

Impact of Inclusive University Programs on the Development of Socio-Emotional Skills and Functional Autonomy in Students with Mild Cognitive Disabilities

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Abstract: *Background:* Inclusive higher education has emerged as a critical pathway for strengthening functional independence and social integration among students with mild cognitive disabilities. Although access to university programs has expanded, empirical evidence on the effectiveness of inclusive educational interventions in promoting socio-emotional skills and functional autonomy remains limited. This study examined the impact of university-based inclusive programs on these key developmental outcomes.

Methods: A quantitative cross-sectional study design was used. Data were collected from final-year university students with mild cognitive disabilities who had participated in structured inclusive programs. A validated Likert-type questionnaire was used to measure socio-emotional skills and functional autonomy. Descriptive statistics were used to assess overall trends, while inferential analyses, including independent-samples t-tests and multiple regression, were conducted to examine group differences and predictive relationships.

Results: The findings indicated that inclusive university programs were associated with improvements in socio-emotional competencies, including self-regulation, interpersonal interaction, and decision-making, as well as in functional autonomy related to academic and everyday activities. However, the regression analysis showed that these variables did not significantly predict overall perceived program effectiveness, suggesting the influence of additional contextual and institutional factors.

Conclusions: University-based inclusive programs contribute positively to the development of socio-emotional skills and functional autonomy among students with mild cognitive disabilities. Nevertheless, their overall effectiveness appears to depend on a broader, integrative framework that includes academic support, social inclusion, and institutional resources. These findings provide relevant evidence for strengthening inclusive practices and policies in higher education.

Keywords: Inclusive Education, Higher Education, Social-Emotional Development, Independent Living Skills, Intellectual Disability, Educational Programs.

INTRODUCTION

In recent decades, inclusive higher education has emerged as a core component in promoting equity, social participation, and the holistic development of persons with intellectual disabilities. This approach responds not only to international human rights frameworks but also to growing evidence that recognizes university environments as key settings for strengthening students with mild cognitive disabilities' functional, social, and employment-related competencies [1-3]. In this context, higher education institutions have progressively expanded access policies by incorporating inclusive programs at develop skills fostering independence, self-determination, and the transition to adult life.

Nevertheless, despite these advances, the literature shows that access to higher education does not, by itself, guarantee significant improvements in functional

autonomy or in the development of socio-emotional and employment-related competencies [4, 5]. Several studies have documented persistent structural, social, and pedagogical barriers that limit the effectiveness of inclusive programs, particularly during the transition to employment and independent living [6, 7, 8]. These limitations highlight the need to analyze not only the reach of inclusive education but also the quality and actual impact of interventions implemented in university contexts.

Adaptive functioning is a central construct for understanding the development of persons with intellectual disabilities because it integrates the conceptual, social, and practical skills required for daily life and autonomous participation in society [9, 10]. Similarly, the literature has emphasized the importance of self-determination and socio-emotional skills, such as self-regulation, decision-making, and social interaction, as key factors in the transition to adulthood and labor-market inclusion [11-13]. These competencies influence not only academic

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performance but are also closely linked to quality of life, social inclusion, and the ability to adapt to changing environments.

Within this framework, universities have increasingly been conceptualized as complex ecological systems capable of influencing the holistic development of students with disabilities through coordinated academic, social, and vocational support [14, 15]. The implementation of inclusive university programs has shown positive effects on the development of social skills, personal autonomy, and employment readiness. However, the results reported in the literature are neither homogeneous nor fully conclusive, suggesting that program effectiveness depends on contextual, institutional, and methodological factors [16, 17].

Despite growing interest in inclusive education at the higher education level [18], a significant gap persists in the scientific literature regarding the integrated assessment of socio-emotional skills and functional autonomy as key outcomes of inclusive university programs. Most research has analyzed these dimensions in isolation or at earlier educational levels, which limits understanding of the actual impact of higher education on students' holistic development with mild cognitive disabilities [9, 14, 19]. Likewise, few empirical studies have examined these variables jointly within university contexts, particularly in settings where inclusive programs are still being consolidated.

Despite the growing number of studies on inclusive education at the higher education level, much of the literature has focused on descriptive approaches or on the isolated analysis of specific variables, which limits a comprehensive understanding of the development of students with mild cognitive disabilities. In this context, the present study introduces an explanatory approach that jointly integrates socio-emotional skills and functional autonomy, thereby enabling analysis of their capacity to explain the effectiveness of inclusive university programs. This approach represents a significant contribution to the field by moving beyond traditional models that focus solely on individual variables and by proposing a more integrated perspective on the phenomenon.

In this regard, the present study seeks to contribute to the existing literature by integrating an analysis of these dimensions, thereby addressing a relevant gap in research on inclusive higher education. Therefore, this study aims to examine the impact of inclusive university programs on the development of socio-emotional skills

and functional autonomy among students with mild cognitive disabilities, with the aim of providing empirical evidence to clarify the role of higher education in promoting independence, social inclusion, and the transition to adult life.

METHODOLOGY

Research Design

The study adopted a quantitative, non-experimental, cross-sectional design with an explanatory scope to analyze the relationship between inclusive university programs and the development of socio-emotional skills and functional autonomy in students with mild cognitive disabilities. This approach not only described the variables but also examined their explanatory capacity within the context of inclusive higher education.

The research was conducted in higher education institutions that implement structured inclusive programs integrating academic, social, and vocational support for students with special educational needs. These settings were considered complex intervention systems in which educational experiences extend beyond the academic sphere and are linked to processes of personal and social development.

Participants and Selection Criteria

The study adopted a quantitative, non-experimental, cross-sectional design with an explanatory scope to analyze the influence of the variables under study within the context of inclusive higher education.

The population consisted of university students with a prior diagnosis of mild cognitive disability, certified by specialized professionals in accordance with established clinical and educational criteria. The study used a purposive sample of 100 students from different inclusive academic programs.

The sample consisted of students with a balanced gender distribution and ages ranging from 18 to 26 years. Participants came from various academic fields, including the social sciences, administrative sciences, and engineering, providing a heterogeneous representation of the university context. In addition, all students had been enrolled in inclusive programs for at least two years, ensuring sufficient exposure to institutional interventions. The detailed distribution of sociodemographic characteristics is presented in the results section (Table 1).

Although the sample size was moderate, it was adequate for exploratory studies using factor analysis and regression models, especially in specific populations such as students with mild cognitive disabilities, where access to participants is limited. In addition, the sample size met the minimum recommended criteria for multivariate analyses, ensuring the stability of the estimates obtained.

The inclusion criteria were as follows: (i) having a documented clinical diagnosis of mild cognitive disability, (ii) being enrolled in an inclusive higher education program, and (iii) having completed at least two academic years, ensuring sustained exposure to institutional interventions. These criteria ensured that the participants were appropriately aligned with the phenomenon under study.

The explanatory nature of the study is supported by the use of regression models, which enable the assessment of predictive relationships among the analyzed variables.

Instrument

Data were collected using a structured questionnaire specifically designed to assess the study variables. The instrument consisted of 30 items organized into two main dimensions: socio-emotional skills and functional autonomy.

Socio-emotional skills included indicators such as self-regulation, social interaction, decision-making, and the handling of academic and social situations. Functional autonomy, in turn, was assessed through students' ability to perform academic tasks and activities of daily living independently.

The items were measured using a four-point Likert-type scale ranging from "Strongly agree" (4) to "Strongly disagree" (1). The instrument was constructed on the basis of conceptual frameworks related to adaptive functioning and self-determination, ensuring theoretical coherence with the variables analyzed.

The instrument was developed from conceptual frameworks [20-22] widely used in the study of adaptive functioning and self-determination in populations with intellectual disabilities and integrated socio-emotional and functional dimensions validated in previous research. Its structure also aligns with contemporary assessment approaches in inclusive education, which emphasize measuring individual and

contextual variables in an integrated manner to understand development in university settings.

Data were collected using a structured 30-item questionnaire designed through a three-stage process. In the first stage, the literature on adaptive functioning and self-determination in persons with intellectual disabilities was reviewed, which allowed the dimensions and their indicators to be defined. In the second stage, an initial pool of items aligned with these dimensions was developed and subsequently refined according to clarity and relevance criteria. In the third stage, a pilot test was conducted with participants with characteristics similar to those of the study population to assess item comprehension and adjust the final wording.

The instrument was organized into two dimensions, socio-emotional skills and functional autonomy, and was administered using a four-point Likert-type scale ranging from "Strongly agree" (4) to "Strongly disagree" (1).

The dependent variable, "perceived effectiveness of inclusive university programs," was operationalized as students' subjective assessment of the impact of these programs on their personal, academic, and social development. This variable was measured through a set of specific items included in the instrument and aimed at assessing the perceived usefulness, relevance, and contribution of inclusive programs to participants' comprehensive development. Responses were recorded using the same four-point Likert-type scale used throughout the instrument, allowing the variable to be incorporated into the statistical analyses as a quantitative measure.

Validity, Reliability, and Data Quality Control

Content validity was assessed through expert judgment, with the participation of five specialists in special education, psychology, and educational assessment. Each item was evaluated on clarity, relevance, and coherence, yielding content validity indices above 0.80 in all cases, indicating adequate representativeness of the constructs analyzed.

Instrument reliability was determined using Cronbach's alpha coefficient, calculated from a pilot test. The results showed adequate internal consistency, with values of $\alpha = 0.88$ for socio-emotional skills, $\alpha = 0.85$ for functional autonomy, and $\alpha = 0.90$ for the overall instrument.

Data quality control procedures were also applied, including outlier screening, normality analysis, and verification of response consistency, to ensure the reliability of subsequent statistical analyses.

Data Collection Procedure

Data were collected over a 4-week period after obtaining authorization from the participating institutions. The instrument was administered in person, allowing direct interaction with participants and facilitating comprehension of the items.

Students completed the questionnaire individually under supervision, thereby minimizing potential biases arising from question interpretation. The questionnaires were collected immediately after administration, ensuring the integrity and completeness of the data gathered.

Statistical Analysis

Data were analyzed using SPSS statistical software, including both descriptive and inferential techniques. In the first stage, descriptive statistics were used to characterize the distribution of the variables through measures of central tendency and dispersion. Subsequently, exploratory factor analysis (EFA) was conducted to identify the underlying structure of the assessed dimensions and verify the grouping of the items.

In a second phase, independent-samples t-tests were conducted to examine possible differences across sociodemographic variables. Finally, a multiple regression model was used to evaluate the predictive effect of socio-emotional skills and functional autonomy on the perceived effectiveness of inclusive university programs. All analyses were conducted at a significance level of 0.05.

Before estimating the regression model, the corresponding statistical assumptions were verified. The normality of the residuals was assessed using skewness and kurtosis analyses and graphical procedures, which indicated an approximately normal distribution. Multicollinearity among the independent variables was examined using the variance inflation factor (VIF), with values below 5 indicating no significant multicollinearity. In addition, the independence of residuals was evaluated using the Durbin-Watson statistic, which fell within the acceptable range (1.5-2.5), confirming the model's validity for interpretation.

The combination of exploratory factor analysis and regression models enables not only the identification of the underlying structure of the variables but also the evaluation of their explanatory capacity within the proposed model, moving beyond purely descriptive approaches and providing a deeper understanding of the phenomenon under study.

Ethical Considerations

The study was conducted in accordance with the ethical principles of research involving human participants. Participation was voluntary, and informed consent was obtained from all participants.

The confidentiality and anonymity of the information were protected, ensuring that the collected data were used exclusively for academic purposes. The study also received approval from the ethics committee of the corresponding institution, in compliance with applicable regulations.

RESULTS

Sample Characteristics

Table 1 presents the distribution of participants across sociodemographic variables, indicating a heterogeneous sample in terms of age, gender, academic field, and length of participation in inclusive programs.

Exploratory Factor Analysis of the Variables

Before conducting exploratory factor analysis, data adequacy was evaluated. The Kaiser-Meyer-Olkin (KMO) index yielded a value of 0.86, indicating adequate item intercorrelations. Likewise, Bartlett's test of sphericity was statistically significant ($\chi^2 = 742.35$; $p < 0.001$), confirming the suitability of factor analysis.

Exploratory factor analysis, using principal component extraction and varimax rotation, identified two factors with eigenvalues greater than 1, which together accounted for 70% of the total variance. The first factor, corresponding to socio-emotional skills, accounted for 42% of the variance, while the second factor, functional autonomy, accounted for 28%.

Exploratory factor analysis (EFA) confirmed the adequacy of the data for dimensional reduction and showed a structure consistent with the proposed theoretical constructs. The original instrument consisted of 30 items; however, for presentation

Table 1: Sociodemographic Characteristics of the Sample

Variable	Category	Frequency	Percentage (%)
Gender	Male	42	48.8
	Female	44	51.2
Age	18-20 years	28	32.6
	21-23 years	36	41.9
	24-26 years	22	25.5
Academic field	Social sciences	30	34.9
	Administrative sciences	28	32.6
	Engineering	28	32.6
Time in inclusive program	2 years	26	30.2
	3 years	34	39.5
	4 years or more	26	30.2

purposes, Table 2 shows the factor loadings of representative items, demonstrating clear differentiation among the analyzed dimensions and adequate structural consistency of the instrument.

Table 2: Rotated Factor Loadings of Representative Items by Dimension

Item	Socio-emotional skills	Functional autonomy
HS1	0.78	0.22
HS2	0.81	0.19
HS3	0.75	0.25
HS4	0.73	0.28
HS5	0.77	0.21
HS6	0.74	0.26
AF1	0.24	0.76
AF2	0.21	0.79
AF3	0.27	0.74
AF4	0.30	0.72
AF5	0.22	0.78
AF6	0.25	0.75

Note: Only the items with the highest factor loadings by dimension are presented.

The factor loadings show clear differentiation among the analyzed dimensions, with high loadings for items representative of each factor and minimal cross-loadings, confirming the instrument's structural consistency.

Figure 1 presents the proportion of variance explained by each factor, showing a greater contribution from socio-emotional skills than from functional autonomy.

Descriptive Results

The descriptive analysis showed that students reported moderately high levels in both evaluated dimensions. Socio-emotional skills showed higher values than functional autonomy, suggesting that inclusive programs have a stronger impact on the development of interpersonal and self-regulation competencies than on full functional independence.

In particular, higher levels were observed in indicators related to social interaction and decision-making, whereas the lowest values were recorded for aspects linked to the autonomous management of complex academic tasks and the independent resolution of everyday situations. These findings indicate that, although students develop relevant social skills, they still face challenges in consolidating functional autonomy. Figure 2 compares mean scores across the variables analyzed, showing a trend toward higher scores in socio-emotional skills than in functional autonomy.

The results show that socio-emotional skills had higher mean scores than functional autonomy, suggesting greater development of interpersonal competencies compared with operational independence. This difference indicates that inclusive programs have a stronger impact on relational

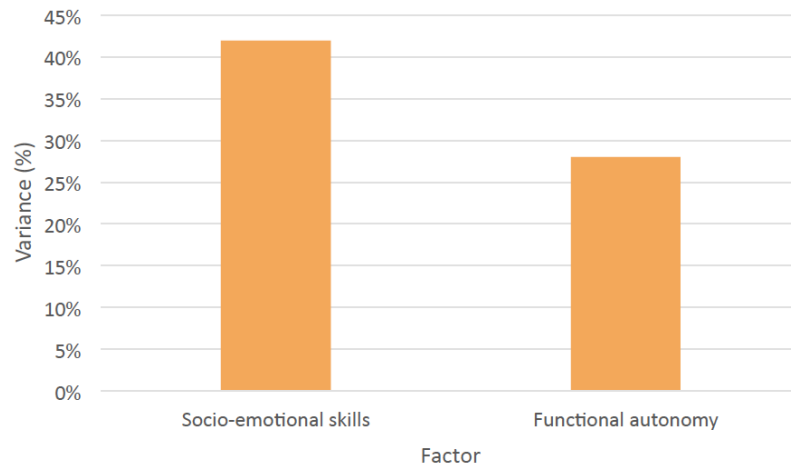


Figure 1: Variance explained by the factors.

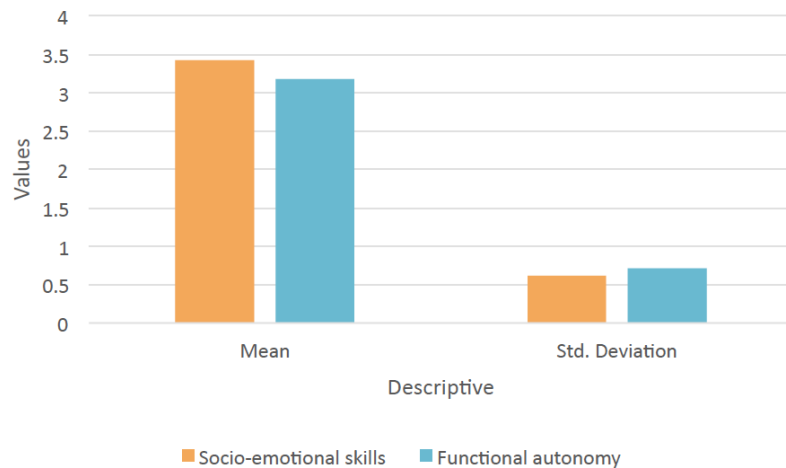


Figure 2: Comparison of means of the study variables.

dimensions than on those associated with full autonomy.

Comparative Analysis According to Sociodemographic Variables

The results of the independent-samples t-tests indicated no statistically significant differences in overall levels of socio-emotional skills or functional autonomy across sociodemographic variables such as gender or age. Model assumptions were verified beforehand and met the criteria of normality, independence, and absence of multicollinearity.

Nevertheless, specific variations were identified in some items, particularly those related to decision-making and adaptation to new situations, where certain groups showed slight differences. However, these variations were not sufficient to reveal differentiated patterns at the overall level, suggesting that the impact of inclusive programs is relatively homogeneous across

the groups analyzed. To identify possible group differences, independent-samples t-tests were conducted, controlling for sociodemographic variables. Table 3 presents the results of the independent-samples t-test, indicating no statistically significant differences between the groups.

Table 3: t-Test by Gender

Variable	Men	Women	p-value
Socio-emotional skills	3.40	3.44	0.412
Functional autonomy	3.15	3.21	0.368

No statistically significant differences were observed between the groups analyzed, suggesting that the development of socio-emotional skills and functional autonomy is not conditioned by gender but responds homogeneously to exposure to inclusive programs.

Multiple Regression Analysis and Explanatory Capacity of the Model

The results show that, although the variables analyzed were positively associated with the perceived effectiveness of inclusive programs, these relationships did not reach statistical significance. Likewise, the model showed low explanatory power ($R^2 = 0.07$), suggesting that the included variables accounted for only a limited proportion of the variability in the phenomenon under study.

At the individual level, socio-emotional skills showed a greater relative contribution than functional autonomy; however, neither predictor reached a level of statistical significance sufficient to be considered a determining factor. These results suggest that the effectiveness of inclusive university programs does not depend solely on the development of these dimensions, but rather on a more complex interaction among institutional, pedagogical, and contextual factors. Accordingly, a multiple regression model was estimated to assess the predictive effect of the independent variables on perceived program effectiveness. Table 4 presents the results of the multiple regression model, showing positive but non-significant relationships and low explanatory capacity.

Table 4: Multiple Regression Model

Variable	Beta	p-value
Socio-emotional skills	0.28	0.084
Functional autonomy	0.11	0.312

The model yielded $R^2 = 0.07$.

The results show that although there is a positive relationship between the variables analyzed and perceived effectiveness, the model has limited explanatory power. None of the variables reached statistical significance, suggesting the presence of

additional factors that influence the assessment of inclusive programs.

Figure 3 represents the proposed conceptual model, showing the relationships between the independent variables and the dependent variable, which, although positive, were not statistically significant.

The model represents the relationship between socio-emotional skills (D1) and functional autonomy (D2) as independent variables, and the effectiveness of inclusive university programs (Y) as the dependent variable. The coefficients indicate positive but non-significant relationships between the variables. The dependent variable was computed as the mean item score for the perceived effectiveness of inclusive programs.

DISCUSSION

The results of the present study provide a more precise understanding of the scope and limitations of inclusive university programs for the holistic development of students with mild cognitive disabilities. First, the factor structure identified supports the existence of two distinct dimensions, socio-emotional skills and functional autonomy, which is consistent with theoretical approaches that describe the multidimensional nature of adaptive functioning and its role in the independent living of persons with intellectual disabilities. This finding reinforces the conceptual validity of the proposed model and confirms that both dimensions are core components in the analysis of this population's development. Unlike previous studies focused on descriptive or comparative approaches [1, 4, 5, 15, 16, 23], the results of the present study provide an explanatory perspective that enables questioning of the sufficiency of traditional models based solely on individual variables.

From a descriptive perspective, the results show greater relative development of socio-emotional skills

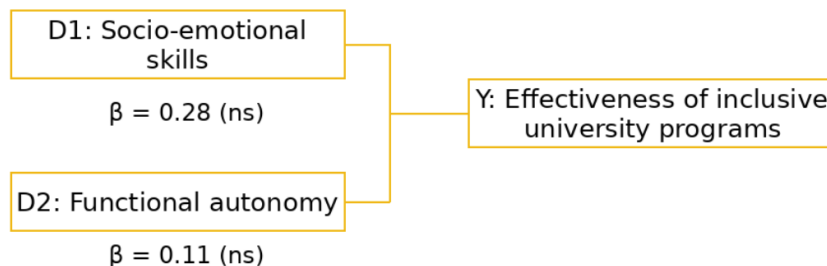


Figure 3: Conceptual model of the study.

compared with functional autonomy. This pattern suggests that inclusive university programs tend to foster competencies in social interaction, self-regulation, and decision-making more effectively, likely because of the nature of the university environment itself, characterized by constant interpersonal interaction and exposure to complex social dynamics. By contrast, functional autonomy, particularly in aspects related to the independent management of academic and everyday tasks, appears to require more structured and sustained interventions over time.

Regarding the comparative analysis, the absence of statistically significant differences between sociodemographic groups suggests that the impact of inclusive programs is distributed relatively homogeneously among students. This result may be interpreted as an indication of equity in the implementation of inclusive strategies, though it may also reflect limited differentiation in adapting programs to the specific needs of subgroups.

One of the most relevant findings of the study is that, although socio-emotional skills and functional autonomy showed positive associations with the perceived effectiveness of inclusive programs, these associations were not statistically significant. This result suggests that, although theoretically relevant, these variables are not sufficient in themselves to explain program effectiveness in the analyzed context. This finding is consistent with research indicating that inclusive educational environments tend to foster the development of social and interaction skills, especially in university contexts where exposure to social dynamics is constant [7, 9].

A possible explanation for this result lies in the nature of the inclusive university environment, which more directly supports the development of socio-emotional skills through constant interaction with peers, teachers, and collaborative academic contexts. These dynamics promote socialization, self-regulation, and decision-making in real situations, facilitating the consolidation of interpersonal competencies.

By contrast, functional autonomy involves more complex and progressive processes that go beyond the academic sphere and include the ability to function independently in everyday, administrative, and personal contexts. This type of competency usually requires more structured and sustained interventions and, in many cases, specific support outside the university environment.

In this regard, the results suggest that, although inclusive programs contribute to socio-emotional development, their impact on functional autonomy may be more limited if they are not coordinated with comprehensive strategies that explicitly address independence in daily life.

The model's low explanatory capacity further indicates the likely influence of additional factors not considered in the analysis, such as institutional, pedagogical, or contextual variables. Therefore, the results should be interpreted with caution, avoiding broad generalizations and recognizing the complexity of inclusion in higher education.

In this regard, the results suggest the presence of additional factors that substantially influence perceptions of program effectiveness, including the quality of institutional support, pedagogical methodologies, teacher training, psychosocial support, and conditions in the educational environment. This interpretation is consistent with ecological approaches to inclusive education, which propose that student development results from the interaction between individual and contextual factors [24].

These results are consistent with previous studies that have highlighted adaptive functioning as a multidimensional construct in populations with intellectual disabilities [20], as well as with research emphasizing the role of self-determination in the development of autonomy and in the transition to adult life [21, 22].

Overall, the findings highlight that although inclusive university programs produce meaningful gains in socio-emotional development and, to a lesser extent, in functional autonomy, their effectiveness depends on broader factors beyond individual dimensions. This implies the need to design inclusive strategies that coherently integrate academic, social, and structural components in order to enhance the impact of these initiatives on students' lives.

Unlike previous studies focused on descriptive or comparative approaches [1, 4, 5, 15, 16, 23], the results of the present study provide an explanatory perspective that enables questioning of the sufficiency of traditional models based solely on individual variables. In this sense, the need to move toward more comprehensive approaches that incorporate institutional and contextual dimensions into the analysis of inclusive higher education becomes evident [25].

In this regard, the results of the study align with recent approaches that propose understanding educational inclusion from a systemic perspective, in which individual variables interact with institutional and contextual factors to explain developmental processes in higher education.

STUDY LIMITATIONS

The present study has some limitations that should be considered when interpreting the results. First, the cross-sectional design prevents the establishment of causal relationships between the variables analyzed, limiting interpretation of the findings to associations observed at a specific point in time.

Second, the use of non-probability sampling restricts the representativeness of the sample and limits the generalizability of the results to other populations or educational contexts.

Likewise, data collection relied on self-report instruments, which may introduce biases stemming from participants' subjective perceptions, such as social desirability or overestimation of certain competencies.

Finally, the results should be generalized with caution, given that the study was conducted in specific, inclusive higher education contexts whose characteristics may not be replicated in other institutional or cultural settings.

CONCLUSIONS

The present study advances understanding of the impact of inclusive university programs on the development of students with mild cognitive disabilities, showing that higher education is an important setting for promoting key competencies associated with adult life. Thus, the results suggest that the impact of inclusive university programs on perceived effectiveness cannot be explained solely by individual variables such as socio-emotional skills and functional autonomy, underscoring the need to incorporate more comprehensive approaches into the analysis of these programs.

Nevertheless, the development of functional autonomy appears to be a more complex and less consolidated process, suggesting the need for more structured and sustained interventions that go beyond traditional academic dynamics. This finding underscores that inclusion in higher education should

not be limited to access but should be oriented toward creating conditions that promote students' genuine independence across different areas of their lives.

Moreover, the absence of significant relationships in the explanatory model indicates that the effectiveness of inclusive university programs cannot be explained solely by individual variables. This result highlights the importance of considering institutional, pedagogical, and contextual factors in shaping effective, inclusive educational experiences, underscoring the need for more comprehensive approaches in the design and evaluation of these initiatives.

In theoretical terms, the study provides evidence that reinforces the multidimensional nature of development among students with mild cognitive disabilities, integrating socio-emotional and functional dimensions within a single analytical framework. At a practical level, the findings suggest that higher education institutions should strengthen their inclusive strategies by integrating academic, social, and structural support that responds more effectively to the needs of this population.

Finally, future research should incorporate institutional and longitudinal variables to deepen understanding of development and transition-to-adulthood processes, as well as to evaluate the sustained impact of inclusive programs across diverse contexts. In this regard, the study not only provides empirical evidence but also contributes to the evolution of analytical approaches in inclusive education at the higher education level.

FUNDING

This research received no external funding.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

LIST OF ABBREVIATIONS

AF = Functional autonomy

HS = Socio-emotional skills

EFA = Exploratory factor analysis

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