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Ideological and Political Evaluation of English Courses in Heterogeneous Campuses Based on UAV Network

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Abstract

Campus heterogeneity has become prominent with the deeper popularization of higher education, necessitating more focused ideological and political instruction. English classes are crucial because they help students develop their humanistic traits and capacity for intercultural dialogue. Although it is a realistic strategy, integrating ideological and political education into English instruction depends on scientific assessment of the educational quality. Existing assessment approaches, however, need to be more particular for English courses and flexible enough to accommodate diverse student populations. Traditional questionnaire surveys are only sometimes accurate, timely, or complete. Therefore, based on the unmanned aerial vehicle (UAV) network, this research suggests a novel ideological and political education quality evaluation approach for English courses at varied campuses. A consistency feature extraction method is used to identify the ideological and political factors in English teaching by analyzing the consistency between English courses and ideological and political courses. The analytic hierarchy process determines the indicator weights. Teachers' education roles are quantified based on educational psychology theories. A UAV network is leveraged to collect real-time classroom data adaptively across various campus types—fuzzy comprehensive evaluation aggregates multi-source data for objective and pertinent assessment. Experiments on three campus types and 60 teachers validate the effectiveness. The model achieves over 84% accuracy, significantly higher than conventional questionnaire and fixed sensor methods. The results match expert opinions and offer diagnostic suggestions to improve teaching. The model provides a practical data-driven approach to evaluate and enhance the ideological and political education quality through English courses on heterogeneous campuses.

Key Words: Ideological and Political Evaluation, English Courses, UAV Network, Analytic Hierarchy Process, Fuzzy Comprehensive Evaluation, Heterogeneous Data.

I. INTRODUCTION

The intake capabilities of universities and colleges have steadily increased in line with the expanding growth of higher education. China now has the most significant number of college students in the world, which is rising every year. Under the background of mass higher education, campus heterogeneity has become increasingly prominent [1]. There are significant differences among students in aspects such as family background, ability level, learning motivation, and employment orientation. Some students have clear motivation and put learning as their top priority. However, some students need more learning initiative due to vague motivations [2-3]. The heterogeneity brings new challenges to college education management and teaching reform.

For socialist builders and successors to be cultivated at colleges and universities, ideological and political education is crucial. The function it plays in helping college students develop the correct worldview, viewpoint on life, and values is vital [4-5]. Improving students' humanistic qualities and abilities in cross-cultural communication depends on English as a public, required course at colleges and universities. Due to the intensifying globalization, English has become a crucial ability [6]. Additionally, English courses are rife with political and ideological content [7]. Some cultural knowledge and values are communicated simply via language. Politics and ideologies are prevalent themes in original English literature. Thus, English classes align with the goals and direction of ideological and political education. Students' understanding of ideologies and politics is successfully increased when political and ideological education is incorporated into English instruction.

However, some novel problems with ideological and political teaching through English classes occur in campus heterogeneity [8-9]: (i) The instructional content's relevance has to be increased. Students with various academic interests and goals have varied requirements for language proficiency and ideological direction. Only some students may benefit from the same instructional materials and approach. (ii) Some students need more learning initiative. Vague motivations lead to inadequate attention and participation in class. (iii) The effect of infusion-type education is

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limited. Traditional indoctrination education causes resistance in some students. (iv) The evaluation needs to have timeliness and comprehensiveness. Traditional surveys and interviews cannot obtain real-time data on teaching activities. The information collected is often one-sided and delayed.

To address the above issues, conducting a pertinent and practical evaluation of the quality of ideological and political education quality through English courses is necessary [10-11]. On the one hand, the evaluation results can diagnose problems and improve teaching. On the other hand, scientific evaluation is also an ideological and political education for teachers, mobilizing them to attach importance to students' ideological guidance in English teaching. However, the existing evaluation models of English courses have limitations: (i) Lack of pertinence for campus heterogeneity. Most models use unified standards without considering differences in majors and motivations. (ii) The objectivity needs improving. There is a reliance on subjective survey data, which cannot comprehensively and realistically reflect teaching quality. (iii) The timeliness needs improving. Traditional data collection methods cannot dynamically track classroom teaching activities.

The unmanned aerial vehicle (UAV) network is used in this study to present an ideological and political evaluation model for English courses on diverse campuses. The use of UAVs is justified by their ability to adaptively and efficiently collect real-time data due to their flexible movement and varied sensing capabilities. They can perform regular observations in various classroom settings, capturing comprehensive multimedia data that encompasses teaching attitudes, content, methods, and outcomes. Unlike traditional surveys and static sensors, UAVs offer superior coverage, timeliness, and objectivity. Consequently, they supply crucial objective data that aptly assesses the quality of ideological and political education. A consistency feature extraction approach is utilized to pinpoint the ideological and political elements in English instruction by examining the consistency between English and ideological and political courses. Based on their relative importance, the indicator weights at various levels are decided by the analytic hierarchy process (AHP) [12]. The teaching responsibilities of instructors are measured at various learning stages. A UAV network is implemented to gather real-time data on English classroom instruction on diverse campuses [13-14]. English courses' ideological and political education quality is evaluated using the fuzzy comprehensive assessment approach appropriate for various teachers. The paper is motivated by the growing diversity in higher education campuses due to its increasing popularization. This diversity necessitates more specialized ideological and political education to cater to varied student needs. English courses are pivotal in enhancing students' cultural and global communication skills. While incorporating ideological education into English teaching is beneficial, its success hinges on precisely evaluating its quality. Current evaluation models are not adequately tailored for English courses and do not cater to the diverse student body. Thus, there is a pressing need for a novel evaluation model designed explicitly for English courses, ensuring accurate assessment and offering directions for enhancement.

The main innovations of this paper include the followings.

- Proposing a consistency feature extraction method to identify the inherent ideological and political elements in English teaching.
- Quantifying teachers' different roles in the knowledge infusion stage, knowledge internalization stage, and knowledge generation stage.
- Introduce UAV network to collect real-time data of classroom activities and teacher-student interactions.
- Apply fuzzy comprehensive assessment to evaluate the quality of political and ideological education provided by English courses in a relevant way for campuses with various demographics.

The remainder of the paper is structured as follows. The related works are reviewed in Section 2. The methodology is introduced in Section 3. The suggested methods are experimentally evaluated in Section 4, and the paper concludes in Section 5.

II. RELATED WORKS

With the popularization of higher education, campus heterogeneity has become increasingly prominent, posing new challenges for college education management and teaching reform. This requires more targeted and adaptive ideological and political education to suit students' diversified characteristics and demands [15]. As an essential carrier, English courses aim to improve students' humanistic qualities and international communication abilities. Although it is a realistic strategy, integrating ideological and political education into English instruction depends on scientific assessments of educational quality [16].

Studies have already looked into several assessment methodologies for political and ideological education. For instance, the assessment methodology for judging the effectiveness of teaching college English integrated with ideological and political courses during the application period has to be more accurate. In order to address this issue, a social network environment was used to construct a teaching quality evaluation model for college English integrated with ideological and political courses [17]. In [18], the authors combined a multi-layer fuzzy evaluation method with AI data mining concepts to create an artificial neural network system. This cutting-edge algorithm was developed to evaluate the impact of political and ideological education on college students. The novel model includes fuzzy information processing, learning, association, recognition, and self-adaptation. Simultaneously, it successfully addresses the limitations inherent in each of these components.

Recent works have investigated data collection means [19-22]. In [23], the authors introduced an intelligent system for managing teachers using wireless sensor network technology. This system can optimize the classroom environment to create favorable conditions, thereby enhancing students' motivation to engage in learning. In [24], the authors proposed a UAV speed control-based fairness data collection scheme.

In summary, existing studies have made meaningful explorations on ideological and political education evaluation and data collection approaches. However, an evaluation model tailored for English courses on heterogeneous campuses still needs to be improved. The indicator systems need further enhancement in pertinence and adaptiveness. Intelligent data analytics like comprehensive fuzzy evaluation can be combined with advanced UAV sensing to improve evaluation accuracy and timeliness. Therefore, this paper aims to propose an innovative English course evaluation model integrating consistency feature extraction, UAV data collection, and fuzzy assessment to evaluate and enhance ideological and political education quality in heterogeneous campuses.

3. METHODOLOGY

3.1. Consistency Feature Extraction Method

The inherent coherence between English courses and ideological and political courses is the foundation for the ideological and political education provided by English courses. An analysis of their consistency may deduce the ideological and political elements included in English education, and this information forms the basis for the formulation of the following assessment indicators.

The similarity between ideological and political courses and English courses may be seen in four ways, as indicated in Fig. 1: student-centered, consistent political aims, consistent educational direction, and consistent educational goals.

In Fig. 1, we have the following:

- Student-centered: Both types of courses aim to educate and guide students, with students as the center.
- Consistent political objectives: They both serve to consolidate the guiding role of Marxism and the Communist Party of China.
- Consistent educational direction: They both aim to help students establish correct world outlook, outlook on life and values.
- Consistent educational goals: They both aim to cultivate socialist builders and successors with an international perspective.

Based on the four-dimensional consistency analysis, this paper isolates the ideological and political components of teaching English from teaching materials and classroom activities.

For teaching materials, topics related to politics, economy, culture, history, values, morality, philosophy, and social science are identified as ideological and political elements. Contents that reflect socialist core values are categorized as ideological and political elements.

Political and ideological components of classroom activities include teacher actions that promote social responsibility, patriotism, collectivism, and other political ideologies. Political and ideological components can also be seen in student behaviors that demonstrate critical thinking, internalization of beliefs, and active learning.

The pertinence and efficacy of ideological and political education can be improved by removing those above ideological and political components from English courses. The

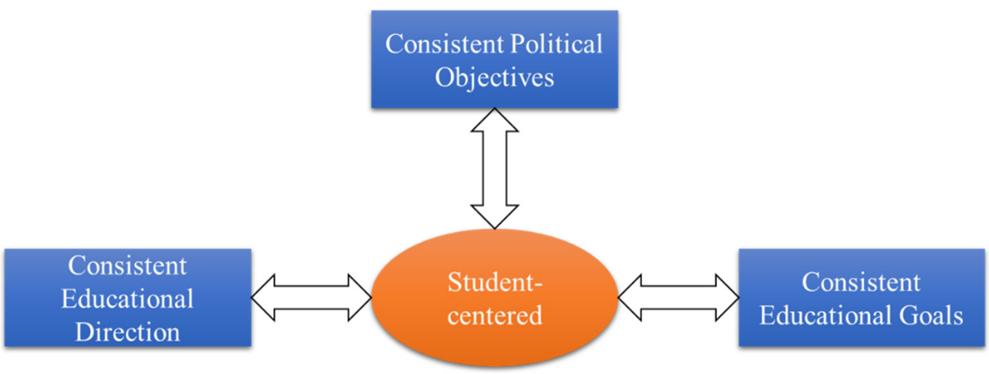

Fig. 1. Consistency between English courses and ideological political courses.

retrieved items are a foundation for building the assessment indication system in the following stage.

3.2. Construction of Evaluation Indicator System

The AHP is used in this research to build a hierarchical assessment indicator system based on extracting ideological and political components from English courses. Three levels make up the indication system [25]:

(1) First level - Teaching quality

The first level is the overall ideological and political education quality through English courses.

(2) Second level - Four dimensions

Referring to the educational laws and characteristics of ideological and political education, four dimensions are determined as the second level indicators:

- D_1: Teacher dimension
- D_2: Teaching content dimension
- D_3: Teaching method dimension
- D_4: Teaching effect dimension

(3) Third level - Specific indicators

Based on the ideological and political elements extracted in Section 1, specific indicators are designed under each second level dimension:

- D_1: Teacher dimension
  - D_{11}: Political stance
  - D_{12}: Moral values
  - D_{13}: Professional ethics
- D_2: Teaching content dimension
  - D_{21}: Content consistency
  - D_{22}: Value guidance
  - D_{23}: Topics pertinence
- D_3: Teaching method dimension
  - D_{31}: Classroom atmosphere
  - D_{32}: Critical thinking
  - D_{33}: Internalization promotion
- D_4: Teaching effect dimension
  - D_{41}: Learning initiative
  - D_{42}: Humanistic spirit
  - D_{43}: International perspective

The hierarchical structure of the evaluation indicator system is shown in Fig. 2.

3.3. Determination of Indicator Weight

The AHP is applied to determine the weights of indi-cators at each level. AHP constructs judgment matrices based on expert scoring of the relative importance between two indicators. Assume there are n indicators $D_1, D_2, \cdots, D_n$ to be weighted. The specific steps are:

Step 1. Construct pairwise comparison matrix $\boldsymbol{A}$:

$$\boldsymbol{A} = \begin{bmatrix} 1 & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & 1 \end{bmatrix}, \tag{1}$$

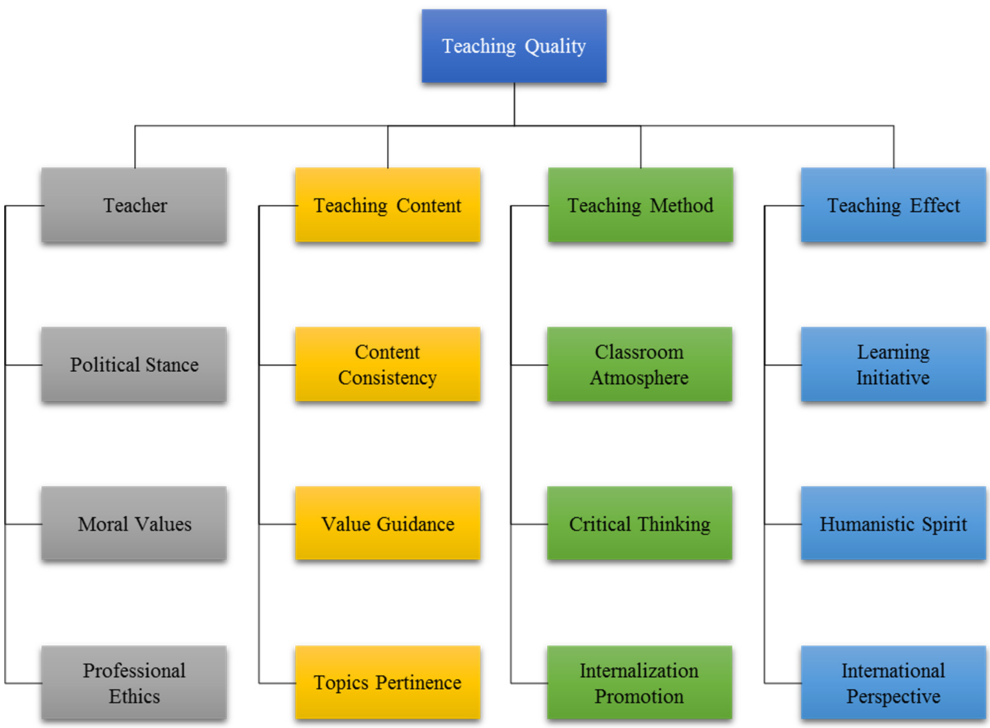

Fig. 2. Hierarchical structure of evaluation indicator system.

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where a_{ij} represents the relative importance score of indicator i compared to indicator j, scored by experts on a scale of 1-9.

Step 2. Calculate the weight of each indicator:

$$w_i = \frac{\sum_{j=1}^{n} a_{ij}}{n} i = 1,2, \dots, n. \tag{2}$$

Step 3. Normalize the weights:

$$\bar{w}_i = \frac{w_i}{\sum_{i=1}^{n} w_i} i = 1,2, \dots, n. \tag{3}$$

Step 4. Consistency check:

$$CI = \frac{\lambda_{\max} - n}{n-1}. \tag{4}$$

$$CR = \frac{CI}{RI}. \tag{5}$$

If CR<0.1, the matrix has satisfactory consistency. Otherwise, the matrix should be modified until CR<0.1. By following the above steps, the subjective judgment of experts can be quantified to obtain the weights of each indicator scientifically, providing a basis for comprehensive evaluation.

3.4. Teaching Role Quantification

Teachers play different roles in exerting educational influence on students in different learning stages. Referring to educational psychology theories, this paper divides the English learning process into three stages: knowledge infusion, knowledge internalization, and knowledge generation. The roles of teachers in each stage are quantified as follows:

- Knowledge infusion stage

In this stage, teachers play an instiller role to teach language knowledge and transmit information. The time percentage of knowledge infusion is recorded as r_1.

- Knowledge internalization stage

In this stage, teachers play a mentor role to guide analysis and inspire thinking. The time percentage of knowledge internalization is recorded as r_2.

- Knowledge generation stage

In this stage, teachers play a facilitator role to promote knowledge reconstruction and innovation. The time percentage of knowledge generation is recorded as r_3.

In addition, teachers need to maintain necessary authority in the overall process. The score for authority is assigned as a constant c_a. By quantifying the time percentage of different roles, this paper can assess the pertinence of teaching methods for heterogeneous students. Adjustments can be made based on the evaluation results. The teaching role score T is calculated as:

$$T = r_1 \times t_1 + r_2 \times t_2 + r_3 \times t_3 + c_a. \tag{6}$$

3.5. UAV Network for Data Collection

The UAV network is capable of collecting real-time data across heterogeneous campuses. The system architecture is shown in Fig. 3. Multiple UAVs with mounted sensors are deployed for each campus type. The UAVs conduct scheduled classroom observations and surveys to collect data, including teaching contents, classroom activities, teacher-student interactions, etc. The perceptual data is transmitted back to the data center in real-time.

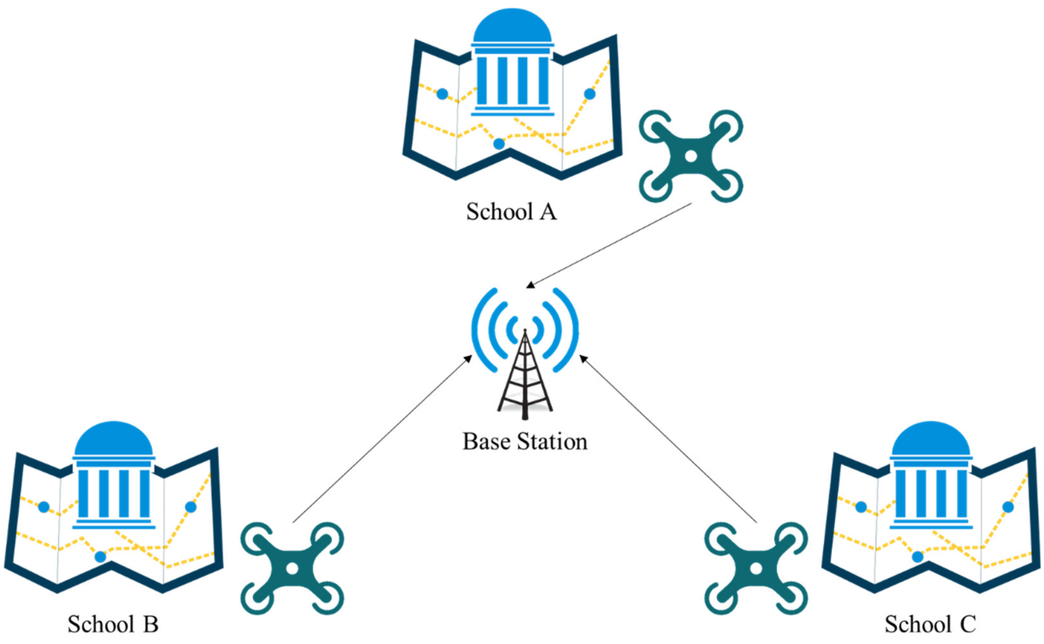

Fig. 3. UAV network architecture for data collection.

The UAV observation involves the following steps:

Step 1. Coverage planning: Divide the campus into grids. Schedule UAV routes to cover classrooms in each grid for a required observation frequency.

Step 2. Motion control: Control UAV motion autonomously to follow planned routes and adjust dynamically to ensure coverage.

Step 3. Data collection: Use sensors to collect audio, video, and texts of classroom teaching and interactions.

Step 4. Transmission: Transmit data streams back to a data center in real time.

Step 5. Recharging: Return to base stations for recharging after observation tasks.

The UAV network integrates optimal coverage path planning, robust autonomous navigation, adaptive sensing, and real-time transmission to achieve efficient, adaptive, and comprehensive data collection.

The coverage path planning pre-computes optimal routes for UAVs to fully observe the target regions. The campus area is discretized into an $M \times N$ grid map based on the classroom locations. The route planning is formulated as an orienteering problem (OP) that maximizes covered grids under a length limit L:

$$\begin{aligned} &\max \sum_{i \in V} x_i \\ &\text{s.t.} \sum_{(i,j) \in E} d_{ij} x_{ij} \leq L \\ &x_{ij} \leq x_i, x_{ij} \leq x_j, \forall (i,j) \in E, \end{aligned} \tag{7}$$

where x_i indicates if grid i is visited, x_{ij} indicates if edge (i,j) is traveled, d_{ij} is distance between grid i and j. The OP can be solved via dynamic programming to obtain the optimal grid sequence:

$$f_k(S_k) = \max_{S_{k-1} \subset S_k} [\, f_{k-1}(S_{k-1}) + r(v_k) \mid S_{k-1} \,], \tag{8}$$

where $f_k(S_k)$ is the maximum reward collected from grids in S_k.

To further improve efficiency, nearby grids are clustered using K-means:

$$\min \sum_{i=1}^{N} \sum_{x \in S_i} \| x - c_i \|^2. \tag{9}$$

The planning is optimized at cluster-level to reduce complexity.

During flight, the UAV navigates autonomously along the planned routes and handles uncertainties. The flight control architecture contains route following to track the global paths, trajectory tracking for dynamic maneuvers, and attitude control for stability.

The guidance laws for route following are:

$$V_c = \frac{2\sqrt{\eta_1 \eta_2} \cos\gamma}{\sqrt{\eta_1 + \eta_2}}, \tag{10}$$

$$\psi_c = \psi_r + \tan^{-1}\left(\frac{\eta_2 - \eta_1}{\eta_2 + \eta_1} \tan\gamma\right), \tag{11}$$

where η_1, η_2 are cross-track errors, ψ_c is commanded heading, ψ_r is reference heading.

For trajectory tracking, a PD controller is applied:

$$u(t) = k_p e(t) + k_d \frac{d}{dt} e(t). \tag{12}$$

The attitude is stabilized using a cascaded PID control:

$$u(t) = k_p e(t) + k_i \int_0^t e(\tau) \mathrm{d}\tau + k_d \frac{d}{dt} e(t). \tag{13}$$

This hierarchical control architecture ensures robust UAV navigation.

The UAV adaptively adjusts its state and sensors to optimize data capturing. The altitude tuning for coverage is defined as follows.

$$H^* = \sqrt{\frac{P_r h_r^2}{\eta P_t}}. \tag{14}$$

Speed and hovering time based on scene complexity are defined as follows.

$$T_h = \frac{H}{R_h} \times \frac{1}{V_h}. \tag{15}$$

$$I_c = \frac{1}{N} \sum_{i=1}^{N} \sum_{j=1}^{M} | I(i,j) - I(i-1,j) |. \tag{16}$$

Directional audio recording using beamforming:

$$\mathbf{y}(k) = \mathbf{w}^H(k) \times (k). \tag{17}$$

$$\mathbf{w}(k) = \frac{\mathbf{R}xx^{-1}\mathbf{a}(\theta)}{\mathbf{a}^H(\theta)\mathbf{R}xx^{-1}\mathbf{a}(\theta)}. \tag{18}$$

By tuning its state and configuring sensors adaptively, the UAV achieves optimized data capturing for the surveillance tasks.

The large-scale sensing data is transmitted to the data center continuously in real-time. To maximize throughput within the power budget $P_{\max}$:

$$\max_{\gamma(i)} \sum_{i=1}^{N} BW(i)$$
$$\text{s.t. } \sum_{i=1}^{N} p(i) \leq P_{\max}. \tag{19}$$

Erasure coding provides transmission reliability:

$$L = \sum_{i=1}^{k} \left\lceil \frac{b_i}{RTT} \right\rceil. \tag{20}$$

Data transfer from the UAV network to the ground center is efficient and dependable thanks to real-time wireless streaming and redundancy coding. In conclusion, integrated coverage planning, reliable navigation, adaptive sensing, and real-time transmission enable high-performance UAV-based data collection, overcoming limitations of traditional methods and providing crucial objective data for assessing the quality of ideological and political education.

3.6. Fuzzy Comprehensive Evaluation

Based on the evaluation indicator system and data gathered, a fuzzy comprehensive assessment is used to evaluate English courses' ideological and political education quality. The steps are as follows:

Step 1. Construct first-level fuzzy relationship matrix R based on indicator weights:

$$R = (w_1, w_2, \ldots, w_n), \tag{21}$$

where w_i is the weight of ith indicator calculated by the AHP method.

Step 2. Construct second-level fuzzy relationship matrix $\boldsymbol{B}_j$ for each second-level indicator:

$$\boldsymbol{B}_j = \left(b_{j1}, b_{j2}, \ldots, b_{jm}\right), \tag{22}$$

where b_{jk} is the membership degree of third-level indicator k to grade j evaluated by experts.

Five grades are set: excellent, good, medium, pass, and fail. The comprehensive evaluation is defined as follows.

$$B = A \cdot R = (A_1 \cdot B_1, A_2 \cdot B_2, \ldots, A_n \cdot B_n)$$
$$P = B \cdot Q = (p_1, p_2, \ldots, p_m), \tag{23}$$

where $\boldsymbol{B}_j$ is the fuzzy evaluation matrix for second-level indicator j. A is the weight vector of second-level indicators calculated by AHP. B is the final fuzzy comprehensive evaluation matrix. P is the evaluation score vector.

The evaluation results can be obtained by:

$$grade = \arg\max_{i} p_i, \tag{24}$$

where p_i is the score of grade i, used to determine the final evaluation grade.

In summary, the fuzzy comprehensive evaluation method can convert the qualitative evaluation of indicators into quantitative scores based on the membership functions. The overall ideological and political education quality is evaluated comprehensively. The results are more objective and pertinent compared with traditional methods while considering the heterogeneity.

IV. EXPERIMENT AND RESULTS ANALYSIS

To evaluate the effectiveness of the proposed ideological and political education quality evaluation model of English courses based on UAV network, experiments are conducted on three campus types: school of law, school of electronics & information engineering, and school of education.

4.1. Experiment Settings

Three campuses are selected as experimental scenarios:

(1) Campus 1: School of law

Features: Focus on humanity and social sciences. Students have diverse motivations and unclear career plans.

(2) Campus 2: School of electronics & information engineering

Features: Focus on science and technology. Students have clear motivations and high learning initiative.

(3) Campus 3: School of education

Features: Cultivate teaching professionals. Students aim for educational careers.

The heterogeneity of the three campuses poses challenges for pertinent ideological and political education through English courses. 60 English teachers who teach college English courses and 720 students who take these courses participate in the experiments. The details are

Table 1. Settings of teacher and student participants.

Campus	Teachers	Teacher features	Students	Student features
Campus 1	20	Years of teaching: 5−15 years	240	Mixed motivations and participation
Campus 2	20	Years of teaching: 3−10 years	240	Clear motivations and active participation
Campus 3	20	Years of teaching: 3−8 years	240	Motivated to be future teachers

shown in Table 1.

Five UAVs are deployed at each campus to carry out data collection. The UAVs are equipped with cameras, microphones, and sensors to collect video, audio, and environmental data. The main parameters are set as:

• Sensing coverage diameter: 40 m
• Flight altitude: 20 m
• Flight speed: 5 m/s
• Battery life: 25 minutes

Based on the indicator system constructed above, 12 third-level indicators are selected as evaluation indicators, as shown in Table 2.

The weights are determined by the AHP method based on expert scoring.

To evaluate the proposed model, two comparison methods are adopted. (i) Traditional questionnaire survey method. Conduct questionnaires for students about teachers' performance in aspects like teaching attitude, content, methods, effects, etc. The results reflect the ideological and political education quality. (ii) Fixed sensor network method. Deploy cameras and microphones to collect video, audio, and textual data at fixed classroom locations. Use the collected data for evaluation.

The proposed UAV network method will be compared with the above two methods, and the performance metrics are evaluation accuracy (number of correct evaluations / total number of evaluations) and data collection efficiency (amount of valid data collected / total observation time).

Table 2. Evaluation indicators and weights.

Indicator	Description	Weight
D_{11}	Political stance	0.05
D_{12}	Moral values	0.07
D_{13}	Professional ethics	0.03
D_{21}	Content consistency	0.09
D_{22}	Value guidance	0.11
D_{23}	Topics pertinence	0.05
D_{31}	Classroom atmosphere	0.10
D_{32}	Critical thinking	0.12
D_{33}	Internalization promotion	0.08
D_{41}	Learning initiative	0.05
D_{42}	Humanistic spirit	0.06
D_{43}	International perspective	0.09

4.2. Analysis of Results

The accuracy of the evaluation reveals how accurate the outcomes of the evaluation were. It is employed to assess the potency of various approaches. Table 3 presents the accuracy findings.

The proposed model achieves over 84% accuracy on all campus types, significantly outperforming the comparison methods. The accuracy of the questionnaire survey and fixed sensors is around 70% due to survey objectivity and sensor coverage limitations. The pertinence of the assessment indicators is increased by the consistency feature extraction, which pinpoints inherent ideological and political elements in English courses. The data collecting UAV mobility responds to the diversity of various campuses and instructors. The fuzzy comprehensive evaluation collects data from several sources for unbiased evaluation. Contrarily, biases result from subjective questionnaire surveys. The fixed sensors need to be more timely norand adaptable. The suggested methodology may, therefore, assess the quality of ideological and political education through English classes with more accuracy.

The data collection efficiency evaluates the performance of different data collection means. Table 4 shows the data collection efficiency of the UAV network and fixed sensors.

The results show that the UAV network collects three times more valid data than fixed sensors in the same duration, indicating higher collection efficiency owing to mobility. UAVs dynamically cover observation regions based

Table 3. Evaluation accuracy.

Campus type	Proposed model (%)	Questionnaire survey (%)	Fixed sensors (%)
School of law	87.50	71.20	68.90
School of electronics & information engineering	86.20	69.80	67.10
School of education	84.70	73.60	70.20

Table 4. Data collection efficiency.

Collection method	Valid data amount (MB)	Total time (hours)	Efficiency (MB/Hour)
UAV Network	1,024	120	8.53
Fixed Sensors	315	120	2.63

on planning, ensuring high mobility. Adaptive motion adjustment ensures timely tracking of classroom activities. Flexible height and angle adjustment optimizes data capturing. Real-time wireless transmission provides efficient data streams. In contrast, the fixed sensors lack flexibility and adaptation, leading to blind spots and inefficient coverage. Therefore, the UAV network enables more efficient real-time data collection from heterogeneous campuses than fixed sensors.

The fuzzy comprehensive evaluation results of 6 example teachers from different campus types are shown in Table 5.

The results demonstrate that the model can objectively evaluate teachers' ideological and political education performance through English courses. The quantitative scores and identified problems match the actual classroom performance. T1 achieves excellent grades for school of law with rich content and interactive methods. T2 needs to further promote critical thinking instead of indoctrination. For school of electronics and information engineering, T3 passes but should enhance topic pertinence to students' majors. T4 passes and needs to inspire students' enthusiasm. For schools of education, T5 has good overall performance but can strengthen value guidance. T6 achieves excellent grades with strong initiative promotion. In conclusion, the suggested model may evaluate the relevance of English instructors' ideological and political education based on the features of various campus types. The objective findings help teachers enhance their instruction.

In terms of evaluation, the UAV system employs a sophisticated method known as the fuzzy comprehensive evaluation. This approach captures and analyzes data from various sources, ensuring a holistic and accurate assessment. By integrating information from different inputs, the system can provide a more nuanced and precise understanding of the situation. To validate the effectiveness of the UAV system, rigorous tests were conducted across three distinct campus environments, involving a total of 60 teachers. The results were impressive, with the system demonstrating an accuracy rate of over 84%. Such a high level of precision underscores the reliability and robustness of the UAV system in real-world scenarios. While investing in the UAV system does entail an upfront cost, the benefits it offers post-deployment are manifold. The versatility of the UAVs means that they can be repurposed for a range of applications, extending their utility and ensuring a good return on investment. This adaptability justifies the initial expenditure and positions the UAV system as a cost-effective solution in the long run. One of the standout features of the UAV system is its automation. Automated operations translate to reduced manual intervention, leading to significant savings. Compared to the labor-intensive and time-consuming process of conducting large-scale surveys, the UAV system emerges as a more economical and efficient alternative. In today's digital age, the Internet is a potential competitor to the UAV system. However, the Internet has its limitations. It does not offer the same mobility level as UAVs, support interactive surveys, or provide unbiased sensing. Significant additional infrastructure would be needed to match the UAV system's capabilities, making the Internet a less efficient option in this context. Lastly, the high accuracy of the UAV system is about more than just numbers. It plays a crucial role in identifying specific challenges and areas of concern. With such detailed insights, educators and administrators can take informed actions, making necessary adjustments to enhance the quality of teaching. This proactive approach, powered by the UAV system, paves the way for continuous improvement in educational settings.

The experiments allow for the following inferences to be made. (i) The suggested approach successfully pinpoints the ideological and political components in English instruction by systematically analyzing English and ideological political courses, improving the evaluation's relevance. (ii) The constructed hierarchical indicator system comprehensively evaluates the teaching quality from four dimensions: teacher, content, method, and effect. (iii) The UAV network provides flexible, timely, and comprehensive data collection for the evaluation system adapting to different campus types. (iv) Fuzzy comprehensive evaluation converts qualitative assessments into objective quantitative results, which precisely reflect teachers' performance. (v) The proposed model achieves over 84% accuracy, significantly higher than traditional questionnaire and fixed sensor methods. It

Table 5. Evaluation results of example teachers.

Teacher	Campus type	Score	Grade	Problems
T1	School of law	92	Excellent	-
T2	School of law	81	Good	Insufficient critical thinking training
T3	School of electronics & information engineering	78	Medium	Contents not closely related to students' majors
T4	School of electronics & information engineering	68	Pass	Lack of classroom interactions
T5	School of education	86	Good	Can increase value guidance in contents
T6	School of education	93	Excellent	-

demonstrates strong reliability. (vi) The results match expert opinions and can provide diagnostic suggestions to improve teaching. The findings demonstrate the high accuracy and great applicability for diverse campuses of the proposed ideological and political education quality evaluation model of English courses based on the UAV network. It provides a practical approach to strengthen and improve education quality.

V. CONCLUSION

This study addresses the imperative need for targeted ideological and political education within the context of increasingly heterogeneous campuses brought about by the expansion of higher education. This paper introduces an avant-garde ideological and political education quality evaluation model for English courses in heterogeneous campuses, leveraging the capabilities of the UAV network. The proposed model is built upon a foundation of consistency feature extraction, which entails a meticulous analysis of the alignment between English and ideological-political curricula to identify pertinent factors. The analytic hierarchy process contributes to the model by determining the optimal weights of evaluation indicators. Moreover, quantifying teachers' roles based on educational psychology theories enhances the precision of evaluation. By harnessing the power of a UAV network, real-time classroom data is collected adaptively across diverse campus settings, enabling a comprehensive and objective assessment through fuzzy comprehensive evaluation. The empirical validation of the model across three distinct campus types and involving 60 teachers underscores its efficacy, achieving an impressive accuracy rate of over 84%. This performance significantly outperforms conventional questionnaire-based and fixed sensor methods.

While the results are encouraging, certain limitations remain. The model's effectiveness might be influenced by varying UAV network capabilities and infrastructure across different campuses. Additionally, the model's application to non-English courses warrants exploring its adaptability and broader utility. Future work should focus on refining the model's implementation, addressing these limitations, and extending its scope to encompass a broader range of educational contexts and subjects.

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