, it's important to understand if is similar for Latin American students.

2.2. Self-efficacy in Entrepreneurial Mindset: behavioral research

In general, the entrepreneurial *mindset* can be grouped into three types of aspects: cognitive, behavioral, and emotional (Kuratko et al., 2020). Self-efficacy is inserted within behavior aspects and has been studied in the field of psychology since the Social Learning Theory (SLT) or Socio-Cognitive Theory of Albert Bandura (1978), but also from other perspectives such as the Theory of Cognition and Behavior (Mauer et al., 2009) or the Theory of Planned Behavior or TPB (Ajzen, 1991; cited by Hassan, 2020).

The self-efficacy construct is defined as the flame of motivation that can turn off or ignite the impulse of individuals to engage in certain behaviors, by mitigating or increasing their fears about their abilities to perform a task, and plays a fundamental role within SLT (Bandura, 1978).

Self-efficacy has been measured with different approaches in the entrepreneurship literature, studies can be grouped into 3 groups: task-specific measurement, domain-specific measurement, and general measurements; placing the entrepreneurial perspective within the group of specific domains (Mauer et al., 2009). Different researchers have analyzed this aspect from a competency approach, proposing several ratings (González-López et al., 2020).

It is important to note a large amount of the papers about self-efficacy are based on Ajzen's (1991) TPB. This behavioral theory analyzes the behavioral changes that a person faces by combining three constructs: their previous attitudes, social norms, and the locus of control or self-efficacy (Ajzen, 1991). Many of the published papers are causal or empirical and aim to measure the impact of these three constructs, most of which conclude their impact or mediation on entrepreneurial intention (Mukesh et al., 2020; Hassan, 2020; Paray & Kumar, 2020).

Some other studies considered as independent variables the constructs proposed by the TPB (subjective norms, previous attitudes, and locus of control-self-efficacy) either alone (Hassan, 2020) or mediated by other variables, such as self-employment (Otache et al., 2020), emotional competencies (Huezo-Ponce et al., 2021), entrepreneurial education (Cui & Gu, 2024), spirituality (Cegarra-Navarro et al., 2023), innovation (Bell, 2019) or career selection (Cui & Gu, 2024), the impact of role models on entrepreneurial intention (Wardana et al., 2024); among others. Some of theme inclusive propose or test new tools to measure the constructs (Norambuena et al., 2024).

In addition, some studies are focused on studying entrepreneurial intention but with other theoretical approaches (not based in TPB) such as learning and education (Horng et al., 2020); the profitability of the entrepreneur's efforts (Schultz, 1985; cited by Aboobaker & Renjini, 2020) based on the Social Capital Theory; career choice based on Oyama's Relational Developmental Systems Theory (Oyama, 1985; cited by Gilmartin et al., 2019); self-regulation based on the concept of Core-Self evaluations (Judge et al., 1997; cited by Auzoult et al., 2016) or entrepreneurial education based on Identity Conflict Theory (Shepherd & Haynie, 2009; cited by Newbery et al., 2018).

As can be seen, most of the literature use TPB as a base theory to measure entrepreneurial intention and related constructs as self-efficacy, however, the main criticism of the findings of TPB based papers lies in the fact that intentions are not necessarily reflected in behaviors, and the results of such

research demonstrate a moderate, indirect, or no impact, therefore, some papers analyze other perspectives or moments in decision-making to understand if intentions really translate into concrete actions or implementation (Ismail et al., 2018).

2.3. Self-efficacy for self-regulated learning in Entrepreneurial Mindset: social-cognitive research

From another perspective, there is different approach of self-efficacy in the context of social cognitive research, the relationship between self-efficacy and self-regulated learning proposed by Zimmerman in his Cyclical Model or CM (Zimmerman, 2013) which emerges as a different approach, not in the context of entrepreneurial intention but in the context of education.

Unlike behavioral researchers, for social cognitive researchers (Zimmerman & Schunk, 2001) self-regulation refers to a process through which students develop skills, not only as an aptitude or an ability in itself. From this perspective, self-regulated learning includes both individual and social forms of learning (Zimmerman & Campillo, 2003), that is, it can be reflected both in skills such as conflict resolution but also in requesting help from others to do so (Schunk & Zimmerman, 1998). It's important to highlight the main role of the educator motivating this goal setting, suggesting or asking for specific study strategies and asking to self-evaluate the tasks, all of this considering student´s beliefs but also self-efficacy perception (Zimmerman et al.1996).

Under this position, self-efficacy is part of a 3-stage model that occurs during the learning process, during which the student first of all analyzes the task to be performed, then sets objectives, and motivates himself to perform it but also evaluates if is capable (self-efficacy); then executes the task while using various self-control strategies to stay engaged and motivated to finish; finally, students reflect to evaluate their performance on the task (Zimmerman & Kitsantas, 1997; Panadero, 2017) . Likewise, derived from this model, 5 different instruments have been developed to measure self-regulation and self-efficacy for self-regulated learning (Panadero, 2017).

Previous research has already found positive relation between self-regulation and self-efficacy in the learning context (Longhurst, 2024; Sulistiani et al, 2024), their mediating role (Do & Lai, 2024), the non linear effect between the constructs (Uy et al. 2023) or the relationship between constructs when technology as ChatGPT is applied (Wu et al., 2024).

For this study, it has been decided to take as a basis the SLT (Bandura, 1978) definition for self-efficacy and the MC (Zimmerman & Iwanski, 2014) theory, because the contribution is focused in reviewing the concept of self-efficacy from a socio-cognitive perspective (as a process) during the learning process and related to self-regulation, comparing for this purpose different learning techniques, but not to measure entrepreneurial intention (behavioral), which allows to evaluate the construct from another perspective considering the existence of skills and attitudes which favor entrepreneurship education. In this sense, the following section describes the experimental design and the methodology used.

3. Methods

3.1. Methodological approach and data analysis

For this research, the main objective is to compare teaching techniques to understand which ones favor skills development in entrepreneurship students. Seeking to delve into the changes presented in their entrepreneurial mindset, particularly in the aspect of self-efficacy and self-regulation, after being subjected to the flipped classroom teaching technique combined with playful activities (LUD), project-based learning (PBL), and the classic master class or conference (CONF).

To this end, an experimental design was proposed, through a randomized sample of 106 students of the Entrepreneurship and Innovation course in Universidad Anáhuac México, selected from the literature an aspect of the entrepreneurial *mindset* most commonly measured as a independent variable, self-efficacy (AF), and self-regulation for learning (AR) as an dependent variable, considering the three teaching techniques: CONF, LUD, and PBL.

Specifically, the factor analysis procedure was carried out to generate the constructs of Self-Efficacy (AF) and Self-Regulated Learning (AR). This procedure identifies underlying patterns in the set of items to discern common variance and generate estimates of latent variables, also called factors. These factors are statistically evaluated to validate their correspondence with the theoretical variables indicated in the literature and proceed to study their relationships and causality, which is known as confirmatory factor analysis (Peña, 2018).

Based on the AF and AR constructs, a structural equation model (SEM) is estimated to quantify the effect of Self-efficacy (AR) on Self-Regulated Learning (AR) (see Appendix 1) in the PBL, LUD, and CONF groups, with the master class or CONF group being the control group (base group).

Structural equations make it possible to evaluate and analyze the relationships between observed and latent variables in a theoretical model, allowing concepts that cannot be measured directly to be measured more accurately. In addition, SEM allows several statistical tests to be carried out to verify whether the theoretical model fits the data adequately and whether the relationships between the variables are meaningful and consistent with the research hypotheses (Acock, 2013).

Additionally, a Multiple Analysis of Variance (MANOVA) exercise is performed to verify if there are differences in the mean of the AF and AR variables, attributable to sex, age, or career.

3.2. Sample

The students' sample used is a randomized sample taking the total amount of students in the Entrepreneurship and Innovation course. The 106 students were invited to participate through an invitation sent by email at the end of the course. All students enrolled in the course without knowing which type of course each one corresponded to; the randomization was performed by the authors in a simple random sampling.

Students enrolled were randomized into 3 groups: a control group to be trained with traditional teaching-teaching technique (CONF), a second group to be trained with flipped class combined with play (LUD), and a third group to be trained with flipped class combined with project-based learning (PBL). The course considers experimentation and validation though Lean Startup and Design Thinking methodology. One of the authors was responsible to teach this course.

All participants were undergraduate students, aged between 18 and 26 years, who were enrolled in the Entrepreneurship and Innovation course (mandatory course) at Universidad Anáhuac México (See Table 1).

Table. 1.
Characteristics of the participants

Item	Possible Values	Composition
Age	18 to 26 years old	18 years- 1 19 years-7 20 years-15 years 21 years-35 22 years-29 23 years-12 24 years-4 25 years-2 26 years-1
Gender	Female/Male	Female: 71 participants (64%) Male: 35 participants (33%)

Source: Authors' creation.

3.3. Variables

In this study, the control group and two treatment groups were defined as follows:

a) Control treatment: Course based on traditional teaching technique (CONF).
b) Treatment 1: Course based on Flipped Classroom Technique Course combined with Project-Based Learning (PBL).

c) Treatment 2: Course based on Flipped Classroom Technique Combined with Play (LUD).

The independent variable is Self-efficacy (AF) and the dependent variable is Self-Regulated Learning (AR), see Appendix 1. In this regard, age, sex, career, and business family history were considered as control variables. In this sense, the hypotheses are as follows:

a) H0: Self-efficacy (AF) and self-regulated learning (AR) in students do not increase when they are trained with active techniques.
b) H1: Self-efficacy (AF) and self-regulated learning (AR) in students when receiving flipped classroom technique training combined with play increase better than when receiving traditional technique training.
c) H2: Self-efficacy (AF) and self-regulated learning (AR) in students when receiving flipped classroom training combined with project-based learning increase better than when receiving traditional technique training.
d) H3: Self-regulated (AR) learning has a direct and positive relationship with self-efficacy (AF).

3.3. Instruments for obtaining information and fieldwork

A Syllabus containing the same topics was designed for each course (CONF, LUD, and PBL), however, the first one was designed with traditional teaching technique, the second one with flipped classroom technique using play as an active technique, and the third one also using flipped combined with project-based learning as an active technique.

The course was taught in *Bootcamp* modality (duration: 2 hours) and was about teamwork techniques. The topic could be used later in the class to manage the activity to develop an innovative product or service in teamwork. The course was teached by one of the authors. The students selected the group in which they wished to register, without knowing the modality of teaching technique corresponding to each group. Finally, they answered a link with the survey to obtain the required information, which was statistical processed with a structural equation model (SEM). The tools used to collected data are

two inventories previously used and validated in the literature: The development and validation of the Self-Regulation Strategy Inventory—Self-Report and the Self-Efficacy Questionnaire for Self-Regulation of Behavior (Cleary, 2006; Palenzuela et al., 1990). The following section reports the results and their interpretation.

4. Results

The results of the statistical analysis are presented below. Table 2 presents the items factor analysis; it can be observed that the first two factors are relevant since they have eigenvalues greater than one and gather 61.40% of the accumulated variance.

Table. 2.
Factor Analysis

Factors	Eigenvalue	Cumulative Variance
Factor1	9.997	0.417
Factor2	4.737	0.614
Remainder	0.971	0.386

Source: Authors' creation.

The item's factor loads are grouped according to what is found in the literature under a threshold of 0.35. The first sixteen items are identified with Self-Efficacy (AF) and the remaining items with Self-Regulated Learning (AR) (See Appendix 2 and 3). Item number 34 is not significant. In what corresponds to the Kaiser-Meyer-Olkin sample adequacy measure, 0.813 was found, which corresponds to a reasonable fit for the variables of this study (Woods & Edwards, 2007).

Similarly, Bartlett's sphericity test was carried out, where a test statistic of 2284.76 was found with a p-value of less than 1%, which provides evidence

that the elements that make up the factor analysis are significantly correlated since the determinant of the correlation matrix between the items is less than 0.0001 (Hu and Bentler, 1999). See Table 3.

Table. 3.
Factor Analysis
Source: Authors' creation.

Item	Factor 1	Uniqueness	Item	Factor 2	Uniqueness
a1	.543	.694	a17	.540	.704
a2	.750	.429	a18	.597	.643
a3	.622	.611	a19	.689	.522
a4	.535	.669	a20	.675	.535
a5	.703	.479	a21	.640	.575
a6	.656	.550	a22	.546	.674
a7	.649	.563	a23	.720	.447
a8	.822	.323	a24	.510	.729
a9	.727	.470	a25	.494	.741
a10	.712	.490	a26	.408	.770
a11	.753	.413	a27	.522	.720
a12	.723	.458	a28	.560	.672
a13	.672	.532	a29	.780	.380
a14	.650	.577	a30	.440	.788
a15	.751	.414	a31	.633	.538
a16	.462	.722	a32	.600	.639
			a33	.491	.646
			a34		.807
			a35	.542	.678
			a36	.536	.666

A structural equation model (see model in Appendix 1) was carried out by groups that included the variables AF and AR to verify the relationship between them. Table 4 shows that there is a positive relationship, but only significant in the case of the PBL group (0.361, p-value<5%). This provides

evidence that the didactic techniques applied in this group contribute to a relevant effect on AF and AR.

Table. 4.
Structural Equation Model

OF	Coefficient	Statistical error	z-statistic	p-value
ON				
PBL	.361	.122	2.94	.003
CONF	.917	.078	1.18	.239
LUD	.060	.095	0.63	.528

Source: Authors' creation

The estimates in Table 4 do not incorporate control variables, since the Multiple Analysis of Variance (MANOVA) method was carried out. No evidence was found of differences in the means of AF and AR, attributable to sex, age, career, or group: LUD, PBL, and CONF, given that the p-value is greater than the significance level of 10% (See Table 5).

Table. 5.
CHANGE

Variable	Wilks Statistician	p-value
Sex	.984	.438
Age	.797	.127
Race	.212	.115
Group	.987	.860

Source: Authors' creation.

In addition, Table 6 presents the classic goodness-of-fit indicators for an SEM model, namely CFI, TLI, SRMR, and RMSEA. It can be observed that these statistics meet the criteria to affirm that the estimation of structural equations is reasonable (Acock, 2013).

Table. 6.
GOODNESS OF FIT

Statistical	Value	Threshold
CFI	.89	>.80
TLI	.87	>.80
RMSEA	.079	<.08
SRMR	.091	<.10

Source: Authors' creation.

The above estimates provide evidence that mean Self-efficacy (AR) and mean Self-Regulated Learning (AR) do not differ between PBL, CONF, and LUD groups when age, sex, or career are considered (See Table 5).

However, according to SEM model (0.361, p-value<5%), there is evidence that the effect of Self-Efficacy (AF) on Self-Regulated Learning (AR) is positive and significant, with 99% confidence, in the case of the PBL group. So, H2 can be validated, but H3 can only be validated for PBL group (See Table 4).

a) H2: Self-efficacy (AF) and self-regulated learning (AR) in students when receiving flipped classroom training combined with project-based learning (PBL) increase better than when receiving traditional technique training (CONF).
b) H3: Self-regulated (AR) learning has a direct and positive relationship with self-efficacy (AF).

This does not occur in the case of the group treated with LUD where the p-value shows us that there is no impact when using this technique. H1 is invalid.

c) H1: Self-efficacy (AF) and self-regulated learning (AR) in students when receiving flipped classroom technique training combined with

play (LUD) increase better than when receiving traditional technique training (CONF),

As a consequence of the previous results, hypothesis H0 is invalid.

H0: Self-efficacy (AF) and self-regulated learning (AR) in students do not increase when they are trained with active techniques (PBL, LUD).

5. Discussion and conclusions

Entrepreneurship education faces great challenges, one of the most complex being to train students not only knowledge but also skills and attitudes Gangi & Sirelkhatim, 2023). This type of training requires experiential and active learning (Neck & Greene, 2011) that can be favored through certain educational techniques (Mukesh et al., 2020).

Most of the studies carried out to measure the impact of these active techniques on the entrepreneurial mindset focus on self-efficacy based on Ajzen's (1991) TPB, mostly concluding the impact or mediation of these on entrepreneurial intention (Hassan, 2020; Paray & Kumar, 2020).

For this study, the SLT (Bandura, 1978) and the MC (Zimmerman & Iwanski, 2014) were taken as a basis, because the contribution lies in reviewing the concept of self-efficacy from a socio-cognitive perspective (i.e., skills and attitudes), and not only behavioral (entrepreneurial intention). Therefore, the construct of self-efficacy was chosen for self-regulation specifically in Latin American students, after being subjected to the flipped classroom teaching technique combined with LUD, PBL, and CONF, measuring the impact on the AF and AR constructs.

After an experimental treatment through a randomized sample of 106 students of the Entrepreneurship and Innovation course at Universidad Anáhuac México, no evidence could be found that mean Self-efficacy (AF) and mean Self-Regulated Learning (AR) differ between the PBL, CONF, and LUD groups when age, sex or career are considered.

However, there is evidence that the effect of AF on AR is positive and significant, with 99% confidence, in the case of the PBL group, coinciding with previous research that supports that this active technique favors the development of skills (Lykourentzou & Vratimos, 2025). This suggests that courses should be implemented with such a project-based approach, rather than based on gamification or master class, to increase AF and AR. In short validating H2 and H3 (just for PBL) which postulated that:

> H2: Self-efficacy (AF) and self-regulated learning (AR) in students when receiving flipped classroom training combined with project-based learning (PBL) increase better than when receiving traditional technique training (CONF).
> H3: Self-regulated (AR) learning has a direct and positive relationship with self-efficacy (AF).

Based on previous results H1 y H0 are invalids:

> H2: Self-efficacy (AF) and self-regulated learning (AR) in students when receiving flipped classroom training combined with project-based learning (PBL) increase better than when receiving traditional technique training (CONF).
> H0: Self-efficacy (AF) and self-regulated learning (AR) in students do not increase when they are trained with active techniques (PBL, LUD).

The latter coincides with previous findings where the effect on self-efficacy when using active techniques had been studied (Mukesh et al., 2020), however, it is important to point out again that this effect is only detected with the use of PBL and not LUD, i.e., differing from what was previously found (Fameteh, 2025) where positive relationships between self-efficacy and gamification had been found. This may be attributed to the fact that this study uses an approach based on CM theory (Zimmerman et al.,1996) and not on TPB (Ajzen, 1991), that is, it does not focus on understanding the impact of self-efficacy on entrepreneurial intention, often understood as business creation (Mukesh et al., 2020; Hassan, 2020; Paray & Kumar, 2020), but

focuses on understand self-efficacy as an mediator in the learning process, where it can favor the development of other skills such as self-regulation (Longhurst, 2024; Sulistiani et al, 2024; Do & Lai, 2024), that is, in its role supporting learning.

Neither, it can't be generalized to other cultures, for example in Asian Regions the traditional teaching techniques (CONF) has better results than active techniques (Ismail et al., 2018)., a difference from the West where students prefer active education, as this study seems to indicate for Latin American students.

In summary, the above results suggest that the implementation of courses based on the combination of flipped classrooms with PBL can have a positive impact on the constructs of AR and AF, favoring that the active role of the entrepreneurship student becomes fundamental in the teaching-learning process (Gangi & Sirelkhatim, 2023). In other words, the development of the attitudinal constructs of the entrepreneurial mentality is favored with this active technique, as the use of active techniques for this has previously been suggested by authors such as Neck & Greene (2011). The main contributions of the study focus on first, to provide literature on Latin American profiles, but also in highlight the importance of the educator's role when he or she has the power to select the teaching technique, as previous Zimmerman et al. (1996) postulate.

Also, when AF is studied as part of a learning process with MC and as a mediator for AR development (and not as entrepreneurship intention), the educator´s selection of the learning technique should consider which skills are going to be developed, because it was suggested in this study not all learning techniques favors the development of all the skills and the learning process itself. Reinforcing Zimmerman & Schunk (2007) whom postulates learning technique selected can impact the motivation, achievement and cognitive development of the student favoring or not the social and individual learning process. It is not just about developing entrepreneurial skills, but also about promoting learning.

As a result, a comparison of different active techniques was presented to measure the impacts on individual skills, using the SLT (Bandura, 1978) and the MC (Zimmerman & Iwanski, 2014) as a basis to study a perspective of skills development during the learning process and not of entrepreneurship intention, concluding the positive impact on AF and AR when PBL is applied, but not with other learning techniques. Reinforcing the main importance of the educator selection of the learning technique on the student's beliefs and motivation (Zimmerman et al.,1996).

Finally, is suggested, as Zimmerman et al. (1996) previously recommend, that Entrepreneurship Education must consider students' beliefs, their perception of self-efficacy and causal attributions that allow them to define their cognitive or motivational difficulties to find alternative solutions for learning. Student's need self-efficacy not only for entrepreneurship intention, they need it to learn entrepreneurship. It emerges as necessary to go deeper in understanding of self-efficacy, self-regulation and other skills not only since the main focus of favors entrepreneurship intention, may be considering how to favor the entrepreneurship learning process. But also, in making educators aware of the importance of educational innovation and therefore, in the selection of the educational method they use to develop certain skills.

5.1 Limitations

As limitations, it is specified that the study was only carried out with students from a single Educational Institution with a small sample, which limits the profile studied, although it should be noted that there was diversity in terms of age, gender, and careers studied. It opens up the possibility of carrying out a further experiment combined with Latin American students of various nationalities.

Another limitation goes around the sample size, that could be increased and diversified in a second study. The results obtained above cannot be generalized to other populations where the cultural context is different; Mexico's proximity to the United States makes a difference due to the degree of cultural contact. Additionally, future research could consider public

universities, not just private ones, as well as representatives from other countries and cultures.

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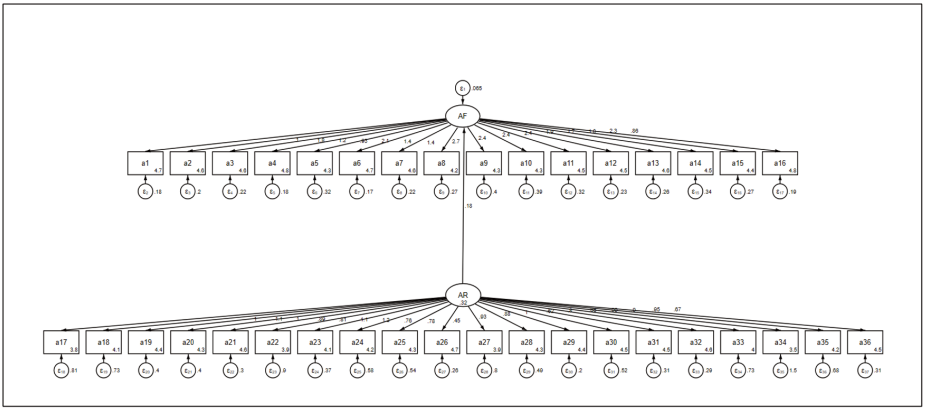
Appendix. 1. SEM model.



Source: Authors' creation

Appendix. 2. Efficacy.

ITEMS	SELF-EFFICACY
A1	As a result of the course taken in Teamwork, I feel able to easily learn the topics and concepts I am taught.
A2	The Teamwork course helped me manage time efficiently to learn.
A3	From the Teamwork course, I find solutions to the school problems that come my way.
A4	The Teamwork course helped me to be efficient in doing school projects.
A5	As a result of the Teamwork course, I can solve the exams that apply to me.
A6	With the Teamwork course, I can achieve the academic goals I set for myself.
A7	The Teamwork course helped me to be able to understand the topics and concepts I am taught.
A8	With the Teamwork course, I developed the ability to analyze in depth the readings of texts and/or articles
A9	As a result of the Teamwork course, I can summarize the main ideas of a text.
A10	The Teamwork course helped me feel confident when I solve an exam.
A11	As a result of the Teamwork course, I can organize my notes.
A12	The Teamwork course helped me to easily relate to the concepts I am taught.
A13	I believe that the Teamwork course helped me to have good study habits.
A14	The Teamwork course helped me to have the ability to design my charts, tables, maps, or diagrams to study the central ideas of a topic.
A15	From the Teamwork course, I can get good grades
A16	As a result of the teamwork course, I feel more capable of working in a team

Source: Authors' creation

Appendix. 3. Self-regulated learning

ITEMS	SELF-REGULATED LEARNING
A17	I organize my activities at least a week in advance.
A18	I set myself deadlines when I set out to accomplish a task.
A19	I think very carefully about what I have to do in my homework and/or school projects.
A20	I set concrete academic goals.
A21	I make sure I have everything I need to complete my homework and school projects.
A22	I have a distraction-free space to focus on my homework and school projects
A23	I maintain my attention and concentration during the teacher's explanations
A24	I clarify any doubts I have with the teacher
A25	I take notes, make summaries, and/or solve exercises to reinforce my understanding of the topics.
a26	I attend all classes on time.
a27	Actively participated in the classes
a28	I stick to my study schedules
a29	I make the necessary changes to reach my academic goals
a30	At the end of an exam, I mentally review my answers to get an idea of the successes and mistakes I may have made.
a31	When I receive a grade, I usually think of specific things I need to do to improve my academic performance.
a32	I review and analyze the corrections that teachers make in my assignments or exams to know where I went wrong and to be able to improve.
a33	I look for exercises and activities that allow me to measure my learning.
a34	I take tests myself to see how much I'm learning while studying.
a35	I compare my grades to my academic goals so I can make changes.
a36	The grades I get on tests, assignments, or homework help make decisions about my academic performance.

Source: Authors' creation

Declaramos explícitamente no tener conflicto de intereses con la Revista Perspectivas, con ningún miembro de su Comité Editorial, ni con su entidad editora, la Universidad Católica Boliviana "San Pablo".

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