

Advances in Psychology Research



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Nadya Columbus
Editor

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Advances in Psychology Research

Volume 159



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Chapter 5

Self-Efficacy and Dropout Rates Among University Engineering Students: Vocational Training as an Alternative to Dropping Out of Education Altogether

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Abstract

University dropout is a multicausal phenomenon influenced by many academic, personal and contextual factors that can, in turn, predict whether students remain in the higher education system. In this regard, self-efficacy is a key factor in academic success, associated with better academic performance and lower intention to drop out. However, leaving the university system does not necessarily mean dropping out of education altogether, as students may consider Vocational Training Programs (VTP) as an alternative for completing their education.

This chapter will address the problem of university dropout considering levels of student self-efficacy and will present some findings from the Spanish National Project “Study of the risk and protection factors of

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university dropout. Creation of a guide to good practice” (PID2022-141290NB-I00). The research results indicate differences in levels of self-efficacy between students who express the intention to drop out of university and those who consider the option of studying Vocational Training. This demonstrates the importance of self-efficacy in the formation of the intention to drop out in new engineering students. Given the importance of self-efficacy in the academic context, some measures are presented for improving university guidance services and tutoring programs that strengthen self-efficacy as a strategy for improving students’ academic success and reducing the intention to drop out. Finally, the chapter highlights the need to prevent students from dropping out of higher education altogether by supporting their academic journey through other alternatives, such as Vocational Training courses.

Keywords: university dropout, self-efficacy, higher education, vocational training programs, engineering, computer science

1. University Dropout

The transition from secondary education to higher education is a complex process of adaptation in which students entering the university system for the first time must face various challenges (such as university culture, academic demands, social environment, and interpersonal relationships) in this new context (De Clercq et al., 2018). Without suitable guidance and support from universities, these challenges can affect academic performance and increase students’ intentions to drop out (Njage & Athimoolam, 2021). While the number of students enrolled in universities worldwide has doubled over the last 20 years (UNESCO, 2023), some research highlights a shortage of university graduates (Behr et al., 2020). One possible reason for this is that not all students who begin courses of higher education complete them, with university dropout being one possible outcome.

University dropout is the result of a process of progressive disengagement from the university system. It has multiple causes (Álvarez-Pérez & López-Aguilar, 2017). According to the definition from the University Statistics and Information Commission (2016), dropout is conceptualized as the percentage of new students who do not graduate from or enroll in any university degree program at any Spanish university in the two academic years following their admission. This phenomenon can be classified according to several dimensions, either by its nature (voluntary or imposed); its duration (early,

temporary or permanent); the time at which it occurs (depending on the academic year); and the situation following the decision (which may be a definitive withdrawal or a transfer) (Andrews et al., 2014). However, it is important to make some distinctions when discussing university dropout, such as distinguishing between dropout as a decision that has been taken and the intention to drop out, which is understood as thoughts about not staying in a higher education program. This intention is more common among first-year students (Bernardo et al., 2018; Díaz-Mujica et al., 2019). It begins to take shape in the first year of university, particularly during weeks six to eight of the academic year (Casanova et al., 2018; Tinto, 2010). These are critical moments when students are confronted with the realities of university life and often find that their expectations have not been met (Respondek et al., 2020). According to the concept of dropout as a process, the intention to drop out is considered a preliminary phase of reflection and adjustment of academic expectations experienced by students before they make the decision to definitively leave their course (Bäulke et al., 2022). According to the OECD's Education at a Glance 2022 report, on average, 12% of students who started a university degree dropped out completely after the first year. However, the figures vary significantly between countries, ranging from 5% in the United States to 20% or more in Colombia, Iceland, and the Walloon Community of Belgium (OECD, 2022).

Dropout rates also vary significantly between fields of study and reach particularly high levels in science and technology (STEM) courses (Blackmore et al., 2021; Buizza et al., 2024). Spanish public universities provide a perfect example of this, with dropout rates in the first year of engineering (22.4%) and computer science (19.7%) being above the average for all degrees (16.7%) (Ministerio de Ciencia, Innovación y Universidades, 2025). While these two fields have similar dropout rates, the progression between 2011-2012 and 2020-2021 indicates notable differences. While the dropout rate for computer science degrees decreased by 8 percentage points, the rate for engineering degrees and for degrees as a whole remained stable, decreasing by 0.3 and 1 percentage point, respectively.

2. A Phenomenon with Multiple Causes

The magnitude of the higher education dropout problem has drawn the attention of the international research community, resulting in a growing body of research on student dropout profiles and underlying causes. Consequently,

a variety of studies have been conducted, ranging from systematic reviews (Behr et al., 2020; Bernardo et al., 2025; Kocsis & Molnár, 2024) offering theoretical insights into the phenomenon to empirical research focusing on specific variables and different contexts. Bäumke et al. (2022) conducted a study exploring the stages of developing the intention to drop out among German students from all fields of study. Other studies have examined psychosocial student variables that influence the decision to drop out, analyzing factors such as academic performance, motivation, commitment, satisfaction, self-efficacy, social integration and employment status. Examples include studies conducted in Germany (Baalmann, 2024), Australia (Irwin et al., 2024), Italy (Biasi et al., 2018), the United Kingdom (Edge & Gladstone, 2022), Tanzania (Moses et al., 2019), Chile (López-Angulo et al., 2023), and Colombia (Valencia-Arias et al., 2023).

University dropout has been extensively studied for decades due to its global impact. It can be considered a persistent problem that has been addressed using various theoretical models.

In early conceptualizations, drop out was considered a one-dimensional phenomenon, explained solely by academic, social or personal factors. Within this framework, psychological, sociological and economic models emerged. Psychological models focused on student behavior and attitudes, considering behavior, coping mechanisms, attributions and self-efficacy, as well as psychological characteristics before starting university and engagement with the institution (Baker & Siryk, 1984; Behr et al., 2020). Sociological models focused on students' social (e.g., relationships with peers and extracurricular activities) and academic (e.g., grades, academic norms or values) integration (Ethington, 1990; Velázquez & González, 2017). In contrast, economic models considered benefits and costs to be determinants in the decision to drop out or not, taking into account economic factors, effort and performance.

Subsequently, multidimensional models emerged, with Tinto (1975) being a leading figure in reshaping how the phenomenon is considered. Studies into dropout began to consider variables such as family and personal characteristics, individual skills and abilities, and academic achievement as potential influencing factors (Spady, 1971; Tinto, 1975, 1987, 2005; Pascarella et al., 1986). Building on Tinto's explanatory model, the Student Retention Model (2001) by Bean and Eaton represented a theoretical advance in that it drew on psychological theories to explain how social and academic integration occurs. The model is based on the idea that dropping out of university is ultimately a response to individual decisions based on psychological processes influencing academic and social integration (Bean &

Eaton, 2001). It proposes that students enter university with characteristics shaped by previous experiences. As they interact with the institutional environment, different psychological processes are activated that affect aspects such as self-efficacy, stress management, locus of control and motivation. These adaptation processes determine how well students integrate socially and academically. When integration is low, students tend to feel that they do not fit in well at the institution (low institutional adjustment) and that they chose the wrong university (low institutional loyalty). This increases the likelihood that they will consider dropping out.

One of these personal characteristics is the initial levels of self-efficacy with which students begin university. Self-efficacy is based on perceptions of past abilities and is considered closely related to academic performance and intention to drop out. In the context of higher education, students who see themselves as more capable tend to perform better academically (Acosta-Gonzaga & Ramirez-Arellano, 2020; Honicke & Broadbent, 2016) and are less likely to drop out if they are confident in their academic abilities (Cocorada et al., 2021).

3. Self-Efficacy and Dropout

Self-efficacy is defined as students' beliefs, perceptions and expectations regarding their ability to achieve their goals and successfully complete academic tasks (Bandura, 1997; Lin et al., 2018). Socio-cognitive theories provide a valuable framework for understanding how self-efficacy influences students' decisions about continuing their courses (Bandura, 2012).

According to the Student Retention Model proposed by Bean and Eaton (2001), self-efficacy is a predictor of academic performance, success, and failure. Students with high self-efficacy tend to be more confident when facing academic challenges, more proactive in finding solutions and more persistent in the face of difficulties (El-Adl & Alkharusi, 2020; Habók et al., 2020). Similarly, self-efficacy beliefs can influence cognitive, motivational, emotional, and decision-making processes (Bandura, 2012). Consequently, self-efficacy is significantly and negatively associated with the intention to drop out (González-Benito et al., 2021; López-Aguilar & Álvarez-Pérez, 2021).

The scientific literature identifies self-efficacy as a significant factor in explaining the phenomenon of dropping out. Research suggests that self-efficacy acts as a mediator between dropout and other cognitive and academic

factors that contribute to academic success (Buizza et al., 2024; Díaz-Mujica et al., 2022; Barrientos-Illanes et al., 2021). Similarly, students' beliefs about their ability to complete tasks and achieve goals are directly and significantly related to their intentions to drop out (González-Benito et al., 2021; López-Aguilar & Álvarez-Pérez, 2021). Consequently, students with low self-efficacy tend to perceive academic difficulties more frequently, experience greater anxiety before exams and exhibit greater intention to drop out (Acosta-Gonzaga & Ramírez-Arellano, 2020; Hayat et al., 2021).

Self-efficacy is also recognized as a significant factor in choosing a STEM degree. Students who enroll on these courses tend to have high levels of self-efficacy (Hernández & Neira, 2022), although the wide variety of degrees in the STEM field attracts students with different profiles. For instance, students starting computer science degrees tend to have moderate levels of self-efficacy, which may not give them the sense of competence and motivation required to complete their studies (Abdunabi et al., 2019; Korkmaz & Altun, 2014). Engineering students often demonstrate an academic mismatch between their expectations and the reality of the academic context, which negatively impacts their performance, particularly during the first year (Casanova et al., 2018; Eichler & Gradwohl, 2021). Whitcomb et al. (2020) found significant discrepancies between levels of engineering students' self-efficacy and their actual academic performance, with boys being more confident in their abilities despite subsequently performing similarly to—or slightly worse than—their female classmates. The same is true for computer science degrees, where the demand for mathematical skills applied to programming and logical problem-solving often causes significant difficulties.

These problems can lead students to consider dropping out. In engineering and computer science programs, dropout appears to be mainly due to a combination of academic, motivational and institutional factors (Geisinger & Raman, 2013). Low entrance exam scores and poor initial performance in mathematics and programming have a major impact on dropout rates (Kabashi et al., 2022). Similarly, a lack of career suitability, decreased self-efficacy and a lack of genuine interest can significantly undermine persistence (Casanova et al., 2021; Virkki, 2023). Institutional factors that exacerbate the problem include deficiencies in course planning, rigid schedules and inadequate academic support (Salas-Morera et al., 2019; Tayebi et al., 2021). While some articles highlight demographic and regional influences on dropout intentions, these appear to be inconsistent (Lázaro-Álvarez et al., 2020). Finally, research consistently identifies the first year of study as a high-risk period, during

which academic difficulties accumulate and motivation to study declines (Casanova et al., 2021; Kabashi et al., 2022).

4. Pathways After Dropping Out: Vocational Training as a Way to Continue Studying

While some students who drop out of their degree programs do decide to change degrees or universities, many end up leaving university altogether (Almeida et al., 2019; Casanova et al., 2018). In Spain these two options are practically equally common, as Table 1 shows.

Table 1. First-year dropout rates, course change rates, and permanent dropout rates

Area	Change of course (A)	University dropout (B)	Total dropout (A+B)
All areas	7.98%	8.72%	16.70%
Computer science ¹	9.99%	9.7%	19.69%
Engineering	10.79%	11.63%	22.42%

Source: Prepared internally based on data from the Integrated System of University Indicators. Spain. Public universities offering face-to-face programs. Newly enrolled students. Cohort 2020–2021.

However, these types of statistics obscure the variety of paths that students take after leaving the university system (Heublein, 2014; Ishitani & Flood, 2018). Permanent dropout is usually the least common option compared to alternatives such as seeking employment or continuing studies outside the university system (Tieben, 2023). As the decision to take a particular path is associated with different causes of dropout (Aparicio-Chueca et al., 2021; Braunstein et al., 2024; Crisp et al., 2022), the early detection and differentiation of these factors is crucial for improving our understanding of dropout and for developing more effective support measures for students intending to drop out of their degree programs.

Among the options after dropping out of a degree course, Vocational Training is a popular alternative to seeking employment without qualifications and simply leaving education altogether. It allows students to continue their education and obtain a qualification (Hossler et al., 2012). These more practically oriented programs offer a second chance to students who do not

¹ Software Engineering and Computer Engineering in Information Technology.

find the university environment conducive to their academic and personal development (Kalogrides & Grodsky, 2011).

The term ‘reverse transfer’ has been coined in academic literature to describe the movement of university students towards Vocational Training (e.g., Goldrick-Rab & Pfeffer, 2009). This transition has been observed in several countries and is far from being an anomaly. In Europe, Ulriksen et al. (2015) estimated that between 12% and 16% of Danish students studying STEM subjects choose to continue their studies in Vocational Training. More recently, Tieben (2023) demonstrated that 22.5% of German university dropouts enter the German dual Vocational Training system within five years of leaving university.

Although reverse transfer has been less studied than pathways from Vocational Training to university (vertical transfer) or degree changes (lateral transfer), evidence on predicting these transitions is growing. The transition to Vocational Training after dropping out of university is more often chosen by women, and it is significantly inversely related to socio-economic status, previous academic performance, sense of belonging, and self-efficacy (Crisp et al., 2022). Conversely, having friends with positive expectations of university (Goldrick-Rab & Pfeffer, 2009) or being in receipt of a scholarship (Hillman et al., 2008) reduces the likelihood of taking this path.

5. Permeability Between Vocational Training and University Education in Spain

In the Spanish education system, compulsory education covers primary and secondary levels, from the ages of 6 to 16. It is at this point that students can decide on their future educational or professional path. Those who choose to continue their studies can opt to spend two additional years studying for the *Bachillerato* (Baccalaureate) or Intermediate Vocational Training qualification. The *Bachillerato* enables students to take the university entrance exam and also gives them direct access to Advanced Vocational Training, which can also be accessed upon completion of an Intermediate Vocational Training cycle. Successful completion of Advanced Vocational Training leads to an Advanced Technician qualification. This allows access to undergraduate university courses via an admission procedure, as well as validation of the corresponding university academic credits.

Since 2011, permeability between higher Vocational Training and university has been regulated by a mechanism for the transfer and recognition of ECTS credits, although the specific access conditions, as determined by the relevant educational authorities, depend on the degree program (European Centre for the Development of Vocational Training, 2023). However, the mechanism suffers from several problems, two of which stand out. Firstly, different universities recognize different numbers of credits for the same qualification. Secondly, the distribution of recognized credits over time does not reduce the duration of studies (Michavila, 2025).

In addition to these transfer formulas, there has been a recent commitment to promoting new models of collaboration between higher Vocational Training centers and universities. The aim is to share knowledge, foster innovation, and make better use of resources through joint projects and the creation of integrated workspaces within higher education (as set out in Organic Law 3/2022 of 31 March on the organization and integration of Vocational Training).

Although credit recognition works both ways, official statistics only reflect data on transitions from Vocational Training to university, a path taken by 27.6% of higher Vocational Training graduates in 2019–2020. Regarding the transition from university to Vocational Training, Diego-Rodríguez et al. (2025) estimated that almost 10% of those who completed a higher Vocational Training cycle in 2013–14 had previously studied at university, based on microdata from the Educational Transition and Labour Market Integration Survey (ETEFIL-19). However, it remains impossible to determine the magnitude of this flow given the absence of statistics on students who begin Vocational Training after dropping out of a degree course (Harris, 2009).

In any case, both universities and Vocational Training provide students with opportunities to develop academically and acquire the skills and abilities needed to successfully enter employment.

Against this backdrop, this chapter will analyze dropout among engineering students, not only as leaving the university system altogether, but also as readjustment towards other educational options such as Vocational Training. The chapter will consider self-efficacy as a potential influencing factor in this decision.

6. Current Research

Within that theoretical framework, this study aims to investigate the relationship between engineering students' academic self-efficacy and their intentions to drop out of their degree program in order to pursue Vocational Training. It will also examine the differences between computer engineering students and those in other branches of engineering.

The study is part of the national knowledge generation project, “*Estudio de los factores de riesgo y protección del abandono universitario. Elaboración de una guía de buenas prácticas*” [‘Study of risk and protective factors for university dropout: Development of a Guide to Good Practice’] (ref. PID2022-141290NB-100), which is part of the 2021–2023 State Plan for Scientific, Technical and Innovation Research. The project aims to produce a detailed analysis of the risk and protective factors associated with dropout, as well as analyze the dynamics between the variables that influence the phenomenon. The project is longitudinal and uses a series of questionnaires to monitor students' academic progress. Participation from universities is required at three timepoints: when students first enroll, at the start of the second semester in their first year (after their first round of evaluations), and at the start of the second year. This study presents preliminary results from the first questionnaire, which was administered to new engineering students during the first six weeks of the 2024–25 academic year.

A. Method

a. Participants

Before data collection, approval was sought from the Ethics Committee (ref. 40_RRI_2023) of the participating university. Universities offering degrees in engineering were also contacted and asked to participate in the study and help with data collection. Students were asked to complete an online questionnaire during the first seven weeks of the 2024–25 academic year. They were informed in advance about the study's objectives, and their informed consent was obtained. Participation was voluntary and anonymous, data protection and confidentiality were ensured, and ethical guidelines were followed.

The study sample consisted of 344 students, of whom 27.9% were women. Participants were aged between 16 and 34 (mean age 17.98, SD = 1.36) and were studying engineering degrees at four different locations in a public

university in northern Spain. Half (49.7%) of the participating students were studying computer engineering degrees, while the remaining 50.3% were studying other engineering degrees. More than two thirds (69.8%) were enrolled in their first-choice degree program, and 50.6% were receiving scholarships.

Table 2. Descriptive data

	Total (n = 344)	Computer engineering (n = 171)	Other engineering (n = 173)
Women	27.9%	19.9%	35.8%
Age	18.0	17.8	18.2
Access note	10.688	11.240	10.145
Applied for a scholarship	50.6%	42.7%	56.1%
First-choice degree	69.8%	66.7%	72.8%
Access from Vocational Training	2.6%	1.2%	4%

b. Instruments

A sociodemographic questionnaire was used to collect information on the participants’ personal, academic and socioeconomic characteristics. This covered the participants’ gender, age, grade point average, route of entry to university, and whether they received a scholarship to pursue their studies. It also indicated whether the degree program they were enrolled in was their first choice.

The Spanish version of the Motivated Strategies for Learning Questionnaire (Cardenoso et al., 2022) was used to collect students’ perceptions of self-efficacy. This 66-item questionnaire has responses using a 7-point Likert scale, where 1 = does not describe me and 7 = describes me very well. Although the full questionnaire was administered, only the eight-item learning self-efficacy subscale ($\alpha = .901$, $\omega = .905$) was used in this study.

The intention to drop out was assessed using a dichotomous question with a yes/no answer option (Blanco et al., 2024; López-Angulo et al., 2023): ‘Have you ever considered dropping out of university?’ To measure the intention to drop out in order to pursue Vocational Training, the following question was asked: ‘Have you ever thought about dropping out of university and continuing your studies in a Vocational Training program?’, with the following multiple-choice answers: ‘Strongly disagree’, ‘Disagree’, ‘Agree’, and ‘Strongly agree’. Students who answered ‘Agree’ or ‘Strongly agree’ to

this statement were understood as having intended to drop out of their studies to pursue Vocational Training courses.

c. Data Analysis

Statistical analyses were performed using Jamovi (version 2.6.19; The Jamovi Project, 2022). First, descriptive analyses were performed to characterize the sample according to the variables of interest: intention to drop out, intention to pursue Vocational Training, and levels of self-efficacy.

Initially, chi-square tests were performed to detect whether any of these variables showed different distributions depending on the type of engineering course. Subsequently, the association between the intention to drop out of university and the intention to pursue Vocational Training (VT) was analyzed.

Next, self-efficacy levels were compared between two independent samples for the following dichotomous variables: type of engineering course (computer science or other engineering), intention to drop out (yes or no) and intention to pursue Vocational Training (yes or no). For the variable ‘type of engineering’, Welch’s t-test was applied since, although normality was indicated, the variances were not equal. Student’s t-test was applied to the variable ‘intention to drop out’ as assumptions of normality and variance were met, while a Mann–Whitney test was used for the variable ‘intention to pursue Vocational Training’ as normality was not indicated. All the tests described in this section were first done using the full sample, and then separately for computer engineering students and students doing other engineering degrees.

B. Results

The results are organized into several sections. The first section describes the results relating to the intention to drop out, the intention to drop out in order to pursue Vocational Training, and the association between these two variables. The second section analyzes differences in levels of self-efficacy according to: 1) type of engineering degree, 2) intention to drop out of university, and 3) intention to do Vocational Training. Finally, the results of the last two analyses are presented, broken down by type of engineering degree.

B.1. Intention to Drop out and Intention to Enroll in a Vocational Training Program

The results show that 18.9% of the 344 participants said they intended to drop out of university. However, computer engineering students demonstrated less intention to drop out (11.1%) than students in other engineering fields (26.6%). These differences were statistically significant ($\chi^2(1, N = 344) = 13.44, p < .001$). Although the effect size was small to moderate (Cramer’s $V = 0.198$), the odds ratio ($OR = 2.90$) suggests that students in other engineering programs were almost three times more likely to intend to drop out than those in computer engineering.

The percentage of those intending to enroll in a Vocational Training program was slightly lower (18%) than the percentage intending to drop out. As with the intention to drop out, the intention to enroll in Vocational Training courses was significantly lower in computer engineering (12.3%) than in other engineering fields (23.7%), $\chi^2(1, N = 344) = 7.59, p = .006$. Although the effect size was small (Cramer’s $V = 0.149$), the odds ratio ($OR = 2.22$) suggests that students in other engineering disciplines were more than twice as likely to intend to do Vocational Training as their counterparts in computer engineering.

Table 3. Relationship between dropout and degree

	Computer engineering (n = 171)	Other engineering (n = 173)	n	df	χ^2	Cramer’s V
Intention to drop out	11.1%	26.6%	344	1	13.4***	0.198
VT intention	12.3%	23.7%	344	1	7.59**	0.149

***. $P < .001$; **, $p < .01$; *, $p < .05$.

B.2. The Association Between the Intention to Drop Out and the Intention to Pursue Vocational Training

The results of the chi-squared test indicated a significant association between the two intentions, with a large effect size (Cramer’s $V = .469$): $\chi^2(1, N = 344) = 75.7, p < .001$. The odds ratio suggests that students intending to drop out were approximately 12 times more likely to intend to pursue Vocational Training ($OR = 12.08$). More than half (55.4%) of students intending to drop out considered Vocational Training compared to around a tenth (9.3%) of those not intending to drop out.

These results remained significant when the analysis was performed separately for computer engineering and other engineering students.

For computer engineering students specifically, the strength of the association was moderate (Cramer’s $V = .321$), with a chi-square value of $\chi^2(1, N = 171) = 17.7, p < .001$. Students who intended to drop out were 7.8 times more likely to intend to do Vocational Training ($OR = 7.78$).

In other engineering fields, the association was also statistically significant ($\chi^2(1, N = 173) = 47.9, p < .001$, Cramer’s $V = .526$), but stronger. This is reflected in the odds ratio ($OR = 13.64$), which indicates that students intending to drop out were over 13 times more likely to intend to do Vocational Training.

In fact, 42.1% of computer engineering students intending to drop out expressed an interest in Vocational Training, compared to 60.9% of students from other engineering disciplines with the same intention.

Table 4. Relationship between intention to drop out and intention to pursue Vocational Training

	Intention to drop out	VT intention	n	df	χ^2	Cramer’s V
Total	18.9%	18.0%	344	1	75.7 ***	0.469
Computer engineering	11.1%	12.3%	171	1	17.7 ***	0.321
Other engineering	26.6%	23.7%	173	1	47.9 ***	0.526

***. $P < .001$; **, $p < .01$; *, $p < .05$.

In short, the intention to drop out and the intention to pursue Vocational Training were closely related, with the strongest association among students in engineering disciplines other than computer engineering.

B.3. Relationship Between Self-Efficacy and Engineering Fields

In the sample as a whole ($N = 344$), the mean self-efficacy level was 5.08 ($SD = 0.99$) and the median was 5.13. The interquartile range, representing the central 50% of participants, was found to range from 4.38 to 5.88 on a scale of 1 to 7, indicating a general trend towards moderately high levels of self-efficacy.

Table 5. Mean, standard deviation and distribution of the sample

	N	Mean	SD	Median	P25	P75	RIC
Self-efficacy	344	5.08	0.99	5.13	4.38	5.88	1.5

An independent samples t-test with unequal variances (Welch’s test) was performed to compare the self-efficacy levels of computer engineering students ($M = 5.28$, $SD = 0.88$) with students from other engineering disciplines ($M = 4.89$, $SD = 1.05$). There was a significant difference in self-efficacy levels between the two groups ($t(333.59) = 3.76$, $p < .001$). The moderate effect size ($d = 0.405$) indicates that computer engineering students had significantly higher self-efficacy levels than students in other engineering disciplines.

B.4. Relationship Between Self-Efficacy and Intention to Drop out of University

An independent samples t-test showed that students intending to drop out ($M = 4.50$, $SD = 1.01$) had significantly lower levels of self-efficacy than those who had not considered dropping out ($M = 5.22$, $SD = 0.93$). The size of the effect was medium to large ($t(333.59) = 3.76$, $p < .001$, Cohen’s $d = 0.763$).

B.5. Relationship Between Self-Efficacy and Intention to Pursue Vocational Training

Students intending to pursue Vocational Training had lower levels of self-efficacy (median = 4.75) than those not considering this option (median = 5.75). The Mann–Whitney U test indicated significant differences ($U = 6974.50$, $p = 0.013$), although the effect size, as determined by biserial rank correlation, was small to moderate ($r = -0.202$).

B.6. Relationship Between self-Efficacy and the Intention to drop out of University or Pursue Vocational Training according to Degree Program

Computer engineering students who expressed an intention to drop out ($M = 4.55$, $SD = 1.07$) exhibited lower levels of self-efficacy than those who did not intend to drop out ($M = 5.37$, $SD = 0.81$). These differences were statistically significant ($t(169) = 3.97$, $p < .001$, $d = 0.966$). In contrast, there were no significant differences in self-efficacy levels between computer engineering students who intended to pursue Vocational Training (median = 5.25) and those who did not (median = 5.38), $U = 1484.00$, $p = .670$.

In other engineering fields, self-efficacy levels were inversely related to the intention to drop out or pursue Vocational Training. An independent samples t-test revealed that students intending to drop out ($M = 4.47$, $SD = 1.00$) had significantly lower self-efficacy levels than those intending to stay on their courses ($M = 5.04$, $SD = 1.02$). The results indicated a significant difference ($t(171) = 3.218$, $p = .002$) with a moderate effect size ($d = 0.554$). Similarly, students intending to pursue Vocational Training ($M = 4.57$, $SD = 0.96$) demonstrated lower self-efficacy levels than those who did not consider this option ($M = 4.98$, $SD = 1.06$). These differences were also statistically significant ($t(171) = 2.223$, $p = 0.028$), with a small to moderate effect size ($d = 0.397$).

C. Discussion

The study aimed to investigate the relationship between engineering students' academic self-efficacy and their intention to drop out of their courses or enroll in Vocational Training, paying particular attention to possible differences between computer engineering students and those on other engineering courses.

The results showed that 18.9% of new engineering students intended to drop out of university within the first few weeks of classes. This high dropout rate may be due to the fact that, as previous studies indicate, it is during the first weeks of the academic year that new students are confronted with the reality of university life and begin to consider dropping out (Casanova et al., 2021; Feixa et al., 2018). As this figure is slightly above the 16.7% of students who drop out in the first year, it suggests that early intervention measures should be adopted. Guiding and supporting students with intentions to dropout could prevent that and encourage them to continue their studies, either within or outside the university system.

Looking at the differences between students on different degree programs, rates of intention to drop out and pursue Vocational Training were significantly lower among computer engineering students than those doing other engineering degrees. In line with previous literature, students with higher levels of self-efficacy are less likely to drop out of their studies (Barrientos-Illanes et al., 2021; Saefudin et al., 2021; Girelli et al., 2018). However, comparing the dropout intentions of computer engineering students (11.1%) and of students in other engineering disciplines (26.6%) with the actual dropout rates provided by the Ministry of Science, Innovation and Universities

(2025) (19.69% and 22.42%, respectively) suggests that computer engineering students may have expectations that are less in line with reality—at least in the early stages of the course. The longitudinal nature of the study, the initial results of which are presented in this chapter, will allow us to see variations in self-efficacy levels and dropout intentions in the second term, by which point students will have access to more objective information about their academic performance and academic and social integration.

Considering the sample as a whole, the results suggest that students who consider pursuing vocational training if they drop out have lower levels of self-efficacy, both within this sample and compared to students on other engineering programs. These results are consistent with those of previous studies (Crisp et al., 2022). However, when the analysis is limited to computer science students, these differences disappear. This is an unexpected finding for which we have no clear explanation, and it has not been reported in the literature.

The intention to drop out and the intention to pursue Vocational Training were also closely related. This is despite only a little over half of the students who expressed an intention to drop out (55.4%) considering Vocational Training as an alternative. Another interpretation of this data is that a substantial proportion (44.6%) of students intending to drop out were considering alternative exit strategies. Similarly, at this early stage of the academic year, we cannot rule out the possibility that the intention to drop out is accompanied by consideration of several exit paths simultaneously.

Conclusion

The democratization of access to higher education means that universities must welcome students with increasingly diverse profiles into the system. This necessitates a rethink of universities' organizational policies, particularly with regard to student guidance and support services. There is clearly a need to provide students with tools to help them adapt to the demands of higher education. This includes strengthening learning strategies such as self-efficacy (Tuero et al., 2018), as well as introducing career guidance and mentoring programs to support students during their time at university (Huntington & Gill, 2020; López-Aguilar et al., 2023).

Previous studies have demonstrated the benefits of tutoring and mentoring programs for students on various engineering courses, including computer science. These programs improve feelings of self-efficacy and self-concept, as

well as improving academic performance (Da Re et al., 2022; Dennehy & Dasgupta, 2017; Irwin et al., 2024).

The study described in this chapter corroborates the association between low levels of self-efficacy and the intention to drop out (Honick & Broadbent, 2016; Cădariu & Rad, 2023). Given the predictive value of self-efficacy in relation to dropout intentions, protective measures aimed at enhancing new students' self-efficacy are proposed, particularly strategies that increase student engagement with their university education. This is especially important in engineering and computer science degrees, as dropout in these areas is closely related to self-efficacy (Mego-Sánchez et al., 2020).

Similarly, providing first-year students with motivational counselling through university guidance services could boost their interest in academic tasks and enhance their sense of self-efficacy (Bargmann et al., 2022). Guidance services play an important role in both higher education and previous educational stages. Providing more information and guidance prior to enrolment could reduce early dropout rates (Silver Wolf et al., 2017) by offering students information on the various paths they can take to continue their academic training, including Vocational Training courses. In science and technology degrees in particular, the guidance first-year students receive is related to their intention to drop out (Hernández & Neira, 2022). Therefore, providing students with information on the career opportunities these degrees offer, as well as course content and dynamics, could help them to make educational decisions that are more in line with their expectations and interests. One possible way to improve training in the scientific and technological fields is to offer 'summer research courses' or 'summer bridge courses', which incorporate elements of university life and boost students' self-efficacy and sense of belonging to the institution (Barth et al., 2021; Betz et al., 2021).

In addition, considering other individual factors, such as previous performance and student motivation, as well as social factors, such as peer and teacher support networks, can reduce the likelihood of dropping out (Behr et al., 2020; Morelli et al., 2023). A good relationship with peers and teaching staff, as well as participation in university groups, has been shown to predict university student retention (Tuero et al., 2018; Maluenda-Albornoz et al., 2022). Therefore, it is important to recognize the role of teachers in protecting students from dropping out. Raising teachers' awareness of their influence could strengthen students' academic engagement and prevent them from considering dropping out, not only at university, but also in Vocational Training programs (Cerdeña-Navarro et al., 2017).

Finally, longitudinal studies could help us to understand how students' intentions to drop out or pursue Vocational Training develop over time, as well as how these intentions and levels of self-efficacy are related to actual academic performance. Furthermore, monitoring the trajectories of students who ultimately drop out would enable us to ascertain the predictive value of these three factors.

While the results offer valuable insight into the phenomenon under study, it is important to recognize that the small sample size and specific context of a small, on-campus public university restrict the generalizability of the conclusions. Therefore, mixed quantitative and qualitative studies should be conducted with a larger, more heterogeneous sample—that includes students from different national and international universities—in order to examine how these variables relate to the intention to drop out in different educational settings, and to corroborate the results of this study.

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References

- Abdunabi, R., Hbaci, I., & Ku, H. Y. (2019). Towards enhancing programming self-efficacy perceptions among undergraduate information systems students. *Journal of Information Technology Education Research*, 18, 185-206. <https://doi.org/10.28945/4308>
- Acosta-Gonzaga, E., & Ramirez-Arellano, A. (2020). Estudio comparativo de técnicas de analítica del aprendizaje para predecir el rendimiento académico de los estudiantes de

- educación superior. *CienciaUAT*, 15(1), 63-74. <https://doi.org/10.29059/cienciauat.v15i1.1392>
- Almeida, L. S., Casanova, J. R., Bernardo, A. B., Cervero, A., dos Santos, A. A. A., & Ambiel, R. A. (2019). Development of a transcultural questionnaire of motives for higher education dropout. *Avaliação Psicológica*, 18(2), 201-209. <https://doi.org/10.15689/ap.2019.1802.17694.11>
- Álvarez-Pérez, P. R., & López-Aguilar, D. (2017). Estudios sobre deserción académica y medidas orientadoras de prevención en la Universidad de la laguna (España). *Revista Paradigma*, 38(1), 48-71.
- Andrews, R., Li, J., & Lovenheim, M. F. (2014). Heterogeneous paths through college: detailed patterns and relationships with graduation and earnings. *Economics of Education Review*, 42, 93-108. <http://doi.org/10.3386/w19935>
- Aparicio-Chueca, P., Domínguez-Amorós, M., and Maestro-Yarza, I. (2021). “Beyond university dropout. An approach to university transfer”. *Studies in Higher Education*, 46(2), 473-484. <https://doi.org/10.1080/03075079.2019.1640671>
- Baalmann, T. (2024). Health-related quality of life, success probability and students’ dropout intentions: evidence from a German longitudinal study. *Research in Higher Education*, 65(1), 153-180.
- Baker, R. W., & Siryk, B. (1984). Measuring adjustment to college. *Journal of Counseling Psychology*, 31(2), 179–189. <https://doi.org/10.1037/0022-0167.31.2.179>
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. Freeman and Company.
- Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of management*, 38(1), 9-44.
- Barrientos-Illanes, P., Pérez-Villalobos, M. V., Vergara-Morales, J., & Díaz-Mujica, A. (2021). Influence of the perceived autonomy support, self-efficacy, and academic satisfaction in the intentions of permanence of university students. *Revista Electrónica Educare*, 25(2), 90-103. <http://dx.doi.org/10.15359/ree.25-2.5>
- Barth, J. M., Dunlap, S. T., Bolland, A. C., McCallum, D. M., & Acoff, V. L. (2021). Variability in STEM summer bridge programs: Associations with belonging and STEM self-efficacy. In *Frontiers in Education*, 6. 667589. <https://doi.org/10.3389/feduc.2021.667589>
- Bäulke, L., Grunschel, C., & Dresel, M. (2022). Student dropout at university: A phase-orientated view on quitting studies and changing majors. *European Journal of Psychology of Education*, 37(3), 853-876.
- Bean, J. P., & Eaton, S. B. (2001). The Psychology underlying successful retention practices. *Journal of College Student Retention: Research, Theory and Practice*, 3(1), 73-89. <http://doi.org/10.2190/6R55-4B30-28XG-L8U0>
- Becker, R., & Hecken, A. E. (2007). University or vocational training? An empirical test of the rational choice model of educational choices suggested by Esser as well as Breen and Goldthorpe. *Zeitschrift für Soziologie*, 36(2), 100-117. <https://doi.org/10.1177/0001699308100632>
- Behr, A., Giese, M., Teguin Kamdjou, H. D., & Theune, K. (2020). Dropping out of university: a literature review. *Review of Education*, 8(2), 614-652. <https://doi.org/10.1002/rev3.3202>

- Bernardo, A. B., Cervero, A., Esteban, M., Fernández, A., Solano, P., & Agulló, E. (2018). Variables relacionadas con la intención de abandono universitario en el periodo de transición. *Revista d'Innovació Docent Universitària*, 10, 122-130. <http://doi.org/10.1344/RIDU2018.10.11>
- Bernardo, A. B., García-Gutiérrez, V., Esteban, M., & Maluenda-Albornoz, J. (2025). Relationship between self-efficacy and university dropout: A systematic review. *Frontiers in Psychology*, 16, 1553485. <https://doi.org/10.3389/fpsyg.2025.1553485>
- Betz, A. R., King, B., Grauer, B., Montelone, B., Wiley, Z., & Thurston, L. (2021). Improving academic self-concept and STEM identity through a research immersion: pathways to STEM summer program. In *Frontiers in Education*, 6, 674817. <https://doi.org/10.3389/educ.2021.674817>
- Biasi, V., De Vincenzo, C., & Patrizi, N. (2018). Cognitive strategies, motivation to learning, levels of wellbeing and risk of drop-out: An empirical longitudinal study for qualifying ongoing university guidance services. *Journal of Educational and Social Research*, 8(2), 79-91. <https://doi.org/10.2478/jesr-2018-0019>
- Blackmore, C., Vitali, J., Ainscough, L., Langfield, T., & Colthorpe, K. (2021). A Review of Self-Regulated Learning and Self-Efficacy: The Key to Tertiary Transition in Science, Technology, Engineering and Mathematics (STEM). *International Journal of Higher Education*, 10(3), 169-177.
- Braunstein, A., Krötz, M., Deutscher, V., & Seifried, J. (2024). Analyzing dropout intentions in vocational education and training: exploring the nexus between different dimensions of dropout reasons and the different directions of dropout intention. *Empirical Research in Vocational Education and Training*, 16(1), 19. <https://doi.org/10.1186/s40461-024-00173-1>
- Buizza, C., Cela, H., Sbravati, G., Bornatici, S., Rainieri, G., & Ghilardi, A. (2024). The role of self-efficacy, motivation, and connectedness in dropout intention in a sample of Italian college students. *Education Sciences*, 14(1), 67. <https://doi.org/10.3390/educsci14010067>
- Cardenoso, O., Larruzea-Urkixo, N., y Bully, P. (2022). Adaptación al contexto universitario español y propiedades psicométricas del MSLQ: Contribución a la medida y análisis de las diferencias de género del aprendizaje autorregulado. *Anales de Psicología*, 38(2), 295-306. <https://doi.org/10.6018/analesps.444851>
- Casanova, J. R., Vasconcelos, R., Bernardo, A. B., & Almeida, L. (2021). University dropout in engineering: Motives and student trajectories. *Psicothema*, 33(1), 134-141. <https://doi.org/10.7334/psicothema2020.197>
- Casanova, J. R., Castro-López, A., Bernardo, A. B., & Almeida, L. S. (2023). The dropout of first-year STEM students: is it worth looking beyond academic achievement?. *Sustainability*, 15(2), 1253. <https://doi.org/10.3390/su15021253>
- Cerda-Navarro, A., Sureda-Negre, J., & Comas-Forgas, R. (2017). Recommendations for confronting vocational education dropout: A literature review. *Empirical Research in Vocational Education and Training*, 9(1), 17. <https://doi.org/10.1186/s40461-017-0061-4>
- Cocorada, E., Curtu, A. L., Nastasa, L. E., & Vorovencii, I. (2021). Dropout intention, motivation and socio-demographics of forestry students in Romania. *Forests*, 12(5), 618. <http://doi.org/10.3390/f12050618>

- Comisión de Estadística e Información Universitaria. (2016). *Catálogo oficial de indicadores universitarios*. Sistema Integrado de Información Universitaria. <https://bit.ly/4dEuhNV>
- Crisp, G., Potter, C., & Taggart, A. (2022). Characteristics and Predictors of Transfer and Withdrawal Among Students Who Begin College at Bachelor's Granting Institutions. *Research in Higher Education*, 63(3), 481-513. <https://doi.org/10.1007/s11162-021-09657-5>
- Da Re, L., Bonelli, R., & Gerosa, A. (2022). Formative tutoring: A program for the empowerment of engineering students. *IEEE Transactions on Education*, 66(2), 163-173. <https://doi.org/10.1109/TE.2022.3205962>
- De Clercq, D., Haq, I. U., & Azeem, M. U. (2018). Self-efficacy to spur job performance: Roles of job-related anxiety and perceived workplace incivility. *Management Decision*, 56(4), 891-907. <https://doi.org/10.1108/MD-03-2017-0187>
- Dennehy, T. C., & Dasgupta, N. (2017). Female peer mentors early in college increase women's positive academic experiences and retention in engineering. *Proceedings of the National Academy of Sciences*, 114(23), 5964-5969. <https://doi.org/10.1073/pnas.1613117114>
- Díaz-Mujica, A., Pérez-Villalobos, M. V., Bernardo, A. B., Cervero, A., & González-Pianda, J. A. (2019). Affective and cognitive variables involved in structural prediction of university dropout. *Psicothema*, 31(4), 429-436. <http://doi.org/10.7334/psicothema2019.124>
- Díaz-Mujica, A., Sáez-Delgado, F., Cobo-Rendón, R., Del Valle, M., López-Angulo, Y., & Pérez-Villalobos, M. V. (2022). Systematic review for the definition and measurement of self-efficacy in university students. *Interdisciplinaria*, 39(2), 37-54. <https://doi.org/10.16888/interd.2022.39.2.3>
- Edge, D., & Gladstone, N. (2022). Exploring support strategies for improving nursing student retention. *Nursing Standard*, 37(9), 28. <https://doi.org/10.7748/ns.2022.e11914>
- El-Adl, A., & Alkharusi, H. (2020). Relationships between self-regulated learning strategies, learning motivation and mathematics achievement. *Cypriot Journal of Educational Sciences*, 15(1), 104-111. <https://doi.org/10.18844/cjes.v15i1.4461>
- Ethington, C. A. (1990). A psychological model of student persistence. *Research in Higher Education*, 31(3), 266-269. <https://doi.org/10.1007/BF00992313>
- European Centre for the Development of Vocational Training. (2023). Vocational education and training in Spain: Short description. Publications Office. <https://data.europa.eu/doi/10.2801/221364>
- European Commission, Eurostat (2022). Population with medium educational attainment not in formal education who started but never completed tertiary education by sex, age, educational attainment level, work experience while studying and reason for not completing tertiary education. https://doi.org/10.2908/LFSO_16YMGNEDNC
- Feixa, M., Llanes, J., Pueyo, M. (2018). El abandono en el recorrido formativo del estudiante de ADE de la Universidad de Barcelona. *Revista de Investigación Educativa*. 36(1), 185-202. <https://doi.org/10.6018/rie.36.1.278971>

- Geisinger, B. N., & Raman, D. R. (2013). Why they leave: Understanding student attrition from engineering majors. *International Journal of Engineering Education*, 29(4), 914–925.
- Goldrick-Rab, S., & Pfeffer, F. T. (2009). Beyond Access: Explaining Socioeconomic Differences in College Transfer. *Sociology of Education*, 82(2), 101–125. <https://doi.org/10.1177/003804070908200201>
- González-Benito, A., López-Martín, E., Expósito-Casas, E., & Moreno-González, E. (2021). Motivación académica y autoeficacia percibida y su relación con el rendimiento académico en los estudiantes universitarios de la enseñanza a distancia. *RELIEVE*, 27(2), art. 2. <http://doi.org/10.30827/relieve.v27i2.21909>
- Habók, A., Magyar, A., Németh, M. B., & Csapó, B. (2020). Motivation and self-related beliefs as predictors of academic achievement in reading and mathematics: Structural equation models of longitudinal data. *International Journal of Educational Research*, 103, 1–12. <https://doi.org/10.1016/j.ijer.2020.101634>
- Harris, R. (2009). Two worlds? Higher education and post-school VET in Australia and the movement of learners between them. *European Journal of Vocational Training*, 46(1), 66–88.
- Hayat, A. A., Choupani, H., & Dehsorkhi, H. F. (2021). The mediating role of students' academic resilience in the relationship between self-efficacy and test anxiety. *Journal of Education and Health Promotion*, 10, 297. https://doi.org/10.4103/jehp.jehp_35_21
- Hernández, J. G., & Neira, R. H. (2022). Brecha en la vocación de los estudiantes por profesiones STEM y el mercado laboral europeo. *IE Comunicaciones: Revista Iberoamericana de Informática Educativa*, (35), 22–32.
- Heublein, U. (2014). Student Drop-out from German Higher Education Institutions. *European Journal of Education*, 49(4), 497–513. <https://doi.org/10.1111/ejed.12097>
- Hillman, N., Lum, T., & Hossler, D. (2008). Understanding Indiana's reverse transfer students: A case study in institutional research. *Community College Journal of Research and Practice*, 32(2), 113–134. <https://doi.org/10.1080/10668920701707797>
- Honick, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review*, 17, 63–84. <https://doi.org/10.1016/j.edurev.2015.11.002>
- Hossler, D., Shapiro, D., Dundar, A., Chen, J., Zerquera, D., Ziskin, M., & Torres, V. (2012). *Reverse transfer: A national view of student mobility from four-year to two-year institutions*. National Student Clearinghouse Research Center.
- Huntington-Klein, N., & Gill, A. (2021). Semester course load and student performance. *Research in higher education*, 62(5), 623–650.
- Irwin, P., Magee, D., Weiley, S., Teakel, S., & Linden, K. (2024). Improving student success and retention in first-year nursing through embedded tutor support. *Nurse education today*, 136, 106134. <https://doi.org/10.1016/j.nedt.2024.106134>
- Kabashi, Q., Shabani, I., & Caka, N. (2022). Analysis of the student dropout rate at the Faculty of Electrical and Computer Engineering of the University of Prishtina, Kosovo, from 2001 to 2015. *IEEE Access*, 10, 55913–55923. <https://doi.org/10.1109/ACCESS.2022.3177225>
- Kalogridis, D., & Grodsky, E. (2011). Something to Fall Back On: Community Colleges as a Safety Net. *Social Forces*, 89(3), 853–877. <https://doi.org/10.1353/sof.2011.0019>

- Lázaro-Álvarez, N., Callejas, Z., & Griol, D. (2020). Factores que inciden en la deserción estudiantil en carreras de perfil Ingeniería Informática. *Revista Fuentes*, 22(2), 141-156. <https://doi.org/10.12795/revistafuentes.2020.v22.i2.09>
- Lin, L., Lee, T., & Snyder, L. A. (2018). Math self-efficacy and STEM intentions: A person-centered approach. *Frontiers in psychology*, 9, 2033. <https://doi.org/10.3389/fpsyg.2018.02033>
- López-Aguilar D. y Álvarez-Pérez P. R. (2021). Modelo predictivo PLS-SEM sobre intención de abandono académico universitario durante la COVID-19. *Revista Complutense de Educación*, 32(3), 451-461. <https://doi.org/10.5209/rced.70507>
- López-Angulo, Y., Sáez-Delgado, F., Mella-Norambuena, J., Bernardo, A. B., & Díaz-Mujica, A. (2023). Predictive model of the dropout intention of Chilean university students. *Frontiers in Psychology*, 13, 893894. <https://doi.org/10.3389/fpsyg.2022.893894>
- Maluenda-Albornoz, J., Infante-Villagrán, V., Galve-González, C., Flores-Oyarzo, G., & Berrios-Riquelme, J. (2022). Early and Dynamic Socio-Academic Variables Related to Dropout Intention: A Predictive Model Made during the Pandemic. *Sustainability*, 14(2), 831-843. <https://www.doi.org/10.3390/su14020831>
- Mego-Sanchez, C., Huaman-Sarmiento, L., Iraola-Real, I., & Iraola-Arroyo, A. (2020). Niveles de autoeficacia matemática en estudiantes mujeres y varones aspirantes a la carrera de ingeniería. *Revista Ibérica de Sistemas e Tecnologías de Informação*, (E38), 142-155.
- Michavila, F. (Coord.) (2025). *La relación entre la Formación Profesional y la Universidad. Documento de reflexiones y propuestas*. Redefinir. https://redefinir.es/wp-content/uploads/2025/05/FP_UNIV-reflexiones-y-propuestas-2025.pdf
- Ministerio de Ciencia, Innovación y Universidades. (2025). *Datos y cifras del Sistema Universitario Español*. Secretaría General Técnica. Centro de Publicaciones. Ministerio de Ciencia, Innovación y Universidades. <https://bit.ly/42xLma4>
- Morelli, M., Chirumbolo, A., Baiocco, R., & Cattellino, E. (2023). Self-regulated learning self-efficacy, motivation, and intention to drop-out: The moderating role of friendships at University. *Current Psychology*, 42(18), 15589–15599. <https://doi.org/10.1007/s12144-022-02834-4>
- Moses, I., Admiraal, W., Berry, A., & Saab, N. (2019). Student-teachers' commitment to teaching and intentions to enter the teaching profession in Tanzania. *South African Journal of Education*, 39(1), 1-15.
- Njage, R. & Athiemoolam, L. (2021). Effectiveness of secondary school guidance programs in preparing learners for successful transition to university: A case of Moi University. *European Journal of Education and Pedagogy*, 2(3), 88-95. <https://doi.org/10.24018/ejedu.2021.2.3.84>
- OECD (2022). *Education at a Glance 2022: OECD Indicators*, OECD Publishing, Paris. <https://doi.org/10.1787/3197152b-en>
- Organic Law 3/2022 of 31 March on the organization and integration of Vocational Training. Boletín Oficial del Estado, 78, de 01 de abril de 2022. <https://www.boe.es/eli/es/lo/2022/03/31/3/con>
- Pascarella, E., Smart, J., & Ethington, C. (1986). Long-term persistence of two-year college student. *Research in Higher Education*, 24(1), 47-71.

- Respondek, L., Seufert, T., Hamm, J. M., & Nett, U. E. (2020). Linking changes in perceived academic control to university dropout and university grades: A longitudinal approach. *Journal of Educational Psychology*, 112(5), 987-1002. <https://doi.org/10.1037/edu0000388>
- Salas-Morera, L., Molina, A. C., Olmedilla, J. L. O., García-Hernández, L., & Romero, J. M. P. (2019). Factors affecting engineering students dropout: A case study. *The International journal of engineering education*, 35(1), 156-167.
- Shapiro, S.S. & Wilk, M.B. (1965) An Analysis of Variance Test for Normality (Complete Samples). *Biometrika*, 52 (3-4), 591-611. <https://doi.org/10.1093/biomet/52.3-4.591>
- Spady, W. (1971). Dropouts from Higher Education: an interdisciplinary review and synthesis. *Interchange*, 1, 64-85.
- Tayebi, A., Gómez, J., & Delgado, C. (2021). Analysis on the lack of motivation and dropout in engineering students in Spain. *IEEE Access*, 9, 147848-147858. <https://doi.org/10.1109/ACCESS.2021.3124649>
- Tinto, V. (1975). Dropout from Higher Education: a theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.
- Tinto, V. (1987). *Leaving college. Rethinking the causes and cures of student attrition*. University of Chicago Press.
- Tinto, V. (2005). *Student retention: What next?* National Conference on Student Recruitment, Marketing, and Retention. Noel-Levitz, Inc. <http://bit.ly/2XWPQ7P>
- Tinto, V. (2010). From theory to action: Exploring the institutional conditions for student retention. In *Higher Education: Handbook of Theory and Research: Volume 25* (pp. 51-89). Dordrecht: Springer Netherlands.
- Tuero, E., Cervero, A., Esteban, M., & Bernardo, A. B. (2018). ¿Por qué abandonan los estudios universitarios? Variables de influencia en el planteamiento y consolidación del abandono. *Educación XXI*, 21(2), 131-154. <http://doi.org/10.5944/educXXI.20066>
- Ulriksen, L., Madsen, L. M., & Holmegaard, H. T. (2015). What Makes Them Leave and Where Do They Go? Non-completion and Institutional Departures in STEM. En E. K. Henriksen, J. Dillon, & J. Ryder (Eds.), *Understanding Student Participation and Choice in Science and Technology Education* (pp. 219-239). Springer Netherlands. https://doi.org/10.1007/978-94-007-7793-4_14
- UNESCO. (2023). *Avances hacia el ODS 4 en educación superior: desafíos y respuestas políticas en América Latina y el Caribe*. UNESCO.
- Valencia-Arias, A., Chalela, S., Cadavid-Orrego, M., Gallegos, A., Benjumea-Arias, M., & Rodríguez-Salazar, D. Y. (2023). University Dropout Model for Developing Countries: A Colombian Context Approach. *Behavioral Sciences*, 13(5), 382. <https://doi.org/10.3390/bs13050382>
- Velázquez, Y., & González, M. A. (2017). Factores asociados a la permanencia de estudiantes universitarios: caso UAMM-UAT. *Revista de la Educación Superior*, 46(184), 117-138. <http://doi.org/10.1016/j.resu.2017.11.003>
- Virkki, O. T. (2023). Performance and attrition in information technology studies: A survey of students' viewpoints. *IEEE Global Engineering Education Conference (EDUCON)*, 652-659. <https://doi.org/10.1109/EDUCON52537.2023.10131317>