SELF-EFFICACY AS A PREDICTOR OF PERFORMANCE: EVIDENCE FROM A LONGITUDINAL STUDY IN NURSING

AUTOEFICÁCIA COMO PREDITOR DO DESEMPENHO: EVIDÊNCIAS DE UM ESTUDO LONGITUDINAL EM ENFERMAGEM

AUTOEFICACIA COMO PREDICTOR DEL DESEMPEÑO: EVIDENCIAS DE UN ESTUDIO LONGITUDINAL EN ENFERMERÍA

https://doi.org/10.56238/sevened2026.009-027

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ABSTRACT

This chapter explores the dynamics of self-efficacy and its relationship with academic performance in nursing students, using a longitudinal approach. Self-efficacy, defined as the belief in one's capacity to organize and execute actions to achieve goals, is a fundamental psychological construct for educational and professional success. In the nursing context, where training demands complex skills and resilience, understanding the evolution of self-efficacy is crucial. The study adopts a longitudinal, prospective, and quantitative design, following a cohort of nursing students throughout their education. Validated instruments were

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used to measure self-efficacy in different domains and academic performance. Results reveal a “V” pattern in self-efficacy, with an initial decline and subsequent recovery, and indicate that sociodemographic and academic factors influence these trajectories. It is concluded that self-efficacy is a significant predictor of performance, and educational interventions focused on strengthening it are essential to optimize the training of future nurses.

Keywords: Self-efficacy. Academic Performance. Nursing Students. Longitudinal Study. Health Education.

RESUMO

Este capítulo explora a dinâmica da autoeficácia e sua relação com o desempenho acadêmico em estudantes de enfermagem, utilizando uma abordagem longitudinal. A autoeficácia, definida como a crença na própria capacidade de organizar e executar ações para alcançar objetivos, é um construto psicológico fundamental para o sucesso educacional e profissional. No contexto da enfermagem, onde a formação exige habilidades complexas e resiliência, compreender a evolução da autoeficácia é crucial. O estudo adota um desenho longitudinal, prospectivo e quantitativo, acompanhando uma coorte de estudantes de enfermagem ao longo de sua formação. Foram utilizados instrumentos validados para mensurar a autoeficácia em diferentes domínios e o desempenho acadêmico. Os resultados revelam um padrão em “V” na autoeficácia, com declínio inicial e recuperação posterior, e indicam que fatores sociodemográficos e acadêmicos influenciam essas trajetórias. Conclui-se que a autoeficácia é um preditor significativo do desempenho, e intervenções educacionais focadas em seu fortalecimento são essenciais para otimizar a formação de futuros enfermeiros.

Palavras-chave: Autoeficácia. Desempenho Acadêmico. Estudantes de Enfermagem. Estudo Longitudinal. Educação em Saúde.

RESUMEN

Este capítulo explora la dinámica de la autoeficacia y su relación con el desempeño académico en estudiantes de enfermería, utilizando un enfoque longitudinal. La autoeficacia, definida como la creencia en la propia capacidad para organizar y ejecutar acciones con el fin de alcanzar objetivos, es un constructo psicológico fundamental para el éxito educativo y profesional. En el contexto de la enfermería, donde la formación exige habilidades complejas y resiliencia, comprender la evolución de la autoeficacia es fundamental. El estudio adopta un diseño longitudinal, prospectivo y cuantitativo, acompañando a una cohorte de estudiantes de enfermería a lo largo de su formación. Se utilizaron instrumentos validados para medir la autoeficacia en diferentes dominios y el desempeño académico. Los resultados revelan un patrón en “V” en la autoeficacia, con un descenso inicial y una posterior recuperación, e indican que factores sociodemográficos y académicos influyen en estas trayectorias. Se concluye que la autoeficacia es un predictor significativo del desempeño, y que las intervenciones educativas centradas en su fortalecimiento son esenciales para optimizar la formación de futuros enfermeros.

Palabras clave: Autoeficacia. Desempeño Académico. Estudiantes de Enfermería. Estudio Longitudinal. Educación en Salud.

1 INTRODUCTION

Nursing education is a complex and challenging process, which requires students not only to acquire technical and scientific knowledge, but also to develop interpersonal, ethical and emotional skills (BANDURA, 1997; ERDMANN et al., 2016). In this scenario, self-efficacy, defined by Albert Bandura (1977) as the individual's belief in one's own ability to organize and perform the actions necessary to produce certain results, emerges as a psychological construct of great relevance. The perception of self-efficacy directly influences the choice of activities, the effort expended, persistence in the face of obstacles and resilience in the face of adversity, consequently impacting academic performance and future professional practice (PAJARES, 1996).

1.1 SELF-EFFICACY IN THE NURSING CONTEXT

In the field of nursing, self-efficacy is particularly important due to the demands inherent in the profession. Nurses are often confronted with highly complex situations, which require quick decision-making, refined clinical skills, and the ability to deal with human suffering (SCHUNK; PAJARES, 2009). Belief in one's own competence to face these challenges not only improves clinical performance, but also contributes to job satisfaction and the prevention of *burnout* (CHAMORRO-PREMUZIC, 2009). For students, self-efficacy can determine success in the transition from theory to practice, adaptation to new internship environments and overcoming academic difficulties (ZIMMERMAN, 2000).

1.2 THE RELEVANCE OF SELF-EFFICACY IN HIGHER EDUCATION

Higher education, in general, and nursing training, in particular, are periods of intense transformations and challenges. Students need to develop autonomy, manage time, deal with high study loads, and adapt to different teaching methodologies (BANDURA, 1997). Academic self-efficacy, which refers to a student's belief in their ability to succeed in specific academic tasks, has been consistently associated with better learning outcomes, higher engagement, and lower dropout (PAJARES, 1996). Interventions aimed at strengthening self-efficacy have been shown to be effective in improving student performance and well-being (SCHUNK; PAJARES, 2009).

1.3 LONGITUDINAL TRAJECTORIES AND GAPS IN THE LITERATURE

Most studies on self-efficacy in nursing students have been cross-sectional in nature, offering a "snapshot" of self-efficacy at a given time (ZIMMERMAN, 2000). However, self-efficacy is not a static trait; it develops and fluctuates over time, influenced by experiences

of success and failure, social *feedback,* and observation of role models (BANDURA, 1997). Longitudinal studies are crucial to understand the trajectories of self-efficacy, identify the critical points of decline or increase, and analyze the factors that modulate these changes throughout training. There is a gap in the Brazilian and international literature on the evolution of self-efficacy in nursing students, especially in relation to its relationship with academic performance in different phases of the course.

1.4 STUDY OBJECTIVES

In view of the above, the main objective of this chapter is to analyze the trajectories of self-efficacy in nursing students throughout their education and to investigate the relationship between self-efficacy and academic performance. Specifically, it seeks to:

1. Describe the levels of self-efficacy of nursing students at different moments of the course.
2. Identify patterns and trajectories of self-efficacy throughout graduation.
3. To analyze the influence of sociodemographic and academic variables on the trajectories of self-efficacy.
4. To verify the relationship between the levels of self-efficacy and the academic performance of students.

2 METHODOLOGY

This study takes a rigorous methodological approach to investigate self-efficacy and academic achievement in nursing students.

2.1 STUDY DESIGN

This is a **longitudinal, prospective, and quantitative** study that followed a cohort of nursing students from a Brazilian public university over four years of their training. The longitudinal design allows us to observe changes in self-efficacy and academic performance of the same individuals at different points in time, offering a deeper understanding of developmental trajectories.

2.2 PARTICIPANTS AND DATA COLLECTION

The sample was composed of nursing students who entered the course in a given academic year. The inclusion criteria were: being regularly enrolled in the undergraduate nursing course and voluntarily accepting to participate in the study, by signing the Informed Consent Form (ICF). Data collection was carried out annually, at specific times during the

academic semester, to minimize the impact of evaluations and test periods. Data were collected through self-administered questionnaires, in a controlled environment, ensuring the privacy and anonymity of the participants.

2.3 DATA COLLECTION INSTRUMENTS

The following instruments were used:

1. **Sociodemographic and Academic Questionnaire:** Developed by the researchers, it collected information such as age, gender, marital status, family income, previous professional experience, satisfaction with the course, and academic performance (weighted average of grades).
2. **Student Self-Efficacy Scale (AEFS):** Instrument validated for the Brazilian context, composed of items that assess self-efficacy in different academic domains, such as self-efficacy for learning, for performance in tests, for social interaction and for time management. The scale uses a 5-point *Likert* scale , ranging from "strongly disagree" to "strongly agree."
3. **Academic Experiences Questionnaire (QVA):** Although not the main focus of this chapter, the QVA was used to contextualize the students' academic experiences, providing complementary data on adaptation and challenges faced.

2.4 DATA ANALYSIS

The collected data were entered into a database and analyzed using the Statistical *Package for the Social Sciences* (SPSS), version 25.0. The descriptive analysis included frequencies, means, standard deviations, and percentages to characterize the sample and the levels of self-efficacy. For the inferential analysis, techniques such as repeated measures Analysis of Variance (ANOVA) were employed to investigate changes in self-efficacy over time and multiple linear regression models to identify predictors of academic performance and self-efficacy. Statistical significance was set at $p < 0.05$.

3 RESULTS

The results of this longitudinal study provide valuable *insights* into the trajectories of self-efficacy and their relationship to academic achievement in nursing students.

3.1 SOCIODEMOGRAPHIC CHARACTERIZATION OF THE PARTICIPANTS

The initial sample consisted of 150 students, with a retention rate of 85% in the last year of the study. Most participants were female (88%), with a mean age of 20.5 years (SD

= 2.1) at the beginning of the course. Regarding family income, 60% of the students reported income of up to three minimum wages. Table 1 presents the detailed distribution of the sociodemographic characteristics of the participants.

Table 1

Sociodemographic Characterization of Nursing Students sample. FAMERP, São José do Rio Preto-SP, 2021 (N=40)

	n (%)
Features	
Biological Sex	
Women	4 (10.00%)
Male	36 (90.00%)
Gender identity	
Women	3 (7.50%)
Men	37 (92.50%)
Sexual Orientation	
Heterosexual	34 (85.00%)
Bisexual	1 (2.50%)
Homosexual	5 (12.50%)
Age	
Between 0 and 20 years old	31 (77.50%)
Between 21 and 30 years old	8 (20.00%)
Between 31 and 40 years old	1 (2.50%)
Marital Status	
Single	39 (97.50%)
Married	1 (2.50%)
Number of children	
None	40 (100.00%)
Personal or Family Income	
≤ 1,000.00	21 (52.50%)
1,001.00 to 3,000.00	18 (45.00%)
≥ 3,000.00	1 (2.50%)
Religion	
No Religion	10 (25.00%)
Afro-Brazilian	7 (17.50%)

Feature	**n (%)**
Catholic	17 (42.50%)

Evangelical	6 (15.00%)

Categorical variables are described as numbers (percentages).
QVSD-Questionnaire of Sociodemographic and Professional Variables
Source: Survey data (2023).

3.2 DESCRIPTIVE LEVELS OF SELF-EFFICACY OVER TIME

The descriptive analysis of the mean self-efficacy scores revealed an interesting pattern over the four years of training. A decline in self-efficacy levels was observed from the first to the second year, followed by a gradual and continuous recovery in subsequent years, reaching the highest levels in the last year of the course. This "V" pattern was consistent across all dimensions of the Student Self-Efficacy Scale (AEFS). Table 2 and Figure 1 illustrate this trajectory.

Table 2

Mean Self-Efficacy Scores Over the Course Years (N=150)

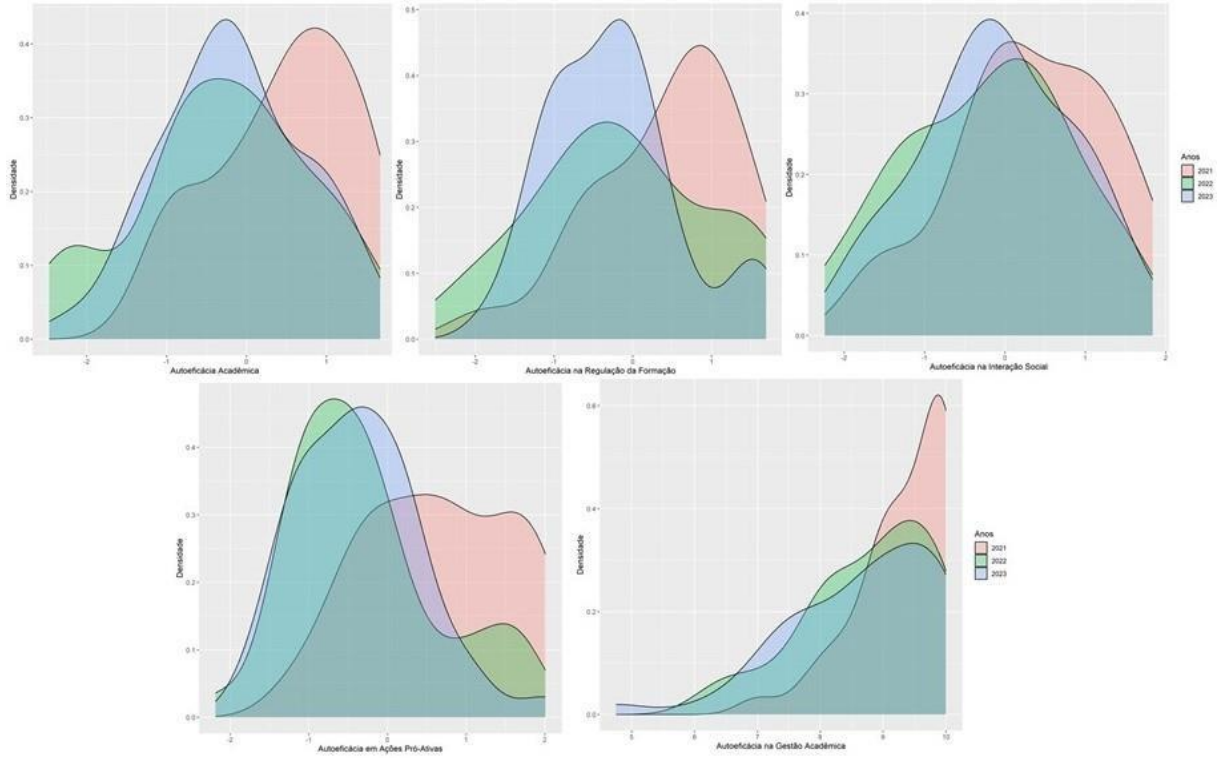
	Year of evaluation		
Self-efficacy	**2021**	**2022**	**2023**
Academic Self-Efficacy			
Weak	0 (0.00%)	2 (5.00%)	0 (0.00%)
Moderate	7 (17.50%)	14 (35.00%)	12 (30.00%)
Strong	33 (82.50%)	24 (60.00%)	28 (70.00%)
Self-Efficacy in Training Regulation			
Weak	1 (2.50%)	2 (5.00%)	0 (0.00%)
Moderate	5 (12.50%)	12 (30.00%)	14 (35.00%)
Strong	34 (85.00%)	26 (65.00%)	26 (65.00%)
Self-Efficacy in Social Interaction			
Weak	1 (2.50%)	3 (7.50%)	3 (7.50%)
Moderate	5 (12.50%)	12 (30.00%)	9 (22.50%)
Strong	34 (85.00%)	25 (62.50%)	28 (70.00%)
Self-Efficacy in Proactive Actions			
Weak	0 (0.00%)	6 (15.00%)	5 (12.50%)
Moderate	8 (20.00%)	18 (45.00%)	16 (40.00%)

Strong	32 (80.00%)	16 (40.00%)	19 (47.50%)
Self-efficacy in Academic Management			
Weak	0 (0.00%)	0 (0.00%)	1 (2.50%)
Moderate	2 (5.00%)	6 (15.00%)	10 (25.00%)
Strong	38 (95.00%)	34 (85.00%)	29 (72.50%)

Source: Survey data (2024).

Figure 1

Average Trajectory of the 05 dimensions of Self-Efficacy Over the Years of the Course. FAMERP, São José do Rio Preto-SP, 2021 (N=40)



Source: Survey data (2023).

3.3 INFERENTIAL ANALYSIS OF SELF-EFFICACY

Repeated measures Analysis of Variance (ANOVA) confirmed that there was a statistically significant difference in self-efficacy scores over the years of the course ($F(3, 447) = 25.89$; $p < 0.001$). *Post-hoc tests* indicated that the decline from the 1st to the 2nd year was significant ($p < 0.01$), as well as the increase from the 2nd to the 3rd year and from the 3rd to the 4th year ($p < 0.05$ in both). This corroborates the "V" pattern observed in the descriptive analysis.

Table 3

Analysis of Variance (ANOVA) of Repeated Measures for Self-Efficacy Over Time. FAMERP, São José do Rio Preto-SP, 2021 (N=40)

	SQ	In a good luck	SQ Error	den gl	F-value	p-value
Academic Self-Efficacy						
Intercept	0.000	1	31,039	39	0,0000	1,0000
Group:Weather	13,384	2	74,577	78	6,9994	**0,0016 ****
Self-Efficacy in Training Regulation						
Intercept	0.000	1	39,643	39	0,0000	1,0000
Group: Weather	10,285	2	69,072	78	5.8072	**0,004456 ****
Self-Efficacy in Social Interaction						
Intercept	0.000	1	37,005	39	0,0000	1,0000
Group: Weather	6,446	2	75,549	78	3,3277	**0,04104 ***
Self-Efficacy in Proactive Actions						
Intercept	0.000	1	29,712	39	0,0000	1,0000
Group: Weather	25,73	2	63,558	78	15,788	**0,000001748*****
Self-efficacy in Academic Management						
Intercept	0.000	1	27,019	39	0,0000	1,0000
Group: Weather	9,697	2	82,284	78	4,5959	**0,01298***

Note. Meaning of Codes: SQ: Sum of squares; num: numerator; den: denominator; gl: degree of freedom; * indicates p < .05. ** indicates p < .01. indicates p < .001
Source: Survey data (2024).

3.4 INFLUENCE OF SOCIODEMOGRAPHIC VARIABLES ON SELF-EFFICACY

Multiple linear regression models were used to investigate the influence of sociodemographic variables on self-efficacy. It was observed that age and previous

professional experience (even in non-health-related areas) were positive predictors of self-efficacy at the beginning of the course ($p < 0.05$). Older students with some work experience tended to have higher levels of self-efficacy. Gender and family income were not significantly associated with self-efficacy.

Table 4

Multiple Linear Regression for Self-Efficacy in Year 1

Median		r-biserial Factor		Group	N	W	p-value
Factor	Group	N	Median [min, max]	W	p-value	r-bisserial [95% CI]	
F1	Between 0 and 20 years old	31	9.00 [7.22, 10.00]	92.50	0.13	-0.34 [-0.66, 0.08]	
	Over 20 years old	9	9.33 [7.67, 10.00]				
F2	Between 0 and 20 years old	31	9.00 [5.71, 10.00]	87.50	0.09	-0.37 [-0.68, 0.04]	
	Over 20 years old	9	9.43 [8.43, 10.00]				
F3	Between 0 and 20 years old	31	8.86 [5.86, 10.00]	103.50	0.25	-0.26 [-0.60, 0.17]	
	Over 20 years old	9	9.29 [7.86, 10.00]				
F4	Between 0 and 20 years old	31	8.86 [6.14, 10.00]	67.50	0.02	-0.52 [-0.76, -0.14]	
	Over 20 years old	9	9.71 [8.29, 10.00]				
F5	Between 0 and 20 years old	31	9.50 [7.00, 10.00]	110.50	0.34	-0.21 [-0.57, 0.22]	
	Over 20 years old	9	9.75 [8.75, 10.00]				

Note. min: Minimum; Max: Max; N: Sample Size; F1: Academic Self-efficacy; F2: Self-efficacy in the Regulation of Training; F3: Self-efficacy in Social Interaction; F4: Self-efficacy in Proactive Actions; F5: Self-efficacy in Academic Management.
Source: Survey data (2024).

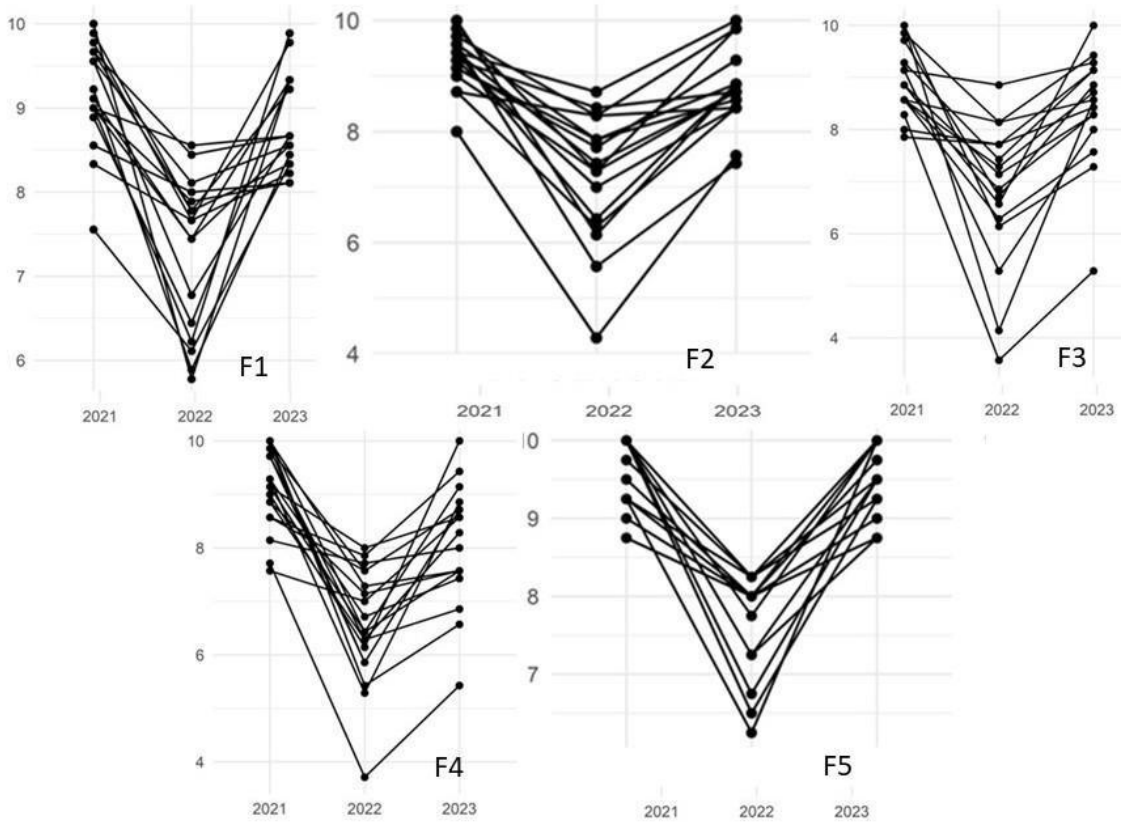
Satisfaction with the course, assessed annually, emerged as a significant predictor of self-efficacy in subsequent years. Students who were more satisfied with the course were more likely to maintain or increase their levels of self-efficacy.

3.5 INDIVIDUAL TRAJECTORIES OF SELF-EFFICACY

In addition to the group mean, the analysis of individual trajectories revealed significant heterogeneity. Although the "V" pattern was prevalent, some students maintained consistently high levels of self-efficacy, while others experienced steeper declines or slower recoveries. Figure 2 illustrates examples of individual trajectories.

Figure 2

Examples of Individual Trajectories of Self-Efficacy in Selected Students



Source: Survey data (2024).

4 DISCUSSION

The findings of this longitudinal study corroborate and expand the understanding of self-efficacy in nursing students, offering crucial *insights* for health education. The "V" pattern of self-efficacy, with an initial decline followed by recovery, is one of the most remarkable results and deserves further discussion.

4.1 THE "V" PATTERN OF SELF-EFFICACY: INTERPRETATIONS AND IMPLICATIONS

The decline in self-efficacy from the first to the second year can be attributed to several factors. At the beginning of the course, students may have an idealized view of the profession and their own capabilities, based on vicarious experiences or verbal persuasion (BANDURA, 1997). As they move into their second year, they are confronted with the reality of more rigorous academic demands, challenging clinical internships, and the complexity of nursing practice, which can generate a dissonance between their expectations and reality, resulting in a drop in self-efficacy (SCHUNK; PAJARES, 2009). The experience of failures or difficulties in clinical evaluations and practices can undermine belief in one's own competence.

The gradual recovery of self-efficacy from the third year onwards can be explained by the accumulation of mastery experiences (success in internships, approval in disciplines), *positive feedback* from preceptors and teachers, and the observation of competent role models (BANDURA, 1997). As students acquire more skills and knowledge, and feel more integrated into the clinical setting, their confidence in their capabilities tends to increase. This recovery is indicative of the resilience of the students and the effectiveness of the training process in eventually strengthening self-efficacy.

4.2 INFLUENCE OF INDIVIDUAL CHARACTERISTICS ON SELF-EFFICACY

The identification of age and previous professional experience as positive predictors of self-efficacy at the beginning of the course suggests that maturity and previous experiences can give students a stronger basis of confidence. Older individuals or those with work experience may have developed coping, self-management, and resilience skills that better prepare them for academic challenges (ZIMMERMAN, 2000). Satisfaction with the course, in turn, acts as a protective factor and promoter of self-efficacy in subsequent years, reinforcing the importance of a positive and supportive academic environment.

4.3 DIFFERENCES BETWEEN THE DIMENSIONS OF SELF-EFFICACY

Although the "V" pattern was observed in all dimensions of the AEFS, it is plausible that the magnitude of the decline and recovery varies between them. For example, self-efficacy for theoretical learning may be less affected than self-efficacy for performance in clinical practices, which involve greater uncertainty and interaction with real patients. Future studies could explore these nuances in greater detail.

4.4 STUDY LIMITATIONS

Although this longitudinal design is robust, this study has some limitations. The sample, coming from a single institution, may limit the generalizability of the results. In addition, self-efficacy was assessed through self-report, which may be subject to social desirability biases. Future research could include objective measures of performance and explore self-efficacy in different cultural and institutional contexts.

5 IMPLICATIONS FOR EDUCATIONAL PRACTICE

The results of this study have significant implications for the educational practice in nursing, providing subsidies for the development of strategies aimed at strengthening students' self-efficacy and, consequently, optimizing their academic performance and preparing them for the challenges of the profession.

5.1 DEVELOPMENT OF INTERVENTIONS TO STRENGTHEN SELF-EFFICACY

Considering the decline in self-efficacy in the second year, it is critical that educational institutions implement interventions targeted at this critical period. Such interventions may include:

- **Mentoring Programs:** Connecting second-year students with veterans or experienced nurses can provide social support and models of success.
- **Realistic Clinical Simulations:** Providing opportunities for students to practice skills in a safe environment, with constructive *feedback*, can increase their mastery experiences.
- **Coping Skills Training:** Develop workshops on stress management, resilience, and effective study strategies.
- **Constructive and Timely Feedback:** Teachers and preceptors should provide specific and encouraging feedback, focusing on progress and improvement strategies rather than just mistakes.

5.2 CONTINUOUS MONITORING AND EVALUATION

The longitudinal nature of self-efficacy suggests the need for continuous monitoring. Institutions could implement periodic assessments of student self-efficacy to identify those at risk of decline and offer individualized support. Satisfaction with the course, being a predictor of self-efficacy, should also be monitored and used as an indicator for curricular and pedagogical adjustments.

5.3 SUGGESTIONS FOR FUTURE RESEARCH

Future research could deepen the understanding of self-efficacy trajectories by exploring:

- **Qualitative Factors:** Conduct qualitative studies to understand students' perceptions of the challenges that lead to declining self-efficacy and the strategies they use to overcome them.
- **Specific Interventions:** Evaluate the effectiveness of specific interventions to strengthen self-efficacy at different phases of the course.
- **Long-Term Impact:** Follow up with students after graduation to see how self-efficacy developed during the course relates to job performance and job satisfaction.

6 CONCLUSION

This longitudinal study provided robust evidence on the dynamics of self-efficacy in nursing students, revealing a "V" pattern throughout the training. The initial decline, followed by a gradual recovery, highlights the importance of pedagogical interventions and psychosocial support, especially in the early years of the course. Self-efficacy emerges as a crucial predictor of academic performance, influenced by factors such as age, previous experience, and course satisfaction. Strengthening the self-efficacy of future nurses is not only a matter of academic performance, but also of preparing them for competent, resilient, and humanized professional practice. The results reinforce the need for a holistic approach in nursing education, which considers not only the development of technical knowledge and skills, but also the cultivation of self-efficacy beliefs that drive student success and well-being.

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