

RESEARCH ARTICLE

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Going online? Does transferring to online university increase the likelihood of graduation among students from lower social background?

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Abstract

The increase in university participation has led to greater complexity in terms of students' trajectories, with the option of changing degree course or higher education institution or, more recently, the mode of study (face-to-face and online learning). These transitions can be strategic moves that facilitate greater continuity in educational trajectories and increase equity within the education system. Online universities offer greater flexibility in terms of time and location, providing new opportunities for students with specific profiles to pursue higher education. This article aims to delve into the complex trajectories of change and to analyse whether there are differences in educational outcomes based on students' social backgrounds. Using registry data from the Catalan university system ($n = 42,370$), we identify and characterise the trajectories of change and analyse the effect of the interaction between them and social origin on educational outcomes. The results indicate that students from lower social backgrounds and those who also work are most likely to transition to virtual education. However, social background continues to have an effect on the probability of graduating, dropping out or pursuing further studies.

Keywords: Online university, Social background, Graduation, Inequalities, Academic trajectories

Introduction

Some studies have shown that access to university has become more equitable. However, the analysis of inequity in higher education has shown that students' opportunities at university differ according to their social origin, and that socioeconomic status remains a significant determinant of differences in study conditions and the quality of the education provided (Jury et al., 2017; Reay et al., 2010), as well as likelihood of graduation (Li & Dockery, 2015; Mills et al., 2009; Tomul & Polat, 2013).

There has been recent increased attention to the matter of inequality in higher education with respect to the pathways that students take during their degree. Access delays, changes in modes of study and transitions between degrees and/or institutions are just a few of the indicators that contribute to the complexity of educational trajectories (Boylan, 2020; Crisp et al., 2022; Deil-Amen & Goldrick-Rab, 2009; Denice, 2019; Kalogrides

& Grodsky, 2011; Robinson & Bornholt, 2007; Taylor & Jain, 2017). To this effect, the ways in which students move through university are diversifying and there is an increase in complex trajectories that deviate from the continuous, linear and time-limited one (Clasemann & Boon, 2019; Lee, 2021; McCormick, 2003).

Another phenomenon that adds further complexity to the analysis of educational equity is the increasing centrality of online education in the higher education system, providing students with a whole new context of opportunities. This educational model is particularly relevant given its flexibility, allowing students to combine their degree studies with other responsibilities, and opening up new opportunities for students from lower socioeconomic backgrounds.

The focus of this article is twofold. First, we aim to produce a detailed analysis of complex trajectories in higher education, which differ from the traditional continuous and linear one. Specifically, we will focus on those that involve some sort of change in relation to the student's initially envisioned university programme, and particularly those that involve a shift from face-to-face to online university education. Second, we aim to analyse the socio-demographic and educational characteristics of students with complex academic trajectories. Last, we examine whether these complex backgrounds contribute to enhancing educational equity by assessing differences in academic outcomes among students with diverse backgrounds, particularly in relation to their social origin. This enabled us to identify which change trajectories are more likely to support students from lower socioeconomic backgrounds in continuing and graduating from university.

University trajectories, social origin and academic results

In recent years there has been an increase in student participation at university and in diversity among this group in terms of social origin, gender, access routes, migratory origin, age and previous educational experiences, among others (Rubin et al., 2019; Soler Julve, 2013; Troiano & Torrents, 2018). This diversity has led to a broader understanding of the university experience and the ways of moving through this higher education institution, which has crystallised in an increase in the complexity of students' academic trajectories (Andrews et al., 2014; Clasemann & Boon, 2019; Haas, 2022; Haas & Hadjar, 2020).

This complexity, which occurs in both the transition from secondary school to university and once at university (Clasemann & Boon, 2019; Denice, 2019; Robinson & Bornholt, 2007), involves a de-standardisation of academic careers. The increase in the number of interruptions—entries and exits from the education system, the lengthening of educational trajectories and changes in degree studies and educational institutions, among others, are new indicators of the complexity of students' trajectories. Among these phenomena, of special interest in this article are the change trajectories, be they changes of degree, institution or mode in relation to the option first chosen by the students on accessing university level education.

Although much research in the United States has delved conceptually and empirically into the trajectories of change in the higher education system (Crisp et al., 2022; Lee, 2021; Taylor & Jain, 2017), less research has analysed these trajectories of change in Europe. The importance of deepening our understanding of change trajectories in higher education because they have been found to present differences according to

students' social origin (Deil-Amen & Goldrick-Rab, 2009; Haas & Hadjar, 2020; Langa, 2020; Spencer & Stich, 2023; Troiano et al., 2021). Social origin plays a significant role in shaping decision making in higher education due to factors such as unequal monetary resources, information asymmetry, differences in previous educational strategies and perception of the benefits of higher education (Breen & Goldthorpe, 1997; Lee, 2021; Spencer & Stich, 2023). However, the results of studies on this topic are not always consistent, with mixed findings as to whether students from higher or lower social backgrounds tend to have more complex trajectories (Haas & Hadjar, 2020).

For example, Goldrick-Rab analyses the trajectories of change of institution and different ways of moving through the higher education system in the North American context (Goldrick-Rab, 2006; Goldrick-Rab & Pfeffer, 2009). The results show that although transition trajectories are becoming more frequent among all students, there are differences according to social background both in the forms of transition and in academic results. In this regard, students from more advantaged socioeconomic and educational backgrounds make more fluid transitions—they change institutions without interrupting their studies—while students from less advantaged social backgrounds also temporarily interrupt their studies when they change institutions. Consequently, the trajectories of students from lower social backgrounds tend to lead less frequently to obtaining a university degree. Among other reasons, the authors attribute this fact to economic constraints, poor grades, information deficits and inadequate educational policies, also pointing out that high socioeconomic status students have a lower likelihood of reverse transfer (from a 4-year institution to a two-year institution) but a higher likelihood of lateral transfer (from 4-year institution to four-year institution) (Goldrick-Rab & Pfeffer, 2009).

Other research also shows differential logics of change according to students' social background (Spencer & Stich, 2023). Specifically, the authors argue that trajectories of change—lateral transfer—serve as a mechanism for students from higher social backgrounds to access more selective institutions. In this sense, the authors conclude that trajectories of change are likely to function as a mechanism to further stratify differences in persistence, degree attainment and labor market outcomes.

Specific research delving into the relationship between reverse transfer students and degree attainment also highlights interesting results (Lee, 2021). Reverse transfers refer to students who transfer from four-year colleges to two-year colleges or to less than two-year colleges. The results show that while reverse transfer decreases the probability of obtaining a bachelor's degree in six years, it increases the probability of completing a certificate or associate's degree. However, given that reverse transfer students come from relatively disadvantaged backgrounds, the author concludes that reverse transfer is not a very efficient option, as it clearly does not meet students' initial aspirations for a bachelor's degree and increases the time required to obtain a bachelor's degree.

Similarly, some research specifically explores differences in the profile of students who reverse transfer, laterally transfer, or withdrawal from college after first enrolling at a bachelor's granting institution (Crisp et al., 2022). The results show clear similarities between students who drop out and those who transfer the other way around. In particular, it corresponds to low-income and first-generation students and students who worked longer hours and had a higher financial burden to pay for university. However, other research shows that

students from lower socioeconomic backgrounds tend to be less likely to take risks, and so are the ones who make fewer changes and try to obtain their degree as quickly possible (Boylan, 2020; Kalogrides & Grodsky, 2011; Langa, 2020; Troiano et al., 2021). In this regard, change trajectories, be it the higher education institution itself or the degree course, can be a strategy for students to reduce direct costs and/or adapt initial aspirations and expectations.

In the Spanish context, several researchers have analysed the trajectories of change of degree programme, especially at the end of the first year of university (Corominas, 2001; Villar Aguilés & Hernández i Dobon, 2010). The results show that changing the bachelor's degree on which they are enrolled is often a relocation strategy, especially in the first year of university. Although institutionally these changes between degrees have often been considered as dropout trajectories, empirical findings show that a significant percentage is not an abandonment of the university system but a change of degree that allows students to relocate, thereby increasing retention (Villar Aguilés et al., 2012).

Other research adds to these findings by incorporating the effect of performance on decision making at university, showing how differences continue to be observed according to social background (Haas & Hadjar, 2020; Langa, 2020; Troiano et al., 2021). Following the approach of compensatory advantage (Bernardi & Triventi, 2020), the findings of studies conducted in the Spanish context suggest an inverse relationship between social origin and risk-taking behaviour among young people. Specifically, it can be observed that students from lower social backgrounds are less likely to take risks that could jeopardize their chances of completing their degree (Troiano et al., 2021).

In the same vein, research in the Spanish university context also shows that students from lower social backgrounds tend to change degree programmes less often (Lassibille & Navarro Gómez, 2009; Langa, 2018, 2020). As Langa concluded, the decisions of students from lower social backgrounds are characterised by a tendency to want to avoid failure and by an overestimated sense of cost and limitations, meaning that the university option is increasingly seen as a challenge. To this effect, students from higher social backgrounds with more resources (information, money, etc.) are the ones who take more risks and opt more frequently for pathway changes.

Based on this evidence, it is necessary to introduce a new element. The emergence and rapid consolidation of the online university has created a new scenario in the context of higher education that adds a further element of complexity. Given the specificity of the online mode, it is pertinent to explore the role that online education can play in students' decisions. Further, given that complex pathways are more commonly followed by students from lower socioeconomic backgrounds and migrant backgrounds (Crisp & Nuñez, 2014; Crisp et al., 2022), it is worth exploring the role that online education can play in these students' decisions (Boylan, 2020; Kalogrides & Grodsky, 2011) and whether an option can be developed that allows students from lower social backgrounds to increase their chances of continuing their degree studies and graduating, thus contributing to increasing social equity in higher education.

Specificity of the online mode

The new centrality of online education in the context of higher education can create a novel context of opportunities by offering the possibility of combining face-to-face and online education throughout students' academic careers. To this effect, while there are currently multi-institutional pathways with a change of degree and/or a change of institution, increasingly there can be multi-modal pathways allowing students to go through higher education combining different institutions and modes.

One of the characteristics of the online university that can make it attractive is the flexibility it offers in terms of time and space. Consequently, it can attract a certain profile of students with multiple responsibilities outside the university or with fewer economic resources, who seek to reduce the indirect economic and especially time costs of attending university in person. This should allow students with external responsibilities (work and/or family) or with fewer financial resources to choose an option that allows them to continue studying to obtain a university degree. Some research analysing the profile of online university students points in this direction, highlighting that students with multiple responsibilities such as work or family responsibilities are the majority (Sánchez-Gelabert, 2020; Sánchez-Gelabert, Valente, & Duarte, 2020).

It should be noted that learning online means that students can reduce indirect costs in terms of investment in transport time and attendance at the university compared to those who choose the face-to-face option. The specific characteristics of the student profile in terms of responsibilities—older students and students with more family and work responsibilities—make them less likely to spend time at the university and to attend classes than face-to-face students (Xavier & Meneses, 2020; Raddon, 2007), meaning that the most important costs continue to be indirect ones. In other words, although indirect economic costs can be reduced, other costs—non-economic ones—can be decisive in shaping academic trajectories.

Further, although lack of time is one of the main reasons for transferring to the online mode, many of the students who do go online are faced with a new reality that they are likewise unable to cope with precisely due to lack of time. In particular, the research points to situations of time poverty, paucity of quantity and quality of time (Wladis, Hachey, & Conway, 2022) and time-related conflicts (Simpson, 2013; Xavier & Meneses, 2018), procrastination and inadequate time management skills, and the inability to juggle multiple responsibilities (Lee & Choi, 2011). The psychosocial costs relating to time management and the effort involved in dedication to the degree commitments are the main source of stress in the case of adult students, clearly impacting on academic results and increasing dropout rates. This phenomenon is even more pronounced in the case of women due to the burden of family responsibilities (Waterhouse et al., 2020), usually having gone online initially as they thought it would be a less demanding option or for personal reasons associated with the organisation of family and educational life (Kahu et al., 2014; Oliphant & Branch-Mueller, 2018).

Apart from stress management, other factors specific to online education can have an impact on students' academic trajectories and continuity. Some research highlights social and/or geographical isolation and loneliness, and the difficulty of adapting to a virtual learning model (Xavier & Meneses, 2020) as having psychosocial consequences for students. The lack of self-organisation and interaction with both peers and institutional

staff can interfere with a sense of community and lead to feelings of isolation, increasing stress and dissatisfaction with the online mode (Markova et al., 2017; Vonderwell, 2003).

These characteristics, which are more typical of online education, could be a possible explanation for the high level of abandonment of this mode, accounting for more than half of all students that enrol (Bawa, 2016). Apart from these factors, some research shows that dropout and continuity of education in higher education institutions may be due to different factors associated with the student—internal and external—as well as with the educational institution (Kara et al., 2019). Factors such as insufficient interaction with both tutors and other students, difficult assignments that lack clarity and too difficult or demanding courses or programmes can contribute to students' academic trajectories being unsuccessful in terms of graduation.

Therefore, while online education can become central for on-campus students with financial difficulties or multiple responsibilities who see the flexibility offered by the online university as an opportunity to continue studying, the specificities and requirements of this new learning environment can neutralise the opportunities it offers in terms of time and space, leading students to abandon their higher education aspirations definitively. In terms of educational equity, it is therefore necessary to analyse whether the transition to online education offers more opportunities for students from lower social backgrounds to continue studying and graduate.

Methodology

Objectives

We set different objectives based on the theoretical approach and the empirical evidence. The first was to identify, quantify and characterise different academic trajectories of change in a cohort of on-campus university students, according to socio-demographic and educational variables. Specifically, the aim was to examine the trajectories of change, distinguishing between change of degree, change of institution and change of mode of study.

The second objective was to look specifically at the trajectories of change. In this regard, we analysed the effect of the different change trajectories—degree, institution and mode—on academic results nine years after first entering university. To this effect, the three change trajectories were compared with each other to know the probabilities of graduating, dropping out or continuing to study.

Last, we analysed the interactive effect of trajectory and social background on academic outcomes, or in other words whether the chances of obtaining a university degree—or dropping out or continuing studying—differ according to the effect of social background and the trajectories of change (degree, institutional or mode). This allowed us to assess, among other things, whether switching to the online mode—mode change trajectories—offered more opportunities for further study or graduation among students from lower social backgrounds than degree change and institutional change trajectories.

Methods

At the methodological level, a student-centred approach is adopted which views the higher education system as a context that offers multiple pathways and in which students make choices according to their socio-demographic characteristics, contextual

constraints, educational goals and past experiences. This approach makes it possible to put trajectories at the centre of the analysis and to deepen the distinction between the design of pathways from an organisational and administrative perspective and the actual academic trajectories of students (Adelman, 1999; Clasemann & Boon, 2019; Taylor & Jain, 2017).

The methodological strategy consisted of different steps. First, the different academic trajectories of the students were identified, with special interest in the trajectories of change of degree programme, institution and mode. Second, we analysed whether there were differences in the trajectories according to a set of socio-demographic, institutional and academic variables. This analysis was carried out using the chi-square test of contingency tables and the analysis of corrected standardised residuals.

Last, students' academic results were analysed in terms of the interactive effect of social background and trajectories of change. In this case, we specifically selected students who entered the on-campus university and had experienced one of the three trajectories of change during their higher education experience. Given that the outcome variable had three values, a multinomial logistic model was carried out, introducing the interactive effect of social background and the path of change, in addition to a number of control variables. To perform this analysis, we followed the procedure recommended by Mize (2019) to estimate, interpret and present the nonlinear interaction effects.

Data

The data correspond to a cohort of new students starting any degree course offered by the 12 universities included in the Catalan university system in the academic year 2012–13 ($n=44,285$). The registration data come from the Department of Research and Universities of the Government of Catalonia and include both socio-demographic and educational information on the student, collected during the enrolment process, and information on academic performance once the students entered university. Additionally, registration data with academic information was included for the next eight years, i.e., for the academic years 2012–13 to 2019–2020. Students in the Catalan university¹ system are distributed among seven public universities ($n=32,663$), four private universities ($n=4246$) and one online learning university ($n=7376$). To deepen the analysis and compare the effects of social origin and the trajectories of change on academic results, we specifically selected students who had entered the on-site university and made some type of change in their academic trajectory, whether it was a change of degree, institution or mode ($n=6121$).

Variables

Dependent variable

- Educational outcomes: the outcome variable considers the student's situation nine years after entering university. Three educational situations were considered:

¹ In the context we are analysing, traditional universities basically offer face-to-face education, although there is an online university that offers a wide range of courses. Therefore, the change of mode implies a change of institution, not a change from a face-to-face degree to a virtual degree at the same institution.

- Graduation: obtained a bachelor's degree.
- Enrolled: still enrolled in a degree programme of the Catalan university system and had not yet obtained a university degree.
- Dropout: not enrolled in any university in the Catalan university system and did not obtain the university degree to which they initially gained access.

Central variables

- Academic trajectories: To define the academic trajectory, we identified whether the student, at some time after entering the on-site university and without having obtained a degree, enrolled on a different degree course. Depending on whether the students had changed degree, institution or mode, we distinguished five main academic trajectories: (1) no changing trajectories, (2) change of degree trajectories, (3) change of institution trajectories, (4) change of modality trajectories, (5) dropout trajectories (no changing).
- Family educational level: non-university education or university education (requiring just one of the parents to have a university education).

Control variables

We included control variables at the individual and institutional levels that may have influenced the likelihood of achieving a given educational outcome. At the individual level, we included socio-demographic variables such as gender (male | female), age at university entrance (up to 18 years old | 19–21 years old | 22–25 years old | over 25 years old) and employment status at university entrance (not working | less than 15 h per week | more than 15 h per week). Institutional variables were also introduced such as the area of knowledge of the degree (Arts and Humanities, Sciences, Health Sciences, Social and Legal Sciences and Engineering and Architecture) and the performance rate at the end of the first year at university (number of credits passed / number of credits enrolled on).

Results

Descriptive results: complex trajectories

From the 2012 cohort of new entrants to university, we can identify different academic trajectories over the course of the nine subsequent years, up to the academic year 2019–20. Among the five trajectories identified, three of them include a change of degree at the same institution, a change of institution or a change of mode. The results show that most of the trajectories are linear ones relating to students who have not changed the degree they enrolled on when they first entered university (84.5% of the total cohort) (see Table 1). Of these "no change" trajectories, it should be kept in mind that 23% of the students in the total sample left university without obtaining a university degree.

On the other hand, 15.5% of the total cohort had undergone some kind of change during their trajectory. The most frequent change involved a change of degree within the same higher education institution (7.6%), followed by a change of degree programme to another institution (5.3%). The least frequent change of trajectory involved a change of

Table 1 Academic trajectories at university from 2012–13 to 2019–20—cohort of new entrants in 2012

University trajectories	n	%
No change	26,051	61.5
No change—dropout	9758	23.0
Change of institution	2231	5.3
Change of modality	1112	2.6
Change of degree	3218	7.6
Total	42,370	100.0

Source: own elaboration

Table 2 University trajectories according to independent variables

	Trajectories of change					Total (%)
	No change (%)	Change of institution (%)	Change of modality (%)	Change of degree (%)	Dropout (%)	
<i>Area of knowledge [0.119]**</i>						
Humanities	56.7	5.8	<u>2.7</u>	6.5	<u>28.3</u>	100
Sciences	<u>67.5</u>	<u>8.2</u>	1.4	<u>10.0</u>	12.9	100
Health	<u>73.5</u>	3.9	1.2	3.2	18.1	100
Social Sciences	<u>62.5</u>	3.8	<u>3.2</u>	5.7	<u>24.9</u>	100
Engineering	47.4	<u>8.9</u>	<u>3.1</u>	<u>16.7</u>	<u>23.9</u>	100
<i>Working status [0.052]**</i>						
Working (– 15 h/week)	62.6	5.5	3.1	8.8	<u>19.9</u>	100
Working (15 + h/week)	62.1	6.1	<u>3.8</u>	7.6	<u>20.4</u>	100
Not working	<u>67.3</u>	6.4	2.7	8.4	15.3	100
<i>Family background [0.083]**</i>						
Non-university studies	64.1	5.3	<u>3.3</u>	7.7	<u>19.5</u>	100
University studies	<u>67.2</u>	<u>7.4</u>	2.5	<u>8.7</u>	14.2	100
<i>Sex [0.126]**</i>						
Female	<u>67.0</u>	4.1	2.3	6.2	20.4	100
Male	54.9	<u>6.6</u>	<u>3.0</u>	<u>9.3</u>	<u>26.1</u>	100
<i>Age [0.248]**</i>						
Up to 18	<u>72.4</u>	<u>7.5</u>	1.9	<u>9.6</u>	8.6	100
19–21	<u>62.5</u>	<u>5.8</u>	<u>3.7</u>	7.8	20.2	100
22–25	52.3	2.5	<u>4.9</u>	5.3	<u>35.0</u>	100
+ 25	38.9	0.9	1.8	3.8	<u>54.5</u>	100
Total	61.5	5.3	2.6	7.6	23.0	100

Source: own elaboration

*p ≤ 0.001 **p ≤ 0.01 for chi-square test. Cramer’s test is shown in square brackets. Underlined percentages show categories with residual higher than the value + 1.96

mode (2.6%). Therefore, although still in the minority, multimodality trajectories can be observed; in other words, where the same student combines courses with a face-to-face modality of study and courses where they are enrolled in the online university.

Following the first objective, the trajectories were characterised according to a set of independent variables of different orders (socio-demographic, institutional and academic). As can be seen in Table 2, these results show differences in the type of

student trajectories according to social origin, with students with university peers presenting the most linear and non-changing career paths. There are also differences in the dropout trajectories, where the percentage of students who work, are mature and have parents with a compulsory or a post-compulsory secondary educational (non-university) is higher.

First, and of particular interest in this article, significant differences can also be observed in terms of the trajectories of change. Specifically, it can be seen that students from lower social backgrounds (compulsory level of education of parents), students working more than 35 h and mature students aged 19 to 25 (with more family responsibilities) are over-represented in the trajectories of change of mode. These results are in line with other international research showing that male students, working longer hours and older students are over-represented in more complex trajectories (Boylan, 2020; Crisp et al., 2022). These results may be due to strategies to minimise indirect costs and time, as shown in the studies on online universities (Raddon, 2007; Xavier et al., 2022).

Complex trajectories and academic results

In relation to the academic results of the cohort as a whole, it is observed that nine years after having entered university, 26.7% had left university without having obtained a degree, 63.5% had graduated and 9.3% were still studying for a degree. To address the second objective, the academic results of the students were analysed according to the different trajectories of change, i.e., whether the probability of obtaining a degree, dropping out or continuing to study varied according to whether students changed degree but remained at the same institution, or had also changed institution or the mode. To this end, the three aforementioned trajectories of change were specifically selected. The results shed some light on the effects of change trajectories on academic results.

It was found that students who change degree but stay in the same institution have a higher probability of graduating (0.65) than those who change the institution (0.53). A separate mention should be made of changing trajectories, where the overall probability of graduation decreases drastically (0.06). Part of these differences are due to the fact that the probability of continuing studying among those who switch to the online university doubles in comparison to changing the other two trajectories. Last, another of the most notable differences is the probability of dropping out. The results show that the probability of dropping out when transferring to the online mode (0.39) is higher than for the other change trajectories. According to these results, we can affirm that the higher the dimension of change ((1) degree, (2) degree and institution, (3) degree and mode), the higher the probability of continuing studying and the higher the probability of dropping out, while the probability of graduating decreases.

While the evidence in relation to academic results is strong according to the type of change trajectory, it is also necessary to explore how results vary according to the social background of the students. The results in Table 3 show that students from families without a university level education are less likely to graduate (diff: 13.1%). Notably, among students from lower social backgrounds there is also a higher percentage who continue studying, which could reduce this difference if the students end up graduating.

Table 3 Probability of educational outcomes 2012–2020 by family educational level

	Graduate	Dropout	Enrolled
Family without a university level education	0.42	0.25	0.33
Family with a university level education	0.55	0.18	0.27
Difference	−0.13	0.07	0.06

Source: own elaboration

Table 4 Probability of graduating by family educational level and trajectory: marginal effects of family educational level and differences in effects of family education level across trajectories

	No university	University	Family education gap	Contrasts
a Institutional	0.514	0.563	−0.050*	n.s
b Mode	0.070	0.110	−0.040	n.s
c Degree	0.560	0.647	−0.087**	n.s

* $p < 0.05$, ** $p < 0.001$, two-tailed tests

Source: own elaboration

Complex trajectories, social origin and academic results

Last, to address the third objective, we analyse whether there is an interactive effect between changing trajectories and social background on academic outcomes. That is, whether the chances of obtaining a university degree—or dropping out or continuing—vary according to the different change trajectories, and whether there are differences according to the social background of the students (parents with or without a university level education). By transferring the question to social aspects we were able to answer the question as to whether certain change trajectories increase the chances of graduation or educational continuity among students from lower social backgrounds.

In the case of graduation probabilities, there are significant differences according to social background among students changing degree or institution (Table 4). Students from university-educated families are more likely to graduate if they change institution (0.563) or degree (0.647) than their peers from non-university educated families (Dif (instit.) = −0.050; $p < 0.05$; Dif (degree) = −0.087; $p < 0.001$). The online mode, however, presents certain specificities. First, the probability of graduating decreases drastically compared to the other two paths (see Fig. 1). In this case, the probability of graduation among students from university-educated families is also higher, although the differences by social background are not significant.

In relation to the probability of dropping out, some divergences with the identified patterns were observed. As shown in Table 5, there is a significant family educational gap across all types of changes, with students from university educated families less likely to drop-out than students from non-university educated families (all social origin gaps $p < 0.01$). In the case of changing to the online mode, the difference in the probability of dropping out is greater than in the case of changing institution or degree for both students from university and non-university educated families.

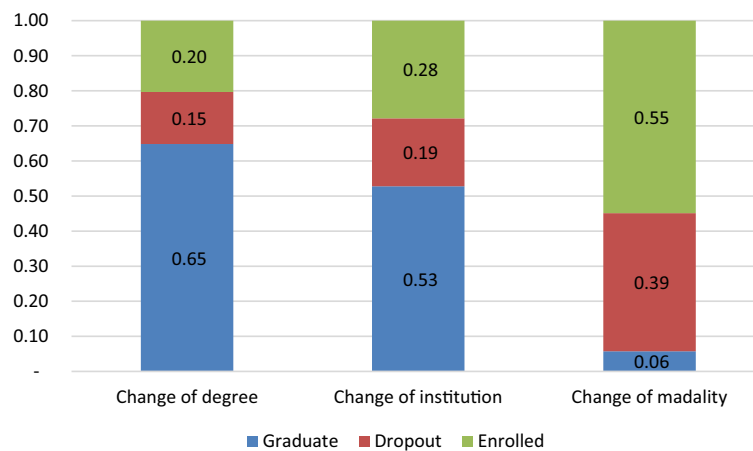


Fig. 1 Probability of educational outcomes 2012–2020 by trajectory of change. Source: own elaboration

Table 5 Probability of dropout by family educational level and trajectory: marginal effects of family educational level and differences in effects of family educational level across trajectories

	No university education	University education	Family educational gap	Contrasts
a Institutional	0.219	0.185	0.034*	n.s
b Mode	0.364	0.284	0.080*	n.s
c Degree	0.214	0.168	0.046**	n.s

* p < 0.05, ** p < 0.001, two-tailed tests

Source: own elaboration

Table 6 Probability of continuing studying by family educational level and trajectory: marginal effects of family educational level and differences in effects of family educational level across trajectories

	No university education	University education	Family educational gap	Contrasts
a Institutional	0.268	0.252	0.016	
b Mode	0.566	0.606	− 0.040	c
c Degree	0.226	0.185	0.042**	b

Source: own elaboration

* p < 0.05, ** p < 0.001, two-tailed tests

To test whether social background affects the probability of dropping out are significantly larger between the different trajectories, a second differences test (column contrast) is required. The results show that the probability of graduating according to social background does not differ significantly according to the type of change trajectories (all second differences = n.s.). That is, differences in the probability of dropping out are always higher for students from lower social backgrounds irrespective of the type of change trajectories.

Last, in Table 6, the same analysis is carried out in the case of the probability of continuing to study. In this case, the results only show significant differences according to social background in the case of students with degree change trajectories. More

surprisingly, it is students from families without a university education that are more likely to continue studying (0.226) than students from families with a university level education (0.185; Dif=0.042; $p < 0.001$) when changing degree and staying at the same institution. Thus, change trajectories would be a retention pathway among students from lower social backgrounds. Regarding changing trajectory, on the other hand, there is no difference by social background in the probability of continuing studying (Dif= - 0.040, n.s. and dif=0.016, n.s., respectively).

In this particular case, we observed that the differences by social background in the probability of continuing to study vary significantly when comparing the change trajectories of changing mode and changing degree. Specifically, students from lower social backgrounds who change degree but remain at the same university are more likely to continue studying than those who change mode.

Conclusions

The analyses carried out revealed some recent trends relating to the increase in student diversity and academic trajectories at university. First, the influence of students' social background on the way they move through and progress through university is highlighted. Students with university educated parents are the ones who are most over-represented in linear and continuous trajectories; in other words, this group is less present among students who make changes and drop out. University dropout also has an important social dimension: it is more frequent among students who have non-university parents, those who work or those who enter university at an older age.

Regarding the trajectories of change, it is clear that among students who change from the face-to-face to the online mode, there is an over-representation of students with non-university educated families. These results are in line with other international research that shows that students from lower social backgrounds are over-represented in more complex trajectories (Boylan, 2020; Goldrick-Rab, 2006; Kalogrides & Grodsky, 2011).

Another of our objectives was to delve deeper into complex trajectories, and specifically whether changing trajectories can provide a safety net for students from lower social backgrounds that allows them to continue studying and/or obtain a university degree. The evidence is strong in relation to graduation and dropout. Students from lower social backgrounds are less likely to graduate than their peers irrespective of the type of the change trajectory. In relation to dropout, students from lower backgrounds are again more likely to drop out regardless of the type of change trajectory they make. In the specific case of transition trajectories to virtual education, no significant differences are observed in the probability of graduation according to social background. This may be due to the low graduation probabilities of students who transition to online education.

Last, specific mention must be made of the probability of academic continuity. The results of some international research show that making a transfer—in particular a reverse transfer—is not a very efficient option, as it increases the time it takes to obtain a degree (Lee, 2021). The results of our research show differences according to social background and switching trajectories in the probability of continuing studying nine years after entering university. Specifically, it is observed that students from lower social

backgrounds are more likely to continue studying only in the case of changing degrees and staying in the same institution. This pattern is significantly different from that of changing mode, where students from lower backgrounds are even less likely to continue studying.

These results reveal a relevant changing trend: in all cases, it is students with parents with a university education who are more likely to graduate and continue studying, but it is the children of parents without a university education who are more likely to continue studying if they change degree and stay in the same institution. This could be a consequence of the less information available to this group prior to entering university (Mangan et al., 2010), or of the adjustment of expectations towards seeking an easier degree programme to improve graduation prospects (Langa, 2018, 2020).

With this evidence, we can answer the question as to whether transferring to online education offers more educational opportunities for students, and specifically for students from lower social backgrounds. The high probabilities of dropping out together with the low probabilities of graduating from university show that changing to the online mode, seeking flexibility and cost reductions, does not seem to increase the probability of graduating over other change trajectories, at least in the short term. The fact that the differences in the probability of dropping out according to social background are accentuated among students who move online reinforces this assertion.

In short, although it may seem that the increased complexity of academic trajectories benefits disadvantaged students by giving them more opportunities and multiple options, the results presented here show the opposite. We find that the chances of graduation and educational continuity among those changing degree course are lower than those of their peers from university educated families, in line with other international research (Boylan, 2020; Goldrick-Rab, 2006).

In turn, these results highlight the specificity of the online university, which differs entirely from that of face-to-face universities in terms of academic results (Sánchez-Gelabert, 2020). These differences may be due to the difference in the profile of the majority of students in each mode, to the motivations for choosing the degree course (Raddon, 2007; Xavier et al., 2022) or to the reasons for dropping out in relation to direct, indirect and opportunity costs. Lack of awareness of the requirements of online education or an overestimation of one's own capabilities may be contributing to increased dropout from online university studies. In turn, factors specific to online universities, such as loneliness, the difficulty of adapting to a virtual teaching model (Xavier & Meneses, 2020) and the lack of self-organisation may lead to a feeling of dissatisfaction that motivates students to abandon studying.

Another noteworthy finding is the importance of time and time horizons for the analysis of university experiences, especially in the case of online education (Kahu et al., 2014; Xavier & Meneses, 2020; Oliphant & Branch-Mueller, 2018). The high percentage of academic continuity nine years after entry points to new paces and ways of moving through higher education and the need to incorporate new indicators of complexity such as stop-outs, exits and entrances to the system, returns and differentiated paces.

By way of conclusion, although the "going virtual" option is not a second chance route to obtaining a degree, at least in the short term, it can be a route that contributes to retaining students in the higher education system. In other words, it can

become a slow trajectory that allows students to progress through university at their own pace. It is necessary, in this regard, to incorporate longer time horizons to be able to assess whether these students eventually obtain a degree or transit indefinitely in the higher education space.

Following these results, we want to identify some limitations of our study. First, the availability of data allows us to analyse trajectories over a period of nine years after students enter university. This is a relatively short period of time especially for analyzing the academic outcomes of students transferring to online education where academic trajectories and time horizons are longer. On the other hand, another limitation is that the characteristics of our data do not allow us to delve deeper into students' reasons for changing, dropping out or continuing their studies. In this sense, it is necessary to carry out qualitative longitudinal analyses that allow us to deepen into the reasons and logics of students in their decision making once they enter university.

Nevertheless, these results allow us to outline some recommendations for education policy makers and practitioners. Firstly, there is a need to incorporate a broader and more dynamic vision of educational pathways that considers the reality of students' trajectories. In this sense, it is necessary to incorporate new indicators about attendance at multiple institutions and modalities, changes throughout the student's trajectory and diversity in the pace of attendance and attainment of the university degree, among others. Secondly, and taking into account the high percentage of early school leavers in the context analysed, it is necessary for educational institutions to recognize this complexity and introduce measures to support different trajectories of change and prolonged trajectories over time, especially among students from lower social backgrounds. Finally, the higher education system needs to introduce guidance, support and accompaniment mechanisms beyond the first year of university entrance. These mechanisms need to help students, especially those from lower social backgrounds, to follow their academic pathways according to their needs at any given time and to move successfully through the higher education system.

Acknowledgements

Not applicable.

Authors contribution

Both authors participated in the research and contributed to the writing of this manuscript. Both authors read and approved the final manuscript.

Funding

Erasmus + Program. Project: Promoting students' successful trajectories in higher education institutions. (face-to-face and online). Code: 2020-1-ES01-KA203-082842.

Availability of data and materials

The data belong to the Department of Education, the authors of the article have signed a confidentiality agreement with this institution. The microdata files provided have been subjected to statistical disclosure control techniques in order to avoid, as far as possible, the direct identification of the individual information subject to statistical confidentiality. In accordance with the terms established in articles 20 and 21 of Decree 143/2010 of 19 October, on the Register of Statistical Files and the cession of data subject to statistical confidentiality. Likewise, they are protected by Regulation (EU) 2016/679 of the European Parliament and of the Council, of 27 October 2016, on the protection of individuals with regard to the processing of personal data and the free movement of such data; the General Data Protection Regulation (RGPD); Organic Law 3/2018, of 5 December, on the protection of personal data and the guarantee of digital rights, and by the other applicable legislation in force in this area.

Declarations

Competing interests

The authors declare that they do not have any competing interests.

Received: 27 March 2023 Accepted: 6 June 2023

Published online: 03 July 2023

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