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The Role and Practice of Ideological and Political Education in Urban Housing Policy Reform

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Abstract The author constructs an AHP-fuzzy comprehensive evaluation model to conduct a comprehensive evaluation of ideological and political education. After determining the weights of evaluation indicators using the analytic hierarchy process, the fuzzy comprehensive evaluation algorithm is applied to calculate the membership degrees of evaluation indicators, thereby determining the evaluation results of ideological and political education. From the perspective of system dynamics, the role of ideological and political education in urban housing policy reforms is considered, and a system dynamics-based ideological and political education system is constructed. A system dynamics model of the impact of urban housing policies on ideological and political education is constructed, and it is tested and analyzed through simulation. In the ideological and political education evaluation practice of this paper, the overall evaluation result of School S's ideological and political education is “excellent.” After 2027, ideological and political theory and social practice will grow rapidly. After 2026, the influence of housing environment on ideological and political content increases. The influence of policy communication on ideological and political content is similar to that of housing environment. After 2027, the effectiveness of ideological and political education improves rapidly.

Index Terms AHP-fuzzy comprehensive evaluation, system dynamics, ideological and political education, urban housing policy

I. Introduction

The real estate industry is not only a pillar of the national economy but also bears significant responsibilities for ensuring the well-being of the people, making positive education and interpretation particularly important [1]. On the one hand, in recent years, issues such as soaring housing prices, frequent quality problems in housing, and the collapse of long-term rental apartments have led to negative public sentiment toward the real estate industry and government regulatory ineffectiveness [2]-[4]. On the other hand, while the “housing for living, not for speculation” policy has helped stabilize housing prices, the decline in industry profits has inevitably led to feelings of discouragement and dissatisfaction among professional students and industry practitioners [5]-[7]. Moral education is the fundamental task of education, and the comprehensive promotion of course-based ideological and political education is a strategic measure to implement this fundamental task [8]. How to guide students to correctly view the achievements of urban housing policy reforms in safeguarding people's livelihoods, improving residents' satisfaction with housing, and enhancing their sense of happiness, as well as correctly understand the reasons for government market regulation and its determination to stabilize the market, are all important measures for maintaining industry stability and social stability, and are also core focal points for guiding students to correctly understand public policy [9]-[12].

The development of the real estate industry, of which housing policy is a component, is inextricably linked to political economy analysis. Delgado Ramos, G. C. utilized political economy analysis tools to study the impact of urban real estate speculation and development on contemporary urbanization. While capital speculation has created contradictions and imbalances in urban development, it has also injected momentum into urban transformation [13]. Shatkin, G. demonstrated that the state's land monetization strategy played a significant role in promoting political and spatial changes in urban peripheries, and that political economy analysis provides a robust explanation for the emergence of social and spatial inequalities and political competition [14]. Waldron, R. explored the causes of the real estate investment trust (REIT) market collapse and its economic, social, and political impacts, aiming to seek solutions to housing finance issues through political-economic model analysis [15]. Rogers, D. and Power, E. described the housing crisis and changes in the housing system during the COVID-19 pandemic, emphasizing that scientifically sound housing policies are key to addressing a range of health, economic, and political challenges [16]. Based on this, taking the social responsibility of real estate development enterprises as

the guiding principle and utilizing the guiding ideology embedded in ideological and political education as a tool to guide students in understanding the entire real estate development process holds significant importance for establishing confidence in the path and system of socialism with Chinese characteristics in the real estate sector.

This paper first constructs a hierarchical analysis-fuzzy comprehensive evaluation model, using the layer analysis method to determine the weights of various factors in the evaluation of ideological and political education, and then calculates the comprehensive evaluation results of each evaluation factor in ideological and political education through the fuzzy comprehensive evaluation algorithm. Taking students majoring in journalism and communication at School S as the survey subjects, the AHP-fuzzy comprehensive evaluation model is used to obtain their comprehensive evaluation results for ideological and political education. System dynamics are introduced to analyze the factors and mechanisms of the ideological and political education system in higher education institutions. Urban housing policies and ideological and political education are linked through a system dynamics model, and simulation analysis is conducted to explore the impact of urban housing policies on ideological and political education.

II. Construction of an AHP-fuzzy comprehensive ideological and political teaching evaluation model

In the field of educational evaluation applications, algorithms such as principal component analysis, backpropagation neural networks, and cluster analysis can be employed, each with its own advantages and disadvantages. The Analytic Hierarchy Process (AHP) is a multi-objective decision-making analysis method that effectively integrates qualitative and quantitative analysis. Fuzzy comprehensive evaluation is a method that utilizes the theoretical concepts of fuzzy mathematics membership degrees to convert qualitative evaluations into quantitative evaluations based on specific sample requirements. It addresses the challenge of how to reasonably and scientifically synthesize multiple indicators into a single indicator form to achieve the purpose of comprehensive evaluation. The combination of AHP and fuzzy comprehensive evaluation improves the consistency issues in traditional hierarchical analysis and the complex indicator weight determination issues in fuzzy comprehensive evaluation, thereby enhancing the scientific rigor and systematic nature of educational evaluation.

II. A. Determining weights using the analytic hierarchy process

The evaluation of the effectiveness of ideological and political education involves numerous factors, multiple characteristic values, and complex hierarchical structures. The analytic hierarchy process (AHP) is used to construct a judgment matrix between factors to determine the weights of each factor [17]. The consistency of the judgment matrix is used to determine the rationality of the set weights to ensure that the weights of each evaluation indicator are consistent with objective reality.

II. A. 1) Determining the importance of each factor

To compare the importance of various indicator factors, a scale method using 1-9 and its reciprocal is generally used. Set the function to represent the importance scale between factors, and agree that $f(x,y)=1/f(y,x)$.

II. A. 2) Constructing a judgment matrix

Let $X=\{x_1,x_2,\cdots,x_n\}$ be the set of all factors. Perform pairwise comparisons of each factor and construct a judgment matrix as shown in Equation (1).

$$S=\left(s_{ij}\right)_{m\times n}=\begin{bmatrix} s_{11} & s_{12} & \cdots & s_{1n} \\ s_{21} & s_{22} & \cdots & s_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ s_{m1} & s_{m2} & \cdots & s_{mn} \end{bmatrix} \tag{1}$$

Among them, $s_{ij}=f\left(x_i,x_j\right)$.

II. A. 3) Calculating the weights of each factor

From the judgment matrix S, find the maximum eigenvalue $\lambda_{\max}$ and obtain the eigenvector of the judgment matrix with respect to $\lambda_{\max}$ as shown in equation (2):

$$\zeta=\left(a_1,a_2,\cdots,a_n\right) \tag{2}$$

The feature vectors are obtained after normalization, as shown in Equation (3):

$$w=\left(b_1,b_2,\cdots,b_n\right) \tag{3}$$

Among them, a_i is the weight of each evaluation indicator.

To determine whether the calculated indicator weights are scientific and reasonable, a consistency index is used to verify whether the constructed judgment matrix is consistent, that is, the ratio of the consistency index CI of the judgment matrix to the average random consistency index RI of the same order is used for judgment, as shown in Equation (4):

$$CR = \frac{CI}{RI} = \frac{\lambda_{\max} - n}{RI(n-1)} \tag{4}$$

Among them, CR is the random consistency ratio of the judgment matrix, n is the order of the judgment matrix, and RI is the average random consistency index. When CR < 0.10, it indicates that the weighting coefficients of the judgment matrix are effectively and reasonably distributed, with satisfactory consistency, and can be used in actual research. Otherwise, the judgment matrix needs to be readjusted until the final satisfactory consistency requirements are met. The smaller the CR, the higher the consistency of the judgment matrix.

II. B.Principles of Fuzzy Comprehensive Evaluation Algorithm

II. B. 1) Determining the set of factors for evaluation

A factor set is a collection of main factors that can be used to evaluate an object, represented as $U = \{u_1, u_2, \cdots, u_n\}$, where n is the number of factors and u_i is the i th evaluation factor. Indicators can be classified into k categories based on different attributes, where $U = \{U_1, U_2, \cdots, U_k\}$.

II. B. 2) Determining the evaluation set for determining the evaluation grade

The evaluation set is a set composed of possible evaluation results for the evaluation object, expressed as $V = \{v_1, v_2, \cdots, v_m\}$, where m is the number of evaluation results, v_j is the j th evaluation result. The evaluation grades used in this paper are $V = \{v_1, v_2, \cdots, v_m\} = \{\text{Excellent, Good, Average, Pass}\}$.

II. B. 3) Establishing a fuzzy evaluation matrix

Starting from a factor u_i, determine the degree of membership of the evaluation object in the judgment set, as shown in Equation (5):

$$R_i = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix} \tag{5}$$

Among these, the element r_{ij} in row i and column j represents the membership degree of the fuzzy subset of level v_j when the evaluated object is factor u_i. The matrix R composed of n single-factor evaluation sets is the fuzzy comprehensive evaluation matrix.

II. B. 4) Determining the weight vector of evaluation factors

Since the importance of each factor varies, i.e., the weights of each factor vary, the weight of each factor u_i is c_i, then the fuzzy set of the weight set of each factor is as shown in Equation (6):

$$W = (c_1, c_2, \cdots c_n) \tag{6}$$

Typically, factor weight vectors can be obtained using methods such as weighted averaging, frequency distribution determination, and hierarchical analysis. This paper uses hierarchical analysis to obtain weight vectors.

II. B. 5) Synthesis of fuzzy comprehensive evaluation result vector

Using an appropriate fuzzy operator, combine W with the fuzzy relationship matrix R to obtain the fuzzy comprehensive evaluation result vector B of the evaluated object, as shown in Equation (7):

$$B = W \cdot R = (c_1, c_2, \cdots c_n) \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix} = (d_1, d_2, \cdots, d_m) \tag{7}$$

Among them, d_i represents the degree of the evaluation result v_i corresponding to the evaluated object. According to the maximum membership principle, the evaluation result takes the maximum d_j corresponding to the evaluation result v_j.

II. B. 6) Comprehensive Evaluation

The AHP-fuzzy comprehensive evaluation method is applied to the evaluation of the effectiveness of course-based ideological and political education [18]. First, the weight distribution among all subjects is determined, and then each secondary indicator of each subject is evaluated in sequence. Next, based on the weights of each secondary indicator, the evaluation matrix for the primary indicators of that evaluation subject is derived. The comprehensive evaluation result for that evaluation subject can then be obtained using the weights and scores of each primary indicator. Finally, weighted averages are calculated across all subjects to obtain the evaluation results for the effectiveness of course-based ideological and political education teaching among participating teachers.

III. Practice of the ideological and political teaching evaluation model

III. A. Determining the weights of primary and secondary indicators

The steps for determining the weights of ideological and political education evaluation indicators using the AHP method are illustrated using five primary indicators as an example. First, five experts in ideological and political education from other universities and our own university were invited to compare the importance of the five primary evaluation indicators using a 1–9 scale according to theoretical rules. After expert consultation, the pairwise comparison importance judgment matrix for the five primary indicators on a 1–9 scale is shown in Table 1.

Table 1: The primary evaluation index matrix

Evaluation index	Teaching target	Teaching content	Teaching method	Teaching resource	Teaching effect
Teaching target	1	1/2	1/3	1/4	1/5
Teaching content	2	1	3	1/5	1/3
Teaching method	3	1/3	1	1/4	1/6
Teaching resource	4	5	4	1	1/4
Teaching effect	5	3	6	4	1

The importance judgment matrix for the first-level evaluation indicators under AHP is calculated as shown in Table 2.

Table 2: The important judgment matrix of the primary evaluation index

Evaluation index	Teaching target	Teaching content	Teaching method	Teaching resource	Teaching effect	Weight
Teaching target	0	0.2000	0.1429	0.1111	0.0909	0.0848
Teaching content	0.8000	0	0.8571	0.0909	0.1429	0.2087
Teaching method	0.8571	0.1429	0	0.1111	0.0769	0.1125
Teaching resource	0.8889	0.9091	0.8889	0	0.1111	0.2414
Teaching effect	0.9091	0.8571	0.9231	0.8889	0	0.3526

Based on the judgment matrix in Table 2, calculate the weights of the five first-level evaluation indicators according to the weights, i.e., the last column in Table 2. Similarly, obtain the weights of other second-level evaluation indicators as shown in Table 3.

Table 3: Secondary index weight

Primary index	Weight	Secondary index	Weight
Teaching target (A)	0.0848	Clarity (A1)	0.0954
		Reasonableness (A2)	0.3211
		Operability (A3)	0.3023
		Contest-teaching compatibility (A4)	0.2812
Teaching content (B)	0.2087	Home-country feeling (B1)	0.0826
		Scientific quality (B2)	0.1742
		Team consciousness (B3)	0.2215
		Professionalism (B4)	0.2034
		Safety awareness (B5)	0.3183
Teaching method (C)	0.1125	Project teaching (C1)	0.0586
		Teacher demonstration (C2)	0.0857
		Brainstorm (C3)	0.1897
		Scenario simulation (C4)	0.2276
		Group operation (C5)	0.1631
		Time-limit skill race (C6)	0.2753
Teaching resource (D)	0.2414	Software simulation (D1)	0.1452
		Training equipment (D2)	0.2516
		Information resource (D3)	0.2188
		Loose-page material (D4)	0.3844
Teaching effect (E)	0.3526	Reflective habit (E1)	0.0202
		Craftsman spirit (E2)	0.0765
		Ideal belief (E3)	0.0974
		Responsibility (E4)	0.1387
		Pioneering innovation (E5)	0.0659
		Labor consciousness (E6)	0.1648
		Patriotism (E7)	0.2257
		Occupational ethics (E8)	0.1806
		Teamwork (E9)	0.0302

III. B. Constructing an evaluation matrix for fuzzy comprehensive evaluation

This study took students majoring in journalism and communication at S University as the research subjects. A survey questionnaire on ideological and political education evaluation was distributed to 150 students majoring in journalism and communication from the 2023 and 2024 cohorts at S University for anonymous completion. Ultimately, 136 students submitted their survey questionnaires.

Based on the process evaluation data obtained from the 136 submitted questionnaires, the fuzzy membership degree matrix for evaluation indicators was determined. For the secondary evaluation indicators under the teaching objectives, the corresponding questionnaire items—“Emotional Attitude and Values Objectives, Process and Methods Objectives, and Knowledge and Skills Objectives Rationality”—had the following distribution of student responses: 50%, 30%, 10%, 10%, and 0% of students selected “Satisfied (Excellent)”, “Fairly Satisfied (Good)”, “Generally Satisfied (Average)”, “Generally (Passing)”, and “Dissatisfied (Failing)”, respectively. Therefore, the membership function values for the reasonableness evaluation indicators are 0.5, 0.3, 0.1, 0.1, and 0. Similarly, the membership function values for other secondary indicators are obtained as shown in Table 4, thereby deriving the membership matrix.

The single-level evaluation results for the five primary indicators are calculated as follows:

A = (0.5060, 0.2801, 0.1367, 0.0772, 0.0000).

B = (0.5199, 0.3163, 0.0960, 0.0499, 0.0180).

C = (0.5443, 0.3205, 0.0854, 0.0447, 0.0051).

D = (0.5470, 0.3201, 0.0921, 0.0387, 0.0022).

E = (0.5384, 0.3217, 0.0808, 0.0553, 0.0039).

After determining the single-level fuzzy comprehensive evaluation, the membership degrees of 136 students' evaluations of ideological and political education were calculated as “satisfied (excellent)”, “comparatively satisfied (good)”, “generally satisfied (average)”, “generally (qualified)”, and “dissatisfied (unqualified)”, with membership

degrees of 0.5345, 0.3165, 0.0920, 0.0508, and 0.0062, respectively. According to the principle of maximum membership degree, the overall evaluation result for ideological and political education is “Excellent.”

Table 4: The membership function of the secondary index

Secondary index	Fuzzy membership function value				
	Excellent	Good	Normal	Qualified	Not qualified
A1	0.50	0.32	0.10	0.08	0.00
A2	0.51	0.30	0.12	0.07	0.00
A3	0.50	0.20	0.20	0.10	0.00
A4	0.51	0.33	0.10	0.06	0.00
B1	0.53	0.31	0.11	0.05	0.00
B2	0.51	0.34	0.09	0.06	0.00
B3	0.50	0.32	0.12	0.06	0.00
B4	0.53	0.32	0.11	0.03	0.01
B5	0.53	0.30	0.07	0.05	0.05
C1	0.50	0.35	0.10	0.04	0.01
C2	0.53	0.32	0.09	0.06	0.00
C3	0.54	0.34	0.09	0.03	0.00
C4	0.59	0.30	0.06	0.03	0.02
C5	0.55	0.30	0.10	0.05	0.00
C6	0.52	0.33	0.09	0.06	0.00
D1	0.58	0.31	0.07	0.04	0.00
D2	0.51	0.35	0.09	0.05	0.00
D3	0.58	0.31	0.06	0.04	0.01
D4	0.54	0.31	0.12	0.03	0.00
E1	0.55	0.30	0.09	0.06	0.00
E2	0.56	0.31	0.09	0.04	0.00
E3	0.51	0.33	0.09	0.07	0.00
E4	0.56	0.31	0.08	0.05	0.00
E5	0.50	0.30	0.11	0.07	0.02
E6	0.50	0.35	0.10	0.05	0.00
E7	0.56	0.32	0.05	0.06	0.01
E8	0.55	0.32	0.08	0.05	0.00
E9	0.53	0.31	0.09	0.06	0.01

III. C. Analysis of Evaluation Results

Based on the results of the single-level evaluation of each indicator, the membership degrees of the five primary indicators—teaching objectives, teaching content, teaching methods, teaching resources, and teaching effectiveness—are 0.5060, 0.5199, 0.5443, 0.5470, and 0.5384, respectively. From the membership degrees, it can be seen that the membership degree of teaching objectives at the “excellent” level is relatively low. This can be addressed by further optimizing teaching objectives in accordance with the characteristics and needs of the current era, thereby further improving teaching effectiveness.

IV. Ideological and political education system based on system dynamics

IV. A. Theoretical Foundations of System Dynamics

IV. A. 1) System Dynamics Concepts

System dynamics (SD) is a multidisciplinary, multi-theoretical, and multi-methodological science that integrates system theory with computer simulation technology [19] to study the feedback structure and behavioral performance of systems. It offers the following advantages in addressing issues related to the real estate market:

(1) It can intuitively reflect long-term cyclical changes. System dynamics models are widely applied in studies related to social sustainability, population dynamics, and economic growth, providing scientific and reasonable explanations while exploring the operational mechanisms of systems.

(2) It excels in addressing issues of partial data missing in systems. Leveraging its inherent structural interdependence, system dynamics assists modelers in making relatively scientific and reasonable predictions about system performance based on feedback mechanisms and causal relationships between information.

(3) They are commonly used to address complex economic and social issues. They can resolve complex time-varying problems involving high-order nonlinearities in systems, analyzing system behavior while utilizing software to complete simulation processes.

(4) Model functions can be highly adapted to policy regulation experiments. The research conclusions provided by system dynamics often take the form of "if...then," meaning that in the face of an unoccurred change, what outcomes will follow, particularly providing the optimal policy combination.

IV. A. 2) System Dynamics Modeling Steps

The analytical approach and basic modeling steps for explaining system problems using a system dynamics model are shown in Figure 1.

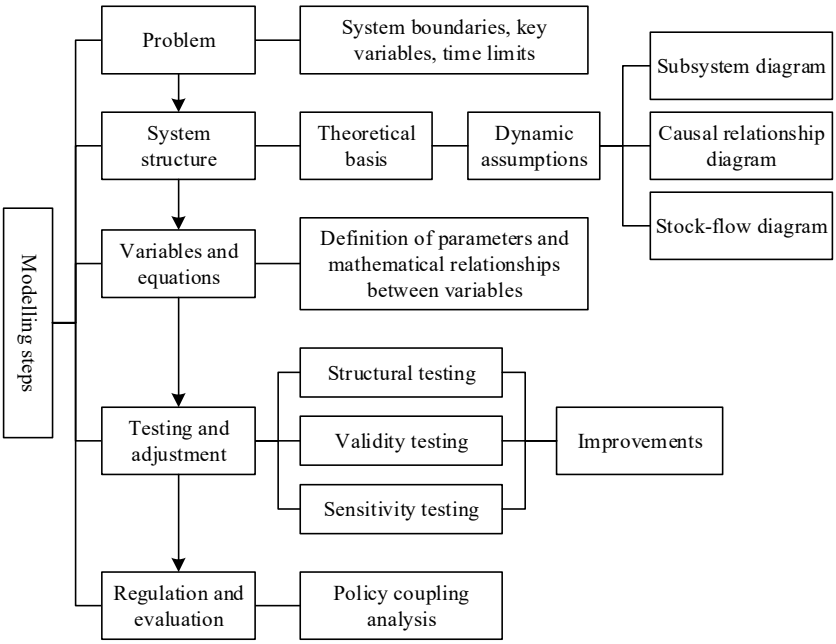

Figure 1: System dynamics modeling process diagram

IV. A. 3) Basic Principles of System Dynamics and System Simulation

(1) Causal loop diagram

A causal loop diagram (CLD) is an important tool used to describe the feedback structure of a system and the interrelationships between variables [20].

A causal loop diagram often contains multiple variables, which are connected by arrows representing causal relationships. Each causal chain has a positive (+) or negative (-) polarity, as shown in Figure 2, to represent the synergistic changes between variables.

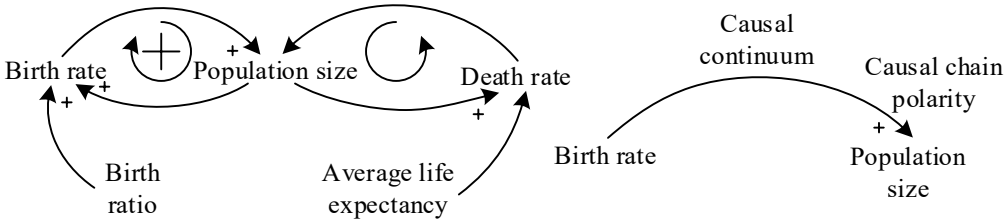

Figure 2: Representation method of system causal loop

(2) Stock Flow Diagram

The primary representation methods in the stock-flow diagram are shown in Figure 3. The system stock can be analogized to a reservoir. The side through which water flows into the pipeline represents the inflow rate, while the side through which water flows out of the pipeline represents the outflow rate. There is a valve on each pipeline at

the inlet and outlet sides of the reservoir, indicating that water can flow in or out under specific conditions. The cloud cluster at the starting point of the inflow pipeline is referred to as the source, while the cloud cluster at the endpoint of the outflow pipeline is referred to as the sink. The system's stock flow diagram also includes constants and auxiliary variables, such as population births, immigration, population outflow, and natural deaths in Figure 3. In the system, auxiliary variables play an intermediary role, reflecting the information transfer and transformation process between stock and flow rate variables; while quantities that remain almost unchanged or have very small changes throughout the model are typically referred to as constants.

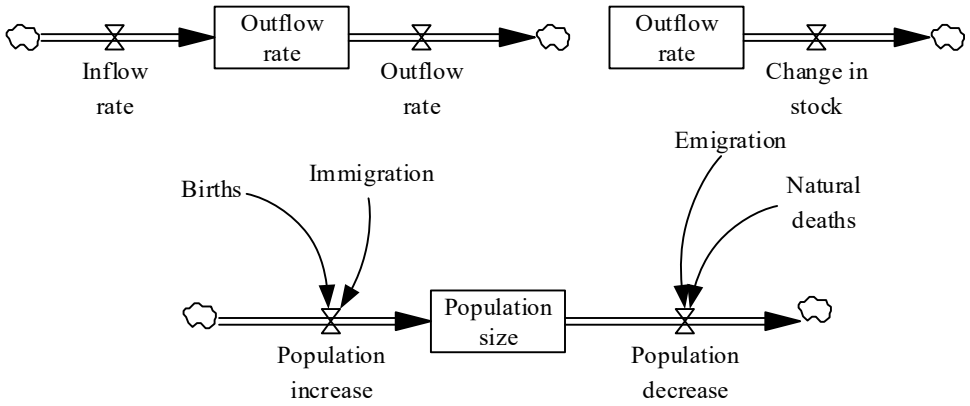

Figure 3: Representation method of system stock flow chart

The cumulative amount of the difference between inflow and outflow variables is called the stock variable, which is expressed by formula (8):

$$Stock(t) = \int_{t_0}^{t} \left[Inflow(s) - Outflow(s) \right] ds + Stock\left(t_0\right) \tag{8}$$

In this context, $Stock(t)$ represents the cumulative value of the variable at time t, $Inflow(s)$ represents the inflow rate variable, $Outflow(s)$ represents the outflow rate variable, and $Stock(t_0)$ represents the initial value of the stock variable at time t_0.

Additionally, the net change rate in the flow graph is typically reflected by the flow rate variable, and the entire mathematical structure is expressed using the differential equation (9):

$$\frac{d\left(Stock\right)}{dt} = Inflow(t) - Outflow(t) \tag{9}$$

IV. B. Analysis of Factors in the Ideological and Political Education System of Higher Education Institutions

In the research and analysis of the educational mechanisms of ideological and political theory courses in higher education institutions, it is necessary to clearly define the boundaries of the educational system of such courses in order to identify the variables involved and clarify the interactions between them.

First, an analysis of the boundaries of the ideological and political education system in higher education institutions. Although China places great emphasis on the development of ideological and political education, the system for advancing ideological and political education through collaborative efforts remains incomplete. It is necessary to clarify the external environment of the ideological and political education system in higher education institutions from a systems theory perspective, specifically national support, social support, institutional support, and family support. The external environment constitutes the potential variables of the ideological and political education system in higher education institutions. The internal environment plays a particularly critical role in influencing the educational system, primarily composed of external conditions and internal needs. By guiding external conditions to align with internal needs, both factors work together to promote the development of the ideological and political education system in higher education institutions.

Second, the endogenous variables of the ideological and political education system in higher education institutions. The target audience of ideological and political education courses is university students, whose participation and sense of fulfillment serve as the intrinsic driving force for the sustainable development of such courses and are also important criteria for evaluating their effectiveness. The factors influencing university students' learning of ideological and political education courses can be divided into two parts: intrinsic needs and external

conditions. The influencing factors of these two aspects constitute the endogenous variables, which together form the internal factors of the educational system.

Third, the exogenous variables of the ideological and political education system in higher education institutions. The external environment of the ideological and political education system in higher education institutions is composed of national support, social support, institutional support, and family support. These four components are important external factors influencing the effectiveness of ideological and political education in higher education institutions, constituting the exogenous variables of the ideological and political education system. The aforementioned four “supports” are the exogenous variables of the system, collectively forming the external environment of the educational system.

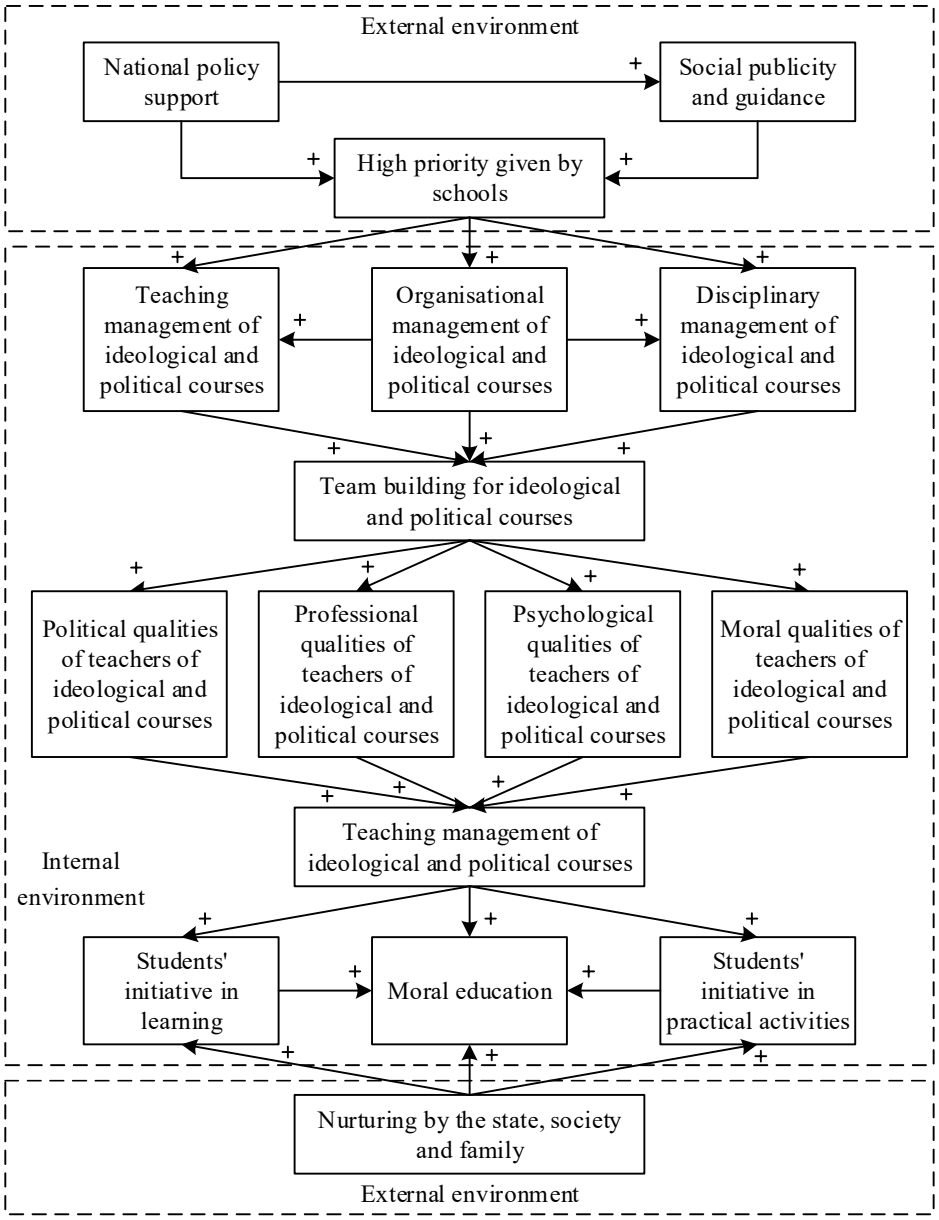

Figure 4: Internal and external environmental factor causality of ideological and political education

IV. C. Analysis of the Mechanism of Ideological and Political Education in Colleges and Universities from a System Dynamics Perspective

The ideological and political education system in higher education institutions encompasses various elements such as macro policies, social environment, educational entities, and teaching content. The organic integration of these

elements forms the structural and functional characteristics of the system. Based on the causal feedback relationships between external factors, internal factors, and the interactions between the two, this study explores the causal relationships influencing the system from its external and internal environments, thereby elucidating the operational mechanisms of the ideological and political education functions in higher education institutions.

1. Causal diagram of the higher education ideological and political education system. In system dynamics, causal diagrams are created during the system modeling and analysis phase based on the positive and negative feedback relationships among various elements. Due to the complexity of the system's numerous elements and interrelated relationships, directed arrows represent the direction of input or output between variables, with “+” and “-” indicating positive and negative feedback, respectively. Therefore, the causal diagram may contain multiple directed positive and negative causal chains. If the flow between two factors increases or decreases simultaneously, the chain is a positive feedback chain; otherwise, it is a negative feedback chain.

From a macro perspective, considering the system's overall integrity, the external environment of the ideological and political education system in higher education institutions constitutes external factors, while the internal environment constitutes internal factors. The causal diagram illustrating the relationships between internal and external factors of the education system is shown in Figure 4. From a micro perspective, considering the system's hierarchical structure, the causal diagram illustrating the relationships between internal factors within the ideological and political education system in higher education institutions is shown in Figure 5.

The internal environment is composed of internal needs and external conditions. In terms of internal needs, the main aspects are the proactive attitude of college students toward learning ideological and political theory courses and their proactive attitude toward practical activities. From the perspective of external conditions, the political, professional, moral, and psychological qualities of the teaching staff are particularly important. From the perspective of the process of ideological and political education courses in higher education institutions, the unified effectiveness of teaching preparation, classroom instruction, and teaching feedback directly influences the “satisfaction” that college students derive from these courses. At the same time, the management of ideological and political education courses by higher education institutions in terms of organization, teaching, faculty, and discipline has a significant impact on the development of these courses.

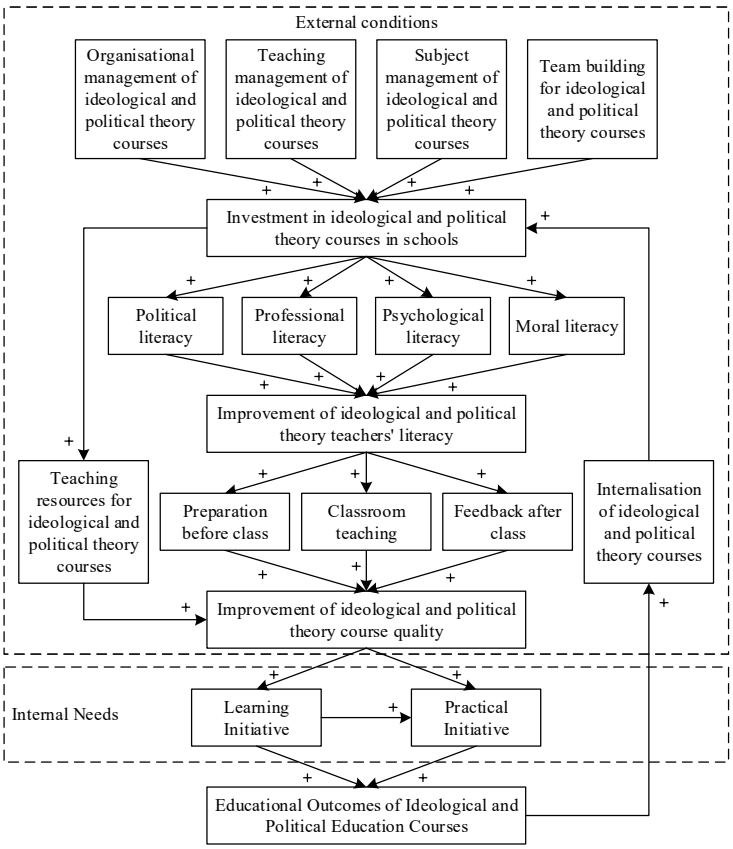

Figure 5: Internal environmental factor causality of ideological and political education

2. Causal analysis of the ideological and political education system in higher education institutions. First, the nonlinear relationships between variables in the causal diagram. The relationships among the numerous factors influencing ideological and political education in higher education institutions are not simple linear relationships but rather complex nonlinear relationships. In the system, the input of college ideological and political education courses serves as the independent variable, the educational outcomes of such courses as the dependent variable, and the improvement of the quality of the teaching staff, the enhancement of course quality, and the quantity of teaching resources as process variables. Other factors act as control variables or auxiliary variables. The educational outcomes of college ideological and political education courses are jointly formed through the mutual coupling and interaction of these variables, stimulated by external conditions and driven by internal needs.

Second, the logical relationships between variables in the causal diagram. Figure 5 primarily features two types of closed loops, both of which are positive feedback relationships. In terms of the synergy among educators, courses, and learners: an increase in the input of ideological and political education courses in higher education institutions leads to improved teacher quality, enhanced course quality, and increased student learning initiative and practicality, thereby improving the educational outcomes of ideological and political education courses. This, in turn, promotes an increase in the input of ideological and political education courses through internalization. In terms of the synergy among educational forms, ideological and political education courses, and students: increased investment in ideological and political education courses at universities, increased teaching resources for ideological and political education courses, improved teaching environments, facilities, and resources, enhanced students' proactive and practical learning, and subsequently promoted increased investment in ideological and political education courses at universities through internalization.

Third, the multiple feedback relationships between variables in the causal diagram. As can be seen from Figures 4 and 5, internal and external factors interpenetrate each other, and various factors have more than one feedback chain, resulting in multiple positive feedback relationships between variables. When a factor undergoes a qualitative or quantitative change, it can have a significant impact on other factors or even the entire system. Therefore, the ideological and political education system in higher education institutions has formed a multiple feedback education mechanism between various dimensions and between the whole and the parts.

V. System dynamics simulation of the impact of urban housing policies on ideological and political education

This paper uses Vensim software for model construction and simulation experiments. All indicators in the model are collected from the Statistical Yearbook of Province A, the China Science and Technology Statistical Yearbook, and the China High-Tech Industry Statistical Yearbook. The indicator weights are calculated using the expert scoring method. The rate variables involved are calculated using the indicator weights and historical data from the statistical yearbooks to obtain the average growth rate over the past five years, as shown in Table 5.

Table 5: Rate variable table

Rate variable	Average growth rate
Housing investment growth rate	4%
Enterprise investment growth rate	7%
Improvement rate for housing environment	10%
Policy exchange intensification rate	21%

V. A. System dynamics model verification

All system dynamics models must be validated after construction to ensure their effectiveness. This paper uses a variety of validation methods to ensure the reliability of the validation.

V. A. 1) System Boundary Verification

Before determining the system boundaries, this paper reviewed a large number of documents and materials related to urban housing policy reforms and ideological and political education, screened evaluation indicators from different dimensions, and preliminarily determined the model boundaries, thereby constructing a system dynamics model. Furthermore, by comparing the indicators from relevant studies on ideological and political education, it was determined that the variables selected in this paper are important variables in the urban housing policy system. Furthermore, the influence pathways of the system model are clearly articulated, indicating that there is no need to further expand the model boundaries. The model boundaries defined in this paper are reasonable.

V. A. 2) Dimensional consistency and integral error verification

This paper utilizes the functionality provided by the software Vensim PLE to verify the dimensional consistency of the model. The dimensions of the variables in the constructed model were examined, and after modifications and adjustments, the message “Model is OK” appeared, indicating dimensional consistency. The length of the time intervals in the model is crucial for the display of simulation curves. Intervals that are too long or too short can cause abnormalities in the simulation curves, and the purpose of the integral error test is to analyze whether the time interval settings in the model are reasonable. In the SD model constructed in this paper, the time span is set to 2015–2030, totaling 15 years, with a time interval of 1 year. The results are shown in Figure 6, where the simulation curve is relatively smooth, and no modifications to the model's time interval are required.

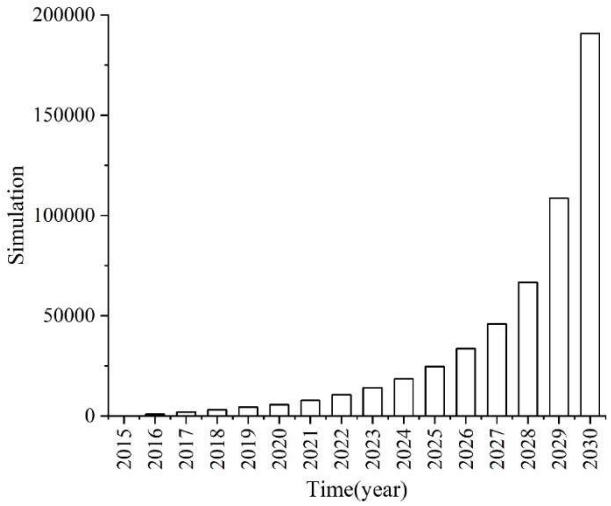

Figure 6: Ideological and political education simulation

V. A. 3) Extreme condition testing

The extreme condition verification method generally involves randomly selecting a rate variable, taking two extreme values of 0 and 1, and observing the changes in the curve. If the changes are significant and the trend of the changes deviates little from the actual situation, then the model is considered valid. The verification results of this paper are shown in Figure 7. The characteristics of the graph meet the above requirements, indicating that the SD model constructed in this paper is valid and can respond to any situation.

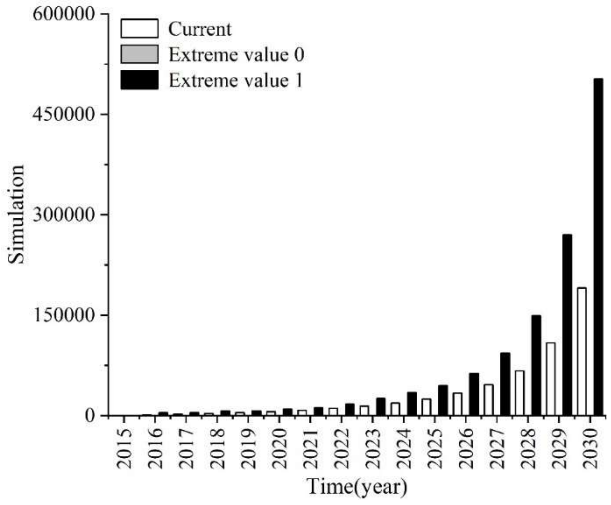

Figure 7: Extreme value change

V. A. 4) Historical Verification

Historical validation involves comparing the simulation values obtained from running the model with actual values to analyze the degree of deviation. This is the most reliable form of validation. The simulated values obtained from

running the model and the actual values collected are shown in Table 6. This study employs a correlation test method, where a correlation coefficient between 0.7 and 0.9 indicates a high correlation, and between 0.91 and 1 indicates an extremely high correlation. Calculations show that the correlations between the actual values of ideological and political theory, social practice, and ideological and political content and the model simulation values are all greater than 0.7. Specifically, the correlations between ideological and political theory and ideological and political examinations are both greater than 0.9, indicating that the SD model constructed in this study has good fitting performance and is effective.

Table 6: Model test table

Year	Ideological and political theory		Social practice		Ideological and political content	
	Real	Simulation	Real	Simulation	Real	Simulation
2015	17593.52	17593.49	8452.32	8452.34	6254.56	6254.57
2016	18542.63	18542.66	8036.41	8759.48	6534.27	6822.49
2017	19547.06	19547.12	8442.78	9012.53	7023.59	7413.22
2018	20643.17	20598.54	9005.42	9243.64	7841.34	8036.17
2019	23416.35	22542.75	10168.54	9724.85	8824.52	8945.42
Degree of correlation	0.9935		0.7528		0.9846	

V. B. System dynamics model simulation analysis

The control variables in this paper are the intensity of supply policies (S), the intensity of demand policies (D), and the intensity of environmental policies (E). This paper uses 2015 as the starting year for simulation, so at the initial stage of the model, the values of the three control variables S, D, and E are all set to 1. Next, three sets of control variable values are selected through analysis of the policy proportion structure and policy content. The rate variables used for system verification in this paper are the growth rate of housing investment, the growth rate of corporate investment, the rate of improvement in housing environment, and the rate of policy communication enhancement.

Based on the research content of this paper, four sets of control variables are established, namely:

Initial group: S0=1, D0=1, E0=1.

Reference group 1: S0=1.4, D0=1.2, E0=1.5.

Reference group 2: S0=1.5, D0=1.3, E0=1.6.

Reference group 3: S0=1.6, D0=1.4, E0=1.8.

V. B. 1) Housing Investment Simulation Scenarios

The simulated changes in housing investment are shown in Figure 8. The growth rate of ideological and political theory will increase rapidly after 2027. A sensitivity analysis was conducted using the first set of variables, which showed an increase of 4.8%. Using the second set of data, the increase was 7.6%. Using the third set of data, the increase was 10.5%. It can be seen that under the current policy structure, continuing to increase policy efforts will not result in significant changes in ideological and political theory.

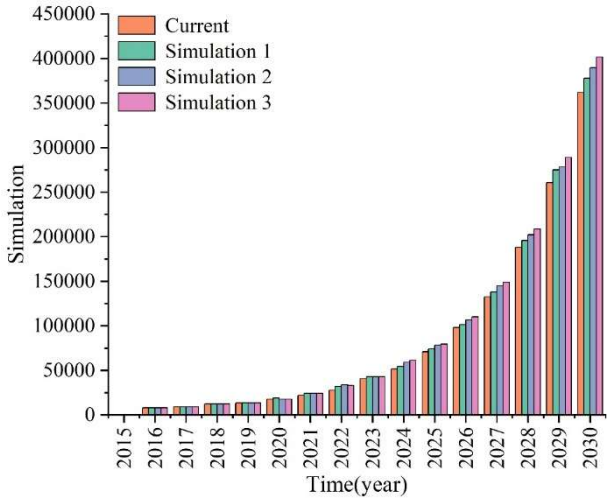

Figure 8: Housing investment simulation changes

V. B. 2) Enterprise Investment Simulation Scenarios

The simulated scenario for corporate investment is shown in Figure 9. The improvement in social practice also accelerated in 2027. A sensitivity analysis was conducted using the first set of variables, resulting in a 16.2% improvement. Using the second set of data, the improvement was 24.3%. Using the third set of data, the improvement was 33.4%. It can be seen that under the current policy structure, further intensifying policy efforts initially leads to a significant improvement in social practice. However, as policy efforts continue to intensify, the rate of improvement slows markedly. This indicates that the current policy structure remains highly effective in enhancing social practice within ideological and political education. However, over time, the sensitivity to existing policies diminishes.

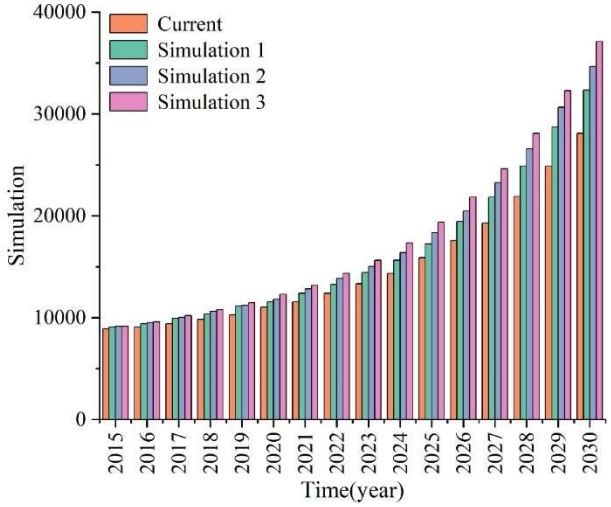

Figure 9: Enterprise investment simulation changes

V. B. 3) Housing Environment Simulation Conditions

The simulation of housing conditions is shown in Figure 10. Improvements in housing conditions have little impact on ideological and political content before 2026, but become increasingly important thereafter. This is because improvements in housing conditions do not take effect immediately; rather, they are a gradual process that begins to have an impact once a certain level is reached. A sensitivity analysis using the first set of variables showed an increase of 28.2%, while using the second set of data resulted in an increase of 44.5%. Using the third set of data, the improvement reached 67.4%. This demonstrates that improvements in housing conditions have a significant impact on the enhancement of ideological and political education content. Currently, half of the existing policies are related to improving the housing environment, which aligns with China's reform trend of “streamlining administration and delegating power.”

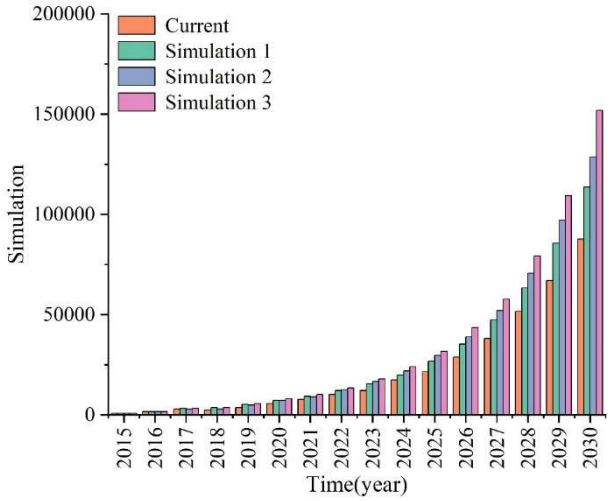

Figure 10: Housing environment simulation changes

V. B. 4) Policy Exchange Simulation Scenarios

The simulation of policy exchange is shown in Figure 11. Similar to the housing environment, policy exchange has little impact on ideological and political content in the early stages. However, as the frequency and depth of exchange increase, its impact on ideological and political content gradually strengthens. Sensitivity analysis using the first set of variables showed an increase of 13.8%. Using the second set of data, there was an increase of 25.1%. Using the third set of data, there was an increase of 34.5%. It is evident that the enhancement of innovative exchange significantly impacts the improvement of ideological and political content.

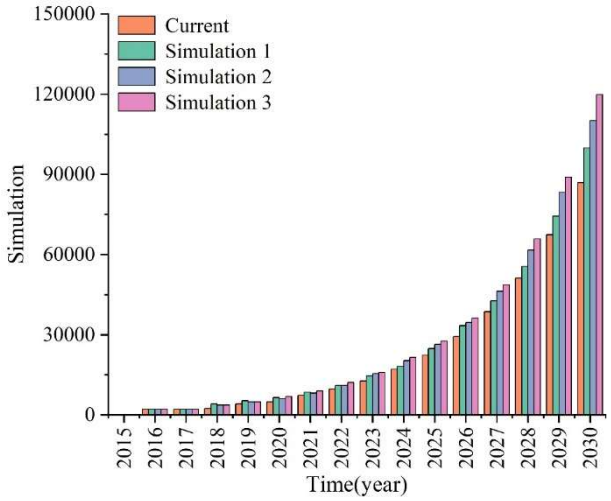

Figure 11: Policy exchange simulation changes

V. B. 5) Simulation of ideological and political education

The simulation results for ideological and political education are shown in Figure 12. Ideological and political education began to grow rapidly after 2027. Sensitivity analysis shows that using the first set of variables resulted in an increase of 11.2%. Using the second set of data resulted in an increase of 17.9%. Using the third set of data resulted in an increase of 25.1%. It is evident that under the current policy structure, further intensifying policy efforts will lead to a noticeable improvement in ideological and political education in the future, but the rate of improvement will decline rapidly. Based on the sensitivity analysis of the above subsystems, environmental policies show prominent effects, supply-oriented policies are relatively ineffective, and demand-oriented policies are insufficient in number.

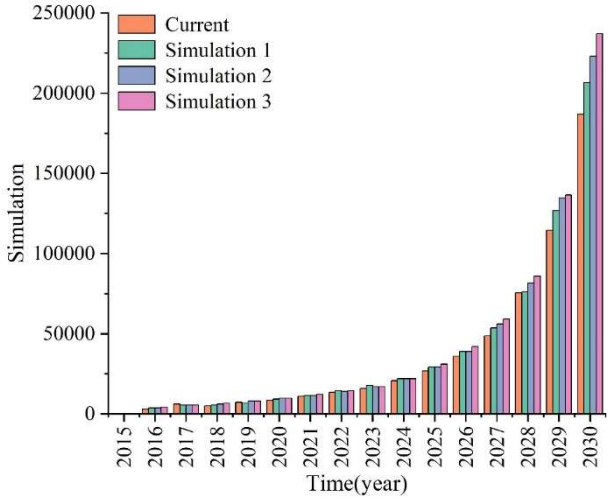

Figure 12: ideological and political education simulation changes

VI. Conclusion

The article employs the AHP-fuzzy comprehensive evaluation model to conduct a comprehensive evaluation of ideological and political education. By incorporating system dynamics concepts, it simulates the system dynamics of how urban housing policies influence ideological and political education.

Taking students from the School of Journalism and Communication at S University as the survey subjects, the membership degrees for ideological and political education evaluations of “excellent,” “good,” “average,” “qualified,” and ‘unqualified’ are 0.5345, 0.3165, 0.0920, 0.0508, and 0.0062, respectively. The overall evaluation result for ideological and political education is “excellent.” The growth rates of ideological and political theory and social practice will rapidly increase after 2027. Improvements in housing conditions will increasingly influence ideological and political content after 2026. Policy exchanges have a minimal impact on ideological and political content in the early stages but gradually strengthen as the frequency and depth of exchanges intensify. After 2027, the effectiveness of ideological and political education will rapidly improve.

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