Journal of Education and Learning (EduLearn)
Vol. 20, No. 1, February 2026, pp. 465~473
ISSN: 2089-9823 DOI: 10.11591/edulearn.v20i1.22878

Effectiveness of vocational-to-bachelor continuation of studies: an inclusion mechanism for academic success in higher education

Jorge Miranda-Ossandón[1], Carla Muñoz[2,4], Jorge Valenzuela[3,4]
[1]Department of Education and Innovation, Faculty of Education, Universidad Católica de Temuco, Temuco, Chile
[2]Department of Psychology, Universidad Católica del Maule, Talca, Chile
[3]Faculty of Education Sciences, Universidad Católica del Maule, Talca, Chile
[4]Millennium Nucleus for the Science of Learning, Talca, Chile

Article Info

Article history:

Received Jul 26, 2024
Revised Mar 22, 2025
Accepted Jul 17, 2025

Keywords:

Academic performance
Higher education
Inclusion
Student persistence
Vocational education

ABSTRACT

In the context of promoting student inclusion in higher education, this study examines the effectiveness of transition programs from vocational to undergraduate education as access mechanisms that enable effective and successful inclusion. A cohort of 637 Chilean students from three academic disciplines, namely, agronomy, early childhood education, and physical education was analyzed, comparing academic performance, failure rates, and persistence between continuation program participants and students admitted through traditional or inclusive pathways. Statistical analyses, including persistence metrics and analysis of variance (ANOVA), indicate that students in the continuation program achieve equal or superior academic outcomes to their peers admitted through regular or other inclusionary pathways. These results provide evidence to support the relevance and feasibility of this type of higher education pathway access as an effective inclusive education strategy in terms of academic success and persistence. So, this paper contributes with specific evidence on the effectiveness of this inclusion mechanism, which could be relevant for designing efficient inclusion policy mechanisms. However, future studies that address career paths and professional development longitudinally must complement these initial results.

Corresponding Author:

Jorge Valenzuela
Faculty of Education Sciences, Universidad Católica del Maule
Av. San Miguel 3605, Talca, Chile
Email: jvalenzuela@ucm.cl

1. INTRODUCTION

This article offers novel empirical evidence on the effectiveness of continuing vocational-to-bachelor studies as a mechanism for access and inclusion in higher education. It focuses on a specific cohort of Chilean students in these programs, comparing their academic performance, dropout rates, and persistence with those using traditional or other inclusive admission routes. Thus, this paper offers concrete data on the impact of continuity programs from vocational training to bachelor's degree training.

Since the 1990s, higher education in Chile has experienced a steady increase in the number of students enrolled. However, the number of students from the lowest income quintiles remains low despite this increase [1], [2]. Part of the problem has been attributed to the Chilean university selection system, which has been based on various national standardized test since 1967. This selection system has been criticized for its results being socio-economically biased. From official data for 2024, we constate that while

only 1.5% of students in private education do not reach the minimum score to apply to university, this percentage rises to 8.5% in state-subsidised schools and 15.1% in public schools, which precisely serve the most socio-economically vulnerable population.

One way to compensate for this situation has been implementing a public policy of inclusive access to higher education. Based on this policy, the inclusive access programs were created to provide opportunities for students who represent 15% of the best academic performance in publicly-funded educational establishments to enter higher education. The principles underpinning the inclusive strategy in tertiary education are aimed at transforming the university into a more equitable space in economic terms and more diverse in terms of the origin of students under the criteria of inclusion and social cohesion [3], [4].

The strategies used are diverse, and a scaling-up process has been developed to generate access that complements the established selectivity processes [5]–[7]. Each of these strategies highlights student talent as a central aspect of access to higher education [8]. In this way, generating more inclusive access to a tertiary education system incorporating equity variables has paved the way for different inclusion mechanisms.

Within this framework, the process of continuing studies based on the recognition of previous qualifications has generated opportunities that, until recently, were unthinkable for a group of the population that did not have access to traditional academic education [9], [10]. This process of continuity, known as permeability, refers to the capacity of education system to allow students to move between different levels of qualification, though recognizing previous learning. This process reduces the duration of training, provided that the student demonstrates a set of acquired skills and knowledge [11], [12].

Likewise, the concept of continuity of studies aligns with global trends of educational permeability, as pointed out by Chankseliani and McCowan [9], who note that flexibility in educational transitions is essential to foster lifelong learning. The Organisation for Economic Co-operation and Development (OECD) [13] also support this position, recommending programs facilitating mobility between vocational and bacherlor degree pathways. In this way, the processes of vocational-to-bachelor continuation of studies that incorporate the effective recognition of learning constitute a significant advance in the tertiary education system to generate greater levels of equity, given that they allow a group of students who have demonstrated promising results at the vocational training level to continue studies at a higher level of qualification [14], [15].

However, the evidence, both nationally and internationally, points to low levels of permeability and reflects a series of obstacles to the development of transitions between successive levels of training [16], [17]. Evidence shows that many students graduating from vocational training seek paths to continue their studies in the short term after graduation [18]. In this regard, according to data from the Servicio de Información de la Educación Superior (Chilean higher education information service) for the 2016 and 2017 cohorts, 23.0% of vocational training graduates continued their studies immediately after graduation [19]. In most cases, they did so without recognizing their previous studies and with the consequent lengthening of their training processes.

One of the reasons that could explain the difficulties experienced by programs for recognizing prior learning is the lack of confidence in the abilities of students with lower incomes. These students, who comprise the bulk of the contingent entering through the inclusion pathway, face additional skepticism regarding their readiness for higher academic levels [18]. The lack of clarity around this question hinders the construction of training trajectories that incorporate criteria of greater equity into the system.

The recommendations of different educational bodies (e.g., [13]) in relation to selectivity processes suggest that the education system should move towards an articulated structure that allows for dynamic, flexible and permeable educational pathways that effectively articulate secondary and post-secondary education. And within the latter, between vocational training and degree programmes. In this context, various studies reveal the importance of articulation and the continuation of studies as positive aspects that should be incorporated into people's training [6], [16], [20], given that they allow more significant degrees of inclusion into an exclusive system [21]. This idea was ratified by the publication of the Higher Education Act, which enshrines the principle of articulation as a process that the Chilean tertiary education system must mobilize [22].

This study aims to provide evidence of the effectiveness of vocational-to-bachelor transitions as an inclusion mechanism in higher education. The work is based on the proposition that the articulation between vocational training and academic careers (bachelor's degree) is effective in influencing outcomes such as academic performance, failure, and persistence rates, compared with students who enter higher education through standardized admission test (regular admission), inclusive access programs, or special admissions. These variables-academic performance, failure rates, and persistence-were used in this research to compare students admitted to the degree programs through the different enrolment modes. Through these, it sought to test the hypothesis of whether students who pursue continuing studies perform at least equivalently to students who enter the same degree programs through traditional selectivity routes in academic degree

programs leading to a bachelor's degree. The main argument supporting this hypothesis is that vocational training at the tertiary level provides social and academic integration [23], [24], allowing students who have continued their studies through undergraduate programs to strengthen their academic performance skills and persist in their studies [25]–[27], thus obtaining efficiency indicators at least similar to those of students from traditional, inclusive and special access pathways. If so, a vocational-to-bachelor continuation of studies can become a tool that strengthens inclusive access initiatives to higher education for groups of lower socioeconomic status, broadening the response to the need for inclusion and social justice [3], [28]. In this way, showing specific evidence about the effectiveness or not of this inclusion mechanism in academic performance, failure rates, and persistence is very relevant for policy-makers.

2. METHOD

2.1. Participants

The present study used the academic database of a university belonging to the Chilean Council of Rectors in the Araucanía Region, updated to July 2018. Participants correspond to all students from three undergraduate university degrees: agronomy (n=243), early childhood education (n=212) and physical education (n=182) enrolled in the 2014-2017 cohorts. These programs were chosen because they provide for the continuation of studies with no other requirement than completing the tertiary-level vocational degree associated with each area. For example, the "early childhood education technician" degree allows direct access to the university degree in early childhood education. In these cases, this entry route is a complementary mechanism to the traditional forms of entry to university studies (university selection test, inclusive entry, and special admission). This fourth mode of entry accounted for 14% of enrolments in agronomy, 38.2% in early childhood education, and 23.6% in physical education in 2018, see Table 1.

Table 1. Distribution of students by degree program and admission way

Program	Admission pathway to the university	N	% in program	% female	Secondary school type (%)	
					SHSE	SVTE
Agronomy (n=243)	Regular admission	175	72.0	37.7	81.1	18.9
	Continuation of studies	34	14.0	44.1	30.3	69.7
	Inclusive admission	8	3.3	75.0	25.0	75.0
	Special admission	26	10.7	34.6	69.2	30.8
Early childhood education (n=212)	Regular admission	80	37.7	100	72.5	27.5
	Continuation of studies	81	38.2	100	54.3	45.7
	Inclusive admission	25	11.8	100	27.3	72.7
	Special admission	26	12.3	100	57.7	42.3
Physical education (n=182)	Regular admission	95	52.2	28.4	83.2	16.8
	Continuation of studies	43	23.6	37.2	64.3	35.7
	Inclusive admission	18	9.9	44.4	47.1	52.9
	Special admission	26	14.3	30.8	76.0	24.0

Note: SHSE=scientific and humanistic secondary education and SVTE=secondary vocational education.

The gender composition of the sample corresponds to 39.5% of women in agronomy, 32.4% in physical education, and 100% in early childhood education. The distribution by sex in the different ways of enrolment corresponds to the expected frequency in each degree course $p>0.171$. Concerning socioeconomic characterization, the participants in the sample correspond mainly to students of low socioeconomic level, where 64.3% of the sample belong to income deciles 4 and 5. Only 10.9% belong to the three higher-income deciles (8, 9, and 10). On the other hand, a significant percentage of students who used the "vocational-to-bachelor continuation of studies" modality completed their secondary education in vocational schools: 69.7% in agronomy, 45.7% in early childhood education, and 35.7% in physical education. In all cases, these rates are higher than the proportion of students from vocational secondary education admitted via the regular route.

2.2. Procedures and measures

Academic performance is operationalized through the student's cumulative grade point average (CGPA), which corresponds to a grade on a scale of 1 to 7 and reflects the average of the final grades of the courses enrolled by the student and weighted by the number of credits of each subject; failure is expressed as the number of subjects not passed in the period analyzed; and persistence in the program was operationalized as the regular students' permanence in the program, in contrast to those students who dropped out or suspended their studies and those who fall into grounds for dismissal (failure>50% of the credits enrolled in

the academic year or failure of a subject for the third time). For this study, the way of enrolment to the program is considered as a variable that distinguishes four types of access:

i) Regular admission: through the score obtained in the national university admission test and with which the student applies to the course and university of their choice through the single national admission system.
ii) Vocational-to-bachelor continuation of studies: corresponds to students who have completed a university vocational degree in agricultural production, early childhood education, or physical education and are pursuing a degree in agronomy, early childhood education, or physical education, respectively.
iii) Inclusive access: this grouping includes different inclusive admission programs that share access to university for students who did not obtain the minimum entrance score in the national university admission test but whose school performance during their secondary education or ranking places them in the top 15% of their cohort [29].
iv) Special admission: this grouping includes different admission programs for people who have studied abroad, are outstanding sportsmen and women or artists, and applicants with visual, hearing, or motor disabilities.

All data provided by the university institution were previously anonymized to protect the privacy of the student's backgrounds, following the ethical standards for this type of research.

3. RESULTS AND DISCUSSION

To test the hypothesis that students enrolling through the continuation of studies pathway have a similar academic performance to students who entered through the regular process, an analysis of variance (ANOVA) with planned contrasts of the academic performance of students grouped by the four types of enrollments to the program was carried out, Table 2. After verifying the homogeneity of the variances of the academic performance of the students who entered through the different entry routes ($Levene_{(3,239)}$=1.609; p=0.188 in agronomy; $Levene_{(3,208)}$=.117; p=0.950 in early childhood education; and $Levene_{(3,178)}$=0.105; p=0.957 in physical education), a one-way ANOVA was performed using the CGPA as the dependent variable and the ways of access to university (regular admission, continuing studies, inclusive access and special admission) as the fixed factor.

Table 2. Academic performance by degree program and university admission route

Admission pathways/programs	Agronomy			Early childhood education			Physical education		
	N	CGPA*	SD	N	CGPA*	SD	N	CGPA*	SD
Regular admission	175	4.68	.75	80	5.05	.67	95	4.93	.63
Continuation of studies	34	4.76	.60	81	5.14	.71	43	5.17	.62
Inclusive admission	8	5.22	.46	25	4.80	.71	18	4.75	.64
Special admission	26	4.64	.70	26	5.35	.63	26	5.33	.55

*CGPA: cumulative grade point average (in Chile, the grading scale is from 1 to 7, where the minimum passing grade is 4.0).

3.1. Differences in overall performance

To account for the hypothesis, three planned comparisons were carried out: i) comparison between continuation studies v/s the set of other ways of admission; ii) comparison between continuation studies vs. regular entry; and iii) comparison between continuation of studies vs. inclusive access. these comparisons were performed using the Bonferroni method to reduce type I error without sacrificing statistical power (lower type II error).

On analyzing the differences in performance by way of admission, regardless of the program, it is observed that there are significant differences between the CGPA of the students who entered the university via the different routes $F_{(3,633)}$=6,040; p<0.001. In order not to lose power, the planned comparisons were carried out, and it was observed that the students who entered by the continuation of studies showed a significantly higher performance than their peers who entered by other methods of access $t_{(1,633)}$=95,564; p<0.001. These differences are replicated concerning regular entry students $t_{(1,633)}$=3,431; p<0.001; but not concerning students who entered through inclusive access $t_{(1,633)}$=1,903; p=0.057.

3.2. Results by study programs (degree programs)

The same analyses (one-way ANOVA and planned comparisons) were carried out to deepen the information analysis and determine the behavior of the different access methods in each program. The results show that the students who entered the degree programs through the continuation of studies show similar or significantly higher academic performance (CGPA) than their peers who entered the same degree program

through other routes. Thus, the continuation students compared with their peers with regular admission, i.e., via regular admission, show equivalent CGPAs (p>0.05) in the case of agronomy and early childhood education, while in physical education continuation of studies students presented significantly higher CGPAs than those with regular admission $t_{(1,178)}$=2,106; p=0.037. In other words, none of the cases analyzed did the continuation of studies obtain lower CGPAs than those students admitted via the regular admission.

Along with the above, the hypothesis of the academic performance of the continuation of the studies group versus the inclusive access group was contrasted. For this purpose, it was tested whether the entry route through the continuation of studies accounts for differences in performance between these groups. The results show that the continuation of studies group obtains a significantly higher academic performance compared to the inclusive entry group both in early childhood education $t_{(1,208)}$=-2,134; p=0.034; and in physical education $t_{(1,178)=}$2,411; p=0.017; while in agronomy these differences are not evident $t_{(1,239)}$=1,620; p=0.0106. Also, a possible difference in academic performance by gender was assessed, and no differences were observed within the different types of admission (p>0.05).

3.3. Failed courses

A similar analysis was conducted to test whether continuing students performed differently from their peers regarding the number of failed courses during their time in the degree program (M=2.52; SD=1.72). The results show no significant difference (p>0.05) in the overall comparison and by degree program. Likewise, no differences are observed in the different contrasts between groups. That is to say, students who enter by continuation of studies fail a similar rate of subjects as their peers who enter by the other enrolment methods.

3.4. Persistence rate

Another way to analyze the effectiveness of inclusion via continuation of studies is to compare the persistence rates in the program by type of entry, i.e., that they remain as regular students of the program, see Table 3. The results show that the persistence rates in early childhood education and physical education are similar in the four access modalities. Something partially different occurs in the case of agronomy, where these differences are significant $\chi 2_{(1,3)}$=11.226; p=0.011. In this degree course, the highest persistence rate is observed for the continuation of studies group (94%), a rate which, although not significantly higher than that of their regular entry peers (81%), is significantly higher than that of the inclusive access students, whose rate is only 50% (p<0.05). However, the number of students who entered via this route is lower than the others analyzed. On the other hand, the relative proportion of students who fall under the grounds for dismissal concerning what is expected does not differ significantly according to the enrollment method.

It is found that the rates of students who fall into the grounds for dismissal category in the continuation of studies group are similar to the other groups except in the preschool education program where no student enrolled through the continuation of studies has fallen into this situation. On the other hand, the relative proportion of students who fall into the program grounds for dismissal compared to what is expected does not differ significantly by pathway. Finally, we note that the rates of students who fall into grounds for dismissal in the continuity of studies group are similar to those in the other groups. The only exception is the early childhood education program, where no single student admitted for continuity of studies has fallen into this situation.

Table 3. Comparison of the academic situation of students by admission route and program (in %)

Program	Academic situation	Admission pathways			
		Regular admission	Continuation of studies	Inclusive admission	Special admission
Agronomy	Regular student	81.7[a, b]	94.1[b]	50.0[a]	69.2[a, b]
	Into grounds for dismissal	1.7[a]	2.9[a, b]	25.0[b]	--
	Suspension of studies	1.7[a]	2.9[a, b]	12.5[a, b]	11.1[b]
	Abandonment	14.9[a, b]	--	12.5[a, b]	19.2[a]
Early childhood education	Regular student	90.0[a]	90.1[a]	96.0[a]	92.3[a]
	into grounds for dismissal	3.8[a]	--	--	7.7[a]
	Suspension of studies	--	7.4[a]	--	--
	Abandonment	6.2[a]	2.5[a]	4.0[a]	--
Physical education	Regular student	87.4[a]	86.0[a]	77.0[a]	96.3[a]
	Abandonment	8.4[a]	11.6[a]	5.6[a]	3.7[a]
	Suspension of studies	4.2[a]	2.3[a]	16.7[a]	--

Note: Each different subscript letter ([a] or [b]) indicates a subset of admission pathway, categories whose column proportions do not differ significantly from each other (p>0.05).

3.5. Discussion

The initial hypothesis of this study indicated that students entering college through the vocational-to-bachelor continuation of studies modality, given their two-year experience in higher education, would obtain an academic capital that would allow them to successfully advance in a bachelor's degree program during this period. This would be observable in obtaining similar or even better results than their peers who entered through regular admission, inclusive access, and special admission in academic performance, failure rate, and persistence. Our results indicate that vocational-to-bachelor continuation of studies leads to significantly higher academic performance in physical education (p=0.037) and equivalent performance in agronomy and early childhood education. These findings align with previous studies that highlight the importance of academic integration in university success [30]–[32]. However, the superior performance in physical education suggests that vocational pathways may better align with the practical demands of specific disciplines, warranting further exploration

These findings highlight the potential of students who enter through the continuation of studies to perform academically at a high level. Their achievements are often similar and sometimes exceed those of their peers who enter through other access modalities. This performance demonstrates that even students who may have obtained low scores on the standardized test for regular admission or faced barriers to accessing university through the regular pathway can excel academically, even in the absence of supplementary support, as in the case of some university experiences (e.g., [33], [34]). The results suggest that the years of technical training at university provide a solid basis for building educational trajectories towards academic careers leading to bachelor's degrees, auguring well for the future academic performance of the continuation of studies students.

The literature shows that academic integration, i.e., incorporating these new students into this new academic culture, is a fundamental key to academic success in university higher education [30], [35]. However, this process takes time [25], which explains why this type of higher education entry pathway performs so well. Previous experience in a vocational career within the university should have meant acquiring academic skills specific to the university culture. This prior experience likely enhanced students' self-esteem, self-efficacy, and ability to build networks in higher education. This previous experience allows students to face academic challenges in their new careers efficiently [36]. However, these more specific aspects should be explored in depth in the future.

Although our study provides quantitative evidence on the performance of students who entered university through continuity of studies and complements qualitative studies of this transition, this research has limitations. Given that this is a recent inclusion system with a certain degree of novelty in Chilean higher education, this case study was developed only based on four cohorts and three programs, and therefore, its scope is limited. Nevertheless, it can be concluded that the observed phenomenon presents a pattern that transcends degrees and cohorts; however, this preliminary evidence, although not directly generalizable, constitutes a starting point to confirm this trend in other degrees and different educational contexts [37], [38] and encourages further studies to verify these results in other degrees.

4. CONCLUSION

In the context of promoting student inclusion in higher education, this paper compared the effectiveness of Vocational-to-Bachelor continuation of studies with others access pathways in different aspects of success in university studies, such as performance, failure rates, and persistence. The results provide initial evidence to show that this university admission route is an opportunity to diversify the alternatives of access to higher education. This mechanism of university entrance permits students to develop gradually the competences to fully access to an academic experience. Also, we observe a better adherence to the program.

ACKNOWLEDGMENTS

The authors express their gratitude to the Agencia Nacional de Investigación y Desarrollo (ANID) for supporting the development of this research and the support of the Millennium Nucleus for the Science of Learning [NCS2022_026]. We would also like to thank the article reviewers for their constructive comments.

FUNDING INFORMATION

The research process received financial support from the Agencia Nacional de Investigación y Desarrollo (ANID) through grants from the fondecyt project 11240073.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Jorge Miranda-Ossandón	✓	✓			✓	✓		✓		✓				
Carla Muñoz		✓				✓				✓				
Jorge Valenzuela	✓				✓	✓		✓	✓	✓				✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

This study uses previously collected and fully anonymized institutional data; therefore, informed consent was not required. The study complies with applicable ethical regulations and the principles of the Declaration of Helsinki.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [JV], upon reasonable request.

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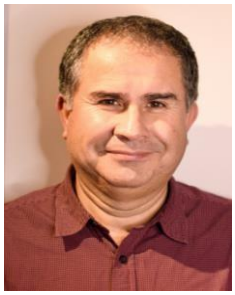
BIOGRAPHIES OF AUTHORS



Jorge Miranda-Ossandón is a PhD in education. He is associate professor at Universidad Católica de Temuco, Chile. His research interest is focused on student development in higher education and motivation learning and evaluation. He is a member of the interuniversity group of education research. He can be contacted at email: jmiranda@uct.cl.

Carla Muñoz is a PhD in psychology. She is a full professor at the psychology department of Universidad of Católica del Maule, Chile, and a Principal Researcher at Millennium Nucleus for the Science of Learning (MiNSoL). Her research interest focuses on teacher training and reading motivational processes. She is a member of the interuniversity group of education research. She can be contacted at email: cmunozv@ucm.cl.

Jorge Valenzuela is a PhD in education. He is a full professor at Universidad Católica del Maule, Chile, and a Principal Researcher at Millennium Nucleus for the Science of Learning (MiNSoL). His research interests focus on motivational processes and learning. He is a member of the Interuniversity group for education research. He can be contacted at email: jvalenzuela@ucm.cl.