A Study on the Relationship between the Perceived Effect of the Second Classroom Implementation and Labor Literacy among Private Undergraduate College Students in Guangdong Province of China

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Abstract

This study aims to explore how college students' perception of second classroom implementation affects their labor literacy in Guangdong Province, China. The research collected data from students across 8 colleges and universities in Guangdong through questionnaire surveys. Statistical analysis was conducted to examine the correlation between second classroom implementation effectiveness and students' labor literacy, with public service motivation as a potential mediating variable.

The findings reveal that students' perception of second classroom implementation significantly and positively impacts their labor literacy, specifically through factors including activity quality, teacher guidance, resource adequacy, and post-activity feedback. Moreover, public service motivation was found to mediate the relationship between second classroom implementation and labor literacy. Based on these findings, it is recommended that higher education institutions enhance the quality of second classroom activities, strengthen teacher professional development, optimize resource allocation, and implement robust feedback mechanisms. Additionally, institutions should integrate public service value education into second classroom activities to foster students' labor literacy development.

Keywords: Relationship Between the Perceived Effect; Second Classroom Implementation; Labor Literacy; Private Undergraduate College Students; Guangdong Province of China

Introduction

Labor literacy, as one of the core literacy essential for college students in the new era, covers multiple dimensions such as labor concepts, labor habits, labor skills and innovation ability, and is a key factor in the success of students' future careers and the improvement of their social adaptability. In the context of today's higher education reform, college students' perception of the second classroom (such as practical activities, community participation, volunteer services, etc.) and its impact on the improvement of their own labor literacy have become a hot topic in the field of education. As an effective supplement to the first classroom, the second classroom can not only enrich students' campus life, but more importantly, it provides students with a valuable platform to apply theoretical knowledge to practice and exercise various abilities (Wang Ting, Cheng Yong, 2012). College students' perception of the implementation effect of the second classroom is directly related to the comprehensive development of their labor literacy, including the cultivation of labor awareness, the

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improvement of labor skills and the shaping of labor spirit. For college students, there is a close connection between the second classroom of colleges and universities and the cultivation of their comprehensive quality and ability. The higher the degree of student participation, the more significant the improvement of their comprehensive quality and ability (Wei Peizheng, Ma Huaxiang, Ma Liping, 2011).

This study focuses on exploring how college students in private undergraduate universities perceive the implementation effect of the second classroom (generally referring to various practical activities or projects in the second classroom), and deeply analyzes how this perception affects the cultivation of their labor literacy. The research subjects are college students in private undergraduate universities in Guangdong Province, China, aiming to reveal the intrinsic connection between the perception of the implementation effect of the second classroom and the cultivation of college students' labor literacy, and to examine students' specific feelings about the organization of activities, content design, and practical effects during their participation in the second classroom activities, as well as how these feelings are transformed into the internal motivation to promote the improvement of labor literacy.

The research will take college students in private undergraduate universities in Guangdong Province, China as the research subjects. Although Guangdong Province pays attention to educational development and reform, strengthens the all-round development of students, systematically implements high-quality labor education, innovates labor practices inside and outside the school, and carries out diversified social labor practices, private universities in Guangdong lack due attention to labor education for college students, and are relatively weak in the configuration of software and hardware. College students have a tendency to be more skillful and entertaining in labor education. The above problems will affect the cultivation of college students' labor literacy. Therefore, the research subjects are undergraduate students in private universities in Guangdong, which is more representative of the research. In order to improve the representativeness of the sample, a three-level stratified sampling was selected, that is, first selecting representative urban areas, then selecting representative undergraduate colleges, and finally random sampling (Lin Shengchuan, 2002). The principle of selecting the research scope is balanced regional distribution, and 8 representative universities in Guangdong Province were selected for sampling.

literature review

This study takes the theory of multiple intelligence as the theoretical basis, and the related theories of each variable include constructivism theory, quality education theory, public service motivation theory and social support theory.

The theory of multiple intelligence was proposed by American psychologist Gardner. This theory emphasizes the differences and diversity of individuals in different intellectual fields, and provides a theoretical basis for understanding students' performance and growth in second-class activities. In second-class activities, students can choose to participate in activities according to their intellectual strengths and interests, thereby promoting their all-round development. Constructivism theory originated from the epistemology of Swiss psychologist Piaget, emphasizing that knowledge is constructed through the interaction between individuals and the environment. In the second classroom, students apply the theoretical knowledge learned in the first classroom to practice through practical activities, thereby deepening their understanding of knowledge and constructing a new knowledge system. This combination of theory and practice is exactly what constructivism advocates. The theory of quality education

emphasizes the cultivation of students' comprehensive qualities, including ideological and political qualities, knowledge integration ability, practical innovation ability, etc. As an important carrier of quality education, the second classroom helps to improve students' comprehensive abilities, including labor literacy, through rich and diverse forms of activities. Second-classroom activities not only focus on students' knowledge learning, but also focus on cultivating students' practical ability, teamwork spirit and social responsibility, which are all important contents of quality education. The theory of public service motivation focuses on the intrinsic motivation of individuals to serve the public interest. In second-classroom activities, students may choose to participate in related activities such as volunteer service and social research out of their concern for social welfare, which not only helps to cultivate students' sense of social responsibility, but also stimulates their public service motivation, thereby improving their labor literacy. Social support theory emphasizes the impact of material and spiritual support obtained by individuals in social networks on their growth and development. In second-classroom activities, students can obtain support from classmates and teachers through teamwork, teacher-student interaction, etc., which helps to improve students' sense of self-efficacy, enhance their confidence and courage to face challenges, and thus promote the improvement of their labor literacy.

1. Definition of the second classroom

"Second classroom" was originally proposed by the famous educator Zhu Jiusi (1983) in the book "Administration of Higher Education Institutions", which refers to guiding and organizing students to carry out various meaningful and healthy extracurricular activities outside the teaching plan. This concept has continued to develop with the deepening of education reform, and has gradually expanded to primary and secondary schools and a wider range of education. It is not only a supplement and extension of the first classroom (i.e. traditional classroom teaching), but also an important carrier and way to achieve quality education. Although the definition and connotation of the "second classroom" have not formed a unified and clear definition in the academic community, its outline has gradually become clear after discussions by many educators and researchers. The famous educator Zhu Jiusi (1983) first mentioned in "Higher Education Management" that the second classroom refers to extracurricular practical activities with educational significance organized and guided by the school for students to participate in outside the teaching plan. This view emphasizes that the second classroom is an important way for students to improve their abilities, cultivate their sentiments, and acquire knowledge. It is an important position and an indispensable practical link for the comprehensive quality improvement of college students (Liu Jun and Gao Xiangdong, 2022). Foreign scholars also have a similar concept, calling it "Activities on the Open Classroom", and regard it as a channel to expand students' extracurricular practical education (Chen, 2009). In Japan, the second classroom is officially included in the talent training plan and is defined as club activities and social practice activities outside of classroom courses that can enhance students' practical and innovative abilities (Prahalad, 1990; Bryant, 1999).

Other domestic scholars have also given different definitions of the second classroom. Cai Keyong and Feng Xiangdong (1988) believe that the second classroom is an extracurricular teaching activity that the school organizes and plans to guide students to carry out outside of classroom teaching. Peng Qiaoyin and Xie Xiangxun (2011) emphasized that the second classroom is an extracurricular educational activity carried out to enrich students' extracurricular life and promote their all-round development. Compared with the first

classroom, it has more teaching flexibility and is an indispensable part of the talent training plan of higher education. It is organically integrated with the first classroom to jointly build a higher education education system. In recent years, my country's education community has conducted more in-depth research on the second classroom.

In summary, this study is based on the concept of "second classroom" proposed by the Central Committee of the Communist Youth League (2018), and defines it as: drawing on the educational mechanism and work system of the first classroom teaching, through scientific, systematic, institutionalized and standardized design, to realize the ideological and political guidance, quality development and improvement, social practice training, volunteer service and self-management service activities implemented by the Communist Youth League organizations of colleges and universities. This definition not only covers the rich connotation of the second classroom, but also reflects its important position and role in higher education.

The research on the second classroom is carried out under the guidance of the constructivist theory proposed by Piaget (1970). As a theory about learning and knowledge, this theory provides rich theoretical nourishment for in-depth exploration of the second classroom. Piaget emphasizes the initiative of individuals and believes that learning is a process in which individuals construct understanding based on their original knowledge, which is usually formed in social and cultural interaction. Under this theoretical framework, the second classroom, as an informal and supplementary learning environment, provides students with rich social and cultural interaction opportunities and promotes the construction and understanding of students' knowledge.

2. Definition of labor literacy

From the evolution of the concept of labor literacy, in the early 20th century, with the acceleration of the process of social industrialization, the importance of labor education gradually emerged. Scholars initially explored the connotation of "labor quality" and regarded it as a comprehensive reflection of the basic abilities and moral qualities displayed by individuals in the labor process. Entering the mid-to-late 20th century, with the deepening development of global economic integration, the competition in the labor market became increasingly fierce. Labor literacy, as a key indicator to measure the adaptation of individuals to the needs of social and economic development, has attracted widespread attention from the academic community.

The Soviet educator Sukhomlinsky first proposed the term "labor literacy" (Xu Jie and Lou Xinglin, 2020), defining it as the basic abilities, professional ethics and comprehensive qualities displayed by individuals in labor, laying the foundation for subsequent research. Tan Chuanbao (2019) started from the combination of education and labor, and believed that labor literacy is the sum of knowledge, skills and attitudes cultivated by individuals in the process of education to adapt to the needs of the future labor market. He closely linked labor literacy with the education system and highlighted its cultivation in the education process. Zhou Guangli (2020) further pointed out that labor literacy is the comprehensive ability of an individual to apply what he has learned to practical work, solve problems and create value. This explanation expands the connotation of labor literacy and emphasizes its importance in practical application. Subsequently, some official agencies also defined labor literacy. For example, the CPC Central Committee and the State Council (2020) regarded labor literacy as a comprehensive reflection of the labor knowledge, skills, values and innovation capabilities acquired by individuals through labor education and practice. This official definition further

clarifies the multiple components of labor literacy.

3. Definition of public service motivation

The origin of the concept of "public service motivation" can be traced back to the in-depth discussion of the driving force of individual behavior, and its theoretical framework has gradually become clear on the basis of absorbing the essence of previous research. Through comprehensive analysis, scholars have revealed the deep-seated motivations behind people's participation in public services. In short, public service motivation refers to the tendency of individuals to contribute personal efforts to promote social welfare out of their inherent values and recognition of the public interest. This concept has been continuously enriched and developed in the academic community, especially since the end of the 20th century. With the contributions of scholars in the fields of public administration, sociology and psychology such as Perry and Wise (1990), public service motivation has been given a more specific and systematic theoretical connotation. They not only deepened our understanding of why individuals are willing to serve the public, but also promoted the application of this theory in many practical fields such as public sector human resource management and policy implementation effect evaluation, laying a solid foundation for the maturity and widespread dissemination of public service motivation theory. This section will comprehensively review the definition, theoretical basis, measurement tools and related research of public service motivation.

Public service motivation is regarded as a multi-level and multi-dimensional concept (Zhang Xinwen and Tao Lanlan, 2022). The origin of this concept can be traced back to the discussion of the intrinsic motivation of individuals to serve the public interest and community welfare. Perry and Wise (1990) emphasized in their study that public service motivation reflects the tendency and willingness of individuals to serve the public interest and contribute to social welfare. It is a noble motivation that transcends personal interests. Brewer and Selden (1998) further elaborated that public service motivation is not only related to personal career choices, but also a lasting tendency deeply rooted in personal values, willing to work hard to improve public welfare.

Scott and Pandey (2005) defined it as the internal driving force generated by the concern and sense of responsibility for the public interest of society when individuals work in the public sector or participate in public services. Kjeldsen (2012) believes that public service motivation is a psychological force that motivates individuals to devote themselves to public service, devote themselves to solving public problems, and promote social progress. It reflects the individual's identification and pursuit of public interests. Some Chinese scholars regard public service motivation as an internal motivation formed by individuals based on their identification with social justice, fairness and public interests, and are willing to engage in public service to maximize social welfare. They emphasize that public service motivation drives individuals to make continuous contributions in the public sphere, even at the expense of personal interests, showing a noble sentiment. Ye Xianbao and Li Shu (2008) proposed that altruistic motivation is a key aspect in defining public service culture, among which values, education and participation are more worthy of emphasis than efficiency, economy and career management. Chen Dingxiang and Liu Bangcheng (2021) proposed in their analysis of the formation mechanism of grassroots civil servants' responsible behavior that civil servants' public service motivation plays a value-based mediating role between leaders' public service motivation and employees' transformation behavior.

Research Objectives

1. To examine how college students' perception of second classroom implementation affects their labor literacy development through analyzing data collected from 8 private universities in Guangdong Province.

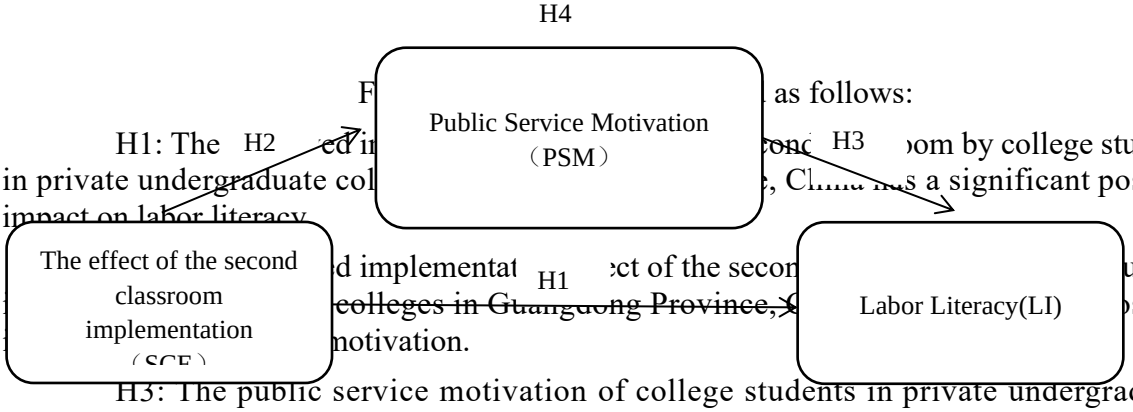
2. To investigate the mediating role of public service motivation in the relationship between perceived second classroom implementation effect and labor literacy.

3. To analyze whether demographic factors (gender, grade, major) have significant differences in their impact on students' labor literacy development.

4. To provide evidence-based recommendations for higher education institutions to optimize their second classroom implementation and enhance students' labor literacy through effective program design and resource allocation.

Research Methodology

According to the research content and research objectives of this study, quantitative research methods will be used. After reviewing the literature and theories, the research dimensions and research variables will be determined. Then, the questionnaire will be tested to see if it is effective in the quantitative stage. Finally, data analysis will be performed to draw research conclusions. After combing through the relevant literature on the relationship between the implementation effect of the second classroom, labor literacy, public service motivation and social support perceived by college students in private undergraduate colleges in Guangdong Province, China (Song Dan, Zeng Jianxiong, 2018; Yang Kaifeng, Yang Huishan, 2021; Qin Yifan, 2021; Zimet et al., 1988), the research framework diagram is obtained, as shown in the figure.



F as follows:

H1: The ed i oom by college students in private undergraduate col , China has a significant positive impact on labor literacy.

H2: The d implementat ct of the secon udents colleges in Guangdong Province, positive motivation.

H3: The public service motivation of college students in private undergraduate colleges in Guangdong Province, China has a significant positive impact on labor literacy.

H4: The public service motivation of college students in private undergraduate colleges in Guangdong Province, China plays a mediating role in the impact of the perceived implementation effect of the second classroom on labor literacy.

Result

SPSS and Amos 24.0 software were used to analyze the data collected from the online questionnaire, including descriptive statistical analysis, reliability test of questionnaire

test items, convergent validity test, discriminant validity test, model fitting, hypothesis test, ANOVA analysis of variance and mediation effect test.

Before the formal questionnaire was distributed on a large scale, a small-scale questionnaire survey was conducted first, and 65 prediction questionnaires were distributed. The samples were divided into 27 and 73 digits. The 7 dimensions were tested by T test for high and low groups. The test results showed that the p values of all questions were less than 0.05, which was significant. There was a significant difference between high and low groups, which meant that the test items had a certain degree of discrimination and needed to be retained. After the prediction, the questionnaire was distributed through the online questionnaire. After the subsequent identification and screening of the 400 questionnaires collected, after the invalid questionnaires were eliminated, the number of valid questionnaires was 393, and the recovery rate reached 98%. There were 18 test items in total, all measured by Likert 7-level scale.

1. Descriptive statistical analysis

From the sample information description table, the gender ratio of the interviewed students is not very different, with slightly more female students. The interviewed students are divided into four age groups, namely freshman, sophomore, junior and senior; the interviewed students are relatively concentrated in the sophomore year, with the largest number of interviewees, followed by freshmen, juniors, and seniors. From the perspective of the majors studied in this survey, most of them are in the literature and history category, and the proportion of education is also relatively large, with fewer students majoring in sports. The subjects of this study are set as college students from 8 private universities in Guangdong Province. From the sample data, the proportion of interviewed students in the 8 target universities is relatively even.

Table 1 Survey sample information description table

		frequency	percentage	Effective percentage	Cumulative percentage
Gender	Male	165	41.9	41.9	41.9
	Female	228	58.1	58.1	100.0
	Total	393	100.0	100.0	
Grade	Freshman	104	26.4	26.4	26.4
	Sophomore	189	48	48	74.4
	Junior	92	23.4	23.4	97.8
	Senior	8	2.2	2.2	100.0
	Total	393	100.0	100.0	
Major	Literature and History	185	47.0	47.0	47.0
	Education	76	19.3	19.3	66.3
	Arts and Music	91	13.1	13.1	79.4
	Science and Engineering	23	5.8	5.8	85.2
	Sports	18	4.6	4.6	100.0
	Total	393	100.0	100.0	

2. Reliability, convergent validity and discriminant validity test

Before hypothesis verification, this model first measures the reliability and validity of the scale. The reliability test is judged by observing the composite reliability (CR) and the

average variance extracted (AVE) (Nunnally, 1979);

After the first factor analysis, the test items wm3, oic9, and ib2 with the common factor load Std value less than 0.6 were eliminated, and then the items were retained through factor analysis. The result shows that the cumulative variance contribution rate reached 67.263%, with less information loss, which can better explain the overall variance, and the factor analysis is ideal.

After confirmatory factor analysis, it can be seen that the Std values of the loads of all valid factors in the common factor are greater than 0.6, reaching the standard range (greater than 0.6), thus ensuring the structural validity of the scale; SMC greater than 0.3 means that the questions have question reliability; CR is greater than 0.7, indicating that there is sufficient internal consistency between dimensions;

It is generally believed that when the CR value is greater than 0.7 and the AVE value is greater than 0.5, the consistency between the measurement variable items is acceptable (Fornell & Larcker 1981); so the reliability of the measurement questions and the convergent validity between dimensions of this model are good. As shown in Table 2, the bold diagonal characters are the square root values of AVE, and the lower triangle is the Pearson correlation and mean value of the dimension. The standard deviation is shown in the table; Robinson believes that the reliability is acceptable when the Cronbach's Alpha value is greater than 0.7. The Cronbach's Alpha values of all latent variables in this study are greater than 0.7, indicating that the reliability requirements are met (Robinson, 1991).

The square root of AVE values of all dimensions in this study are greater than the correlation between dimensions and other dimensions, indicating that there is discriminant validity between dimensions. The bold words on the diagonal are the square root of AVE values, and the lower triangle is the Pearson correlation of the dimensions. The square root of AVE values of all dimensions are greater than the correlation between dimensions and other dimensions, indicating that there is discriminant validity between dimensions. The mean and standard deviation are shown in the table; therefore, the reliability, convergent validity, and discriminant validity of this model are good.

Table 2 Correlation coefficients between the square root of AVE and latent variables

Dimensions	Reliability	Convergent validity	Discriminant validity					Descriptive Statistics		
	Cronbach Alpha	AVE	WM	PI	OI	OIC	IB	mean	Standard Deviation	Number of cases
SCE	.756	.512	.706					5.78	.553	393
PSM	.787	.517	.380	.737				5.49	.706	393
LI	.714	.512	.349	.395	.666			5.61	.621	393

3. Analysis of model fitting and hypothesis testing results

In the structural equation model, the model fit index is a statistical indicator to examine the degree of fit of the theoretical structural model to the data. In this study, Amos 24.0 software was used to test the degree of fit of this model. Considering that the chi-square x2 (Minimum Fit Functional Chi G square) value of the absolute fit index is easily affected by the sample size, some scholars suggest using the ratio of the chi-square value to its degrees of freedom as a standard, combined with the goodness of fit index (GFI), normed fit index (NFI), increased fit index (IFI), and comparative fit index (CFI) as supplements. Its value range is between 0 and 1, the closer to 1, the better, and the root mean square error of approximation (RMSEA) should be less than 0.05, the smaller the better (Bagozzi & Yi, 1988). Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI). GFI and AGFI reflect the proportion of covariance that the hypothesized model can explain. The larger the goodness of fit index, the higher the degree of explanation of the independent variable on the dependent variable, and the higher the percentage of changes caused by the independent variable in the total change.

It is generally believed that GFI and AGFI greater than 0.9 indicate that the model fits the data well, so it can be considered that the model fits the sample data well, the model has a good fit, and can be used for the next step of operation.

Table 3 Results of structural model goodness of fit index

Fit index	Acceptable suggestions	The model fitting value
Chi-square value and degrees of freedom (Chi-square/df)	1—5	1.17
Root mean square error of approximation (RMSEA)	＜0.05—0.08	0.03
Normalized goodness of fit index (NFI)	＞0.9	0.92
Non-normed fit index (NNFI)	＞0.9	0.97
Comparative fit of models (CFI)	＞0.9	0.97
Increased fit index (IFI)	＞0.9	0.97
Goodness of fit index (GFI)	＞0.8	0.93

VIF value < 5 means there is no collinearity between dimensions, R-square value of 0.412 means moderate explanatory power, and R-square value of 0.128 means low explanatory power;

Confidence interval range does not include 0, P value < 0.05, which means the hypothesis is established, so all four hypotheses in this study are established, as shown in Table 5.

Bata value shows that the second classroom implementation effect (SCE) has a greater impact on labor literacy (LI) than public service motivation (PSM).

Table 4 Path analysis table (labor literacy LI)

Dependent Variable	Independent Variable	Unstandardized coefficients		Standardized coefficient	t	Significance	95.0% confidence interval for B		Collinearity Statistics	R^2
		B	Standard error	Beta			Lower limit	Upper limit	VIF	
LI	(constant)	.712	.391		1.823	.069	-.056	1.481		.412
	PSM	.148	.057	.112	2.573	.010	.260	.035	1.244	
	SCE	.301	.053	.291	5.686	.000	.197	.405	1.730	

Table 5 Path analysis table (public service motivation PSM)

Dependent Variable	Independent Variable	Unstandardized coefficients		Standardized coefficient	t	Significance	95.0% confidence interval for B		Collinearity Statistics	R^2
		B	Standard error	Beta			Lower limit	Upper limit	VIF	
PSM	(constant)	.617	.332		1.652	.059	-.079	1.512		.128
	SCE	.143	.051	.136	2.157	.014	.249	.044	1.261	

Note: Second Classroom Implementation Effect (SCE), Public Service Motivation (PSM), Labor Literacy (LI)

Table 6 Research hypothesis results description table

Path relationships between variables	Significance	Hypothesis test results
H1: The perceived implementation effect of the second classroom by college students in private undergraduate colleges in Guangdong Province, China has a significant positive impact on labor literacy	.010	Establishment
H2: The perceived implementation effect of the second classroom by college students in private undergraduate colleges in Guangdong Province, China has a significant positive impact on public service motivation.	.000	Establishment
H3: The public service motivation of college students in private undergraduate colleges in Guangdong Province, China has a significant	.000	Establishment

positive impact on labor literacy.

H4: The public service motivation of college students in private undergraduate colleges in Guangdong Province, China plays a mediating role in the impact of the perceived implementation effect of the second classroom on labor literacy.	.000	Establishment

4. Test of mediation effect

This part uses Model (4) of PROCESS to test whether the mediation hypothesis is established. The mediation hypothesis H4 (the public service motivation of college students in private undergraduate colleges in Guangdong Province, China plays a mediating role in the impact of the perceived implementation effect of the second classroom on labor literacy) is verified. The mediating effect of public service motivation exists. The results are shown in Table 7. The confidence interval values do not include 0. As shown in Table 7, the indirect effect is significant. The confidence intervals are (0.297, 0.487) and the interval range does not include 0. Therefore, the public service work motivation partially mediates the effect.

Table 7 Direct effects

DV	IV	Coeff	Se	T	p	LLCI	ULCI
PSM	constant	1.596	.213	7.500	.000	1.177	2.015
	SCE	.733	.039	18.585	.000	.655	.811
LI	constant	.498	.194	2.566	.011	.116	.880
	PSM	.528	.048	11.081	.000	.434	.622
	SCE	.369	.048	7.676	.000	.275	.464

Table 8 Total impact

	Effect	SE	t	p	LLCI	ULCI
Total	.757	.039	19.367	.000	.680	.833
Direct	.369	.048	7.676	.000	.275	.464
Indirect	.387	.049	7.898	.000	.297	.487

The partial mediating effect of public service motivation was verified, indicating that the implementation effect of the second classroom indirectly affects labor literacy through public service motivation; that is, the implementation effect of the second classroom can affect students' labor literacy by affecting their public service motivation.

In practical applications, this conclusion can provide some guidance for organizations, such as paying attention to and improving the implementation effect of the second classroom,

improving students' public service motivation, and promoting the cultivation of students' labor literacy.

5. Comparison of differences and analysis of results

Use single-factor ANOVA analysis (independent samples) to explore whether factors such as gender, grade, and major of students have different effects on the development of students' labor literacy.

(1) Check homogeneity

When observing data to test homogeneity, a significance value greater than 0.05 indicates homogeneity, indicating that this group of data can be analyzed by ANOVA (if the significance value is less than 0.05, ANOVA analysis cannot be used). A significance value greater than 0.05 indicates no significant difference, and a significance value less than 0.05 indicates a significant difference. As shown in Tables 9 and 10, the significance values are all greater than 0.05, indicating that this group of data can be analyzed by ANOVA.

Table 9 Homogeneity Checklist (LI)

Dependent Variable IB									
Gender	F	Degrees of Freedom 1	Degrees of Freedom 2	Significance	Job	F	自由度 1	自由度 2	显著性
	.396	1	391	.529		.222	4	388	.926
Major	F	Degrees of Freedom 1	Degrees of Freedom 2	Significance	Grade	F	自由度 1	自由度 2	显著性
	1.514	3	389	.210		1.788	3	389	.149

(2) Focus on the inter-subject effect test

Focus on the corresponding significance and local Eta square. After observation, it is found that the significance of education is less than 0.05, indicating that there is a significant difference, indicating that different education levels have significant differences in the performance of innovative behavior, while gender, age, teaching years, and positions and units have no significant differences, as shown in Table 10.

Table 10 Homogeneity Checklist (LI)

Dependent Variable:LI						
Source	Type III Sum of Squares	Degrees of Freedom	Mean Square	F	Significance	Partial Eta Squared
Corrected Model	5.608[a]	3	1.869	3.576	.014	.027

Intercept	3365.503	1	3365.503	6439.123	.000	.943
Grade	5.608	3	1.869	3.576	.014	.027
Error	203.317	389	.523			
Total	12423.889	393				
Corrected Total	208.925	392				

a. $R^2 = .027$（Adjusted $R^2 = .019$）

(3) Perform multiple comparisons

Look at the analysis results of the Scheffe method: the significance value of the comparison between the two is greater than 0.05, indicating that there is no significant difference between the two, and less than 0.05, indicating that there is a significant difference between the two.

As shown in Table 11, the grade of students has a significant impact on the development of students' labor literacy, which is caused by the faculty and staff of both freshmen and seniors.

Table 11 Multiple comparison analysis table (LI)

Grade		Mean Difference (I-J)	Standard error	Significance	95% Confidence Interval	
					Lower limit	Upper limit
Freshman	Sophomore	-.2068	.09296	.178	-.4678	.0542
	Junior	-.2018	.11364	.370	-.5208	.1173
Sophomore	Senior	-.7651*	.26764	.044	-1.5165	-.0136
	Freshman	.2068	.09296	.178	-.0542	.4678
Junior	Junior	.0050	.09466	1.000	-.2608	.2708
	Senior	-.5583	.26015	.205	-1.2887	.1721
Senior	Freshman	.2018	.11364	.370	-.1173	.5208

Freshman	Sophomore	-.0050	.09466	1.000	-.2708	.2608
	Senior	-.5633	.26823	.222	-1.3164	.1898
	Freshman	.7651*	.26764	.044	.0136	1.5165
Sophomore	Sophomore	.5583	.26015	.205	-.1721	1.2887
	Sophomore	.5633	.26823	.222	-.1898	1.3164

Based on measured average values.
The error term is mean square (error) = .514.

*. The difference in means is significant at the .05 level.

The grade that students attend affects their labor literacy, and there may be significant differences. That is to say, students of different grades differ in physical and mental development, cognitive ability, social experience, etc., and these differences may significantly affect their understanding, attitude and mastery of labor skills. Students in lower grades may pay more attention to intuitive and concrete labor experience, while students in higher grades can understand the abstract meaning of labor, such as the importance of labor for personal growth and social contribution. Students in higher grades usually have richer life and social experience, which may make them better understand the social value and practical significance of labor. Students of different grades may have different learning motivations. For example, senior students may pay more attention to the learning and mastery of labor skills because of the pressure of further study or employment. That is to say, when implementing labor education, educators need to consider the grade characteristics of students and design labor education content and activities suitable for their age and physical and mental development level. For example: for lower grade students, their labor interest and basic labor skills can be cultivated through gamified labor activities. For senior students, their labor values and vocational skills can be promoted through more in-depth labor practices such as social services and vocational skills training.

Discussion

This study's findings reveal several significant insights into the relationship between second classroom implementation and labor literacy among private undergraduate college students in Guangdong Province, China. The results merit discussion in relation to existing literature in four key areas:

1. Direct Impact of Second Classroom Implementation on Labor Literacy

The study found that students' perception of second classroom implementation has a significant positive impact on their labor literacy ($\beta = .291$, $p < .000$). This finding aligns with Wang Ting and Cheng Yong's (2012) research, which emphasized that the second classroom provides students with a valuable platform for applying theoretical knowledge to practice. However, our study extends their findings by quantifying this relationship and specifically focusing on labor literacy development. This result also supports Wei Peizheng et al.'s (2011)

assertion that higher student participation in second classroom activities correlates with improved comprehensive abilities, though our study specifically isolates labor literacy as a key outcome variable.

2. Mediating Role of Public Service Motivation

A novel finding of this study is that public service motivation partially mediates the relationship between second classroom implementation and labor literacy (indirect effect = .387, $p < .000$). This result adds a new dimension to Perry and Wise's (1990) theory of public service motivation by demonstrating its role in educational outcomes. While previous research by Zhang Xinwen and Tao Lanlan (2022) discussed public service motivation as a multi-dimensional concept, our study empirically demonstrates its mediating function in educational contexts, particularly in labor literacy development.

3. Grade-Level Differences in Labor Literacy Development

The study revealed significant differences in labor literacy development across grade levels, particularly between freshmen and seniors (mean difference = -.7651, $p < .044$). This finding presents an interesting contrast to Tan Chuanbao's (2019) perspective on labor literacy as a uniform educational outcome. Our results suggest that labor literacy development follows a progressive pattern throughout the undergraduate years, with senior students demonstrating higher levels of labor literacy, possibly due to increased exposure to practical experiences and social interactions.

4. Quality Factors in Second Classroom Implementation

Our analysis identified key factors contributing to effective second classroom implementation, including activity quality, teacher guidance, and resource adequacy. This finding both supports and expands upon Liu Jun and Gao Xiangdong's (2022) research on the second classroom as an important platform for comprehensive quality improvement. However, our study specifically highlights the role of these factors in labor literacy development, providing a more focused perspective than previous general studies on second classroom effectiveness.

These findings contribute to the existing literature by providing empirical evidence for the relationship between second classroom implementation and labor literacy, while also identifying public service motivation as a crucial mediating factor. The results suggest that educational institutions should consider both direct implementation quality and motivational factors when designing second classroom activities aimed at improving students' labor literacy.

Conclusion

Influence on students' labor literacy. This finding emphasizes the mediating role of public service motivation between the second classroom and labor literacy. The following are some explanations and further application suggestions for this finding:

1. Indirect effect: This means that the impact of the second classroom on students' labor literacy does not occur directly, but is achieved through the intermediate variable of public service motivation. This indirect effect shows that the quality and content of the second classroom can stimulate students' public service motivation and promote the formation of their labor literacy. 2. The importance of motivation: As an intrinsic motivation, public service motivation can drive students to actively participate in public service activities and learn and practice labor skills in the process, thereby improving labor literacy. 3. Educational strategy: When designing and implementing second classroom activities, educators should consider

how to stimulate and cultivate students' public service motivation, which is crucial to improving labor literacy.

Paying attention to and improving the implementation effect of the second classroom is of great significance to improving students' public service motivation and promoting the development of students' labor literacy. The following are some specific strategies and methods:

2.Ensure that the second classroom activities are consistent with students' interests and needs, and design practical, interactive and innovative course content. Strengthen the training of teachers and administrators to improve their professional ability in the design and implementation of second classroom activities. 2. Integrate resources inside and outside the school, including community resources and corporate cooperation, to provide students with a wider learning and practice platform. Regularly evaluate the implementation effect of the second classroom, and adjust the content and form of activities in a timely manner through the feedback mechanism. Encourage students to actively participate in the second classroom activities through incentive mechanisms, such as setting up scholarships and honorary certificates. 3. Integrate the education of public service values into the second classroom, emphasizing the importance of serving the society and the public.

Suggestions

Based on the research findings, this study proposes several recommendations to enhance the effectiveness of second classroom implementation and improve students' labor literacy development in private undergraduate institutions.

First, educational institutions should focus on strengthening their second classroom program design and implementation. It is crucial to develop systematic and standardized activities that align with labor literacy objectives while considering the significant differences observed between grade levels. The research findings indicate that senior students demonstrate higher labor literacy levels, suggesting the need for grade-specific program designs. Institutions should provide professional development opportunities for faculty members to enhance their guidance capabilities in labor education and establish clear performance evaluation systems for second classroom instructors.

Second, implementation strategies should emphasize quality assurance and student engagement. Regular monitoring and evaluation systems should be established to ensure program effectiveness. Given the study's finding of public service motivation's mediating role, institutions should integrate more public service elements into their second classroom activities. This could include developing partnerships with community organizations and creating structured volunteer programs that align with academic goals. Additionally, implementing feedback mechanisms and recognition systems can encourage sustained student participation and program improvement.

Third, future research directions should include longitudinal studies to track labor literacy development over time and expand investigation to other regions and institution types. Comparative studies examining differences across various institutional contexts and academic disciplines would provide valuable insights. Research should also focus on developing more comprehensive measurement tools for labor literacy and investigating additional potential mediating variables beyond public service motivation.

Finally, policy recommendations at both institutional and regional levels are

proposed. Institutions should develop comprehensive policies for second classroom implementation with clear guidelines for resource allocation. At the regional level, promoting collaboration among institutions and establishing shared resources and platforms could enhance program effectiveness. These policy frameworks should emphasize the integration of public service values into second classroom activities, as supported by our research findings on the significance of public service motivation in labor literacy development.

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