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The impact of problem-solving ability and academic performance on career adaptability of private university graduates: The mediating role of career decision-making self-efficacy

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Abstract: This study aims to explore the relationship between problem-solving ability, academic performance and career adaptability, as well as the mediating role of career decision-making self-efficacy. The research subjects were graduates from private universities in Sichuan Province, China. A questionnaire survey method was used to collect data, and a total of 550 valid samples were obtained. The study used structural equation modeling analysis to test the research hypotheses. The results show that: (1) problem-solving ability and academic performance have a significant positive impact on career adaptability; (2) career decision-making self-efficacy partially mediates the relationship between problem-solving ability and career adaptability; (3) career decision-making self-efficacy also partially mediates the relationship between academic performance and career adaptability. The research results provide a theoretical basis for understanding the influencing factors of career adaptability of private university graduates, and provide practical suggestions for colleges and universities, educational administrators and policy makers to promote the development of graduates' career adaptability.

Keywords: Problem-solving Ability; Academic Achievement; Career Adaptability; Career Decision Self-Efficacy; Private University Graduates

I. Introduction

In recent years, with the rapid development of higher education in China and the intensified competition in the job market, college graduates are facing increasing employment pressure. According to statistics, the number of college graduates in China has increased from 8.74 million in 2020 to 10.76 million in 2022 (Mao et al., 2022), and the competition in the job market is becoming increasingly fierce. In this context, the career adaptability of graduates has become a key factor affecting their successful employment. Career adaptability refers to the psychological resources that individuals have when dealing with current and upcoming career development tasks, career transitions, and occupational trauma (Savickas, 2005).

Private university graduates face special challenges in the job market. Although private higher education in China has made great progress in the past few decades, compared with public universities, private university graduates are still in a relatively weak position in the job market (Liu, 2020). Especially in areas such as Sichuan Province, private university graduates face more difficulties in the job competition, such as fewer top companies directly recruiting and the school's reputation is not as good as that of key universities (Wang et al., 2021). Therefore, improving the career adaptability of private university graduates is of great significance to promoting their smooth employment.

Problem-solving ability and academic performance are considered important factors affecting career adaptability. Problem-solving ability refers to an individual's ability to identify problems, develop solutions, and implement problem-solving strategies (Lavi et al., 2021). Academic performance reflects the level of achievement of students in an academic environment (Camacho-Morles et al., 2021). How these two factors affect the career adaptability of private university graduates and the mechanisms of action have not been fully studied.

Career decision self-efficacy refers to an individual's belief that he or she can successfully complete tasks related to career decisions (Betz et al., 1996). Previous studies have shown that career decision self-efficacy is closely related to career adaptability (Stead et al., 2022). However, whether career decision self-efficacy plays a mediating role between problem-solving ability, academic performance and career adaptability, especially in the specific group of Chinese private university graduates, still needs further exploration.

Based on the above background, this study takes social cognitive theory and achievement goal

theory as theoretical foundations, constructs a relationship model between problem-solving ability, academic performance, career decision-making self-efficacy and career adaptability, and takes private university graduates in Sichuan Province, China as the research subjects to explore the impact of problem-solving ability and academic performance on career adaptability, as well as the mediating role of career decision-making self-efficacy. The research results will provide a theoretical basis for understanding the influencing factors of career adaptability of private university graduates, and provide practical suggestions for colleges and universities, education administrators and policy makers to promote the development of graduates' career adaptability.

II. Literature Review and Research Hypothesis

2.1 Occupational adaptability

Career adaptability is the psychological resources that individuals have when facing career development tasks, career transitions, and work dilemmas (Savickas & Porfeli, 2012). Savickas (2005) defined career adaptability as the readiness and resources of individuals to cope with current and expected career development tasks, career transitions, and work dilemmas. As the core concept of career construction theory, career adaptability includes four dimensions: concern, control, curiosity, and confidence (Savickas & Porfeli, 2012). Concern refers to an individual's attention to future career development; control refers to an individual's sense of responsibility and autonomy for career development; curiosity refers to an individual's tendency to explore different career possibilities; and confidence refers to an individual's confidence in successfully coping with career challenges (Savickas, 2013).

Career adaptability has an important impact on an individual's career development. Studies have shown that individuals with higher career adaptability are more likely to cope with career changes, obtain employment, adapt to new work environments, and achieve better career achievements (Johnston, 2018). In today's rapidly changing job market, career adaptability has become a key factor in the successful employment and career development of college graduates (Rudolph et al., 2017). Especially for private university graduates, since they face more challenges in the job market, improving career adaptability is particularly important for enhancing their employment competitiveness (Pang et al., 2021).

However, there is still limited research on the factors that affect the career adaptability of private university graduates and their mechanisms. In particular, in the specific regional context of Sichuan Province, China, the career adaptability of private university graduates and its influencing factors need to be further studied. Therefore, this study focuses on the impact of problem-solving ability, academic performance, and career decision-making self-efficacy on career adaptability, in order to provide theoretical and practical guidance for improving the career adaptability of private university graduates.

2.2 Problem-solving ability and career adaptability

Problem-Solving Ability refers to an individual's ability to identify problems, analyze problems, generate solutions and implement problem-solving strategies (Polya, 1973). Heppner et al. (1982) divided problem-solving ability into three dimensions: problem-solving confidence, approach-avoidance style and personal control. Problem-Solving Confidence reflects an individual's confidence in his or her ability to solve problems; approach-avoidance style refers to whether an individual takes an active or avoidant attitude when facing problems; and personal control reflects an individual's sense of control over the problem-solving process.

Problem-solving ability is considered to be one of the most important core abilities in the 21st century (Aslan, 2021), and has a significant impact on an individual's study, work, and life. In the area of career development, problem-solving skills may have a significant impact on career adaptability. According to the research of Xu et al. (2020), there is a significant positive correlation between problem-solving ability and career adaptability. Individuals with stronger problem-solving abilities are more likely to cope with challenges and uncertainties in their career development, thus demonstrating higher career adaptability. The research of Federici et al. (2021) also showed that problem-solving skills can promote the development of career adaptability by enhancing individuals' cognitive flexibility and coping ability.

Among the specific group of Chinese private university graduates, problem-solving ability may have a more important impact on career adaptability. Since private university graduates face more challenges in the job market, they need to have stronger problem-solving skills to cope with the complex employment environment (Wang et al., 2020). However, there is still a lack of empirical research on the relationship between

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problem-solving ability and career adaptability of private university graduates. Therefore, this study proposes the following hypotheses:

H1: Problem-solving ability has a significant positive impact on the career adaptability of private university graduates.

2.3 Academic performance and career adaptability

Academic performance is an important indicator of students' achievement level in an academic environment, usually measured by grade point average (GPA) or cumulative grade point average (CGPA) (Alnjadat et al., 2019). Academic performance not only reflects students' knowledge level and learning ability, but also indirectly reflects students' self-discipline, time management ability, and goal orientation (Datu & Buenconsejo, 2021).

Academic performance may affect career adaptability in a variety of ways. First, good academic performance can enhance an individual's self-efficacy and self-confidence, which are important components of career adaptability (Tolentino et al., 2019). Second, the experience of academic success can cultivate an individual's positive attitude towards challenges, which helps improve their ability to cope with career changes and challenges (Deng et al., 2022). In addition, good academic performance may also provide individuals with more employment opportunities and practical experience, all of which help enhance career adaptability (Stockinger et al., 2021).

Su (2020) found that there is a significant positive correlation between academic performance and career adaptability. Datu and Buenconsejo (2021) also showed that students with better academic performance tend to have higher career adaptability. However, these studies are mainly based on the general college student population, and for the specific group of private university graduates, the relationship between academic performance and career adaptability needs further verification. Therefore, this study proposes the following hypotheses:

H2: Academic performance has a significant positive impact on the career adaptability of private university graduates.

2.4 Career Decision-Making Self-Efficacy

Career Decision Self-Efficacy originates from Bandura's (1986) self-efficacy theory and refers to an individual's belief that he or she can successfully complete tasks related to career decisions (Betz et al., 1996). Career decision-making self-efficacy includes five dimensions: self-appraisal, occupational information collection, goal selection, planning, and problem-solving (Betz et al., 1996).

Career decision-making self-efficacy is closely related to career adaptability. According to social cognitive theory, self-efficacy is an important factor affecting individual behavior and achievement (Bandura, 1986). In the field of career development, career decision-making self-efficacy may affect career adaptability by influencing individuals' career exploration behavior, career decision-making process, and ability to cope with career challenges (Li et al., 2019). Hou et al. (2019) found that career decision-making self-efficacy was significantly positively correlated with career adaptability. The meta-analysis by Stead et al. (2022) also confirmed the stability of this relationship.

In addition, career decision-making self-efficacy may play a mediating role between problem-solving ability, academic performance and career adaptability. Individuals with stronger problem-solving skills tend to be more confident in their decision-making abilities, which may enhance their career decision-making self-efficacy (Chuang et al., 2020). Similarly, good academic performance may also improve individuals' career decision-making self-efficacy by enhancing their self-confidence and sense of accomplishment (Wu et al., 2020). The improvement of career decision-making self-efficacy may further promote the development of career adaptability (Stead et al., 2022).

Based on the above theoretical analysis and empirical research, this study proposes the following hypotheses:

H3: Problem-solving ability has a significant positive impact on career decision-making self-efficacy of private university graduates.

H4: Academic performance has a significant positive impact on career decision-making self-efficacy of private university graduates.

H5: Career decision-making self-efficacy has a significant positive impact on the career adaptability of private university graduates.

H6: Career decision-making self-efficacy plays a mediating role between problem-solving ability and career adaptability.

H7: Career decision-making self-efficacy plays a mediating role between academic performance and career adaptability.

2.5 Theoretical Framework and Research Model

This study constructed a theoretical framework based on social cognitive theory (SCT) and achievement goal theory (AGT). Social

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cognitive theory emphasizes the role of self-efficacy beliefs in shaping individual thoughts, behaviors, and motivations (Bandura, 1986). In this study, social cognitive theory provides a basis for understanding how career decision self-efficacy mediates the relationship between problem-solving ability, academic performance, and career adaptability. Achievement goal theory focuses on the individual's motivational orientation towards achievement and distinguishes between mastery orientation and performance orientation (Urdan & Kaplan, 2020). This theory helps to explain how academic performance, as an indicator of mastery orientation, affects career decision self-efficacy and career adaptability.

Based on the above theoretical analysis and research hypotheses, this study constructed a research model as shown in Figure 1. This model describes the relationship between problem-solving ability, academic performance, career decision-making self-efficacy and career adaptability, in which problem-solving ability and academic performance are independent variables, career adaptability is the dependent variable, and career decision-making self-efficacy is the mediating variable.

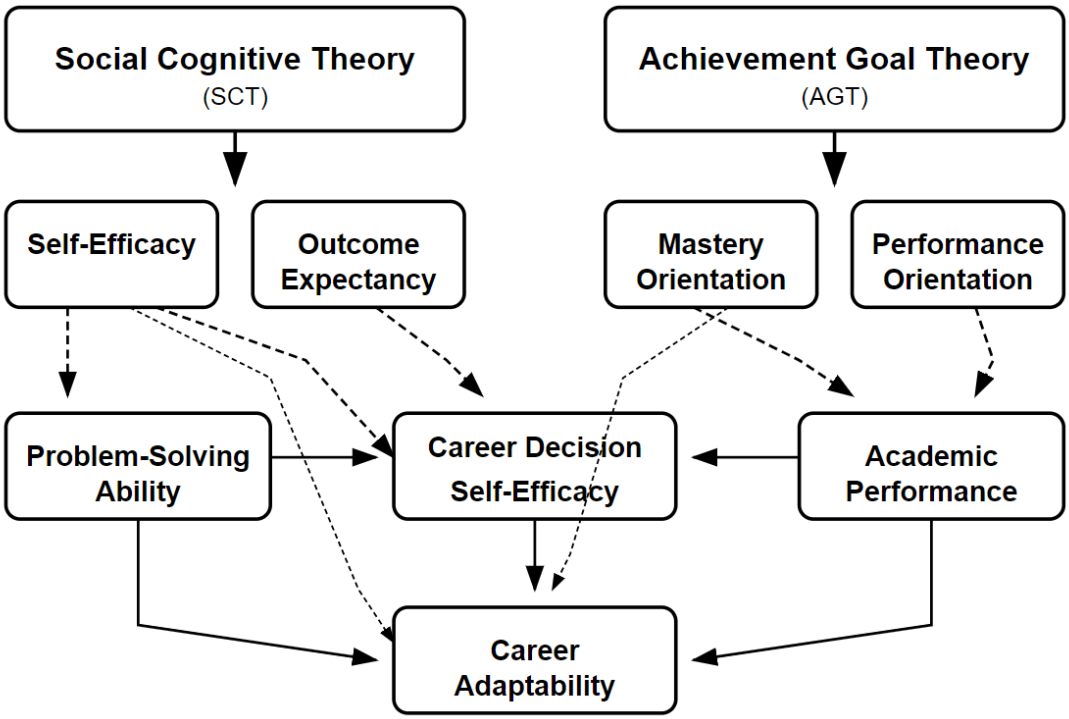

Figure 1: Theoretical framework diagram

III. Research Methods

3.1 Research subjects

This study uses graduates from four private universities in Sichuan Province, China as the research subjects. These four universities are: Chengdu Vocational University of the Arts, Sichuan Media College, Sichuan Culture and Art College, and Sichuan Film and Television Academy. These four universities were selected because they have professional characteristics in the field of art education and their students face special challenges in the job market. The study adopted a quota sampling method, and the sample size was determined according to the proportion of graduates from each school. A total of 550 questionnaires were distributed, and 550 valid questionnaires were finally obtained, with an effective recovery rate of 100%. The specific distribution of the sample is shown in Table 1.

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Table 1 Sample distribution

School Name	Number of graduates	Sample size	Proportion
Chengdu Vocational University of Art	1440	50	9.0%
Sichuan Media College	6012	214	39.0%
Sichuan Culture and Arts Institute	3738	132	24.0%
Sichuan Film and Television Academy	4259	154	28.0%
total	15449	550	100%

3.2 Research Tools

3.2.1 Career Adaptability Scale

Career adaptability was measured using the Career Adapt-Abilities Scale (CAAS) developed by Savickas and Porfeli (2012). The scale contains 24 items and is divided into four dimensions: attention (6 questions), control (6 questions), curiosity (6 questions), and confidence (6 questions). A 5-point scoring system is used, ranging from "1 = completely inconsistent" to "5 = completely consistent". The overall Cronbach's α coefficient of the scale is 0.898, and the Cronbach's α coefficients of each dimension are: attention (0.905), control (0.898), curiosity (0.899), and confidence (0.898), indicating that the scale has good reliability.

3.2.2 Problem Solving Ability Scale

Problem Solving Ability was measured using the Problem Solving Inventory (PSI) developed by Heppner et al. (1982). The scale originally contained 32 items, but two items were deleted after pre-testing, and 30 items were finally used, which were divided into three dimensions: problem-solving confidence (10 items), approach-avoidance style (16 items), and personal control (4 items). A 5-point scoring system was used, ranging from "1 = completely inconsistent" to "5 = completely consistent". The overall Cronbach's α coefficient of the scale was 0.942, and the Cronbach's α coefficients of each dimension were: problem-solving confidence (0.916), approach-avoidance style (0.961), and personal control (0.733), indicating that the scale has good reliability.

3.2.3 Academic performance

Academic performance was measured using the student-reported cumulative grade point average (CGPA). Based on the study by Wu et al. (2018), this study converted the CGPA into a 5-point scale: "1 = below 75 points", "2 = 75-79 points", "3 = 80-84 points", "4 = 85-90 points" and "5 = 91-100 points". To ensure the accuracy of the data, this study verified the student-reported CGPA.

3.2.4 Career Decision-Making Self-Efficacy Scale

Career decision self-efficacy was measured using the Career Decision Self-Efficacy Scale-Short Form (CDSE-SF) developed by Betz et al. (1996). The scale contains 25 items and is divided into five dimensions: self-evaluation (5 questions), career information collection (5 questions), goal selection (5 questions), planning (5 questions), and problem solving (5 questions). A 5-point scoring system is used, ranging from "1 = completely inconsistent" to "5 = completely consistent". The overall Cronbach's α coefficient of the scale is 0.894, and the Cronbach's α coefficients of each dimension are: self-evaluation (0.866), career information collection (0.889), goal selection (0.897), planning (0.898), and problem solving (0.867), indicating that the scale has good reliability.

3.3 Data Collection Procedure

Data collection was conducted using an on-site questionnaire survey from February to May 2024. The research team first obtained permission from the four private universities, then contacted graduates through the student affairs departments of each university and conducted a questionnaire survey on a voluntary basis. In order to ensure the quality of the questionnaire, the research team conducted unified training for the investigators and answered questions that the respondents might encounter on site. Before filling out the questionnaire, the research team explained the purpose of the research, the confidentiality commitment, and the principle of voluntary participation to the respondents. The questionnaire took about 15 minutes to fill out.

3.4 Data Analysis Methods

This study used SPSS 27.0 and AMOS 24.0 software for data analysis. Specific analysis methods include: descriptive statistical analysis, reliability analysis, confirmatory factor analysis and structural equation model analysis. Among them, descriptive statistical analysis is used to understand the basic characteristics of the sample and the distribution of each variable; reliability analysis is used to test the internal consistency of the scale; confirmatory factor

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analysis is used to test the fit of the measurement model; and structural equation model analysis is used to test the research hypothesis and the relationship between variables. In order to test the mediating role of career decision-making self-efficacy, this study used the Bootstrap method to generate 5,000 Bootstrap samples and calculate the 95% confidence interval of the indirect effect.

IV. Research Results

4.1 Descriptive Statistics

The demographic characteristics of the research subjects are shown in Table 2. In terms of gender, the proportion of females (58.2%) is slightly higher than that of males (41.8%); in terms of age, graduates aged 19-21 (42.5%) and 22-25 (48.7%) account for the majority; in terms of major, art majors (76.4%) account for the highest proportion, which is consistent with the characteristics of the four selected private universities.

Table 2 Demographic characteristics of the subjects (N=550)

variable	category	Frequency	percentage(%)
gender	male	230	41.8
	female	320	58.2
age	15-18 years old	12	2.2
	19-21 years old	234	42.5
	22-25 years old	268	48.7
	26-29 years old	30	5.5
	Over 30 years old	6	1.1
major	Arts	420	76.4
	Non-art	130	23.6

The descriptive statistical results of each variable are shown in Table 3. The results show that the subjects' career adaptability (M=3.75, SD=0.68), problem-solving ability (M=3.68, SD=0.72), and career decision-making self-efficacy (M=3.80, SD=0.65) are all at an above-average level, and their academic performance (M=3.25, SD=0.95) is at a medium level.

Table 3 Descriptive statistics of variables (N=550)

variable	Mean(M)	Standard Deviation (SD)	Minimum	Maximum	Skewness	Kurtosis
Career adaptability	3.75	0.68	1.58	5.00	-0.45	0.28
Problem Solving	3.68	0.72	1.73	5.00	-0.52	0.35
Academic performance	3.25	0.95	1.00	5.00	-0.15	-0.62
Career decision-making self-efficacy	3.80	0.65	1.76	5.00	-0.48	0.31

The results of correlation analysis among the variables are shown in Table 4. The results showed that career adaptability was significantly positively correlated with problem-solving ability ($r=0.62$, $p<0.01$), academic performance ($r=0.38$, $p<0.01$) and career decision-making self-efficacy ($r=0.66$, $p<0.01$); problem-solving ability was significantly positively correlated with career decision-making self-efficacy ($r=0.58$, $p<0.01$); and academic performance was significantly positively correlated with career decision-making self-efficacy ($r=0.35$, $p<0.01$). These results preliminarily support the hypotheses of this study.

Table 4 Correlation analysis between variables (N=550)

variable	1	2	3	4
1. Career adaptability	1			
2. Problem Solving	0.62**	1		
3. Academic performance	0.38**	0.25**	1	

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4. Career decision-making self-efficacy	0.66**	0.58**	0.35**	1

Note: **p<0.01

4.2 Measurement model analysis

Before conducting structural model analysis, this study first conducted confirmatory factor analysis on the measurement model to test the fit of the measurement model. Since each scale has many items, in order to simplify the model and improve the fit, this study adopted the item parceling method, taking the average score of each dimension as the observed variable and constructing the latent variable. The fit index of the measurement model is shown in Table 5.

Table 5 Fit index of measurement model

Fit index	χ^2/df	GFI	CFI	TLI	RMSEA	SRMR
Standard value	<3	>0.90	>0.90	>0.90	<0.08	<0.08
Measurement Model	2.67	0.94	0.95	0.93	0.056	0.043

The results show that all the fit indices of the measurement model have reached good standards: χ^2/df=2.67<3, GFI=0.94>0.90, CFI=0.95>0.90, TLI=0.93>0.90, RMSEA=0.056<0.08, SRMR=0.043<0.08, indicating that the measurement model has a good fit.

In addition, the results of the convergent validity and discriminant validity analysis of the measurement model are shown in Table 6. The results show that the average variance extracted (AVE) of each latent variable is greater than 0.5, and the combined reliability (CR) is greater than 0.7, indicating that the measurement model has good convergent validity; the correlation coefficients between the latent variables are less than the square root of their respective AVE, indicating that the measurement model has good discriminant validity.

Table 6 Convergent validity and discriminant validity analysis of the measurement model

variable	AVE	CR	1	2	3	4
1. Career adaptability	0.65	0.88	0.81			
2. Problem Solving	0.61	0.82	0.62	0.78		
3. Academic performance	-	-	0.38	0.25	-	
4. Career decision-making self-efficacy	0.68	0.91	0.66	0.58	0.35	0.82

Note: The diagonal line is the square root of AVE, and the line below the diagonal line is the correlation coefficient between variables; academic performance is a single measurement, so AVE and CR are not calculated.

4.3 Structural model analysis

On the basis of verifying that the measurement model fits well, this study further constructed a structural model and conducted hypothesis testing. The fit index of the structural model is shown in Table 7.

Table 7 Fit index of structural model

Fit index	χ^2/df	GFI	CFI	TLI	RMSEA	SRMR
Standard value	<3	>0.90	>0.90	>0.90	<0.08	<0.08
Structural Model	2.82	0.93	0.94	0.92	0.058	0.046

The results show that all the fit indices of the structural model have reached good standards: χ^2/df=2.82<3, GFI=0.93>0.90, CFI=0.94>0.90, TLI=0.92>0.90, RMSEA=0.058<0.08, SRMR=0.046<0.08, indicating that the structural model has a good fit.

The results of the path analysis are shown in Figure 2 and Table 8. The results showed that: (1) problem-solving ability had a significant positive impact on career adaptability (β=0.35, p<0.001), supporting H1; (2) academic performance had a significant positive impact on career adaptability (β=0.15, p<0.01), supporting H2; (3) problem-solving ability had a significant positive impact on career decision-making self-efficacy (β=0.48, p<0.001), supporting H3; (4) academic

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performance had a significant positive impact on career decision-making self-efficacy (β=0.23, p<0.001), supporting H4; (5) career decision-making self-efficacy had a significant positive impact on career adaptability (β=0.42, p<0.001), supporting H5.

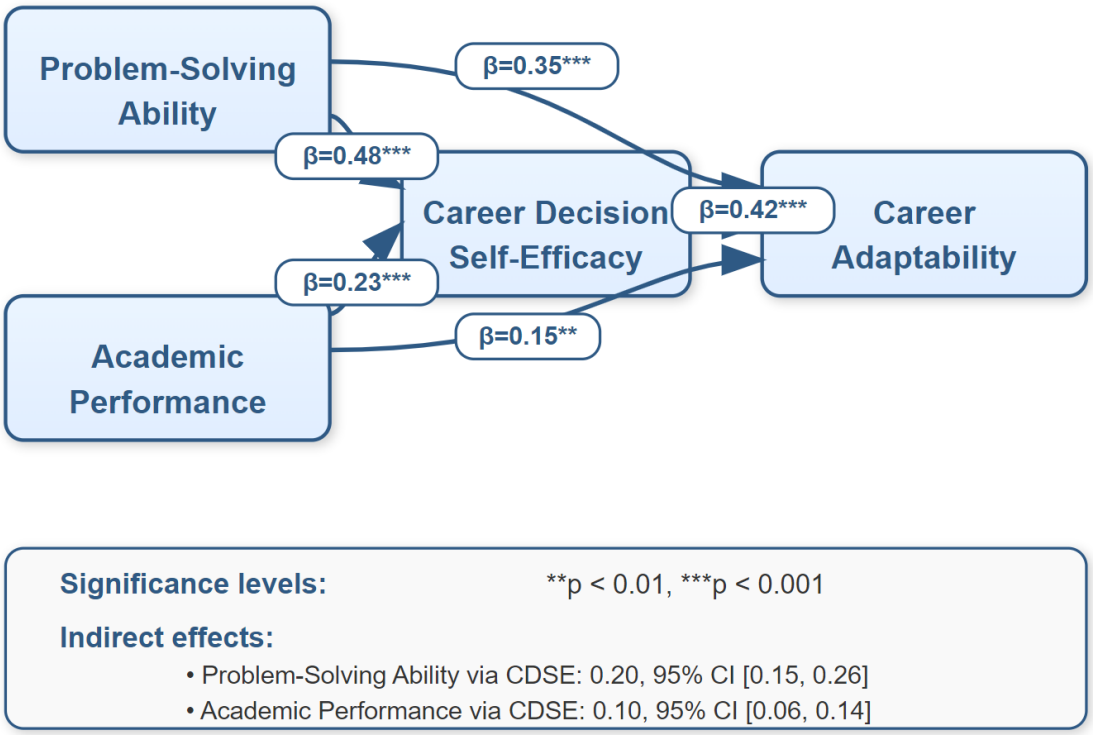

Figure 2: Structural model path analysis results

Table 8 Path analysis results of the structural model

path	Standardized path coefficient (β)	t-value	p-value	Hypothesis test results
Problem-solving skills → career adaptability	0.35	7.82	<0.001	H1 Support
Academic performance → career adaptability	0.15	3.46	<0.01	H2 Support
Problem-solving skills → career decision-making self-efficacy	0.48	10.93	<0.001	H3 Support
Academic performance → career decision-making self-efficacy	0.23	5.47	<0.001	H4 Support
Career decision-making self-efficacy → career adaptability	0.42	9.15	<0.001	H5 Support

4.4 Analysis of mediation effect

In order to test the mediating effect of career decision-making self-efficacy, this study uses the Bootstrap method to generate 5,000 Bootstrap samples and calculate the 95% confidence interval of the indirect effect. The results of the mediation effect analysis are shown in Table 9.

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Table 9 Results of mediation effect analysis

path	Point Estimate	Bootstrap 95%CI	Type of mediation effect
Problem-solving ability → career decision-making self-efficacy → career adaptability	0.20	[0.15, 0.26]	Some intermediaries
Academic performance → career decision self-efficacy → career adaptability	0.10	[0.06, 0.14]	Some intermediaries

The results showed that: (1) the indirect effect of problem-solving ability on career adaptability through career decision-making self-efficacy was 0.20, and the 95% confidence interval was [0.15, 0.26], which did not include 0, indicating that the indirect effect was significant. At the same time, the direct effect of problem-solving ability on career adaptability was also significant (β=0.35, $p<0.001$). Therefore, career decision-making self-efficacy partially mediated the relationship between problem-solving ability and career adaptability, supporting H6. (2) the indirect effect of academic performance on career adaptability through career decision-making self-efficacy was 0.10, and the 95% confidence interval was [0.06, 0.14], which did not include 0, indicating that the indirect effect was significant. At the same time, the direct effect of academic performance on career adaptability was also significant (β=0.15, $p<0.01$). Therefore, career decision-making self-efficacy partially mediated the relationship between academic performance and career adaptability, supporting H7.

V. Discussion

5.1 The impact of problem-solving ability on career adaptability

The results of the study show that problem-solving ability has a significant positive impact on the career adaptability of private university graduates, which is consistent with previous research results (Xu et al., 2020; Federici et al., 2021). This result may be explained by the following aspects:

First, from the perspective of cognitive dimension, problem-solving ability involves a series of cognitive processes such as problem identification, analysis, generation and implementation of solutions (Heppner et al., 1982). These cognitive processes are closely related to the control and curiosity dimensions of career adaptability. Individuals with stronger problem-solving skills tend to be better able to identify problems and challenges in career development and take proactive measures to address these challenges, thus demonstrating higher career adaptability.

Secondly, from the perspective of psychological resources, problem-solving ability can serve as an important psychological resource to help individuals cope with the pressure and challenges in career development (Gerçek, 2023). When faced with career changes or employment difficulties, individuals with strong problem-solving ability can remain calm, analyze problems systematically, and find effective solutions, which helps improve their career adaptability.

Third, from a behavioral perspective, individuals with strong problem-solving skills tend to show greater initiative and flexibility (Solangi et al., 2021), traits that are essential for the development of career adaptability. They are more likely to actively explore career opportunities, try new career paths, and show higher adaptability during career transitions.

For private university graduates, the impact of problem-solving ability may be more prominent. As they face more challenges and uncertainties in the job market (Wang et al., 2021), stronger problem-solving skills can help them better cope with these challenges and enhance their career adaptability. Therefore, improving the problem-solving ability of private university graduates should be one of the important goals of talent training in colleges and universities.

5.2 The impact of academic performance on career adaptability

The results of the study showed that academic performance had a significant positive impact on the career adaptability of private university graduates, which is consistent with previous research results (Datu & Buenconsejo, 2021; Tolentino et al., 2019). This result may be explained by the following aspects:

First, from the perspective of achievement experience, good academic performance represents an individual's successful experience in the academic field, and these successful experiences can enhance an individual's sense of self-efficacy and self-confidence (Bandura, 1986), thereby promoting the development of career adaptability. When graduates face career transitions and employment challenges, past academic success experiences can

enhance their confidence in overcoming difficulties and promote the improvement of career adaptability.

Secondly, from the perspective of ability, academic performance reflects an individual's learning ability, analytical ability, and problem-solving ability to a certain extent (Camacho-Morles et al., 2021), which are closely related to career adaptability. Graduates with good academic performance tend to have stronger learning ability and knowledge base, which helps them adapt to new environments and learn new skills more quickly in their career development, thus showing higher career adaptability.

Third, from the perspective of opportunities, good academic performance may provide graduates with more employment opportunities and practical experience (Magnano et al., 2021), which help enhance career adaptability. Graduates with good academic performance are more likely to obtain internships, part-time jobs and other opportunities, accumulate work experience, and understand the workplace environment, all of which help improve their career adaptability.

For private university graduates, the impact of academic performance may be more critical. In the fiercely competitive job market, good academic performance can become an important advantage that distinguishes them from other job seekers and help them obtain more job opportunities (Liu et al., 2022). Therefore, paying attention to and improving the academic performance of private university graduates is of great significance to enhancing their career adaptability.

5.3 The mediating role of career decision-making self-efficacy

The results of the study showed that career decision-making self-efficacy partially mediates the relationship between problem-solving ability, academic performance, and career adaptability, which is consistent with previous research results (Stead et al., 2022; Hamzah et al., 2021). This result may be explained in the following aspects:

First, from the perspective of social cognitive theory, self-efficacy is an important psychological mechanism that connects individual ability, experience and behavioral performance (Bandura, 1986). Problem-solving ability and academic performance represent individual ability and experience, which affect career adaptability by enhancing individual career decision-making self-efficacy. Specifically, stronger problem-solving ability and better academic performance can enhance an individual's confidence in making the right career decision, and this confidence in turn promotes the development of career adaptability.

Secondly, from the perspective of psychological resource integration, career decision self-efficacy may be an important way to transform problem-solving ability and academic performance into career adaptability. As basic abilities and resources of individuals, problem-solving ability and academic performance need to be more effectively promoted through the psychological mechanism of career decision self-efficacy to promote the development of career adaptability. Career decision self-efficacy may strengthen the impact of problem-solving ability and academic performance on career adaptability by stimulating individual career exploration behavior, enhancing individual career planning ability and promoting individual career decision-making process.

Third, from a developmental perspective, career decision self-efficacy may be a key link in the time series of how problem-solving ability and academic performance affect career adaptability. Individuals first increase their confidence in their ability to make career decisions through the accumulation of experience in the problem-solving process and academic success, and this increase in confidence promotes individuals to show stronger adaptability when facing career development challenges.

This finding is of great significance for understanding the development mechanism of career adaptability of private university graduates. The mediating role of career decision-making self-efficacy shows that simply cultivating graduates' problem-solving ability and improving their academic performance may not be enough to directly promote the development of their career adaptability. It is also necessary to pay attention to the important psychological mechanism of career decision-making self-efficacy. Colleges and universities should help graduates enhance their career decision-making self-efficacy through various means, such as providing career planning guidance, conducting career decision-making skills training, and creating opportunities for career exploration, so as to promote the effective transformation of problem-solving ability and academic performance into career adaptability.

VI. Conclusion and Suggestions

6.1 Research Conclusions

This study explored the relationship between problem-solving ability, academic performance, career decision-making self-efficacy, and career adaptability among graduates from four private universities in Sichuan Province, China. The main

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conclusions of the study are as follows:

1. Problem-solving ability has a significant positive impact on the career adaptability of private university graduates. Graduates with stronger problem-solving skills tend to show higher career adaptability and are better able to cope with challenges and changes in their career development.
2. Academic performance has a significant positive impact on the career adaptability of private university graduates. Graduates with good academic performance tend to have higher career adaptability, which may be because good academic performance enhances their self-confidence and sense of ability, which helps them adapt and develop better in their career development.
3. Career decision-making self-efficacy partially mediates the relationship between problem-solving ability and career adaptability. Problem-solving ability not only directly affects career adaptability, but also indirectly affects career adaptability by enhancing career decision-making self-efficacy.
4. Career decision self-efficacy also plays a partial mediating role between academic performance and career adaptability. Academic performance not only directly affects career adaptability, but also indirectly affects career adaptability by enhancing career decision self-efficacy.

These findings provide a theoretical basis for understanding the influencing factors and mechanisms of career adaptability of private university graduates, and also provide practical guidance for promoting the development of career adaptability of private university graduates.

6.2 Practical suggestions

Based on the research results, this study puts forward the following practical suggestions:

1. **Strengthen the cultivation of problem-solving ability** : Private universities should attach importance to the cultivation of students' problem-solving ability, and create opportunities for students to solve practical problems through case teaching, project learning, simulation practice, etc., so as to improve their ability to discover, analyze and solve problems. At the same time, students should be encouraged to participate in internships, social practice and other activities to exercise their problem-solving ability in real situations.
2. **Emphasis on improving academic performance** : Private universities should continue to attach importance to students' academic performance, and improve students' learning outcomes and academic performance by optimizing curriculum settings, improving teaching methods, and strengthening learning support. At the same time, students should be helped to realize the importance of academic performance to career development and stimulate their learning motivation and enthusiasm.
3. **Focus on cultivating self-efficacy in career decision-making** : Private universities should focus on cultivating students' self-efficacy in career decision-making, and help students understand their career interests, abilities and values, and enhance their confidence and ability in career decision-making by offering career planning courses, providing career counseling services, and organizing career exploration activities. At the same time, they should provide students with more career information and resources to broaden their career horizons.
4. **Build a comprehensive career development support system** : Private universities should build a comprehensive career development support system that organically combines the cultivation of problem-solving skills, academic performance improvement, and career decision-making self-efficacy to form a joint force to promote the development of students' career adaptability. They can provide students with all-round career development support by establishing a career development center, organizing career development workshops, and conducting personalized career counseling.
5. **Strengthen school-enterprise cooperation and social resource integration** : Private universities should strengthen cooperation with enterprises, industry associations, etc., integrate social resources, provide students with more internships, employment opportunities and career experience activities, help students understand the workplace environment and requirements in advance, and enhance their career adaptability. At the same time, successful

alumni and industry experts can be invited to share their experiences with students to broaden their career horizons.

6. **Pay attention to the career development of disadvantaged groups** : Private universities should pay special attention to students with poor academic performance and weak problem-solving ability, and provide them with targeted support and assistance, such as academic counseling, problem-solving ability training and career development guidance, to help them improve their career adaptability and enhance their employment competitiveness.

6.3 Research Limitations and Prospects

This study has the following limitations, and future research can be expanded in the following aspects:

1. **Sample limitations** : This study only selected graduates from four private universities in Sichuan Province as research subjects, which may limit the representativeness of the sample and the generalizability of the research results. Future research can expand the sample range, include more regions and more types of college students, and enhance the generalizability of the research results.
2. **Limitations of research design** : This study adopted a cross-sectional research design, which cannot determine the causal relationship between variables. Future research can adopt a longitudinal research design or an experimental research design to better explore the causal relationship and development changes between variables.
3. **Limitations of variable measurement** : This study only used the average cumulative grade point average reported by students to measure academic performance, which may be subject to subjective bias. Future research can use more objective indicators, such as standardized test scores and teacher evaluations, to improve the objectivity and accuracy of measurement.
4. **Limitations in variable range** : This study only examined the impact of problem-solving ability, academic performance, and career decision-making self-efficacy on career adaptability. Future research can include more factors that may affect career adaptability, such as personality traits, social support, environmental factors, etc., to build a more complete career adaptability influencing model.
5. **Cultural background limitations** : This study was conducted in the Chinese cultural context, and the results may be affected by cultural factors. Future research can conduct cross-cultural comparisons to explore whether there are differences in the impact of problem-solving ability, academic performance, and career decision-making self-efficacy on career adaptability in different cultural contexts.

Despite the above limitations, this study still provides valuable theoretical basis and practical guidance for understanding the influencing factors and mechanism of career adaptability of private university graduates. Future research can conduct in-depth exploration based on the above limitations to further enrich and improve the field of career adaptability research.

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