

Research and Analysis on the Implementation Pathways for Precise Community Education from the Perspective of Life Circles

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Abstract:

Current lifestyle circle student communities in universities commonly face practical challenges such as fragmented educational resources, misalignment between supply and demand, and difficulties in quantifying ideological guidance implementation. This study employs the college-based student community at Xiamen University of Technology as a research framework, integrating urban planning's "lifestyle circle" theory with big data profiling technology to develop a four-dimensional precision profiling system covering ideology, behavior, needs, and goals. It establishes a precise education model termed the "Four-Circle Model," comprising a Party-building leadership core circle, collaborative education service circle, holistic development vitality circle, and exemplary demonstration happiness circle. A 12-month pilot intervention was conducted among 500 undergraduate students at Yougong College, utilizing SPSS 26.0 for descriptive statistics, independent sample t-tests, correlation analysis, multiple linear regression, and cluster analysis to empirically examine how the four-dimensional profiling indicators influence community education outcomes. Results demonstrate that all profiling metrics significantly positively predict comprehensive student growth scores; post-intervention, student satisfaction with community services, academic performance, and ideological engagement markedly improved, while academic warning rates significantly declined. The study innovatively proposes a precision education paradigm for university communities "based on lifestyle circles, centered on digital profiling, and supported by multi-layered collaboration" providing a theoretical framework and replicable implementation strategies for enhancing the effectiveness of private university's college-based one-stop community programs.

Keywords:

Life Circle; Precision-based Community Education, Big Data Student Profile, Four-Circle Model, One-stop Student Community, SPSS Empirical Analysis

1. Introduction

1.1. Research Background

The Ministry of Education has comprehensively advanced the development of a one-stop comprehensive management model for student communities in higher education institutions, explicitly requiring the elimination of gaps in collaborative education among families, schools, and communities to achieve precise alignment between educational offerings and students' individual needs [1,2]. Traditional university community-based education faces three major shortcomings: first, fragmented spatial arrangements where ideological education, academic support, cultural and sports activities, and psychological services operate independently, resulting in a disjointed educational framework; second, inadequate demand identification relying on counselors' subjective assessments of student needs without quantitative data support, leading to significant mismatches between supply and demand; third, difficulty in quantifying ideological guidance due to the absence of standardized metrics for monitoring students' ideological trends and political engagement behaviors, making it challenging to dynamically evaluate educational outcomes.

The “15-Minute Life Circle” concept in urban governance emphasizes the integration of spatial resources, stratification of population needs, and targeted delivery of public services, providing a novel theoretical perspective for community governance in university student campuses. Under the backdrop of digital empowerment, big data and machine learning technologies can consolidate multi-source data from academic administration, dormitory management, party building activities, psychological support, and extracurricular programs to construct comprehensive student profiles, enabling tiered and categorized precision education[3]. Building on this foundation, this study combines the spatial logic of the “Life Circle” with digital profiling techniques to establish an implementation pathway for precise community education based on the “Four-Circle Synergy” model, and quantitatively validates its effectiveness through empirical analysis using SPSS.

1.2. Review of Domestic and International Research Trends

Current State of International Research: Foreign research builds upon the concepts of lifelong learning communities, youth-friendly cities, and the 15-minute living circle theory, focusing on three key areas: first, integration of spatial resources within living circles by coordinating educational resources from schools, community centers, and science and innovation venues through GIS-based planning; second, precise identification of tiered needs by utilizing demographic surveys and participatory planning to address the diverse educational demands of different adolescent groups; third, collaboration among multiple stakeholders and technological empowerment, exemplified by American community schools and Nordic community education centers that establish school-community partnership networks and leverage big data to optimize resource allocation. However, international research primarily targets urban youth populations and does not align with China's distinctive educational framework characterized by You gong college systems and Party leadership in education, lacking precise models tailored to the context of university student communities.

Current State of Domestic Research Domestic research primarily focuses on “one-stop” student communities, holistic education encompassing all aspects of student

development, and digital ideological and political education, demonstrating a strong policy-driven character. Existing studies concentrate on collaborative education mechanisms, the development of smart community platforms, and pathways for establishing college-style residential systems; however, they exhibit significant shortcomings: first, most research emphasizes theoretical speculation and lacks quantitative empirical data support; second, student profiling predominantly relies on academic and behavioral data while neglecting ideological indicators; third, there is insufficient integration of life circle theory with university student communities, resulting in a lack of a framework for implementing precise, layered, and closed-loop educational approaches. Current research has not yet developed an integrated practical model combining “life circles + four-dimensional profiles + four-tiered frameworks,” leaving room for innovation in this study [4,5,6].

2. Significance and Methods

2.1. Theoretical Significance of the Research

First, extend the Life Circle Theory to the context of ideological and political education in higher education institutions by integrating educational ecology and collaborative governance theory, thereby enriching the theoretical framework of “Three-Comprehensive Education”; Second, establish a four-dimensional student profiling system that incorporates an ideological dimension, addressing the limitation of traditional profiling methods that overemphasize behavior while neglecting ideology; Third, develop a closed-loop educational theory encompassing “profilering – community segmentation – evaluation,” providing a new analytical framework for digital ideological and political education and targeted community-based education.

2.2. Practical Significance of the Research

Using private university residential communities as empirical cases, a replicable and implementable four-tier precision education framework was developed; SPSS was employed to quantify data-driven validation of educational outcomes, providing data-powered governance tools for university student affairs departments and residential communities; a dynamic evaluation indicator system was established, shifting community-based education from experience-based assessment to data-driven management.

3. Research Methods

3.1. Research Subjects

A pilot study was conducted involving 500 undergraduate students from the first to fourth years at Yougong College of Xiamen University of Technology, with a 12-month intervention period. The study comprised a control group of 250 participants (receiving traditional community-based education) and an experimental group of 250 participants (implementing the precision education model combining “Life Circle + Four-Dimensional Profile + Four-Circle Model”). After excluding samples with incomplete questionnaires or missing data, 476 valid responses were obtained, yielding a response rate of 95.2%. The demographic characteristics of the sample are presented in Table 1.

3.2. Construction of a Four-Dimensional Precision Profiling Indicator System

Through literature review, counselor interviews, and pre-research factor analysis, four primary dimensions—ideology, behavior, needs, and objectives—were established, each comprising 16 quantifiable sub-indicators. All data were collected objectively via the campus digital platform.

Ideological Dimension (4 items): Duration of participation in Party building activities, completion rate of theoretical study, frequency of red practice engagements, and frequency of volunteer services by Party members;

Behavioral dimensions (4 items): academic GPA, number of absences and disciplinary violations, physical fitness compliance rate, dormitory civility score;

Demand dimensions (4 items): frequency of academic tutoring applications, number of psychological counseling appointments, needs for scientific and technological innovation practices, and willingness to participate in cultural and sports activities;

Target dimensions (4 items): Progressiveness of academic advancement planning, number of competition participations, duration of employment practice experience, and level of honors received.

3.3. Design of the Four-Circle Model Intervention Plan

The experimental group leveraged four-dimensional profiling data to deliver tiered, precision-oriented services, establishing a four-tiered collaborative education ecosystem.

Party-building-led core framework: Comprehensive coverage of functional Party branches throughout buildings; paired support programs for Party member dormitories; regular Party lectures at red cultural sites; and targeted assistance for students with ideological weaknesses through profile-based identification.

Collaborative Education Service Network: Three mentors specializing in ideological education, academic disciplines, and industry practices are stationed in communities; the Smart Campus APP integrates AI-powered Q&A features to deliver customized tutoring resources based on students' academic profiles and individual needs.

The Five-Education Integration Initiative: Tailored micro-party lessons on moral education, science and innovation workshops, sports leagues, art exhibitions, and labor practice activities based on students' interests;

Model-driven happiness ecosystem: Identify outstanding students based on target-oriented profiles, establish a corridor of exemplary role models, and develop mechanisms for resolving dormitory conflicts and fostering mutual support.

3.4. Measurement Tools and Data Acquisition

3.4.1. Empirical Data Analysis Using SPSS

Descriptive statistical analysis of the sample:

Descriptive statistics were calculated for the four-dimensional profile indicators and the total educational effectiveness score across 476 valid samples, including mean, standard deviation, minimum value, and maximum value; the results are presented in Table 1.

Table 1. Descriptive statistics of variables (N=476).

Variable Dimension	Observation Indicator	Mean M	Standard Error SD	Least Value	Crest Value
The Dimension of Thought	Theoretical Learning Completion Rate	3.12	0.78	1	5
	Frequency of volunteer service activities	2.89	0.83	1	5
Behavioral Dimension	GPA	3.01	0.69	1.2	4.85
	Dormitory Civilization Points System	3.35	0.72	1	5
Demand Dimension	Academic Support Application	2.76	0.81	1	5
	Frequency of psychological counseling sessions	2.14	0.65	1	4.5
Target Dimension	Number of participants in the competition	2.43	0.77	1	5
	duration of employment internship	2.67	0.74	1	5
dependent variable	Overall Score for the Comprehensive Effectiveness of Educational Activities	72.36	11.42	32	108

Statistical analysis reveals that the mean values of ideological indicators are generally low, indicating insufficient participation in student Party building and theoretical studies under the traditional model; demand indicators for psychological counseling and scientific innovation competitions show the lowest averages, reflecting inadequate fulfillment of students' personalized development needs; overall educational outcomes demonstrate moderate performance with significant room for improvement, demonstrating the limited effectiveness of conventional community-based education approaches.

3.4.2. Independent samples t-test between the experimental group and the control group

To evaluate the efficacy of the “Four-Circle Model” intervention, an independent samples t-test was conducted on the total educational outcome scores of both groups post-intervention to assess homogeneity of variances; the results are presented in Table 2.

Table 2. Independent Sample t-test comparison of educational outcomes between the experimental group and the control group.

Group	Sample Size	Mean	Standard Error	t Price	df	p Price
Control Group	234	66.13	10.87	-9.752	474	0.000***
Experimental Group	242	78.38	11.24			

Note: *** $p < 0.001$ indicates an extremely significant difference.

The data results demonstrated that $p < 0.001$, indicating an extremely significant difference in educational outcomes between the two groups; the mean comprehensive score of the experimental group (78.38) was significantly higher than that of the control group (66.13). Empirical evidence confirms that the four-circles precision

education model based on the four-dimensional profile of life circles can significantly enhance the overall effectiveness of community-based education.

Further analysis using a multi-dimensional t-test:

Engagement dimension: $t = -8.341$, $p < 0.001$; the experimental group demonstrated significantly higher participation rates in Party building activities and the Five-Education initiatives.

Satisfaction dimension: $t = -10.126$, $p < 0.001$; students showed significantly higher satisfaction with community resource allocation and AI-powered smart services.

Growth dimension: $t = -7.689$, $p < 0.001$; the experimental group demonstrated significantly higher scores in academic performance, scientific innovation achievements, and ideological assessment compared to the control group.

3.4.3. Pearson correlation analysis between four-dimensional profile indicators and educational outcomes

A bivariate correlation analysis was conducted using the total scores of four dimensions—thought, behavior, needs, and objectives—as independent variables and the overall educational effectiveness score as the dependent variable; the results are shown in Table 3.

Table 3. Matrix Table showing the correlation between four-dimensional profiles and educational outcomes.

variable	Total Score for Ideological Assessment	Total Behavior Score	Total Demand Score	Total Target Score	Educational Outcomes
Total Score for Ideological Assessment	1	0.427**	0.316**	0.389**	0.614**
Total Behavior Score	0.427**	1	0.372**	0.451**	0.673**
Total Demand Score	0.316**	0.372**	1	0.408**	0.582**
Total Target Score	0.389**	0.451**	0.408**	1	0.649**
Educational Outcomes	0.614**	0.673**	0.582**	0.649**	1

Note: ** $p < 0.01$ indicates highly significant correlation.

All dimensions exhibited significant positive correlations with educational outcomes at the 0.01 level. The behavioral dimension demonstrated the highest correlation coefficient ($r=0.673$), indicating that students' daily academic performance and foundational civilized behavior serve as the core pillars of educational effectiveness; the ideological dimension ($r=0.614$) confirms that the profiling system incorporating ideological indicators can effectively predict the efficacy of ideological guidance, addressing the limitation of traditional profiling methods in quantifying ideological work; the needs and goals dimensions showed significant correlations, demonstrating that accurate identification of student needs and tailored developmental guidance positively promote student growth.

3.4.4. Multiple Linear Regression Analysis: The Predictive Role of a Four-Dimensional Profile on Educational Outcomes

A regression model was constructed with the four-dimensional profile score as the independent variable and the overall educational effectiveness score as the dependent variable, using stepwise regression. The model fitting results are presented in Table 4.

Table 4. Summary Table of the Multiple Linear Regression Model.

R	R ²	adjust R ²	F price	Sig.F
0.762	0.581	0.577	162.437	0

The model adjustment yielded an R² value of 0.577, indicating that the four-dimensional profile collectively accounts for 57.7% of the variability in educational outcomes; F = 162.437, p <0.001, demonstrating highly significant statistical significance for the entire regression model. The regression coefficients for each dimension are presented in Table 5.

Table 5. Regression Coefficients and Significance Tests Table.

Argument	Non-standardized coefficient B	Standard Coefficient β	t	Sig.	VIF
Constant Term	12.746	—	4.329	0	—
The Dimension of Thought	1.827	0.216	5.743	0	1.324
Behavioral Dimension	2.315	0.289	7.162	0	1.417
Demand Dimension	1.542	0.193	4.871	0	1.286
Target Dimension	2.068	0.254	6.435	0	1.369

All independent variables exhibited a VIF value below 2, indicating no multicollinearity; the standardized regression coefficients for all four dimensions were significantly positive, with the behavioral dimension ($\beta = 0.289$) contributing the most, followed by the goal dimension, ideological dimension, and need dimension. Regression equation: Total Educational Outcomes Score = 12.746 + 1.827 × Ideological Dimension + 2.315 × Behavioral Dimension + 1.542 × Need Dimension + 2.068 × Goal Dimension.

The regression analysis confirmed that the four-dimensional student profile indicators can stably and positively predict the effectiveness of community-based education, providing statistical support for delivering stratified, targeted services based on these profiles.

3.4.5. K-means clustering analysis: Precise stratified classification of students

Using a four-dimensional profile with 16 indicators, we performed K-means clustering and determined the optimal number of clusters (K=3) based on the silhouette coefficient, thereby dividing all students into three distinct groups for precise tiered education.

Balanced Growth Type (187 individuals, 39.3%): All four-dimensional indicators show high scores, characterized by positive mindset, excellent academic performance, and clear development goals; Recommended approach: Cultivate a model demonstration network by selecting individuals as community Party member leaders or exemplary participants in activities.

Developmentally lagging category (152 individuals, 31.9%): Both ideological engagement and academic performance are suboptimal, with issues including

academic warnings and deficiencies in theoretical learning; Recommended intervention plan: One-on-one Party member support through the Party Building Center circle + targeted academic guidance via the Service Circle.

Demand satisfaction-seeking type (137 individuals, 28.8%): Behavioral indicators are satisfactory, but needs related to scientific innovation, psychological support, and academic advancement remain unmet; Recommended solution: The collaborative service network should provide customized resources for scientific innovation, career development, and psychological support.

The clustering results provide data support for the precision-tiered services of the "Four-Circle Model," enabling a personalized profile for each individual and a tailored solution for each category.

3.4.6. Comparison of changes in key objective indicators after intervention (paired-sample test)

Quantitative objective indicators were measured before and after intervention in the experimental group, and paired-sample t-test was performed.

Academic warning failure rate: decreased from 28.7% before intervention to 8.5% after intervention, a reduction of 20.2% ($p < 0.001$).

Average participation frequency in Party-building activities: increased from 1.2 times per month to 3.7 times per month ($p < 0.001$).

Community service satisfaction: increased from 62.4% to 91.3%, exceeding the target of 90%.

Success rate of dormitory conflict mediation: 68.2% → 94.7%. Objective data validated the practical value of the model, fully achieving the project's expected social benefit indicators.

4. Results and Discussion

4.1. Key Research Findings

The four-dimensional student profiling system (ideology + behavior + needs + goals) demonstrates significant positive predictive power for community-based educational outcomes across all dimensions, addressing the limitation of traditional profiling methods that overlook ideological aspects and enabling quantifiable, observable ideological guidance.

From the perspective of the "life circle," the four-ring integrated education model demonstrates significant advantages over traditional fragmented community-based approaches, effectively enhancing students' participation, service satisfaction, and overall development simultaneously.

K-means clustering can categorize students into three groups based on profile data, enabling tailored tiered services and achieving precise supply-demand alignment;

After implementation, the three core issues—academic difficulties, insufficient engagement, and misalignment between resource supply and demand—have been significantly alleviated, demonstrating stable practical outcomes.

4.2. Research-based innovative interpretations

Theoretical Innovation: Develop an integrated and precise educational theory framework comprising “Life Circle–Four-Dimensional Profile–Four Social Spheres,” expand the application of the Life Circle theory in university ideological and political education, and enrich the theoretical systems of holistic education (covering all aspects, all students, and all processes) and digital ideological and political education.

Methodological Innovation: The study introduces SPSS big data statistical methods into community education evaluation to quantify ideological dynamics indicators, employing cluster analysis, regression analysis, and t-test for multidimensional empirical analysis, thereby overcoming the limitation of existing research that predominantly relies on qualitative discourse.

Practical Innovation: A four-tiered closed-loop mechanism has been established, forming a sustainable cycle of “data collection – profile generation – tiered services – dynamic evaluation.” Supported by digital tools from the Smart Campus APP, this system can be directly deployed across university residential communities.

4.3. Limitations of the Study

First, the sample was limited to a single college within one private university, resulting in restricted representativeness; future studies should expand the sample to include multiple universities and diverse types of institutions for comparative analysis. Second, data collection relied on internal campus digital systems, and mechanisms for compliant collection and desensitization of student privacy data still require improvement. Third, with an intervention period of 12 months, long-term educational tracking data spanning three years or more requires sustained accumulation.

4.4. Optimization Plan for the Implementation Path of Precision Community Education within the “Life Circle”

Based on the empirical analysis conclusions from SPSS, refine the implementation pathway for the Four-Circle Model:

4.4.1. Establish a robust mechanism for collecting and dynamically updating four-dimensional profile data

Standardize data interfaces for academic affairs, Party building, dormitory management, psychological services, and extracurricular activities; establish student data anonymization guidelines with monthly automatic updates of profile metrics; utilize Python and SPSS to generate batch-based cluster analysis reports, enabling counselors to instantly access personalized student need lists.

4.4.2. Implementation of Four Tiered Life Circles for Collaborative Educational Services

Party-building-led core zone: Pair students categorized as “lagging in development” with Party members for targeted support, and maintain a monthly tracking ledger for ideological indicators;

Collaborative Education Service Network: Provides students with unmet needs with tailored resources including academic advisors, innovation programs, and psychological support, while the AI Q&A platform delivers real-time responses to their requirements.

Holistic Education Initiative: Automatically recommends cultural, sports, labor, and aesthetic education activities based on user profile interests to enhance activity relevance;

A model-driven circle of happiness: Identify students with balanced development to serve as community role models and foster a culture of mutual support.

4.4.3. Establish a three-dimensional dynamic evaluation system comprising participation “level – satisfaction level – achievement level”

Using SPSS, monthly automated evaluation reports are generated to quantify key metrics such as Party-building attendance rates, academic warning clearance rates, and service satisfaction rates, enabling iterative refinement of community service offerings and establishing a data-driven, continuous improvement cycle.

4.4.4. Research Summary and Prospects

Addressing the practical challenges of university one-stop student communities, this study integrates urban living circle spatial governance principles with digital big data technology to develop a four-dimensional student profile and a precision education model featuring coordinated interaction across four key spheres. Empirical analysis using SPSS statistical methods demonstrates that this model effectively addresses common issues in traditional community education, including fragmented approaches, misalignment between supply and demand, and difficulties in quantifying ideological guidance.

5. Conclusions

Future research could further expand the survey sample to compare practical differences among public, private, and vocational colleges; optimize privacy protection algorithms for multi-source data; extend the tracking period to analyze the long-term impact of this model on students' graduation employment outcomes and sustained ideological development; and promote standardized development of a digital platform for “precision education within living communities,” providing a replicable and quantifiable practical framework for nationwide one-stop student community initiatives in higher education institutions.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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