International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 18 (2026) pp. 1-14

https://doi.org/10.70917/ijcisim-2026-4304
Article

The Implementation Difficulties and Institutional Optimization of the Free Teacher Education Policy in Ethnic Higher Education Institutions

Wei Wang [1,*], Aida Hanim A. Hamid [1] and Bity Salwana Alias [1]

[1] Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor, 43600, Malaysia
* Correspondence author: mathias523_2025@126.com

Abstract: The free teacher education policy is of great significance for ethnic higher education institutions to supplement high-quality teachers and improve the educational quality in ethnic regions. To enhance the implementation effectiveness of the free teacher education policy in ethnic higher education institutions, it is necessary to deeply analyze the factors influencing the implementation effect of the burden reduction policy and their mechanism of action. Based on the Smith policy implementation process model as the theoretical basis, design survey research variables, establish a structural equation model, and verify that the idealized policy, the implementing agency, the target group, and the implementation environment are the influencing factors of the implementation effect of the free teacher education policy in ethnic higher education institutions. The influence degree of each factor from strong to weak is: target group > implementation environment > implementing agency > idealized policy. Moreover, these factors also interact with each other, forming tension, and influencing the entire process of policy implementation. Therefore, measures can be taken to improve the supporting policies: improving the quality of teacher training and providing long-term teaching security; the implementing agency should optimize the implementation content and efficiently promote the policy process; the target group needs to make rational applications, attach importance to the learning process, and firmly establish the confidence to teach; creating a more relaxed social environment and improving the matching degree between the recruitment and the surrounding environment.

Keywords: Free Teacher Education Policy; Ethnic Higher Education Institutions; Smith Model; Structural Equation; Policy Implementation

1. Introduction

National higher education institutions are ordinary higher education institutions established by China to address domestic ethnic issues, and they are also an important part of China's higher education system at present [1-2]. Since the establishment of national higher education institutions, they have borne a special historical mission. They must be in line with the social and economic development and demands of ethnic regions, and must cultivate high-level talents for ethnic regions [3-5]. The free teacher education policy, as an important measure for teacher training in national higher education institutions, has been implemented for over a decade since 2007 [6-7]. This policy attracts outstanding students to apply to national higher education institutions through preferential conditions such as "two exemptions and one subsidy" (exemption of tuition and accommodation fees, and subsidy of living expenses), and requires graduates to engage in primary and secondary education in their place of origin for at least six years [8-10]. On the surface, this seems to achieve a win-win situation for the country, the region, and individuals. However, during the actual implementation process, many structural contradictions have emerged.

Firstly, the shortage of teaching staff is widespread. This is largely due to the lack of talents caused

by insufficient educational investment in the past. Therefore, there are a large number of vacancies [11-12]. Additionally, the uneven distribution of funds is also the most prominent problem. When implementing the free teacher education policy, there are significant differences in expenditure among schools and deviations in implementation, which seriously affects the improvement of the overall level of schools [13-15]. Moreover, the lag in investment for undergraduate students, excessive teacher burden, and insufficient school investment resources have made undergraduate students the beneficiaries of the policy [16-17]. To address these difficulties, institutional optimization is imperative. It is necessary to carry out optimization from aspects such as increasing educational investment, improving the distribution model of funds, and improving the quality of teachers, in order to achieve high-quality development of free teacher education in national higher education institutions [18-19].

Based on the Smith policy implementation model and combined with the actual situation of the implementation of the free teacher education policy in national higher education institutions, latent variables and observable variables are determined from four aspects: idealized policy, policy implementation agency, implementation environment, and target group, forming a new model of policy implementation influencing factors, and proposing five theoretical hypotheses for this study. In addition, based on the above content, the theoretical model and the 465 questionnaire data samples collected are analyzed using descriptive statistics and correlation analysis with SPSS software, and then a SEM model is constructed using AMOS software, and the model is used to analyze the problems, and the proposed theoretical hypotheses are tested. Finally, based on the analysis and summary of the research results, the implementation difficulties of the free teacher education policy in national higher education institutions and the institutional optimization strategies are explored.

2. Research Design

2.1. Model Construction

(1) Structural Equation Model

The SEM equation mainly verifies the hypothesized relationships between observed variables through observed indicators. Therefore, it can be divided into two parts: the measurement model and the structural model. The measurement model is mainly used to analyze the relationship between latent variables and observed variables. Through the principal component extraction method, factors are extracted from the observed variables confirmed through questionnaire surveys and combined with the actual situation of the model to obtain the latent variables [20]. The structural model is precisely used to analyze the relationships among various latent variables.

The equation of the measurement model includes:

$$X = \lambda_X \xi + \delta \tag{1}$$

$$Y = \lambda_Y \eta + \varepsilon \tag{2}$$

Here: $X = (x_1, x_2, \cdots x_q)^T$ refers to the exogenous observed indicators; $\xi = (\xi_1, \xi_2, \cdots \xi_n)^T$ refers to the exogenous latent variables; λ_X refers to the regression matrix of X with respect to ξ, representing the relationship between the indicators and the latent variables; $\delta = (\delta_1, \delta_2 \cdots \delta_q)^T$ refers to the measurement error of X; $Y = (Y_1, Y_2 \cdots Y_p)^T$ is the endogenous observed indicator; $\eta = (\eta_1, \eta_2 \cdots \eta_m)^T$ is the endogenous latent variable; λ_Y refers to the regression matrix of Y with respect to η, representing the relationship between the indicators and the latent variables; $\varepsilon = (\varepsilon_1, \varepsilon_2 \cdots \varepsilon_p)^T$ refers to the measurement error.

The equations of the structural model include:

$$\eta = B\eta + \Gamma\xi + \zeta \tag{3}$$

Among them: The relationship between the endogenous latent variables within B, that is, the coefficient matrix; $\Gamma =$ the influence of exogenous latent variables on endogenous latent variables, that is, the coefficient matrix; $\zeta =$ the part of the variables and the relationships among them in the model that cannot be explained.

The model usually assumes that ζ and ξ are not correlated, ε and δ are not correlated, and they are also not correlated with the latent variables; B is non-singular; and $E(\eta) = E(\zeta) = 0$.

At the same time, the covariance matrices of ξ, ζ, ε, and δ, denoted as $COV(\xi)$, $COV(\zeta)$,

$COV(\varepsilon)$, and $COV(\delta)$ respectively, are assigned to Φ, Ψ, Θ_ε, and Θ_δ.

At present, there are mainly two types of estimation techniques that can be used to construct structural equation models. One is the covariance structure analysis method based on maximum likelihood estimation, often referred to as the "hard model", represented by the LISREL method; the other is the variance analysis method based on partial least squares, known as the "soft model", represented by the PLS method. The former method was developed earlier and is more widely used. With the continuous efforts of many scholars, it has become more mature. The latter method, namely the PLS method, was proposed later and still needs to be improved. In order to clearly and intuitively represent the causal relationship between specified variables, this paper selects the LISREL path diagram method. The LISREL method estimates the model parameters by fitting the model and estimating the covariance $\Sigma(\theta)$ with the sample covariance S. Specifically, it uses the maximum likelihood (ML) method to construct the fitting function of the model estimated covariance and the sample covariance, and then through iteration, obtains the parameter estimates that optimize the fitting function value.

(2) Influencing Factors of the Implementation of Free Teacher Education Policies in Ethnic Higher Education Institutions

Policy implementation is a complex process that is influenced by multiple factors interacting with each other, including policy formulation, implementation, and control. Therefore, we cannot separate it from the entire policy formulation process and should consider them within a unified analytical framework. Based on Smith's policy implementation process model, this paper deeply explores the influencing factors of the implementation of free teacher education policies in ethnic higher education institutions and systematizes and theorizes them, further integrating these factors into a complete theoretical model to better guide the policy implementation of ethnic higher education institutions. Smith proposed that the reason why policies cause social tensions during implementation is that the policy itself, the policy implementation subject, the target group, and the policy environment factors all exert mutual interaction forces during this process, forming feedback. As to whether this feedback is a positive force or a negative force cannot be given an absolute clear judgment [21]. A research model for the influencing factors of the implementation of free teacher education policies in ethnic higher education institutions was constructed based on these several major variables. The theoretical research model is shown in Figure 1.

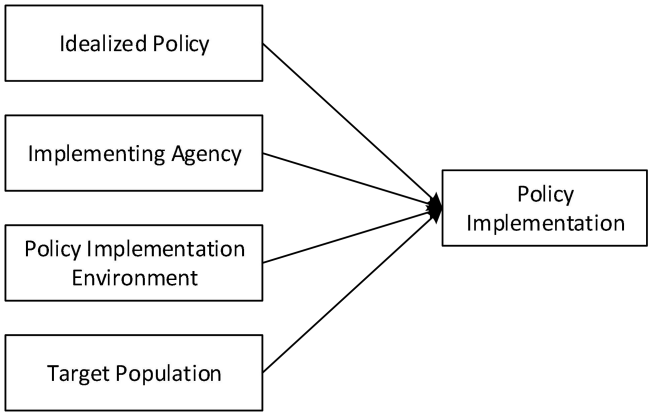

Figure 1. Theoretical research model structure

2.2. Selection of Research Variables and Hypotheses

Smith's theory on the process of policy implementation starts from an idealized policy, indicating that the degree of idealization of a public policy directly affects the public's acceptance of the policy, which in turn influences the efficiency and quality of policy implementation, as well as the degree of completion of the policy goals. Therefore, the following research hypothesis is proposed:

H1: The idealized policy is positively correlated with the implementation of the free teacher education policy.

Policy implementation relies on certain policy implementation resources. In this study, these mainly include the following aspects: the organizational structure of the implementing agency, which serves as the authoritative resource for policy implementation, through the legalization of government institutions and the policy process, possessing the qualification and power to redistribute social benefits and providing "guarantee" for social benefits; the human resources of the implementing agency, including

the human resource status of the implementing personnel, such as their knowledge and skills; the financial resources of the implementing agency, which provide the material guarantee for the smooth implementation of the policy. Therefore, the following research hypothesis is proposed:

H2: The implementing agency is positively correlated with the implementation of the free teacher education policy.

The effective implementation of the policy is to some extent dependent on the acceptance of the target group and the policy regulation objects towards the policy. Under the Chinese bureaucratic system, although the government's institutional design and power intention can replace some regulatory objects, the policy has a certain degree of antagonism and a large number of regulatory objects. It plays an important role in local social economic stability and urban management security, and thus obtaining the support and recognition of the target group for the policy is an important part of effectively promoting policy implementation. Therefore, the following research hypothesis is proposed:

H3: The policy implementation environment is positively correlated with the implementation of the free teacher education policy.

The policy implementation environment generally refers to the sum of natural and social conditions that affect policy implementation, including all factors related to it outside the public policy implementation system. Therefore, in the process of policy implementation, finding appropriate environmental factors is very important for the effective implementation of the policy. Therefore, the following research hypothesis is proposed:

H4: The target group is positively correlated with the implementation of the free teacher education policy.

2.3. Questionnaire Design and Validation

This part mainly involves the design of the questionnaire based on the theoretical foundation. At the same time, to ensure the rigor and scientificity of the survey, the author conducted a preliminary survey of a small group of people and used the collected initial data to test the reliability of the questionnaire. Finally, a suitable questionnaire was formed for this article.

(1) Design of the questionnaire

This article uses the questionnaire as the basis for empirical analysis. The content of the questionnaire mainly consists of two parts. On one hand, it includes the basic characteristics of the respondents, specifically including age, gender, educational level, and other issues. Considering the requirements of the structural equation, the data for this part requires less. The other part is the research on the influencing factors of the implementation of the educational burden reduction policy, which includes five potential variables. It uses the Likert five-level scale. "1" represents disagree, "2" represents relatively disagree, "3" represents uncertain, "4" represents relatively agree, and "5" represents agree. The specific composition is shown in Table 1.

Table 1. Specific questionnaire design

Potential	Observed variable	Code
Policy implementation effectiveness(XG)	Policy objectives	XG1
	Policy validity	XG2
	Public satisfaction	XG3
	Policy sustainability	XG4
Idealized policy(ZC)	Rationality of policy	ZC1
	Policy clarity	ZC2
	Policy feasibility	ZC3
Implementing agencies(JG)	The rationality of the organization	JG1
	Adequacy of resources	JG2
	Synergy between institutions	JG3
	The ability of the performer to work	JG4
Target groups(MB)	The target group has a process identity of policy	MB1
	The group's participation in the policy execution process	MB2
	The target group is satisfied with policy	MB3
	The target group's awareness of policy	MB4
Implementation environment(HJ)	Social conditions are guaranteed	HJ1
	Implement the integrity of the environmental system	HJ2
	Economic factors	HJ3
	The integrity of the supervisory mechanism	HJ4

(2) Pre-test of the questionnaire

To ensure the reliability and validity of the designed questionnaire, a pre-test needs to be conducted before the formal survey. That is, a small sample survey should be carried out according to the original design requirements first. Based on the survey results, the questionnaire is analyzed to determine if there

are any problems, laying the foundation for the formal survey. The author of this article conducted a pre-research in City S. A total of 90 predictive questionnaires were distributed, and 90 questionnaires were returned, with a 100% return rate. The following is the situation of the 90 questionnaires based on the pre-test for reliability and validity testing.

Reliability testing is an evaluation to determine whether the results are reliable and stable. When the coefficient of the results is high, it indicates that the questionnaire design is reasonable and relatively reliable. Currently, most of the results are evaluated using the internal consistency α coefficient. The standard of the α coefficient mostly follows DeVille's viewpoint. DeVille believes that when the α coefficient is between 0.60 and 0.65, the reliability is the worst; when it is between 0.65 and 0.70, the reliability is poor; when it is between 0.70 and 0.80, the reliability is good; when it is between 0.80 and 0.90, the reliability is quite good; and when it is between 0.90 and 1.00, the reliability is particularly good. From the results, it can be seen that $\alpha = 0.958$, and this questionnaire has very strong reliability.

Validity testing mainly measures whether the questionnaire design can well reflect the research topic. Validity testing generally uses KMO value and Bartlett's sphere test. KMO indicates whether the survey sample is appropriate. When the KMO value is less than 0.5, it is considered that the survey sample is inappropriate. The KMO value is closer to 1, indicating that the survey sample is very suitable and can be further factor analyzed. Table 2 shows the validity analysis results. Using the statistical software SPSS 22.0 for analysis, the results are as follows: KMO = 0.931 > 0.5, Chi-square = 3456.221, df = 182, P value = 0.000 < 0.05, indicating that there are common factors among the overall correlation matrix at the 0.05 significance level, and factor analysis can be conducted. In conclusion, it can be considered that this questionnaire has good validity and can be used in empirical research.

Table 2. Questionnaire validity analysis results

The KMO measure the sampling appropriability		**0.931**
Bartlett's spherical test	Chi-square	3456.221
	df	182
	Significance	0.000

After conducting reliability and validity tests on the questionnaire, it can be concluded that the questionnaire design is basically reasonable, the content is reliable and effective, and it can well reflect the research content of this article, providing a foundation for the subsequent content.

(3) Formation and distribution of the formal questionnaire

After conducting reliability tests and validity tests on the survey questionnaire, the questionnaire can pass the reliability and validity tests, confirming that the question setting of the questionnaire is basically reasonable and can be used to assist this research. Therefore, this research will use this questionnaire for empirical research to make the analysis of this article more realistic and reliable. In response to the research needs of this article, this empirical research selects M City for questionnaire distribution. The main objects of this empirical investigation are: staff members of the M City education administrative department, teachers in M City's primary and secondary schools, parents of M City's students, etc. This research conducted questionnaire surveys and semi-structured interviews with relevant stakeholders, and a total of 520 questionnaires were distributed, 480 were retrieved, with a recovery rate of 92.31%. Among them, 465 questionnaires were valid, with a valid recovery rate of 89.42%.

3. Empirical Analysis

3.1. Sample Overview

The basic situation of the sample data is shown in Table 3. In terms of gender, there are more females than males. Among them, the proportion of females is 57.78%, while that of males is 42.22%. From the perspective of age, the population is relatively concentrated. Over 90% of them are in the age range of 18-30 years old, which is in line with the actual situation that the sample comes from students of ethnic universities. In terms of education level, bachelor's degrees dominate, accounting for 88.71%, while the number of students with junior college degrees or below accounts for 10.02%. Regarding the degree of attention to the free teacher education policy, only 12.38% of people are very concerned, 39.55% are somewhat concerned, and the proportion of those who are less concerned or not concerned at all is close to 50%. Thus, the attention situation of students from ethnic universities to the free teacher education policy is relatively satisfactory.

Table 3. The basic information of the questionnaire

Information	**Options**	**Quantity**	**Proportion**

Gender	Male	196	42.22%
	Female	269	57.78%
Age	Under 18	47	10.02%
	18~ 30	412	88.71%
	30~ 45	6	1.27%
	Over 45	0	0
Education	Junior college and	47	10.02%
	undergraduate	412	88.71%
	Master graduate	6	1.27%
	Doctoral student	0	0
The focus on education policy	Pay great attention to	57	12.38%
	Focus on	184	39.55%
	Less concern	184	39.55%
	It's not about bets	40	8.52%

3.2. Descriptive Statistical Analysis

Descriptive analysis was conducted on the questionnaire observation variables using SPSSAU, with a focus on the average value, standard deviation, variance, skewness, and kurtosis indicators. The average value can reflect the general opinion of the respondents, and a higher mean indicates a higher overall tendency in the corresponding variable, while a lower mean indicates a lower tendency. The standard deviation and variance measure the degree of variance in the questionnaire results. The smaller the standard deviation, the smaller the data dispersion and the more concentrated the responses. The variance quantifies the degree of dispersion. Skewness and kurtosis are even more critical indicators for determining the normal distribution of questionnaire data, which are of great significance in ensuring the scientific and rigorous nature of data analysis and helping researchers understand the data patterns and laying a solid foundation for subsequent research. Through the analysis of these indicators, we can better understand the characteristics of the questionnaire data and provide a basis for subsequent data analysis and model construction. Descriptive analysis of the questionnaire results using the SPSSAU software is shown in Table 4 for the questionnaire description of the factors influencing policy implementation effectiveness.

The average values of each option of the questionnaire are within the range of 3.8 to 4.0. Given that the questionnaire question options are divided into five levels based on the degree of agreement, corresponding to the natural numbers 1 to 5, the average value not only shows a small difference but is also closer to the right end (i.e., closer to the value representing a higher degree of agreement). This indicates that the implementation effect of the free teacher education policy in ethnic higher education institutions is not well received in the eyes of the respondents, being at a slightly lower level than average. On the other hand, it also means that when considering the four key dimensions of idealized policy, implementation agency, target group, and implementation environment, the overall situation is average. At the same time, this can also be preliminarily inferred that there is a positive correlation between the independent variable and the dependent variable, that is, the performance of the independent variable has a consistent trend of influence on the dependent variable (policy implementation effectiveness).

Secondly, the standard deviation and variance of the questionnaire as a whole are between 0.6 and 0.9. The values of standard deviation and variance indicate that the dispersion of the data is relatively low, meaning that respondents' opinions on the questions covered by the questionnaire are generally consistent. However, since the values are not zero, it also indicates that there is still a certain degree of disagreement among respondents, not completely unified.

Finally, the absolute values of the kurtosis and skewness coefficients are both less than 1. According to relevant statistical criteria, this indicates that the sample data is in a normal distribution state, meeting the basic requirements of the structural equation model research for the distribution shape of data. Based on all these points, it can be determined that the data collected in this survey is suitable for structural equation model research and can provide a reliable data foundation for further in-depth exploration of the implementation effect of the free teacher education policy in ethnic higher education institutions and its influencing factors.

Table 4. Descriptive analysis of influence factors of policy execution effect

Variable	N	Min	Maxi	Mean	SD	Variance	SK	BK
ZC1	465	2	5	3.922	0.829	0.688	-0.919	-0.143
ZC2	465	2	5	3.839	0.847	0.714	-0.878	-0.083
ZC3	465	2	5	3.927	0.818	0.662	-0.953	-0.112
JG1	465	2	5	3.966	0.848	0.714	-0.817	-0.285
JG2	465	2	5	3.976	0.826	0.681	-0.862	-0.236
JG3	465	2	5	3.959	0.838	0.709	-0.762	-0.286
JG4	465	2	5	3.869	0.857	0.729	-0.992	-0.091
MB1	465	2	5	3.964	0.857	0.735	-0.883	-0.271
MB2	465	2	5	3.862	0.849	0.728	-0.891	-0.132
MB3	465	2	5	3.964	0.868	0.755	-0.798	-0.329
MB4	465	2	5	3.976	0.839	0.711	-0.764	-0.314
HJ1	465	2	5	3.924	0.828	0.697	-0.858	-0.191
HJ2	465	2	5	3.844	0.838	0.698	-0.826	-0.105
HJ3	465	2	5	3.924	0.828	0.68	-0.914	-0.145
HJ4	465	2	5	3.914	0.818	0.677	-0.923	-0.137
XG1	465	2	5	3.957	0.839	0.701	-0.958	-0.191
XG2	465	2	5	3.886	0.843	0.708	-0.801	-0.194
XG3	465	2	5	3.951	0.846	0.718	-0.832	-0.254
XG4	465	2	5	3.945	0.841	0.703	-0.985	-0.166

3.3. Correlation Analysis

The Pearson correlation coefficient has distinct characteristics: when the coefficient is within the range of 0 to 1, it clearly indicates a positive correlation between the variables, and the closer the value is to 1, the stronger the correlation between the variables and the deeper the mutual influence; conversely, when the coefficient is within the range of -1 to 0, it represents a negative correlation between the variables. At this time, the closer the absolute value is to 1, the stronger the negative correlation is, and the closer it is to 0, the weaker the negative correlation is [22]. The correlation analysis results of the factors influencing the policy implementation effect are shown in Table 5.

First, the Pearson correlation coefficient between the idealized policy and the policy implementation effect is 0.933, with a P-value of 0.000, indicating a significant positive correlation. This fully demonstrates that the idealized policy has a strong positive driving effect on the policy implementation effect, and hypothesis H1 is preliminarily verified to be established. Second, the Pearson correlation coefficient between the implementing agency and the policy implementation effect is 0.917, with a P-value of 0.000, indicating a significant positive correlation. This means that the operation status of the implementing agency is closely linked to the policy implementation effect and has an undeniable positive assistance, and hypothesis H2 is preliminarily verified to be established. Third, the Pearson correlation coefficient between the target group and the policy implementation effect is 0.881, with a P-value of 0.000, indicating a significant positive correlation. This result shows that the performance of the target group has a positive and active impact on the improvement of the policy implementation effect, and hypothesis H4 is preliminarily verified to be established. Fourth, the Pearson correlation coefficient between the implementation environment and the policy implementation effect is 0.879, with a P-value of 0.000, indicating a significant positive correlation. This shows that a good implementation environment plays an important promoting role in the achievement of the policy implementation effect, and hypothesis H3 is preliminarily verified to be established.

Through rigorous and systematic analysis, the degree of correlation between each factor and the policy implementation effect is clearly presented. This not only lays a solid data foundation for in-depth exploration of the internal influencing mechanism of policy implementation, but also provides extremely crucial decision-making basis.

Table 5. The impact factor model correlation analysis results of policy execution effect

Variable	Index	XG	ZC	JG	MB	HJ
XG	Pearson	1	0.933**	0.917**	0.881**	0.879**
	Sig.		0.000	0.000	0.000	0.000
	N	465	465	465	465	465
ZC	Pearson	0.933**	1	0.977**	0.919**	0.923**
	Sig.	0.000		0.000	0.000	0.000
	N	465	465	465	465	465
JG	Pearson	0.917**	0.977**	1	0.921**	0.915**
	Sig.	0.000	0.000		0.000	0.000
	N	465	465	465	465	465
MB	Pearson	0.881**	0.919**	0.921**	1	0.955**
	Sig.	0.000	0.000	0.000		0.000
	N	465	465	465	465	465
HJ	Pearson	0.879**	0.923**	0.915**	0.955**	1
	Sig.	0.000	0.000	0.000	0.000	
	N	465	465	465	465	465

3.4. Structural Equation Model Test

(1) Validation of the measurement model's reliability and validity

This study first used SPSS and Amos software to conduct reliability and validity tests on the measurement model. Table 6 shows the standard loadings of each factor, Cronbach's α, composite reliability (CR), and average variance extracted (AVE) of the model. According to the research results, the Cronbach's α and composite reliability (CR) of the scale are both greater than 0.7, and the average variance extracted (AVE) of the other three latent variables except for policy implementation effect and target group is greater than 0.5. Moreover, the average variance extracted (AVE) values of policy implementation and teacher job satisfaction are approximately equal to 0.5, indicating that the scale has good internal consistency and good convergent validity.

Table 6. Reliability and validity of the quantity model

Latent variable	Observed	Standard load	Cronbach's α	CR	AVE
Policy implementation effectiveness	XG1	0.604	0.769	0.777	0.481
	XG2	0.798			
	XG3	0.751			
	XG4	0.681			
Idealized policy	ZC1	0.767	0.852	0.856	0.602
	ZC2	0.609			
	ZC3	0.634			
Implementing agencies	JG1	0.671	0.888	0.856	0.599
	JG2	0.772			
	JG3	0.731			
	JG4	0.721			
Target groups	MB1	0.689	0.867	0.794	0.433
	MB2	0.775			
	MB3	0.621			
	MB4	0.703			
Implementation environment	HJ1	0.714	0.933	0.914	0.626
	HJ2	0.673			
	HJ3	0.798			
	HJ4	0.766			

(2) Fit indices of the structural equation model

Table 7 presents the main fit indices obtained from the structural model test. By comparing the fit indices with the recommended values, except for the AGFI value which is very close to the recommended value of 0.8, and the GFI and NNFI values which are also close to the recommended value of 0.9, the fit values of the other fit indices fall within the recommended range. Thus, it can be concluded that the fit indices of this study are good, indicating that the theoretical model set in this study is reasonable.

Table 7. The fitting of the structure equation model

Fitness index	Recommended value	Fitting value
χ^2	The smaller the better	488.512
χ^2 / df	<3.0	2.273
GFI	>0.9	0.885
AGFI	>0.8	0.799
RMSEA	<0.08	0.075
NNFI	>0.9	0.879
IFI	>0.9	0.919
CFI	>0.9	0.917

(3) Path analysis of the model

Next, a path analysis is conducted on the latent variables in the created model to explore the causal relationships among them. Table 8 shows the path coefficients of the factors influencing the policy implementation effect in the model, and Figure 2 presents the structural diagram of the model. According to the path coefficients between the observed variables and the latent variables, as well as between the latent variables themselves, in the table, all have reached the standard parameters and are significant. Therefore, it supports the four model hypotheses proposed in the previous text. Through the path analysis, the standardized path coefficients of the idealized policy, the implementing agency, the target group, and the implementing environment on the policy implementation effect of the ethnic higher education institution are respectively: 0.217, 0.230, 0.271, and 0.248. Although the numerical values of each coefficient are not much different, they still reflect the strength of the influence of each factor to a certain extent, from strong to weak: target group > implementing environment > implementing agency > idealized policy. At the same time, it is also found that there is an interaction relationship among the factors, and the standardized path coefficients of each observed variable and its corresponding latent variable, from which we can know the degree of influence of the observed variable on the latent variable, and thereby analyze the influence path of the four factors on the policy implementation effect of the free teacher education policy of ethnic higher education institutions.

The target group has a direct impact on the policy implementation effect, with an impact coefficient of 0.277, which is the highest among the other three factors. At the same time, the target group has an indirect impact on the policy implementation effect through the idealized policy, with an impact coefficient of $0.303 \times 0.219 = 0.066$; the target group has an indirect impact on the policy implementation effect through the implementing agency, with an impact coefficient of $0.18 \times 0.23 = 0.0414$; the target group has an indirect impact on the policy implementation effect through the implementing environment. This indicates that the target group is not only a direct factor affecting the policy implementation effect but also a mediating factor. The path analysis results of the model reflect the positive correlation and mechanism of the implementing agency with the policy implementation effect.

The implementing environment has a direct impact on the policy implementation effect, with an impact coefficient of 0.251, indicating a positive correlation between the implementing environment and the free teacher education policy of ethnic higher education institutions. Compared with the other three factors, the standardized path coefficient is relatively high, indicating that the free teacher education policy of ethnic higher education institutions is greatly influenced by the implementing environment. At the same time, the implementing environment has an indirect impact on the policy implementation effect through the idealized policy, with an impact coefficient of 0.0486, and the implementing environment has an indirect impact on the policy implementation effect through the target group and the implementing agency. This indicates that the implementing environment is not only a direct factor affecting the policy implementation effect but also a mediating factor. The path analysis results of the model reflect the positive correlation and mechanism of the implementing environment with the policy implementation effect of the free teacher education policy of ethnic higher education institutions. The policy implementation environment is the comprehensive external complex environmental factor that affects policy implementation, and it has a profound impact on the effect of policy implementation.

The implementing agency has a direct impact on the policy implementation effect, with an impact coefficient of 0.232, and the standardized path coefficient is not too high compared with the other three factors, but the positive coefficient also indicates that the implementing agency has a direct positive impact on the policy implementation effect of the free teacher education policy of ethnic higher education institutions. At the same time, the implementing agency has an indirect impact on the policy implementation effect through the idealized policy, the target group, and the implementing environment. This indicates that the implementing agency is not only the direct factor affecting the policy implementation effect but also a mediating factor. Although the coefficient value is not large, it also

reflects the positive correlation and mechanism of the implementing agency with the policy implementation effect of the free teacher education policy of ethnic higher education institutions. Through the analysis of the influence paths of variables, it is found that the idealized policy has a direct impact on the policy implementation effect, with an influence coefficient of 0.219. Moreover, the idealized policy exerts an indirect influence on the policy implementation effect through the implementation agency, the target group, and the implementation environment. This indicates that the idealized policy is not only an immediate factor influencing the policy implementation effect, but also indirectly affects the policy implementation effect by influencing other factors. Although the coefficient value is not large, it still reflects the positive influence relationship and mechanism of the idealized policy on the implementation effect of the free teacher education policy in ethnic higher education institutions.

Table 8. The influence factor of the policy execution effect

Path	Normalization factor	S.E.	C.R.	P
XG<--ZC	0.219	0.105	3.722	***
XG<--JG	0.232	0.095	4.041	***
XG<--MB	0.277	0.081	4.752	***
XG<--HJ	0.251	0.077	4.431	***
ZC3<--ZC	0.734			
ZC2<--ZC	0.733	0.081	12.268	***
ZC1<--ZC	0.919	0.129	12.741	***
JG4<--JG	0.758			
JG3<--JG	0.809	0.077	14.474	***
JG2<--JG	0.774	0.075	13.812	***
JG1<--JG	0.929	0.097	16.235	***
MB4<--MB	0.831			
MB3<--MB	0.792	0.065	15.737	***
MB2<--MB	0.788	0.061	15.781	***
MB1<--MB	0.915	0.075	18.759	***
HJ4<--HJ	0.831			
HJ3<--HJ	0.797	0.061	16.174	***
HJ2<--HJ	0.807	0.058	16.449	***
HJ1<--HJ	0.929	0.061	19.435	***
XG1<--XG	0.921			
XG2<--XG	0.808	0.041	17.311	***
XG3<--XG	0.733	0.045	15.262	***
XG4<--XG	0.699	0.039	14.133	***
ZC<-->HJ	0.222	0.045	3.222	***
ZC<-->MB	0.303	0.047	4.321	***
ZC<-->JG	0.208	0.035	3.062	0.005
JG<-->MB	0.185	0.044	2.821	0.008
JG<-->HJ	0.299	0.049	4.424	***
MB<-->HJ	0.129	0.053	1.985	0.049

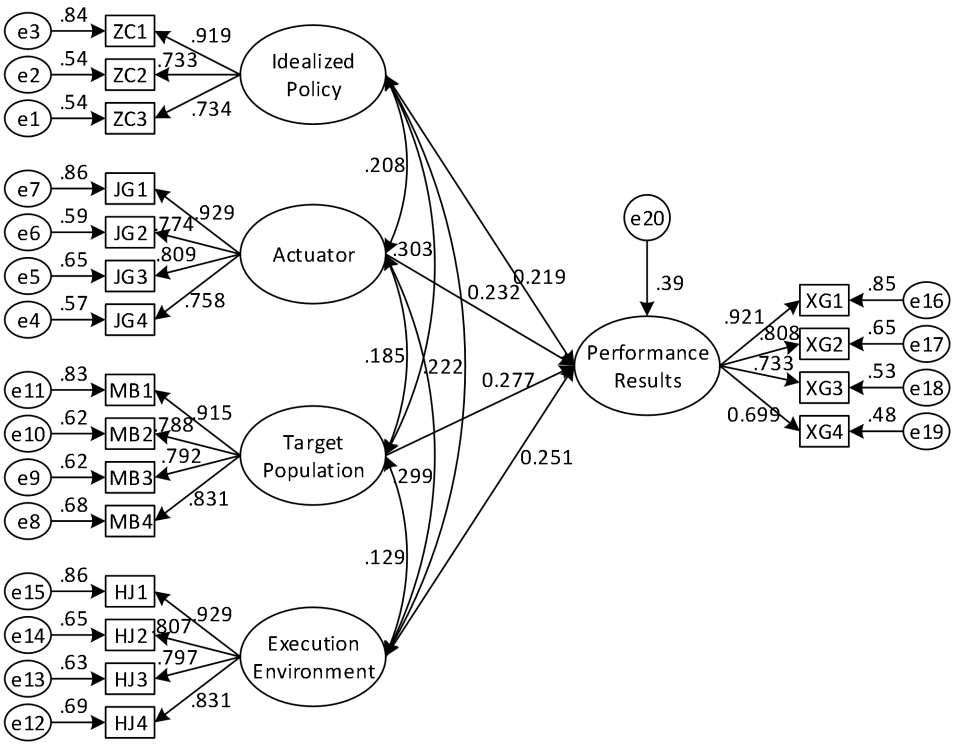

Figure 2. The influence factor model structure of policy execution effect

4. Optimization of the implementation mechanism for the free teacher education policy

4.1. Execution Challenges

(1) Idealized policies: Weak supervision and guarantee measures

Firstly, there is a lack of supervision and evaluation policies. On one hand, the free teacher education policy is insufficient in monitoring the process and quality of teacher training by the training institutions. On the other hand, the supervision of the policy implementation process by the educational administrative departments is weak. Secondly, there is a lack of performance retention guarantee policies. Firstly, local public-funded teacher students have limited opportunities for academic improvement and on-the-job training in terms of upward mobility. Secondly, the cross-regional transfer policies at the mobility level are not specific and have high operational difficulty.

(2) Implementing institutions: Poor effectiveness in implementing policies

Firstly, the degree of policy promotion by implementing schools varies. During the process of promoting the public-funded teacher education policy from top to bottom, the high school schools where the target group is located are the last link in the implementation chain, but this link is the key part where the target group can directly perceive the policy. The publicity intensity of the school on the policy, the understanding and attitude of the implementing personnel towards the policy, directly affect the enthusiasm of the target group to apply. Secondly, the recruitment measures of the educational administrative departments and the target schools need improvement. Thirdly, the recruitment and training of the training universities are not targeted enough.

(3) Target groups: Differentiated obstacles at different stages of the policy

When applying for admission, incomplete policy information acquisition leads to irrational choices. The limited and asymmetric problem of obtaining teacher information will greatly affect the rational behavior of the applicants in their application process. In their studies, the weakened employment prospects reduce the learning motivation. After entering the job, the restrictions of the employment policy weaken the confidence in fulfilling the contract.

(4) Environmental factors: Multiple circumstances exacerbate adverse effects

The proliferation of the teacher education craze leads to the emergence of utilitarian application behaviors. In recent years, there has been a wave of applying for teacher education programs. In disadvantaged areas, the enrollment effect of some majors is not satisfactory. Some backward, remote and poor areas as well as some majors have poor enrollment situations. Their geographical location and

economic conditions not only make it difficult to attract local students to stay but also hinder the entry of students from other regions due to the regional restrictions of the application policies.

4.2. Strategy for System Optimization

(1) Improve supporting policies and enhance the quality of teacher training as well as the long-term teaching guarantee for students.

Introduce process-based supervision and evaluation policies, establish a policy supervision and assessment mechanism, and introduce policies for monitoring the quality of local free teacher training in ethnic universities. Optimize post-service continuing education policies, clearly define the performance obligations after graduation, and address their concerns regarding academic advancement and professional growth after employment. Relevant local departments should refine the mobilization policies, clarify the mobilization procedures, and improve the mobilization mechanism, fully coordinate and reserve the space for the transfer of public-funded teachers, to provide convenience for the cross-county transfer of public-funded teacher graduates and ensure their immediate interests.

(2) The implementing agency should optimize the implementation content and efficiently promote the policy implementation process.

The policy plan should ensure that the policy implementers have smooth information channels and sufficient information sources. On the basis of prioritizing the matching of the original supply and demand, implement dynamic allocation within the region, and strive to ensure the consistency of supply and demand for graduates. Establish a comprehensive skills assessment system for teacher trainees, rate their teaching and educational skills at different levels, and link it to the selection of positions at the time of employment. Expand exchanges and cooperation with basic education schools, establish different types and levels of training bases and training venues, and create internship and practical platforms that meet the needs of students. During the implementation of public recruitment, the education administrative department should also strictly follow the recruitment procedures and implement selection-based assessments.

(3) The target group should be rational in their application, attach importance to the learning process, and firmly establish the confidence to teach.

Before applying: Fully understand the policy content, make rational choices in applying, and local public-funded teacher trainees should avoid a "lying down" mentality, establish a sense of crisis, consolidate academic foundations, enhance teaching and educational skills, abide by the contract spirit after entering the job, and firmly establish the belief to teach. Teacher trainees should recognize the financial investment of the country in cultivating public-funded teacher trainees and the expectations of society for teacher trainees, and on the basis of adhering to their own educational beliefs, practice the contract spirit.

(4) Create a more relaxed social environment and improve the matching degree between the recruitment and the surrounding environment.

Create a more relaxed and friendly employment environment, provide diversified, innovative, and cutting-edge job positions, and alleviate the anxiety of students due to blindly pursuing stability and the narrowness of career choices. For economically disadvantaged remote areas, a combination of compensatory and developmental incentives should be adopted to enhance the treatment guarantee for public-funded targeted teachers.

5. Conclusion

Based on the Smith policy implementation model and referring to the policy comprehensive implementation model for indicator design, this paper constructs a theoretical model of the influencing factors of the implementation of free teacher education policies in ethnic higher education institutions, with idealized policies, implementing institutions, policy implementation environment, target groups, and policy implementation as the main variables. Five theoretical hypotheses of this paper are proposed. During the specific analysis, after conducting correlation and regression analyses using SPSS software, the above five theoretical hypotheses were preliminarily verified. On this basis, a structural equation model was constructed using AMOS software. After testing and correcting the model, the final verification of the research hypotheses was conducted based on the results of path analysis. Through the final test, all five research hypotheses proposed in this paper can be verified. The factors affecting policy implementation mainly include whether the policy itself is ideal, the effectiveness of the implementing institution, the policy implementation environment, and the target group. Among them, the target group has the most significant impact on policy implementation. The research results show that the construction of the assessment variable system and the selection of result analysis methods in this study have good reliability and operability, providing certain references for future research on the influencing factors of

education burden reduction policy implementation. In the implementation process of free teacher education policies in ethnic higher education institutions, there are also problems such as weak supervision and guarantee of the policy itself, poor effectiveness of the implementing institution in promoting the policy, prominent differences among target groups in different policy stages, and adverse effects caused by multiple circumstances of environmental factors. Therefore, adjustments can be made from the following aspects: improving supporting policies to improve the quality of teacher training and long-term teaching security; the implementing institution should optimize the implementation content and efficiently promote the policy process; the target group should be rational in their application, attach importance to the learning process, and firmly believe in teaching; create a more relaxed social environment and improve the matching degree between recruitment and the surrounding environment.

References

1. Taylor, M., Turk, J. M., Chessman, H. M., & Espinosa, L. L. (2020). Race and ethnicity in higher education. American Council on Education, Washington, DC.
2. Shu, F., Sugimoto, C. R., & Larivière, V. (2021). The institutionalized stratification of the Chinese higher education system. Quantitative Science Studies, 2(1), 327-334.
3. Czepil, M., Karpenko, O., Revt, A., & Istomina, K. (2019). Formation of Students' Ethnic Tolerance in Institutions of Higher Education. Advanced Education, 12, 114-119.
4. Arday, J. (2018). Understanding race and educational leadership in higher education: Exploring the Black and ethnic minority (BME) experience. Management in Education, 32(4), 192-200.
5. Allen, W., Jones, C., & McLewis, C. (2019). The problematic nature of racial and ethnic categories in higher education. American Council on Education, 15-19.
6. Youngs, P., Qian, H., Hu, S., & Prawat, X. J. (2017). China's free teacher education policy. In International handbook of teacher quality and policy (pp. 463-477). Routledge.
7. Barnes, M., & Cross, R. (2020). Teacher education policy to improve teacher quality: Substantive reform or just another hurdle?. Teachers and Teaching, 26(3-4), 307-325.
8. Luo, Z., & Mkandawire, M. T. (2015). Are Fruits of Free Normal Education Policy Real or Mythical?" A Critical Appraisal of the Free Teacher Education Policy Meant to Promote Rural Education in China". Journal of Education and Training Studies, 3(3), 13-22.
9. Qian, H., Youngs, P., Hu, S., & Prawat, X. J. (2020). Will China's Free Teacher Education Policy address teacher shortages in rural schools or reproduce existing inequality?. Compare: A Journal of Comparative and International Education, 50(5), 713-725.
10. Chen, J., Wang, Z., Zhang, L., Zhao, Y., & Ma, Y. (2025). Investigating the default intention among preservice teachers in the free teacher education programme: implications for enhancing rural education quality. Journal of Education for Teaching, 51(2), 245-258.
11. Qiao, X., & Lai, M. (2019). Pre-service teachers' job-related perceptions of teaching in rural areas: a study of the free teacher education programme in mainland China. Teachers and Teaching, 25(7), 782-799.
12. Liao, W., & Yuan, R. (2017). Understand an emerging "failure" of an equality-oriented teacher policy in China: A job search perspective. International Journal of Educational Research, 81, 71-82.
13. Zha, Q. (2020). Equality and equity in Chinese higher education in the post-massification era: An analysis based on Chinese scholarly literature. The China Quarterly, 244, 1056-1077.
14. Liu, W. H., & Ma, R. (2018). Regional inequality of higher education resources in China. Frontiers of Education in China, 13(1), 119-151.
15. Zheng, T., Zhou, M., & He, Y. (2022, March). Regional inequality of higher educational resources' distribution in China. In International Conference on Business and Policy Studies (pp. 790-800). Singapore: Springer Nature Singapore.

16. Wang, D. D. (2019). Performance-based resource allocation for higher education institutions in China. Socio-Economic Planning Sciences, 65, 66-75.
17. Li, X., Wang, H., Gong, Y., Zhou, J., & Zhao, P. (2026). The Paradox of Plenty: Efficiency and Sustainable Resource Allocation in Chinese Key Universities. Sustainability, 18(9), 4187.
18. Ye, J., Zhu, X., & Lo, L. N. (2019). Reform of teacher education in China: A survey of policies for systemic change. Teachers and teaching, 25(7), 757-781.
19. Li, J., & Xue, E. (2023). New pedagogical trends in China's teacher education: A holistic policy text analysis. Educational Philosophy and Theory, 55(4), 446-455.
20. Mengxia Chen & Katsuo Tamaoka. (2026). Kanji-based lexical knowledge as a predictor of Japanese text comprehension in Chinese JFL learners: A structural equation modeling (SEM) approach. Acta psychologica,269,107460.
21. Jinfeng Xu. (2024). Reality Blockage and Promotion Strategy of Education Differentiation Policy in Border Areas - An Analysis based on Smith's Model of Policy Implementation Process. Journal of Research in Vocational Education,6(4).
22. Jiayu Chen, Yipeng Wang & Lifeng Lin. (2026). Practical Guidance on Fisher's z Transformation for Meta-Analysis of Pearson's Correlation Coefficients. Journal of evidence-based medicine,e70165.

About the Author

Wei Wang was born in Xining, Qinghai, PR China, in 1989. He received the master degree from East China Normal University. And holder PHD Degree from universiti Kebangsaan Malaysia now.His research interests include Educational Management, Education Policy.