



Determinants of Academic Performance for Chinese Students in Catalonia: A Mixed Methods Analysis

Muyang Zhu^{1*}, Nuria Llevot Calvet², Olga Bernad Caverro³

ARTICLE INFO

Article History:

Received: 07 May 2024

Received in revised form: 09 October 2024

Accepted: 05 November 2024

DOI: 10.14689/ejer.2024.113.03

Keywords

Chinese International Students, Academic Performance, Educational Assessment, Mixed-Methods Research.

ABSTRACT

Purpose: An increasing number of Chinese students are pursuing higher education in Catalonia. This study explores what personal and environmental key factors influence their academic performance in a foreign country. **Methodology.** This study employed a sequential mixed-methods approach to explore 24 variables turned into hypotheses to examine how they influenced the academic performance of Chinese students in Catalonia. Employing the simple random sampling method, 201 respondents participated in a questionnaire survey based on Biggs' 3P model and the theory of self-regulated learning (SRL). **Results.** Quantitative analysis of 201 survey responses revealed

that variables such as teacher-student interaction ($r = 0.892$), time dedicated to studying ($r = 0.862$), and collaborative group learning ($r = 0.661$) have strong positive correlations with academic performance. Conversely, perceived differential treatment based on country of origin ($r = -0.689$) significantly negatively impacts academic outcomes. Linear regression results confirmed the predictive power of these factors, with teacher-student interaction showing the highest influence ($\beta = 0.523$, $p < 0.001$). **Implications for research and practice.** Qualitative findings from focus groups provided further context, highlighting challenges related to cultural adaptation, language barriers, and academic program difficulty. These insights underscore the importance of fostering supportive and inclusive educational environments and call for targeted interventions to aid international students in overcoming linguistic and cultural barriers.

© 2024 Ani Publishing Ltd. All Rights Reserved.

Introduction

With the accelerating pace of globalization, an increasing number of Chinese students are pursuing higher education abroad. According to data from the UNESCO Institute for Statistics (2023), a total of 1,052,283 Chinese international students were enrolled in educational institutions worldwide during the 2022-2023 academic year. However, their

¹ University of Lleida, Lleida, Catalonia, Spain.

ORCID iD: <https://orcid.org/0009-0008-6720-4792>, Email: mz14@alumnes.udl.cat

² University of Lleida, Lleida, Catalonia, Spain.

ORCID iD: <https://orcid.org/0000-0002-6945-2502>, Email: nuria.llevot@udl.cat

³ University of Lleida, Lleida, Catalonia, Spain.

ORCID iD: <https://orcid.org/0000-0001-5344-8130>, Email: olga.bernad@udl.cat

*Correspondence: mz14@alumnes.udl.cat

academic journeys are often fraught with significant challenges (Henze & Zhu, 2012; Zhang-Wu, 2018). Gong et al. (2021), in their study conducted in New Zealand, identified common obstacles such as language barriers, cultural differences, limited social support, psychological stress, and the difficulties associated with adapting to different teaching styles and academic expectations. Similarly, studies have highlighted that beyond academic achievements, Chinese students in the UK face the complex process of cross-cultural adaptation and the reconstruction of personal and cultural identity (Cao & Meng, 2022; Gu, Schweisfurth, & Day, 2010; Wang, 2018). Wang (2018), for example, emphasized that one of the most pressing early-stage challenges is reconciling the differing educational philosophies and learning expectations between the students' home culture and the host culture. In Spain, Li's research at Complutense University of Madrid echoed these findings, noting that cross-cultural conflicts can negatively impact teamwork and teacher-student relationships, ultimately hindering academic progress (Li, 2021).

Although existing studies have extensively examined the cultural adaptation of Chinese international students and its indirect effects on academic performance (Long et al., 2009; Wang, 2022), these investigations predominantly rely on qualitative descriptions and lack a comprehensive quantitative analysis of specific learning determinants. Furthermore, the scope of such research is largely confined to English-speaking countries, with little attention given to the academic performance of Chinese students in Catalonia, despite their growing presence in the region. The decisive factors influencing their academic outcomes in this context remain underexplored. This study addresses these gaps by integrating behavioral and environmental factors through a mixed-methods approach, bridging the divide between qualitative and quantitative research in the existing literature (Malina, Nørreklit, & Selto, 2011). By identifying the key variables affecting the academic performance of Chinese students within the unique linguistic and cultural context of Catalonia, this research makes a significant contribution to the field of cross-cultural education studies in non-English-speaking countries. In addition, beyond theoretical implications, the findings of this study hold substantial practical value. The results provide empirical evidence to inform the development of enhanced educational policies in Catalonia, aiming to optimize support systems for international students. By improving their learning experiences, this research not only addresses pressing educational challenges but also offers a fresh perspective for advancing cross-cultural education in the context of globalization.

Theoretical Framework

The study was based on the application of the 3P Model and Self-Regulated Learning Theory. The 3P Model, proposed by Biggs (1978), serves as a dynamic educational framework that conceptualizes the learning process into three interrelated phases: *Presage*: This phase encompasses students' personal characteristics (e.g., motivation, learning strategies) and environmental attributes (e.g., teaching styles, resources); *Process*: This phase refers to the implementation of learning activities, including the strategies employed by students and their engagement in classroom participation; *Product*: This phase represents the ultimate academic achievement or learning outcomes. The key strength of the 3P Model lies in its dynamic nature, capturing how presage factors influence learning outcomes through the process phase. Widely applied in higher education research, the

model has proven effective in analyzing factors affecting academic performance (Barattucci et al., 2017). Particularly in cross-cultural educational contexts, the 3P Model is well-suited to unravel the complex interactions between personal and environmental factors (Chan & Yeung, 2020; Kanashiro et al., 2020).

Self-Regulated Learning (SRL) theory, introduced by Zimmerman (1989), emphasizes the critical role of students' proactive engagement in their own learning processes. The theory identifies three essential dimensions: *Metacognition*: Includes skills such as planning, monitoring, and evaluating one's learning activities. *Motivation*: Encompasses learning goals, self-efficacy, and interest in learning. *Emotional Regulation*: Refers to how students manage emotional pressures encountered during learning. The SRL theory has been extensively validated as a vital determinant of academic success, especially in contexts requiring autonomous learning and cross-cultural adaptation. Recent studies, (Pintrich, 2000; Wen et al., 2023), have further expanded the applications of SRL theory, demonstrating that the integration of motivational and strategic components is pivotal for enhancing academic performance. In this study, the 3P Model and SRL theory are synthesized into a novel theoretical framework to analyze how personal behaviors, and environmental factors collectively influence academic achievement. Figure 1 presents this conceptual framework.

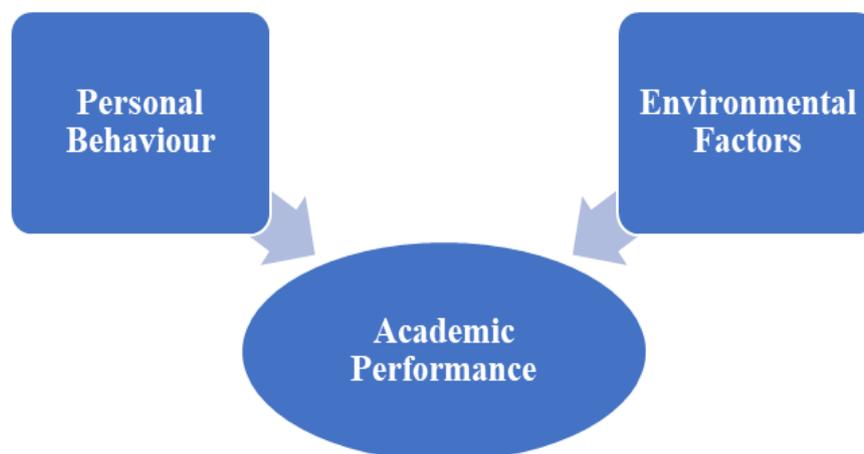


Figure 1: A Conceptual Framework Illustrating the Relationship Between Personal Behavior, Environmental Factors, and Academic Performance.

While this classification provides a comprehensive theoretical structure, it does not fully capture the nuanced interactions and specific influences of individual variables. To address this, the Motivated Strategies for Learning Questionnaire (MSLQ), developed by Pintrich et al. (1991), was used as a key reference for formulating hypotheses related to personal behaviors. Structured around 81 items, the MSLQ evaluates learning strategies and motivation and has been widely validated in diverse academic contexts over decades (Araujo, Gomes, & Jelihovschi, 2023; Segura-Robles et al., 2021; Wang et al., 2023). Its

reliability, with Cronbach's alpha coefficients ranging from 0.52 to 0.93, and flexible design allow for adaptation across cultural and educational settings, making it a practical tool for studying learning behaviors. For environmental factors, the "What Is Happening In this Class?" (WIHIC) model by Fraser, McRobbie and Fisher (1996) was used. This model, particularly suited for analyzing learning environments in multicultural contexts, demonstrates high reliability, with an average Cronbach's alpha of 0.85. It has been validated in diverse educational settings and translated into multiple languages, providing a solid foundation for the environmental factor variables in this study (Cai et al., 2022; Long et al., 2022; Oo, Khine, & San, 2022). As a comprehensive tool for assessing students' motivation and learning strategies, the MSLQ identifies critical dimensions that influence academic performance, offering valuable insights into the behaviors that are most impactful. By applying the MSLQ, 24 hypotheses were built for the current study.

The design of hypotheses H1-H12 was deeply rooted in the MSLQ's structure. The motivation scales of the MSLQ, which focus on intrinsic goal orientation, self-efficacy, task value, and test anxiety, provided a conceptual basis for hypotheses related to learning motivation (H1), confidence (H8), interest in learning (H10), and the sense of achievement derived from academic success (H3, H5). These constructs highlight the psychological and emotional drivers that propel students to perform academically. Beyond motivational factors, the learning strategies scales of the MSLQ, encompassing cognitive, metacognitive, and resource management strategies, directly informed hypotheses related to study habits and behaviors. For instance, time and effort management (H2, H6) is inspired by the resource management component of the MSLQ, emphasizing the importance of structured planning and sustained effort. Preparation and review habits (H7) and knowledge organization skills (H12) reflect the influence of the MSLQ's metacognitive self-regulation dimension, which encourages active engagement with learning processes. Similarly, memory techniques and note-taking habits (H4, H11) are drawn from the cognitive strategies outlined in the MSLQ, such as rehearsal, elaboration, and organization. By adapting these dimensions to the specific context of the study, hypotheses H1-H12 were developed to capture the essential aspects of personal behaviors influencing academic achievement. This process aligns with the theoretical underpinnings of the MSLQ while extending its application to a more focused investigation of how students' self-regulation and strategic learning behaviors correlate with their academic outcomes. Additionally, these hypotheses provide practical insights for designing targeted interventions to optimize students' learning experiences in diverse educational contexts.

For formulating hypotheses H13-H24, the "What Is Happening In this Class?" (WIHIC) model served as a crucial reference. As a robust framework for assessing students' perceptions of classroom learning environments, the WIHIC encompasses various dimensions that influence academic performance both directly and indirectly. Its proven reliability and validity across diverse educational and cultural contexts make it an ideal tool for analyzing environmental factors in multicultural settings, such as Catalonia. The involvement dimension inspired hypotheses related to classroom dynamics, including the encouragement of discussion and exploration (H13) and group collaboration (H23). The equity dimension provided the basis for hypotheses addressing differential treatment due to country of origin (H14). The resource provision dimension informed hypotheses on physical conditions such as hygiene (H15), library resources (H16), financial resources (H17) digital infrastructure (H18), and facility

quality (H20). Furthermore, the teacher support dimension contributed to hypotheses on teacher-student communication (H22) and the availability of psychological support (H19). Additional dimensions emphasized student cohesiveness and collaboration, including a sense of belonging (H21) and peer relationships (H24).

By integrating the WIHIC and MSLQ frameworks into the theoretical foundation of this study, hypotheses H1-H24 were systematically developed to address the factors influencing academic performance. These hypotheses are grounded in robust theoretical frameworks, ensuring their academic validity, while also tailored to meet the unique requirements of this research. Through this comprehensive approach, the study bridges established models with the specific context of Chinese students in Catalonia, providing a solid basis for exploring the interplay between personal behaviors, environmental factors, and academic achievement.

Methodology

Research Design

This study employs a sequential mixed-methods approach to explore the factors influencing the academic performance of Chinese students in Catalonia, combining quantitative and qualitative methods to achieve a comprehensive understanding (Malina et al., 2011). This approach allows for both the validation of existing theories and the generation of new insights. Based on this design, the study begins with a quantitative phase using surveys to gather descriptive data, followed by a qualitative phase involving focus groups to gain deeper insights into students' experiences.

Research Hypotheses

The study hypotheses are based on factors related to personal behaviour and environmental influences. Table 1 sums up these hypotheses for each dimension. Figure 2 illustrates the impact of the research hypotheses on academic performance.

Table 1*Description of research hypothesis*

Hypothesis	Dimension	Hypothesis Statement
H1		There is a significant positive correlation between motivation to learn and academic performance.
H2		Students who maintain a personal study schedule achieve higher academic performance compared to those without a study plan.
H3		The sense of achievement derived from obtaining good grades is significantly correlated with students' academic performance.
H4		Good study habits and note-taking are positively correlated with academic performance.
H5		Students who experience a sense of achievement from acquiring skills and knowledge tend to perform better academically.
H6		Students who dedicate substantial time and effort to studying demonstrate significantly higher academic performance compared to those who invest less time and effort.
H7	Personal Behaviour	Students who habitually prepare and review lessons achieve better academic results than those without these habits.
H8		Students who are confident about obtaining the desired grades tend to perform better academically.
H9		Students with high levels of commitment and concentration achieve significantly better academic performance.
H10		Students who show interest in learning tend to perform better academically than those lacking interest.
H11		Students with effective memory habits and methods demonstrate significantly better academic performance.
H12		Students with strong abilities to summarize and organize knowledge tend to achieve better academic outcomes.

H13		There is a significant positive correlation between a classroom environment that promotes discussion and exploration and academic performance.
H14		Differential treatment due to country of origin is negatively correlated with academic performance.
H15		Satisfaction with the hygienic conditions of the classroom and school is positively correlated with academic performance.
H16		The availability of sufficient resources in the school library is positively correlated with academic performance.
H17		Students who are frequently concerned about their financial situation exhibit lower academic performance.
H18	Environmental Factors	The clarity and simplicity of the school's online platform or social network are positively correlated with academic performance.
H19		Psychological support and guidance have a positive impact on students' academic performance.
H20		The good condition of school facilities and the availability of study rooms are positively correlated with academic performance.
H21		Students with a high level of participation and sense of belonging within the school tend to perform better academically.
H22		Frequent communication and interaction between teachers and students are positively correlated with academic performance.
H23		Collaborative group learning is positively correlated with academic performance.
H24		Good relationships among classmates are positively correlated with academic performance.

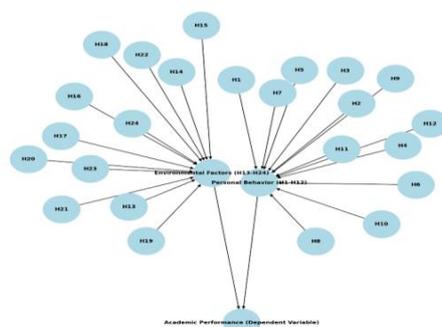


Figure 1: Impact of The Research Hypothesis on Academic Performance.

Sampling

The quantitative data sample included Chinese undergraduates and master’s students enrolled in public universities in Catalonia. A simple random sampling method was used, yielding 201 valid responses out of 250 surveys distributed, representing a response rate of 80.4%. The demographic characteristics of the participants are presented in Table 2.

Table 2

Sample Description

Characteristic	Category	n	%
Gender	Male	95	47%
	Female	106	53%
Age in years	18-20	47	23%
	21-23	49	24%
	24-26	78	39%
	27-29	24	12%
	30 and over	3	1%
Field of study	Languages & arts	66	33%
	Business & management	41	20%
	Social sciences	28	14%
	Science & technology	26	13%
	Engineering	15	7%
	Others	25	12%
Level of study	Undergraduate	102	51%
	Graduate (Master’s)	99	49%
	Less than 1 year	47	23%
Years of enrolment in the university	1-2 years	24	12%
	2-3 years	49	24%
	3 years and above	81	40%
Living with parents or family	Yes	24	12%
	No	177	88%

For the qualitative part of this study, focus groups were employed to explore the personal and environmental factors influencing students' academic performance in depth. With the collaboration of the Spanish as a Foreign Language Centre at the University of Lleida, 13 Chinese students currently studying at universities were invited to participate. These students had started their studies at the same time and had completed nine months of coursework at the University of Lleida. The 13 students were divided into two groups, and discussions were facilitated by the researchers (Breen, 2006).

Research Instruments

The main quantitative data collection instrument in this study was the *Academic Performance Questionnaire for Chinese Students in Catalonia (CRAECC)*, developed by the research team led by the authors. This questionnaire was based on Biggs' 3P model and the theory of self-regulated learning (SRL), with the objective of evaluating the impact of subjective behaviours and environmental factors on the academic performance of Chinese students. The questionnaire underwent a rigorous development and validation process and had been successfully applied in previous studies in this field.

The final questionnaire comprised 30 items, assessed using a five-point Likert scale (where 1 represented "strongly disagree" and 5 "strongly agree") to measure the degree of agreement with each statement. The items covered various aspects, including academic self-assessment, personal learning behaviours and environmental support. This instrument allowed for a detailed quantification and analysis of Chinese students' academic adaptation in Catalonia, revealing the influence of behavioral and environmental factors on their academic performance and providing an empirical basis for future educational interventions in multi-cultural contexts.

Data Collection and Analysis

Quantitative analysis was conducted using SPSS software version 29 (IBM Corp., Armonk, NY, USA). The analysis began with a descriptive assessment of the students' academic performance. To ensure the reliability of the questionnaire, Cronbach's alpha was calculated, along with KMO and Bartlett's tests, to confirm sample adequacy. To assess the relationship between each independent variable (personal and environmental factors) and the dependent variable (academic performance), Pearson's correlation coefficient was applied individually. The 24 independent variables were numbered V1-V24. Pearson's correlation coefficient, developed by Pearson in 1896, measures the strength and direction of a linear relationship between two continuous variables. In this study, it is essential to use Pearson's correlation to understand the degree of association between each factor and academic performance.

The values of Pearson's correlation coefficient range from -1 to 1. where:

- $0.00 \leq |r| < 0.29$: Little to no correlation
- $0.30 \leq |r| < 0.49$: Low correlation
- $0.50 \leq |r| < 0.69$: Moderate correlation
- $0.70 \leq |r| < 0.89$: High correlation
- $0.90 \leq |r| \leq 1.00$: Very high correlation

This categorization provides a clearer understanding of the strength of relationships identified in this study, allowing for more informed conclusions regarding the influence of specific factors on academic performance (Asuero, Sayago, & González, 2006). A simple linear regression analysis was also performed to investigate the potential predictive effect of certain key variables on academic performance. In this analysis, both the P-value and Pearson correlation coefficient were considered to determine statistical and practical significance. Predictors with a P-value less than 0.05 and a Pearson correlation coefficient greater than 0.5 were deemed significant. This approach is supported by Neumann et al. (2020), who suggest that relying solely on $P < 0.05$ may not be sufficient for practical relevance, and recommend incorporating effect size to ensure findings are meaningful in real-world contexts.

The qualitative data analysis was conducted using NVivo software and followed a three-phase coding process to ensure reliability, with two researchers independently performing the coding: (1) Open Coding: In this phase, the two researchers organized and classified the data obtained from interviews, generating primary concepts; (2) Axial Coding: Based on the open coding, the researchers reorganized and grouped the concepts into main categories; (3) Selective Coding: Finally, the main categories were integrated and refined, identifying core categories aligned with the theoretical model of the study. This coding process, conducted independently by two researchers, ensured the reliability of the analysis and facilitated the systematization of personal and environmental behavioral factors influencing academic performance, providing a solid foundation for the analysis of the results.

Ethical Considerations and Privacy Policy

This study complies with the provisions of the European Union General Data Protection Regulation (GDPR) and the Organic Law 3/2018 on Data Protection in Spain. Before participating, students were provided with detailed information about the use of their data, and their anonymity was guaranteed through anonymised data collection and processing.

Results

Quantitative Analysis Results

As shown in the Table 3 and Table 4, Cronbach's alpha coefficients, along with the KMO and Bartlett tests, indicate that the questionnaire used in this study demonstrates adequate reliability and validity.

Table 3

Reliability Analysis Results

items	Sample size	Cronbach's α
24	201	0.917

Table 4

KMO and Bartlett Tests

	KMO		0.932
		X2	3040.298
Bartlett		df	276
		p	<0.001

Pearson Correlation Analysis

In the Pearson correlation analysis conducted on the 24 variables as seen in Table 5, it was found that the majority of the hypotheses were significantly and positively correlated with academic performance, although some correlations were stronger than others. This allows for a significant and reliable prediction of students' academic performance. However, some hypotheses showed weaker correlations, suggesting that their impact on academic performance may be less relevant compared to other factors.

Table 5

Pearson Correlation Coefficients and Significance Levels for Predictor Variables

Variables	r	Significance
V1	0.277	<.001
V2	0.268	<.001
V3	0.237	<.001
V4	0.266	<.001
V5	0.270	<.001
V6	0.862	<.001
V7	0.287	<.001
V8	0.264	<.001
V9	0.369	<.001
V10	0.325	<.001
V11	0.284	<.001
V12	0.596	<.001
V13	0.319	<.001
V14	-0.689	<.001
V15	0.378	<.001
V16	0.282	<.001
V17	0.261	<.001
V18	0.277	<.001
V19	0.290	<.001
V20	0.344	<.001
V21	0.379	<.001
V22	0.892	<.001
V23	0.661	<.001
V24	0.505	<.001

Table 5 clearly demonstrates:

- **V6** presents a very strong positive correlation ($r = 0.862$), indicating that the time and effort students dedicate to studying have a highly significant impact on their academic performance.
- **V22** shows an extremely high correlation ($r = 0.892$), suggesting that frequent communication between teachers and students has a very positive effect on students' academic performance.
- **V23** (collaborative group learning, $r = 0.661$) and **V12** (time and effort dedicated to studying, $r = 0.596$) also show strong correlations, indicating that these factors significantly influence academic performance.

- **V14** (differential treatment based on country of origin) shows a significant negative correlation ($r = -0.689$), suggesting that cultural conflict and perceived unequal treatment have a considerable negative impact on academic performance.

Linear Regression Results

Table 6 depicts the linear regression model analyzing the impact of 24 independent variables on academic performance (dependent variable). In this case, the R-squared value is 0.9065, indicating that the model has a high explanatory capacity and can predict academic performance adequately.

Table 6

Regression Coefficients, P-values, and Model R-squared for Academic Performance Predictors

Variable	Coefficient	P-value
Intercept	-0.345705816	0.033153
V1	0.030212152	0.360163
V2	0.006030098	0.836268
V3	0.005653974	0.844847
V4	0.022943653	0.45281
V5	-0.023887159	0.412738
V6	0.359724824	1.15E-15
V7	-0.020386409	0.528484
V8	-0.044649642	0.152339
V9	0.01396114	0.642071
V10	0.024903492	0.408895
V11	0.006043578	0.841125
V12	0.032087521	0.305411
V13	0.019141718	0.540602
V14	-0.013852725	0.568097
V15	-0.010760125	0.747856
V16	-0.014118026	0.637261
V17	-0.033104387	0.264768
V18	-0.01164159	0.704182
V19	-0.038945345	0.205602
V20	-0.042174814	0.174133
V21	0.066502963	0.024665
V22	0.523119887	1.3E-22
V23	0.11476745	0.001292
V24	0.117329975	3.95E-05
R-squared	0.906498572	

After selection, the following variables met the significance criteria and were included in the final prediction model:

- **V6** (time dedicated to studying): The P-value is extremely small (1.15E-15), indicating a very strong and positive impact on academic performance, with a coefficient of 0.3597.

- **V22** (teacher-student interaction): The P-value is extremely small (1.3E-22), making it one of the most influential variables on academic performance, with a coefficient of 0.5231.
- **V23** (collaborative group learning): The P-value is 0.0013, indicating a significant positive correlation, with a coefficient of 0.1148.
- **V24** (relationships among classmates): The P-value is 3.95E-05, with a significant positive correlation and a coefficient of 0.1173.

Based on the selected significant variables, the following regression equation was formulated to predict academic performance:

$$Y = -0.3457 + 0.3597 \times X6 + 0.5231 \times X22 + 0.1148 \times X23 + 0.1173 \times X24$$

The analysis of the linear regression results identified four key variables that can predict academic performance significantly. The final regression equation clearly demonstrates how these variables influence academic performance and can be used to forecast students' academic outcomes.

Qualitative Analysis Results

During the open coding phase, 107 original statements were identified, from which 21 initial concepts were derived. These concepts were then reorganized into 8 main categories in the axial coding phase. Finally, through selective coding, these main categories were refined into 3 core categories, two of which align with the theoretical model's dimensions: personal behavioral factors and environmental factors. These findings highlight the key role that personal learning strategies, together with the social and academic environment, play in academic success. The following table provides a detailed summary of the coding results from the focus group recordings:

Table 7

Qualitative Coding Results: Selective, Axial, and Open Coding

Selective Coding	Axial Coding	Open Coding
Personal behaviour (62)	Motivation to study (8)	Desire to achieve good grades (5), parental expectations (1), need to graduate (2)
	Dedication to study (34)	Spending a lot of time studying (13), reviewing after class (9), exam preparation (12)
	Organization and study materials (20)	Taking class notes (5), organizing notes after class (4), searching for relevant information online (11)
Environmental Factors (32)	Teacher's ability and style (6)	Teacher's patience (2), expression skills (3), teaching style (1)
	Peer collaboration and communication (14)	Need to discuss assignments with peers (7), collaboration with classmates (4), school interaction and communication (3)
	Cultural environment (5)	Difficulty concentrating in a new cultural environment (3), feeling disconnected from the class (2)
Language and field of study (13)	University integration (7)	Not feeling part of the university (4), unfamiliarity with campus facilities (3)
	Academic difficulty (13)	"My area of study is too difficult" (8), "language barriers hinder understanding of specialized knowledge" (5)

The results show that, in terms of personal behaviour, the qualitative findings align with the quantitative analysis, which necessitates dedication to study for academic success, time invested in studying, reviewing class content, and adequate exam preparation as decisive factors for academic performance, which were agreed upon by all participants. Additionally, the importance of consulting supplementary materials was frequently emphasized, as class time is often insufficient to cover all necessary knowledge, making independent research essential for a full understanding of concepts.

In terms of environmental factors, the focus groups introduced a new insight: the characteristics of the teacher also influence academic outcomes. Some participants mentioned occasional difficulties in understanding the professor's communication, though it was unclear whether this was due to differences in communication style or specific teaching approaches. The cultural environment was another theme, although not all participants reported significant cultural differences. Some expressed challenges in adapting to life in Catalonia, and felt discomfort with everyday cultural differences and sensed a lack of belonging within the classroom. This lack of integration, coupled with limited intercultural communication skills, hindered their concentration in studies and fostered a desire to return to China as soon as possible.

Finally, the focus group discussions revealed an additional concept related to language and field of study. Academic difficulty and language proficiency notably impact students' academic performance. Particularly in high-demand academic fields, group members expressed shared difficulties in managing these challenges. Language barriers further exacerbated this situation, as some students found it challenging to fully understand specialized knowledge due to their limited language skills.

Discussion

This study employed a mixed-methods approach to examine the impact of personal behaviors and environmental factors on the academic performance of Chinese students in Catalonia. The results partially align with the findings of [Henze and Zhu \(2012\)](#) and [Gong et al. \(2021\)](#) regarding the impact of various factors on the academic performance of Chinese international students, while further clarifying, through this approach, the specific effects of these factors on the study population in the Catalonia region. Quantitative analysis revealed that study time, teacher-student interaction, and group learning were key determinants of academic success, confirming hypotheses H6, H22, and H23. Among these, teacher-student interaction showed the highest correlation ($r = 0.892$, $p < 0.001$), aligning with [Pintrich's \(2000\)](#) self-regulated learning theory, which highlights the role of supportive teacher-student relationships in enhancing students' motivation and knowledge acquisition. Similarly, the importance of study time and group learning supports the 3P model's emphasis on process-phase behaviors, indicating that greater time investment and collaborative efforts during learning significantly enhance academic performance.

The study also identified a set of moderately correlated variables that offer additional insights into academic success. For example, concentration (V9, $r = 0.369$, $p < 0.001$) and learning interest (V10, $r = 0.325$, $p < 0.001$) suggest that maintaining focus and intrinsic motivation positively influence outcomes. Knowledge organization skills (V12, $r = 0.596$, $p < 0.001$) showed a stronger correlation, confirming H12 and indicating that the ability to

structure and synthesize knowledge significantly contributes to academic performance, particularly in cross-cultural settings where course content may be more complex. Environmental factors, such as sense of involvement and belonging (V21, $r = 0.379$, $p < 0.001$), further support H21, demonstrating that emotional and social integration within the school community fosters academic success. Similarly, peer relationships (V24, $r = 0.505$, $p < 0.001$) validate H24, emphasizing the role of collaborative and supportive peer interactions in facilitating knowledge sharing and improving individual outcomes.

However, some variables showed weaker correlations or lacked statistical significance. Among personal behavior variables, V1-V5 demonstrated low correlations with academic performance. For instance, learning motivation (V1, $r = 0.277$, $p < 0.001$) and personal study plans (V2, $r = 0.268$, $p < 0.001$) appear less impactful in the cross-cultural context of this study. This finding may reflect students' greater reliance on external supports, such as teacher guidance and group collaboration, rather than purely self-driven efforts. Moreover, motivation may indirectly affect performance by enhancing study time (V6) and concentration (V9). Similarly, the significance of personal study plans may depend on their integration with effective time management and resource utilization strategies, which were not separately measured in this study. Variables related to a sense of achievement from grades (V3) or skills acquisition (V5) may require longer periods to manifest their impact, which a cross-sectional design might fail to capture. Future research should consider longitudinal designs and advanced statistical models to explore these variables' indirect and interaction effects more comprehensively. Among environmental factors, financial status (V17, $r = 0.261$, $p < 0.001$) showed a weak correlation with academic performance, likely reflecting the relatively stable economic support among the study sample. Similarly, classroom hygiene (V15, $r = 0.282$, $p < 0.001$) exhibited limited influence, suggesting that physical environmental factors have less direct impact compared to interpersonal interactions and learning behaviors. Further exploration of these variables' interplay with other factors, such as emotional regulation or resource accessibility, may reveal additional insights.

Qualitative analysis provided valuable context for these findings, highlighting key challenges faced by students. Participants frequently emphasized the critical role of study time and knowledge organization in achieving academic success, consistent with the quantitative results for V6 and V12. Students reported compensating for limited classroom instruction time by reviewing notes and seeking additional resources, demonstrating strong self-directed learning capabilities. However, language barriers and academic difficulty emerged as persistent challenges, particularly in high-demand courses. Participants noted that limited language proficiency required extra time to comprehend specialized knowledge, exacerbating academic pressure and highlighting the role of cultural adaptation in academic outcomes (V14). Moreover, the importance of teacher communication skills and inclusive teaching styles was frequently mentioned, as these factors significantly influenced classroom engagement. While supportive teaching practices were seen as crucial, cultural differences in teaching methods occasionally posed adaptation difficulties. The benefits of peer relationships and group learning were also emphasized. Participants described collaborative activities as vital for both knowledge sharing and emotional support, although cultural differences sometimes hindered effective teamwork. These findings underscore the complex interplay of personal strategies, language challenges, and environmental supports in shaping academic performance.

In conclusion, this study supports and extends the application of the 3P model and self-regulated learning theory. The findings highlight the unique challenges posed by language barriers and academic difficulty while emphasizing the importance of teacher-student interaction, group learning, and effective knowledge organization. These results provide theoretical insights and practical implications for improving educational support systems. Institutions should prioritize initiatives to enhance teacher-student interaction, establish language support centers, promote collaborative learning, and facilitate cultural integration to help international students overcome dual challenges in academic and cultural adaptation. Limitations of this study include the geographic specificity of the sample, potential biases from self-reported data, and the exclusion of interaction effects among variables. Future research should expand the sample scope, adopt longitudinal designs, and explore mechanisms underlying language barriers and cultural adaptation to further validate and deepen the study's conclusions.

Conclusion

This study examined the academic performance of Chinese students in Catalonia using a mixed-methods approach, identifying key personal behaviors and environmental factors that significantly influence outcomes. Quantitative findings demonstrated that teacher-student interaction, study time, and group learning are the strongest predictors of academic success, validating hypotheses H6, H22, and H23. These results align with established theories, such as the 3P model and self-regulated learning theory, highlighting the critical role of collaborative and supportive learning environments. Complementing these findings, qualitative analysis revealed challenges unique to Chinese students in non-English-speaking contexts, including language barriers, cultural adaptation, and academic difficulty, which underscore the need for targeted interventions to enhance their learning experiences. Beyond the primary factors, moderately correlated variables, such as concentration, learning interest, and knowledge organization skills, were identified as secondary but essential contributors to academic success. These results emphasize the multifaceted nature of academic performance, driven by both individual strategies and social integration. Conversely, variables with weaker correlations, such as financial status and classroom hygiene, appear to exert indirect or context-dependent effects, warranting further exploration to clarify their roles.

By integrating quantitative and qualitative insights, this study extends the application of established theoretical frameworks to cross-cultural education while providing practical recommendations for institutions supporting international students. Key strategies include enhancing teacher-student interaction, establishing language support systems, fostering collaborative learning environments, and promoting inclusive cultural practices to address both academic and cultural adaptation challenges effectively. Despite its contributions, this study is limited by its geographic specificity, reliance on self-reported data, and the exclusion of potential interaction effects among variables. Future research should expand the sample scope, employ longitudinal designs, and investigate the mechanisms underlying language barriers and cultural adaptation. Addressing these limitations will further validate and refine the findings, contributing to the development of robust support systems for international students globally.

References

- Araujo, J. d., Gomes, C. M. A., & Jelihovschi, E. G. (2023). The factor structure of the Motivated Strategies for Learning Questionnaire (MSLQ): new methodological approaches and evidence. *Psicologia: Reflexão e Crítica*, 36, 38. <https://doi.org/10.1186/s41155-023-00280-0>
- Asuero, A. G., Sayago, A., & González, A. G. (2006). The Correlation Coefficient: An Overview. *Critical Reviews in Analytical Chemistry*, 36(1), 41-59. <https://doi.org/10.1080/10408340500526766>
- Barattucci, M., Pagliaro, S., Cafagna, D., & Bosetto, D. (2017). An examination of the applicability of Biggs' 3P learning process model to Italian university. *Journal of e-Learning and Knowledge Society*, 13(1). <https://www.learntechlib.org/p/188132/>
- Biggs, J. B. (1978). Individual and Group Differences in Study Processes. *British Journal of Educational Psychology*, 48(3), 266-279. <https://doi.org/10.1111/j.2044-8279.1978.tb03013.x>
- Breen, R. L. (2006). A Practical Guide to Focus-Group Research. *Journal of Geography in Higher Education*, 30(3), 463-475. <https://doi.org/10.1080/03098260600927575>
- Cai, J., Wen, Q., Lombaerts, K., Jaime, I., & Cai, L. (2022). Assessing students' perceptions about classroom learning environments: the New What Is Happening In this Class (NWIHC) instrument. *Learning Environments Research*, 25(2), 601-618. <https://doi.org/10.1007/s10984-021-09383-w>
- Cao, C., & Meng, Q. (2022). A systematic review of predictors of international students' cross-cultural adjustment in China: current knowledge and agenda for future research. *Asia Pacific Education Review*, 23(1), 45-67. <https://doi.org/10.1007/s12564-021-09700-1>
- Chan, C. K., & Yeung, N. C. J. (2020). Students' approach to develop in holistic competency: an adaption of the 3P model. *Educational Psychology*, 40(5), 622-642. <https://doi.org/10.1080/01443410.2019.1648767>
- Fraser, B. J., McRobbie, C. J., & Fisher, D. (1996). Development, Validation and Use of Personal and Class Forms of a New Classroom Environment Questionnaire. *Proceedings Western Australian Institute for Educational Research Forum*. <https://www.waier.org.au/archives/forums/1996/fraser.html>
- Gong, Y., Gao, X., Li, M., & Lai, C. (2021). Cultural adaptation challenges and strategies during study abroad: New Zealand students in China. *Language, Culture and Curriculum*, 34(4), 417-437. <https://doi.org/10.1080/07908318.2020.1856129>
- Gu, Q., Schweisfurth, M., & Day, C. (2010). Learning and Growing in a 'Foreign' context: Intercultural Experiences of International Students. *Compare*, 40(1), 7-23. <https://doi.org/10.1080/03057920903115983>
- Henze, J., & Zhu, J. (2012). Current research on Chinese students studying abroad. *Research in Comparative and International Education*, 7(1), 90-104. <https://doi.org/10.2304/rcie.2012.7.1.90>
- Kanashiro, P., Iizuka, E. S., Sousa, C., & Dias, S. E. F. (2020). Sustainability in management education: A Biggs' 3P model application. *International Journal of Sustainability in Higher Education*, 21(4), 671-684. <https://doi.org/10.1108/IJSHE-05-2019-0176>
- Li, J. (2021). *Educación Intercultural, en el caso de los estudiantes chinos en España* [Trabajo Fin de Master, Universidad de Alcalá]. <http://hdl.handle.net/10017/49981>

- Long, C. S., Sinclair, B. B., Fraser, B. J., Larson, T. R., & Harrell, P. E. (2022). Preservice teachers' perceptions of learning environments before and after pandemic-related course disruption. *Learning Environments Research*, 1-15. <https://doi.org/10.1007/s10984-021-09376-9>
- Long, J. H., Yan, W. H., Yang, H. D., & Van Oudenhoven, J. P. (2009). Cross-cultural adaptation of Chinese students in the Netherlands. *US-China Education Review*, 6(9), 1-9. <https://hdl.handle.net/11370/724558ba-e927-49a7-aa10-1d7fe5d82cb1>
- Malina, M. A., Nørreklit, H. S. O., & Selto, F. H. (2011). Lessons learned: advantages and disadvantages of mixed method research. *Qualitative Research in Accounting & Management*, 8(1), 59-71. <https://doi.org/10.1108/11766091111124702>
- Neumann, N. M., Plastino, A., Junior, J. A. P., & Freitas, A. A. (2020). Is p-value 0.05 enough? A study on the statistical evaluation of classifiers. *The Knowledge Engineering Review*, 36, e1. <https://doi.org/10.1017/S0269888920000417>
- Oo, C. Z., Khine, M. S., & San, N. M. H. (2022). A Reliability Generalization Meta-Analysis of "What Is Happening in This Class?" (WIHIC) Questionnaire. *Education Sciences*, 12(12), 929. <https://doi.org/10.3390/educsci12120929>
- Pintrich, P. R. (2000). The Role of Goal Orientation in Self-Regulated Learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of Self-Regulation* (pp. 451-502). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50043-3>
- Pintrich, P. R., Smith, D., García, T., & McKeachie, W. (1991). *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Ann Arbor, MI: University of Michigan.
- Segura-Robles, A., Moreno-Guerrero, A.-J., Parra-González, M.-E., & López-Belmonte, J. (2021). Adaptation and validation of the motivated strategies for learning questionnaire for spanish adolescents. *European Journal of Investigation in Health, Psychology and Education*, 11(1), 142-153. <https://doi.org/10.3390/ejihpe11010012>
- UNESCO. (2023). *Outbound Internationally Mobile Students by Host Region*. UNESCO Institute for Statistics. <https://data.uis.unesco.org/index.aspx?queryid=3807>
- Wang, D. (2022). The Cross-Cultural Academic Adaptation of Chinese Students in an American University: Academic Challenges, Influential Factors and Coping Strategies. *Research in Social Sciences*, 5(1), 43-53. <https://doi.org/10.53935/26415305.v5i1.231>
- Wang, F., Jiang, C., King, R. B., & Leung, S. O. (2023). Motivated Strategies for Learning Questionnaire (MSLQ): Adaptation, validation, and development of a short form in the Chinese context for mathematics. *Psychology in the Schools*, 60(6), 2018-2040. <https://doi.org/10.1002/pits.22845>
- Wang, I. K. (2018). Long-Term Chinese Students' Transitional Experiences in UK Higher Education: A Particular Focus on their Academic Adjustment. *International Journal of Teaching and Learning in Higher Education*, 30(1), 12-25. <https://www.isetl.org/ijtlhe/pdf/IJTLHE2794.pdf>
- Wen, J., Zhang, J., Yang, Y., & Cai, Y. (2023). Development and validation of the Self-Regulated Translation Learning Strategy Scale (SRTLSS). *Studies in Educational Evaluation*, 78, 101292. <https://doi.org/10.1016/j.stueduc.2023.101292>
- Zhang-Wu, Q. (2018). Chinese international students' experiences in American higher education institutes: A critical review of the literature. *Journal of International Students*, 8(2), 1173-1197. <https://doi.org/10.32674/jis.v8i2.139>

Zimmerman, B. J. (1989). A Social Cognitive View of Self-Regulated Academic Learning. *Journal of Educational Psychology*, 81(3), 329-339. <https://doi.org/10.1037/0022-0663.81.3.329>