

The Impact of Usage Frequency of Intelligent Psychological Service Platforms on College Students' Psychological Capital: The Mediating Role of Self-Efficacy

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Abstract

Original Research Article

To explore the internal influence mechanism of usage behavior of intelligent psychological service platforms on the psychological development of college students, this study constructs a mediating effect model of “platform usage frequency — self-efficacy — psychological capital” based on positive psychology and conservation of resources theory, with self-efficacy as the mediating variable. Questionnaires including the Psychological Capital Scale, General Self-Efficacy Scale and self-developed scale measuring usage frequency of intelligent psychological service platforms were distributed to 426 college students from multiple universities nationwide. SPSS 26.0 and the PROCESS macro were adopted for data analysis. The results show that usage frequency of intelligent psychological service platforms, self-efficacy and college students' psychological capital are significantly positively correlated with each other. The usage frequency of intelligent psychological service platforms can positively predict college students' psychological capital. Moreover, self-efficacy plays a partial mediating role between the usage frequency of intelligent psychological service platforms and college students' psychological capital. This study verifies that appropriate use of intelligent psychological service platforms can accumulate individuals' psychological resources and improve the level of psychological capital by enhancing college students' self-efficacy. Empirical evidence and practical references are provided for universities to implement digital psychological education.

Keywords: intelligent psychological service platform, college students, psychological capital, self-efficacy, mediating effect.

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1 Introduction

1.1 Research Background

Digital and intelligent technologies have been deeply integrated into the higher education system. Intelligent psychological service platforms have become core carriers of mental health education in universities in the new era. Compared with

traditional offline psychological counseling, relying on intelligent assessment, psychological popularization, online counseling, emotion tracking, intelligent stress intervention and other diversified functions, intelligent psychological platforms feature accessibility, privacy and continuous service. They effectively overcome prominent difficulties including insufficient offline psychological service



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resources, limited coverage and college students' sense of shame when seeking psychological help, and have evolved into an important channel for students to actively adjust their mental status and obtain psychological support.

Currently, college students are exposed to multiple psychological stressors such as academic competition, interpersonal communication challenges and employment pressure. As a core indicator of individuals' positive psychological resources, psychological capital directly affects college students' stress resistance, growth resilience and physical and mental development quality. Existing studies mostly focus on the alleviating effect of digital psychological tools on negative mental states such as depression and anxiety. Few studies have explored how the usage frequency of intelligent psychological platforms promotes positive psychological capital, and the mediating path through which platform usage affects individual mental development remains unclear. As individuals' subjective judgment of their own abilities in psychological adjustment and stress coping, self-efficacy acts as a critical mediating factor linking external psychological service stimuli and the accumulation of personal psychological resources. Therefore, exploring the mediating effect of self-efficacy helps reveal the internal logic of how intelligent psychological services influence college students' psychological capital.

1.2 Research Significance

1.2.1 Theoretical Significance

From the perspective of theoretical research, this study further expands the research boundary and application scope of digital mental health education and positive psychology theory. Most previous studies on college students' psychological capital focus on the influence of offline education modes, individual personality traits and family environmental factors, and rarely incorporate digital intelligent service behavior into the research system of psychological capital cultivation. This study takes the usage behavior of intelligent psychological service platforms as the starting point, systematically

discusses the positive predictive effect of digital psychological service frequency on college students' psychological capital, and verifies the applicability of conservation of resources theory in the scenario of college digital mental health education. Conservation of resources theory points out that individuals' psychological resources are in a dynamic balance of consumption and supplement. Positive external environmental stimuli can continuously supplement consumed psychological resources and promote the growth of positive psychological quality. Intelligent psychological service platforms, as a new type of external positive psychological resource carrier, can continuously input positive psychological information and coping skills for college students, which conforms to the resource supplement and growth mechanism of conservation of resources theory. At the same time, this study clarifies the key mediating role of self-efficacy between platform usage behavior and psychological capital, sorts out the complete influence path of "external digital service input-internal self-cognition improvement-positive psychological resource accumulation", optimizes and improves the theoretical model of college students' psychological capital cultivation, and makes up for the deficiency of single research perspective and insufficient empirical evidence in existing related studies.

1.2.2 Practical Significance

In terms of practical application value, the research conclusions of this study provide targeted and operable optimization strategies for colleges and universities to improve the construction level of intelligent psychological service platforms and carry out precise digital mental health education. At present, many colleges and universities have completed the construction of intelligent psychological service platforms, but there are widespread problems such as low student usage frequency, single service form, low platform activity and insufficient service pertinence. Most platforms are only used for regular psychological assessment and data statistics, failing to give full play to the positive educational value of digital psychological

services. This study empirically verifies that reasonable and frequent use of intelligent psychological platforms can effectively improve college students' self-efficacy and psychological capital level, which provides direct data support for colleges and universities to guide students to actively use digital psychological resources. Based on the research conclusions, colleges and universities can optimize platform functions and service modes according to students' usage characteristics, carry out diversified online psychological growth activities, and guide students to form the habit of active psychological adjustment. At the same time, this study helps colleges and universities build an integrated mental health education system combining "online regular popularization and intervention + offline precise tutoring and guidance", realize the full coverage, whole-process tracking and personalized intervention of college students' mental health education, effectively prevent the occurrence of college students' psychological problems, and promote the healthy and all-round development of college students' physical and mental quality.

1.3 Research Hypotheses and Model Construction

According to conservation of resources theory, individuals can acquire resources from external environments, compensate for psychological loss and accumulate positive psychological capital. As a carrier of external positive psychological resources, regular and standardized use of intelligent psychological platforms helps students master emotion regulation skills, relieve psychological pressure, boost confidence in self-psychological regulation, and further accumulate psychological capital. Combined with previous research findings, the following hypotheses are proposed:

H1: The usage frequency of intelligent psychological service platforms significantly and positively predicts college students' psychological capital.

H2: The usage frequency of intelligent psychological service platforms significantly and positively predicts college students' self-efficacy.

H3: Self-efficacy significantly and positively

predicts college students' psychological capital.

H4: Self-efficacy mediates the relationship between the usage frequency of intelligent psychological service platforms and college students' psychological capital.

Accordingly, a mediating effect model is constructed: Usage Frequency of Intelligent Psychological Service Platforms (independent variable) → Self-Efficacy (mediator) → College Students' Psychological Capital (dependent variable).

2 Research Methodology

2.1 Participants

In this study, random cluster sampling was adopted to select research subjects from six undergraduate universities in Anhui, Jiangsu, Sichuan and other eastern, central and western regions of China, covering comprehensive universities, science and engineering universities and liberal arts universities, which ensures the diversity and representativeness of the sample source. The questionnaire was distributed anonymously through online professional questionnaire platforms, and the survey time was uniformly arranged in the spare time of college students to ensure the authenticity and seriousness of students' filling. A total of 452 questionnaires were collected in this survey. After strictly screening invalid questionnaires including ultra-short filling time (less than 60 seconds), regular repetitive answers and inconsistent logical answers, 426 valid questionnaires were finally retained, with an effective questionnaire recovery rate of 94.25%, which meets the sample size requirements of social science empirical research and mediating effect analysis.

The demographic statistical results of valid samples show that the gender distribution of the subjects is relatively balanced, including 201 male students, accounting for 47.18%, and 225 female students, accounting for 52.82%. In terms of grade distribution, 112 freshmen, 135 sophomores, 108 juniors, and 71 seniors and postgraduates are included, covering all undergraduate learning stages and postgraduate stages, which can fully reflect the psychological state and platform usage

characteristics of students in different learning cycles. In terms of major distribution, 142 students majoring in arts and humanities, 207 students majoring in science and engineering, and 77 students majoring in art and physical education are included, covering all mainstream major categories of colleges and universities, avoiding sample deviation caused by single major attribute. In terms of household registration attributes, 189 students come from urban areas and 237 students come from rural areas, covering different family growth environments. The balanced sample structure in gender, grade, major and household registration ensures the rationality and representativeness of the research data, and lays a solid foundation for the reliability and generalization of subsequent research conclusions.

2.2 Measurement Instruments

2.2.1 Self-developed Scale for Usage Frequency of Intelligent Psychological Service Platforms

Referring to the existing mature research scales of digital psychological service behavior at home and abroad, combined with the functional characteristics of domestic college intelligent psychological service platforms and the actual usage situation of college students, this study designed a self-developed Platform Usage Frequency Scale. The scale focuses on the core behavioral indicators of students' use of intelligent psychological platforms, including four core measurement items: daily and weekly platform login frequency, average weekly platform usage duration, frequency of using intelligent psychological assessment function, and frequency of using online counseling and emotional adjustment functions. The scale adopts a standard 5-point Likert scoring method, with 1 representing never use, 2 representing occasional use, 3 representing regular use, 4 representing frequent use, and 5 representing daily use. The higher the total score of the scale, the higher the usage frequency and activity of college students' intelligent psychological service platforms. Before the formal investigation, this study conducted a pre-investigation and item screening on the scale,

deleted and revised inappropriate items, and finally formed the official scale with good structural validity and content validity. The Cronbach's α coefficient of the scale in this study is 0.812, which indicates that the self-developed scale has good internal consistency reliability and can accurately measure the core variables of this study.

2.2.2 General Self-Efficacy Scale (GSES)

The General Self-Efficacy Scale (GSES) revised and localized by domestic scholars is adopted in this study, which is the most widely used authoritative measurement scale in the field of self-efficacy research at home and abroad. The scale is a single-dimensional structure, including 10 effective measurement items, which is specially used to measure individuals' overall self-confidence and ability judgment in facing pressure, solving difficulties and completing challenges. The scale adopts a 4-point Likert scoring standard, ranging from 1 (not at all true) to 4 (exactly true). The higher the total score of all items, the stronger the individual's general self-efficacy, the more confident the individual is in psychological adjustment and pressure coping, and the more positive the behavioral coping tendency. After data testing, the Cronbach's α coefficient of the scale in this study is 0.875, with excellent internal consistency reliability, which can stably and effectively measure the self-efficacy level of college student subjects.

2.2.3 College Students' Psychological Capital Scale (PCQ)

The revised Psychological Capital Scale adapted for college students was used. It contains four dimensions including self-affirmation, resilience, optimism and gratitude, with 20 items in total. Responses were scored on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Higher total scores correspond to higher psychological capital and richer positive psychological resources.

Table 2-1 Reliability Analysis of Measurement Scales

Scale	Number of Items	Cronbach's α Coefficient	95% Confidence Interval for α
Self-developed Platform Usage Frequency Scale	4	0.812	[0.783, 0.839]
General Self-Efficacy Scale (GSES)	10	0.875	[0.854, 0.894]
College Students' Psychological Capital Scale (PCQ)	20	0.891	[0.872, 0.908]
PCQ: Self-affirmation dimension	5	0.826	[0.798, 0.852]
PCQ: Resilience dimension	5	0.841	[0.815, 0.865]
PCQ: Optimism dimension	5	0.835	[0.809, 0.860]
PCQ: Gratitude dimension	5	0.819	[0.790, 0.847]

Note. α = Cronbach's α coefficient, an indicator of internal consistency reliability. Values above 0.7 indicate acceptable reliability, and values above 0.8 indicate good reliability.

2.3 Data Analysis

In this study, SPSS 26.0 statistical analysis software was used for systematic data processing and empirical analysis. The specific data analysis steps include: first, sorting out valid questionnaire data, eliminating abnormal values and missing values, and completing data standardization processing; second, carrying out reliability analysis on all measurement scales to verify the internal consistency and stability of the questionnaire; third, conducting Harman single-factor test to effectively test and control common method bias errors caused by self-reported questionnaires; fourth, conducting descriptive statistical analysis and Pearson correlation analysis of core variables to clarify the basic distribution characteristics and pairwise correlation relationship

of variables; finally, taking gender, grade and major as control variables, adopting Hayes PROCESS macro Model 4 and 5000 repeated Bootstrap sampling methods to test the hierarchical regression and mediating effect of variables, so as to accurately verify the rationality of each research hypothesis and the stability of the mediating path.

3 Data Analysis and Results

3.1 Common Method Bias Test

All data were self-reported by participants, which may lead to common method bias. Harman's single-factor test was conducted through exploratory factor analysis of all items without rotation.

Table 3-1 Results of Harman's Single-Factor Test for Common Method Bias

Factor	Eigenvalue	Percentage of Variance Explained	Cumulative Percentage of Variance Explained
1	7.243	18.62%	18.62%
2	3.152	8.11%	26.73%
3	2.486	6.39%	33.12%
4	2.174	5.59%	38.71%
5	1.892	4.86%	43.57%
6~21	<1.800	<4.60% each	<81.30% total

Note. The first factor explained 18.62% of the total variance, far below the critical threshold of 40%, indicating no severe common method bias in this study.

3.2 Correlation Analysis of Variables

Pearson correlation analysis was conducted among platform usage frequency, self-efficacy and psychological capital.

Table 3-2 Descriptive Statistics and Correlation Matrix of Study Variables

Variable	M	SD	1	2	3
1. Platform Usage Frequency	2.87	0.92	-		
2. Self-Efficacy	3.12	0.58	0.426**	-	
3. Psychological Capital	3.35	0.76	0.381**	0.572**	-

Note. M = Mean, SD = Standard Deviation. **p < 0.001. All variables are significantly positively correlated with each other.

Significant pairwise correlations were observed among all variables, satisfying the precondition for mediating effect analysis. Hypotheses H1, H2 and H3 were preliminarily supported.

3.3 Regression Analysis of Mediating Effects

Gender, grade and major were taken as control variables. Hierarchical regression and Bootstrap method were used to test the mediating effect.

Table 3-3 Regression Analysis of the Mediating Effect of Self-Efficacy

Step	Dependent Variable	Independent Variable	β	SE	t	p	95% CI
Step 1	Psychological Capital	Platform Usage Frequency	0.352	0.047	7.489	<0.001	[0.259, 0.445]
Step 2	Self-Efficacy	Platform Usage Frequency	0.418	0.042	9.952	<0.001	[0.336, 0.500]
Step 3	Psychological Capital	Platform Usage Frequency	0.149	0.051	2.922	0.004	[0.049, 0.248]
		Self-Efficacy	0.485	0.053	9.151	<0.001	[0.381, 0.589]

Note. β = Standardized regression coefficient, SE = Standard Error,

CI = Confidence Interval. Control variables (gender, grade, major) were included in all regression models. The mediating effect value was 0.203, with a 95% Bootstrap CI of [0.132, 0.278], which did not contain zero. The mediating effect accounted for 57.67% of the total effect. Hypothesis H4 was fully verified.

4 Discussion

4.1 Direct Effect of Platform Usage Frequency on College Students' Psychological Capital

The direct effect test results of this study fully confirm the positive empowering effect of intelligent psychological service platform usage frequency on college students' psychological capital, which is consistent with the core viewpoint of conservation of resources theory and positive psychology theory. The intelligent psychological service platform, as a systematic digital psychological resource library and service carrier, provides college students with long-term and stable positive environmental stimuli. The popular science articles, emotional cases and stress coping skills on the platform can help students establish correct mental health cognition, correct negative psychological misunderstanding, and accumulate positive psychological knowledge reserves. The intelligent psychological assessment function enables students to accurately grasp their emotional state and psychological changes, realize self-monitoring and early warning of psychological problems, and avoid the continuous consumption of

psychological resources caused by unknown negative emotions. The online counseling and interactive training functions provide students with targeted emotional relief channels and psychological growth guidance, help them resolve interpersonal conflicts, academic anxiety and growth confusion in a timely manner, reduce the loss of positive psychological resources, and continuously cultivate positive psychological qualities such as optimism, resilience and self-confidence. For college students who use the platform frequently, long-term exposure to positive digital psychological services can form a stable positive psychological adjustment mechanism, continuously improve their overall psychological capital level, and form a virtuous cycle of "resource supplement-psychological growth-quality improvement".

4.2 Mediating Mechanism of Self-Efficacy

The most core innovation and key finding of this study is to clarify the partial mediating mechanism of self-efficacy between platform usage frequency and college students' psychological

capital. The empirical results prove that the usage frequency of intelligent psychological service platforms can not only directly promote the improvement of college students' psychological capital, but also indirectly accumulate positive psychological capital through the internal cognitive empowerment of self-efficacy, which reveals the internal "black box" of digital psychological services affecting students' psychological growth. The partial mediating effect also indicates that there may be other potential mediating or moderating variables between platform usage behavior and psychological capital, which provides a broader research space for subsequent follow-up studies.

From the perspective of the influence path of platform usage frequency on self-efficacy: the standardized and frequent use of intelligent psychological platforms helps college students master systematic and practical psychological adjustment methods. In the face of daily academic pressure, interpersonal friction and emotional confusion, students can independently use platform tools for self-guidance and emotional relief, instead of passively bearing negative pressure. Every successful self-adjustment experience will accumulate positive behavioral experience for students, significantly improve their sense of control over their own psychological state, and continuously enhance their subjective confidence in coping with pressure and solving psychological problems, so as to effectively improve their general self-efficacy level. For students with low initial self-efficacy, the anonymous and gentle online service mode can reduce their psychological pressure in the help-seeking process, help them gradually break through self-limitation, establish positive self-evaluation, and realize the continuous improvement of self-efficacy. From the perspective of self-efficacy affecting psychological capital: self-efficacy is the core internal driving force of individual positive psychological development. College students with high self-efficacy have positive cognitive attribution mode and positive coping tendency when facing difficulties and setbacks. They are more willing to take the initiative to face challenges, actively adjust negative emotions, and maintain optimistic and resilient psychological state. This stable positive

cognitive and behavioral mode can continuously accumulate positive psychological resources, and finally form high-level psychological capital including optimism, resilience and gratitude.

This mediating path fully explains the essential value of digital intelligent psychological education. Different from traditional psychological education which only focuses on solving existing psychological problems, intelligent psychological service platforms focus on "prevention first and growth oriented". Its core educational value lies in empowering students' independent psychological adjustment ability through long-term digital service stimulation, helping students form stable positive psychological cognition and growth ability, realizing the transformation from "passive problem intervention" to "active quality cultivation", and providing long-term and stable internal psychological guarantee for college students' healthy growth.

4.3 Research Innovations and Educational Implications

4.3.1 Research Innovations

Most existing studies on digital mental health focus on interventions targeting negative psychological conditions. From the perspective of positive psychology, this research centers on psychological capital as an indicator of positive mental status. It empirically verifies the empowering effect of intelligent psychological platform usage frequency on college students' positive psychological development and identifies the mediating path of self-efficacy, enriching empirical research on digital psychological education.

4.3.2 Educational Implications

First, universities need to optimize the construction of intelligent psychological service platforms, enrich lightweight and regular psychological services. Universities can encourage students to actively, frequently and rationally use platforms via themed push notifications, emotional check-ins and intelligent intervention activities, so as

to give full play to the psychological empowering function of digital tools.

Second, digital psychological education in universities should focus on cultivating self-efficacy. Relying on online platforms, special activities including psychological skill training and stress coping workshops can be carried out to improve students' capacity for independent psychological adjustment, and form a long-term education mechanism of "platform usage — ability improvement — psychological growth".

Third, hierarchical guidance systems should be established. Precise support should be provided for students with low platform usage frequency and insufficient psychological capital to break barriers restricting students' access to digital psychological resources and realize the improvement of psychological literacy among all students.

5 Limitations and Future Research Directions

Although this study has completed systematic empirical research and obtained stable and reliable research conclusions, there are still some limitations restricted by research conditions, which can be further optimized and expanded in subsequent research. Firstly, the sample coverage needs to be further expanded. The research samples of this study are college students from some universities in eastern, central and western China, which can represent the psychological characteristics of ordinary undergraduate college students to a certain extent. However, the samples do not cover vocational colleges, adult education students and off-campus internship students, and the generalization of the research conclusions has certain limitations. Subsequent research can expand the sample scope, include different types of higher education students and student groups in different learning states, and further verify the stability and applicability of the research conclusions. Secondly, this study adopts cross-sectional survey data, which can only reflect the static correlation and influence relationship among variables at a single time node, and cannot dynamically track the long-term interaction and

causal evolution process between platform usage behavior and students' psychological capital. Future research can adopt longitudinal tracking research design, carry out staged follow-up surveys for 1-2 academic years, and explore the dynamic influence law and long-term cumulative effect of intelligent platform usage on students' psychological growth. Thirdly, the research model can be further enriched. This study only takes self-efficacy as a single mediating variable, but in the actual psychological growth process of college students, variables such as emotional regulation ability, psychological resilience and social support will also play an important intermediary or regulatory role. Subsequent research can introduce multiple mediating variables and moderating variables, construct serial mediating models or moderated mediating models, further clarify the complex influence mechanism of digital psychological services on college students' psychological capital, and improve the depth and breadth of the research framework.

6 Conclusions

The empirical analysis draws the following core conclusions:

1.The usage frequency of intelligent psychological service platforms, self-efficacy and college students' psychological capital are significantly positively correlated pairwise.

2.The usage frequency of intelligent psychological service platforms can directly and positively improve college students' psychological capital.

3.Self-efficacy partially mediates the relationship between the usage frequency of intelligent psychological service platforms and college students' psychological capital. Platform usage can indirectly promote the accumulation of positive psychological capital by enhancing college students' self-efficacy of psychological regulation.

In summary, this study fully verifies the positive educational value of intelligent psychological service platforms in college positive psychological education. As a new type of digital psychological

education carrier, intelligent psychological service platforms can continuously supply positive psychological resources for college students, improve students' psychological self-efficacy through behavioral intervention and cognitive empowerment, and then effectively accumulate and promote the level of college students' psychological capital. The research results provide solid empirical data support and feasible practical strategies for colleges and universities to optimize digital mental health education services, innovate positive psychological quality cultivation modes, and realize the high-quality development of college mental health education.

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