

## Retraction

# Retracted: The Optimization of Civic Education with the Assistance of Artificial Intelligence Devices

### Wireless Communications and Mobile Computing

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### References

- [1] S. Luo, "The Optimization of Civic Education with the Assistance of Artificial Intelligence Devices," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 4144654, 13 pages, 2022.

## Research Article

# The Optimization of Civic Education with the Assistance of Artificial Intelligence Devices

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With the advent of the era of artificial intelligence, a technological revolution has begun in the field of education, which has injected new momentum into moral education. Today, civic education is developing rapidly in countries around the world, while civic education in China is still relatively lagging behind. In China, we need to optimize civic education by building a comprehensive civic education system, implementing the concept of people-oriented, gathering the joint efforts of the whole society, expanding diversified civic education methods, and selecting and enriching the contents of civic education. Artificial intelligence technology enables higher education institutions to carry out civic education, enrich teaching contents, broaden teaching methods, and optimize teaching evaluation. However, technology-related innovations are dualistic in nature, with essential, technical, and value risks that hinder their effectiveness in civic education. This paper proposes strategies for optimization in terms of improving digital core risk response capabilities, establishing reliable technology risk response mechanisms, and maintaining a foundation for civic education response costs. Thus, weakening the risk factors of AI in civic education facilitates the transformation of AI and technology to the advantage of knowledge-based civic education. This paper discusses strategies and methods for optimizing smart education using AI devices and establishes a corresponding smart education platform to help students with their ideological education. Based on the analysis of actual cases, the paper discusses the effectiveness and advantages of the program.

## 1. Introduction

The change of the times drives the change in education, and the arrival of the era of artificial intelligence has set off a technological revolution in the field of education [1]. In July 2017, the State Council issued the “New Generation of Artificial Intelligence Development Plan,” which clearly puts forward intelligent education as a key task: “using intelligent technology to accelerate the reform of talent training mode and teaching methods and build a new education system that includes intelligent learning and interactive learning [2].” With the support of both technology and government, research on the application of artificial intelligence in education is flourishing like a spring. Artificial intelligence technologies can support inclusive and ubiquitous access to learning, help ensure equitable and inclusive educational opportunities, promote personalized learning, and enhance learning outcomes [3]. However, the innovation brought

by technology has two sides, and it can bring new problems while driving changes in educational development [4]. In this paper, we focus on the work of ideological and political education in colleges and universities in the context of artificial intelligence, discuss the opportunities and risks brought by artificial intelligence to the work of ideological and political education in colleges and universities, and propose the optimization strategies of artificial intelligence applied to ideological and political education in colleges and universities, so as to promote the technical advantages of artificial intelligence into the advantages of ideological and political education.

With the reform of education informatization, artificial intelligence technology is progressively embedded in the ideological and political education work of colleges and universities from the aspects of educational subject, object, and carrier [5]. Driven by big data, deep learning, strong computing, and other technologies, the ideological and political

education teaching content, teaching methods, and teaching evaluation in colleges and universities have been changed and developed. The ideological and political education content should be not only ideological and theoretical but also affinity and relevance, and moreover, it should show the characteristics of scientificity and modernity. With the support of powerful data processing ability of artificial intelligence and virtual reality technology such as VR, on the one hand, the accuracy of ideological and political teaching content has been improved and students' personalized needs have been met. Big data provides a large amount of material for ideological and political education, and in the face of the huge and ponderous amount of information, the superb data processing and analysis ability of artificial intelligence based on big data can widely collect and search valuable information for specific needs and carry out multidimensional comprehensive three-dimensional processing of the collected information, and also according to the data browsing traces and tracking technology, it can target different students. It can also make accurate portrait according to the data browsing traces and tracking technology and realize the pushing of accurate curriculum resources, teaching resources, test resources, and other learning resources, so as to promote the ideological and political education from the preaching type of flooding to the personalized and accurate drip irrigation [6]. On the other hand, it enriches the presentation form of teaching contents. Most students' perception of the traditional ideological and political classroom is boring. In the era of artificial intelligence, with the support of powerful data processing ability and virtual reality technology such as VR, teachers can enhance the vividness and fun of the ideological and political classroom by carrying out experiential teaching, so that students can have immersive education in the scene experience, which not only meets the demand characteristics of college students in the new era but also improves the effect of ideological and political education.

Ideological and political education should not only be attractive in content and form but also keep up with the times in education methods and means. Contemporary college students are basically the "post-95" and "post-00" generation, and the Internet is the most active platform for them [7]. Along with the integration of artificial intelligence technology and civic education, online learning platforms such as MOOC (Mu Classroom), Xuedang Online, StudyTong, Nail, and Tencent Conference have emerged [8]. With the support of the Internet and the hardware and software of computer equipment, the transmission of knowledge is no longer confined to the three-foot podium but has been made convenient and efficient in the cloud. The online learning platform also provides a good carrier for students to obtain quality civics course resources, and some famous teachers' course resources will be shared to more students in need through the online learning platform in the form of recorded or live broadcasts, and students can retrieve and learn according to their shortcomings and interests. The virtual teaching assistants are created at the same time as the online learning platform, and they take up the daily management work such as the collection of preparation materials, the mastery of students' knowledge points, the analysis of learn-

ing concern points, and the collection of roll call and after-class homework, etc. Teachers are able to be appropriately freed from the tedious transactional work, which facilitates them to spend more time and energy thinking about the innovation of civics work and pay attention to students' individual characteristics; thus, it can be said that AI technology also creates a better teaching and research environment for teachers to continuously improve the level of education [9].

Scientific and reasonable evaluation is a necessary part of optimizing ideological and political education methods and promoting reform and innovation in ideological and political theory classes. Evaluating the teaching effect of ideological and political science classes should comprehensively consider students' knowledge mastery, ability enhancement, and value shaping [10]. Having accurate and effective assessment data is the basis for ensuring the evaluation effect. Integrating artificial intelligence technology into ideological and political education assessment will effectively improve the accuracy and scientificity of ideological and political science teaching evaluation. First, the online classroom has the feature of real-time monitoring, which can accurately grasp the class status and interaction of students in each civics class, and the students' reactions are the "touchstone" to test the effectiveness of civics classroom teaching. Second, through the intelligent assessment system, students can complete the test online and give objective assessment results to avoid subjective judgment. According to the background assessment results, we can systematically and comprehensively understand students' mastery of overall knowledge, and through intelligent data analysis technology, we can see the strengths and weaknesses at a glance. Finally, based on big data technology, students' daily internet browsing and concern topic points can be detected. Based on students' concern points, it is easy to make a relatively scientific judgment on students' value direction and ideological situation. This is an inspiration and improvement for the preparation of the civics teaching plan, the setting of classroom format, and the assignment of after-class homework.

## 2. Related Work

Since artificial intelligence has entered people's view, the research on it in various fields of society has never stopped and is getting hotter. In terms of educational AI, domestic and foreign research on educational AI is still in the early stage.

*2.1. Current Status of Domestic Research.* As of January 5, 2019, a total of 78 papers were retrieved from a search of the General Literature Collection of China Knowledge Network under the title of educational artificial intelligence; however, no relevant works were retrieved from a search under the title of educational artificial intelligence and ideological and political education model [11]. It can be seen that the research on the combination of educational AI and ideological and political education is still in the early stage, and so far, there are no papers published on the Internet specifically on the research of educational AI and ideological and

political education model, and no similar research results have been published.

In the context of today's research, there are three main areas of professional research on educational artificial intelligence in China as follows.

*2.1.1. Basic Knowledge about Educational Artificial Intelligence.* This type of result can provide information about the latest innovations in educational AI technology. Its shortcoming is that authors tend to explore less about educational teaching practice. This results in a large proportion of the articles being unreadable for readers without a relevant technical background.

*2.1.2. The Use of Educational AI in Teaching and Learning.* Researchers in the field of educational technology provide some insights into the specific practical operation of AI in education. However, they usually lack a sense of history [12]. They do not delve into the circuitous paths and success stories of AI in education. Only the circle of educational technology is detached from reality by talking only about possibilities and advantages, not about reality and costs.

*2.1.3. System Development and Empirical Studies.* These articles have data and practice, although most of them lack practical feedback, reflecting that the authors are not very familiar with the application of educational AI [13]. They are characterized by terminology and data accumulation but lack technical design and application methods, reflecting a lack of theoretical thinking, terminology, and methods in educational teaching practice, making it difficult to hide the pallor of data and technology [14]. Most traditional AI learning systems are designed to meet the learning needs of specific domains and are aimed at facilitating the acquisition of specific knowledge and skills by learners. These systems tend to complement schooling and do not interfere with students' daily learning. With the development of artificial intelligence technology, the education field has a deeper pursuit of educational AI technology. Educational AI technology will certainly have a huge impact on China's education model.

The State Council proposed a development plan for artificial intelligence on July 8, 2017 [15]. In order to accelerate the innovation and application of AI technology in education, intelligent education was proposed for the first time, pointing out the development direction of education+AI [16]. Some domestic experts and scholars have carried out related research, and it can be seen that education, as one of the main application areas of AI, is moving toward a new path of AI+education. At present, the government, universities, enterprises, and other institutions in China attach great importance to the integration and development of AI and education: at the government level, the government work report of the National People's Congress in 2018 clearly pointed out that the development and application of a new generation of AI must be strengthened and promoted in many fields such as healthcare, elderly care, education, culture, and sports [17]. The Ministry of Education website on April 10, 2018, published a notice about the AI

innovation program in universities, suggesting that a new model of AI+education will be formed in the future [18]. It will be used in primary and secondary schools, universities, etc. The education system requires the introduction of AI education in schools in the future; at the school level, many universities have established AI colleges and AI-related majors, and the Chinese Academy of Sciences, Xi'an University of Electronic Science and Technology, and Nanjing University have established AI technology colleges, and many universities have opened AI-related majors; enterprises actively carry out AI vocational training to cultivate innovative and intelligent talents, and also, active enterprises actively carry out AI vocational training, cultivate innovative and intelligent talents, and at the same time actively introduce professional talents in AI [19].

*2.2. Status of Foreign Research.* All countries in the world attach great importance to the ideological and moral education of young people, especially college students who have received higher education [20]. In the western countries led by the United States, they themselves have powerful modern network technology, which will inevitably influence the formation and inculcation of values and ideology of college students and have corresponding network regulations to regulate the words and behaviors of college students on the network; at the same time, on the basis of legislation to control the behavior of college students on the network platform, other countries will directly control the behavior of students through network monitoring, such as the United States Computer Ethics Association [21]. The ethical and moral monitoring of information and communication was established in Korea to monitor information that is detrimental to the healthy development of college students [22]. However, because foreign countries pay more attention to the model of education as well as the diversity of methods in ideological and political education and because ideological and political education in foreign countries is very different from ideological and political education in the professional sense in China, it has not been possible to find specific research literature on ideological and political education in colleges and universities in the context of educational artificial intelligence [23].

*2.3. Review of Research Literature.* First, in terms of the existing research results, there are specific studies on educational AI perspectives about ideological and political education in colleges and universities, mainly by domestic scholars, and most of the perspectives are technology-assisted teaching-oriented [24]. These research results mainly elaborate on the meaning, characteristics, and development trend of educational AI. The characteristics of educational AI are mainly summarized as superb intelligence, openness, and personalization [25]. For the development trend of educational AI, most of them are assisted teaching technologies, such as teaching platforms and teaching robots.

Secondly, for the research on the problems of ideological and political education in colleges and universities under the perspective of educational AI, the academic community is more focused on whether intelligence is in conflict with

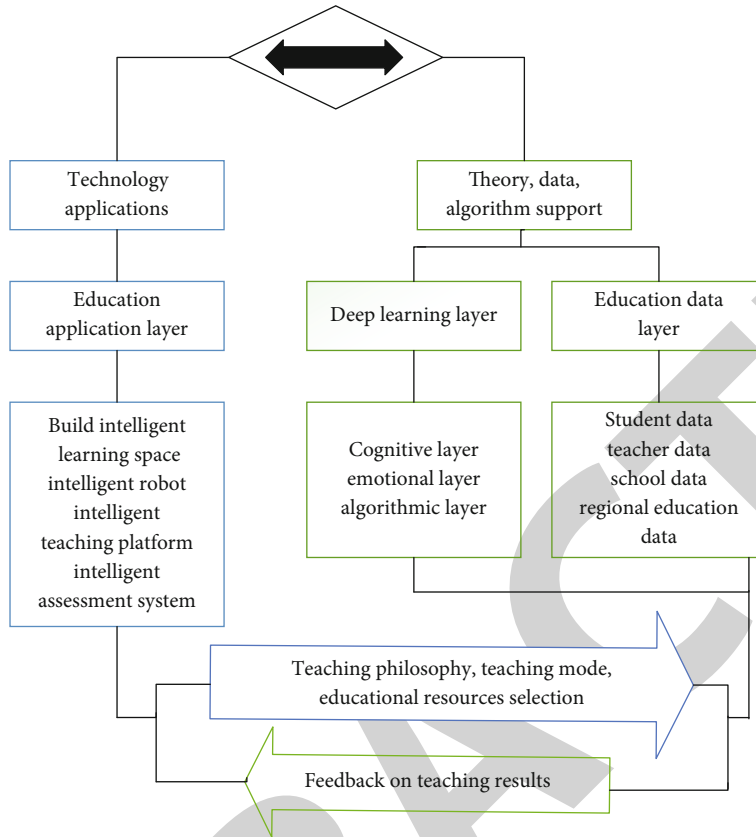


FIGURE 1: Educational AI technology framework.

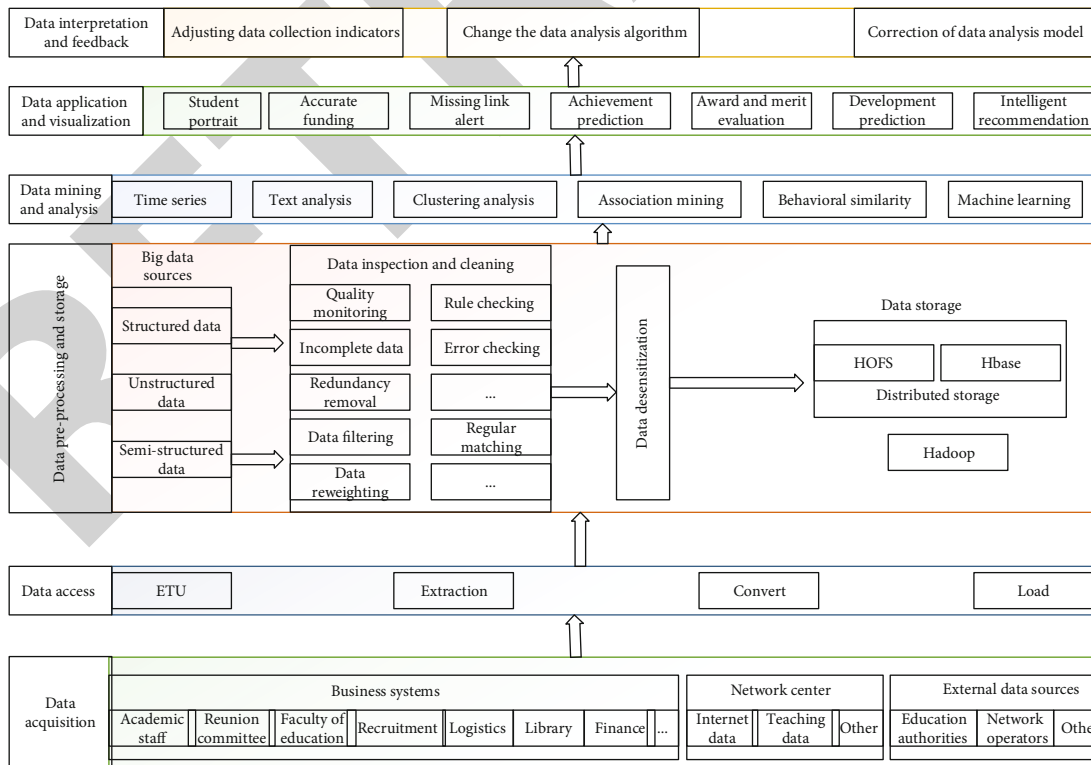


FIGURE 2: Operational architecture of civic education big data system.

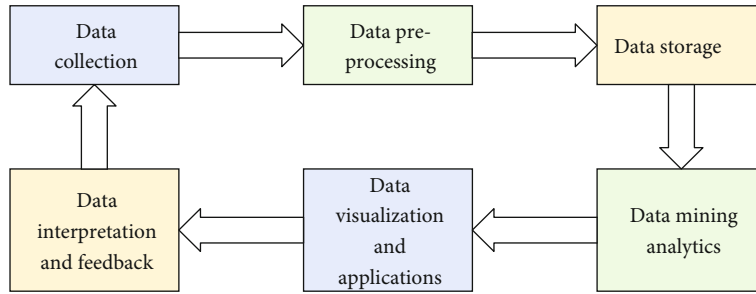


FIGURE 3: Flow chart of civic education big data platform application.

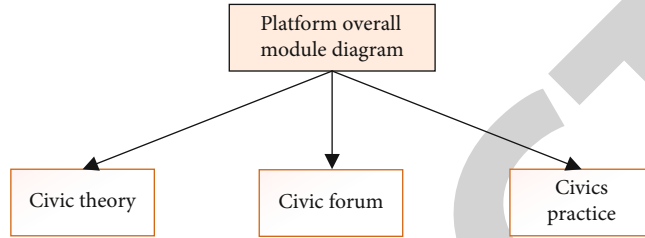


FIGURE 4: Overall module diagram of the intelligent platform.

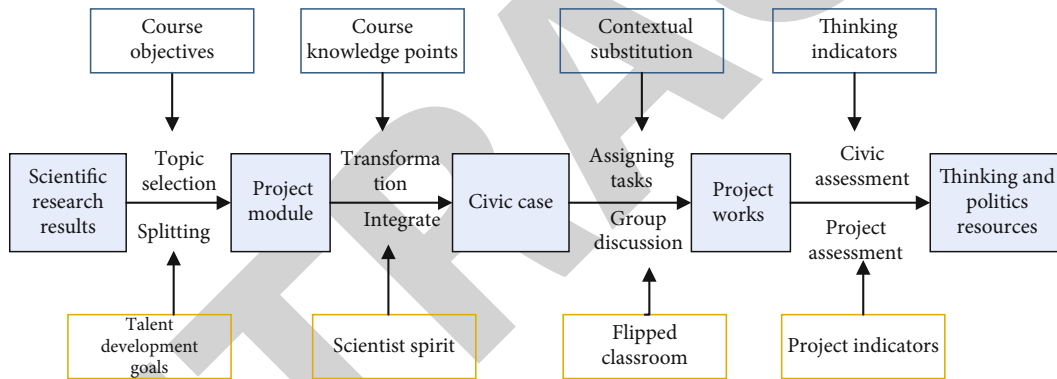


FIGURE 5: Flow chart of the development of practical teaching civic politics case resources with the integration of artificial intelligence.

traditional teachers’ teaching. It is mainly believed that educational AI will bring threatening problems to traditional teachers. So, can traditional learning mechanisms be replaced by AI? The answer is no.

Finally, there is a lack of special research on the reform of ideological and political education mode in colleges and universities under the perspective of educational artificial intelligence, so this paper mainly focuses on the ideological and political education teaching in colleges and universities creating a personalized ideological and political learning platform, improves the quality of educators, optimizes the platform dissemination environment, etc., from the mode concept, method and way, operation mechanism, and mode evaluation, to explore an ideological and political education based on educational artificial technology innovative concept and model.

### 3. Strategies

The shift is from relying solely on persuasive teaching by teachers to group discussions, as well as social research, role-playing, community service, creative writing, etc., and

a special focus on using modern methods such as online information for discussion and consultation services on the Internet. In summary, civic education has now received attention from the entire international community. Currently, big data as well as deep learning together constitute artificial intelligence, where deep learning is an advanced algorithm based on big data. It can simulate the neural external world of the human brain. It promotes artificial intelligence from the algorithm level and perception level and gradually transitions to the cognitive level. Based on AI technology, the new ecology of education is changed and the technical framework of educational AI is constructed (as shown in Figure 1), and the technical framework of educational AI is the basis for people to understand educational AI. It is also the key to unifying the integration of education and artificial intelligence.

*3.1. Educational Data Layer.* The foundation of educational AI is educational data; without data, there is no educational AI. Collect educational data, including student data, teacher data, school data, and regional education data. For data to be

TABLE 1: Statistical table of survey samples ( $N = 577$ ).

Type	Option	Sample (person)	Percentage (%)
Household registration location	Rural	242	41.9
	Urban	142	24.7
	City	193	33.4
Gender	Male	230	39.0
	Female	347	61.0
Is the only child	Yes	298	51.5
	No	279	48.5
Grade	Freshman	152	26.3
	Sophomore	198	34.5
	Third year	227	39.2
Political appearance	Chinese Communist Party members (including preparatory)	54	9.0
	Members of the Communist Youth League	505	87.9
	Masses	18	3.1
	Other party members	0	0
Major	Humanities and Social Sciences	288	49.9
	Natural disciplines	289	50.1
Civics course type	Fundamentals of thought, moral cultivation, and law	536	92.5
	Outline of modern Chinese history	440	76.7

TABLE 2: Reliability analysis of college students' subjectivity scale ( $N = 577$ ).

Item	Cronbach alpha	Number of measurement items
Subjectivity	0.944	34
Autonomy scale	0.925	14
Motivation scale	0.893	17
Creativity scale	0.852	5

collected in a comprehensive and high quality, for students and teachers, not only knowledge data should be collected to have a comprehensive understanding and grasp of the knowledge that students and teachers have but also behavior data, including students' and teachers' classroom language expressions and body language. The education data layer emphasizes the high combination of big data and ideology and politics. According to the basic principles and methodological steps of big data platform construction and the actual ideological and political education, this paper divides the construction and operation of ideological and political education big data repository into five main modules and processes: data collection, data preprocessing and storage, data mining and analysis, data application and visualization, and data feedback, and its system architecture is shown in Figure 2.

**3.2. Deep Learning Layer.** The development of artificial intelligence has gone through the algorithm stage and the perception stage. Now, it steps into the cognitive stage. In the algorithmic stage, AI is not really AI but only algo-

gorithmic intelligence, which has certain advantages in improving the speed of data computing; in the perception stage, in this period, AI has no self-awareness due to the limitation of technology. AI is able to not only know text, speech, and images but also understand the meaning behind the text, speech, and images, which creates the conditions for the integration and development of AI and education.

**3.3. Education Application Layer.** Artificial intelligence and education are moving toward integration, giving rise to a series of new application forms, summarized as intelligent robots, intelligent teaching platforms, and intelligent assessment systems, freeing teachers from tedious teaching work, realizing human-computer collaborative teaching, paying more attention to students' development, returning to the essence of education, and improving teaching effectiveness. As the degree of integration of artificial intelligence and education continues to deepen, so does educational artificial intelligence. The ultimate goal is a comprehensive intelligent learning platform, through the cultivation of professional talents, in order to ensure the dynamic balance of the continuous development of the education system and the social system. The five stages of data collection, data preprocessing and storage, data mining and analysis, data visualization and application, and data interpretation and feedback of the ideological and political education big data platform are a value cycle process of data-information-theory-practice (see Figure 3), which in essence follows the principle of dialectical materialism epistemology and adheres to the cyclic cognitive process from practice to knowledge and then practice and knowledge again.

TABLE 3: Structure validity test and analysis table of each scale ( $N = 577$ ).

Item	$\chi^2/df$	AGFI	GFI	TLI	CFI	NFI	RMR	RMSEA
Critical criterion	<5	>0.9	>0.9	>0.9	>0.9	>0.9	<0.05	<0.08
Autonomy scale	2.05	0.94	0.96	0.99	0.98	0.99	0.03	0.03
Motivation scale	2.73	0.91	0.96	0.95	0.95	0.93	0.05	0.06
Creativity scale	1.62	0.99	0.98	0.98	0.98	0.98	0.03	0.02

TABLE 4: Statistical analysis table of intelligent device technology platform usage frequency ( $N = 577$ ).

Name	Minimum	Maximum	Mean	Standard deviation
QQ	1	5	4.83	0.537
WeChat	2	5	4.72	0.600
Microblog	1	5	3.43	1.535
Baidu posting, Zhihu, and other online Q&A communities	1	5	3.16	1.212
Short video platforms such as Jieyin and Crypto	1	5	2.35	1.487
China University MOOC, Xue Tang Online, and other platforms	1	5	3.28	1.112
Today's Headlines and other news and information platforms	1	5	1.78	1.044

TABLE 5: Statistical table of main information concerned by using intelligent device.

Key information for responding to Internet concerns	$n$	Response Response rate (%)	Penetration rate ( $n = 577$ )
Current affairs	443	19.67	76.61
Social and livelihood information	322	14.28	55.65
Financial	67	3.04	11.78
Entertainment and leisure	493	21.98	85.63
Sports and life	137	6.15	23.91
Civics	55	2.42	9.35
Professional courses	249	11.05	42.99
Literary works	271	12.12	47.15
Education	182	8.05	31.42
Other	27	1.24	4.84

Only by fully excavating the ideological and political elements that fit the characteristics of the curriculum and conform to the law of education, designing teaching cases, and precisely drip-feeding instead of flooding can the curriculum of ideological and political education be “silent” and “like salt and water.” The actual network platform is shown in Figure 4.

Combined with the talent cultivation objectives, the core of the Civic Science element of the AI curriculum is the scientist's spirit proposed by General Secretary Xi Jinping at the Scientist Symposium on September 11, 2020. In order to make students spontaneously establish the noble patriotic sentiment of being rigorous, climbing to the top, having the motherland in mind, and being willing to devote themselves like scientists from the heart, it is necessary to put students into real application scenarios and face the actual scientific and engineering problems in the development of the country and the industry, and the vertical AI concepts of national and industrial development undertaken by teachers are the best testing ground for cultivating the scien-

tist's spirit. Opening up the channel of integration of AI and intelligent devices between AI concepts and classroom teaching and letting students “participate” in AI concepts in an immersive way can make students understand more deeply the practical difficulties encountered in the development and construction of China and inspire the most simple and sincere feelings of home and country in students' hearts.

The concept of AI should be transformed into a civics teaching case with several principles: firstly, the material selected should have a prototype system as the basis of the AI concept; purely theoretical research is not conducive to the initial practice of students; secondly, the AI concept must be closely integrated with the curriculum, try to achieve full coverage of knowledge points, and provide learning materials in advance for the overarching part; finally, the stage tasks set in the civics case should be open to give students sufficient space to think and play, and the confidential parts must be desensitized. The process of developing Civic and Political Science resources is shown in Figure 5.



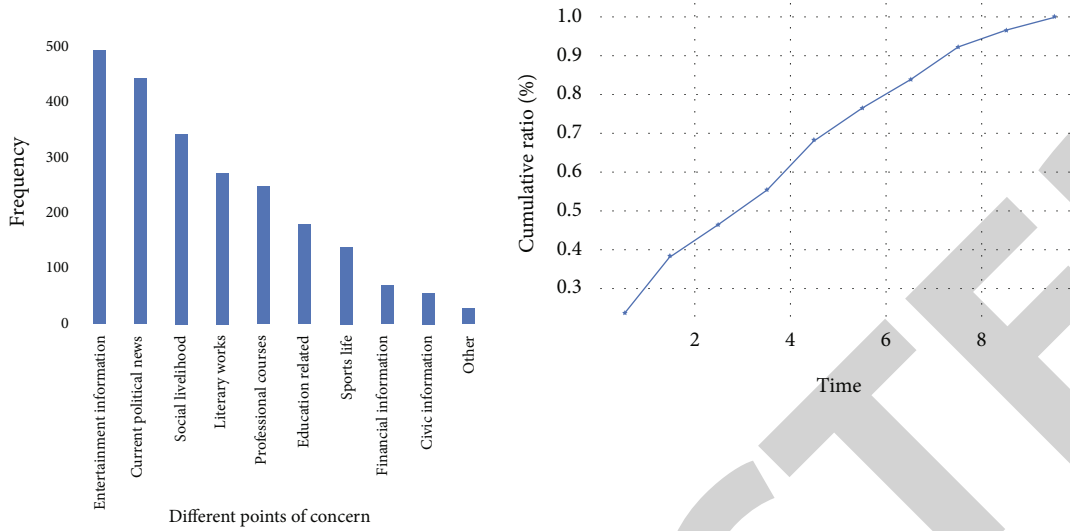


FIGURE 6: Main information on the intelligent device.

TABLE 6: Statistical table of main motives for using intelligent device.

The main motives for using intelligent device	<i>n</i>	Response Response rate (%)	Popularity ( <i>n</i> = 577) (%)
Browsing current affairs news	375	15.18	65.15
Entertainment and leisure	543	21.88	93.92
Internet chatting	468	18.92	81.27
Finding study materials	461	18.55	79.73
Participating in hot discussions on the Internet	225	90.3	38.81
Shopping on the Internet	402	16.17	69.52
Other	5	0.23	1.02

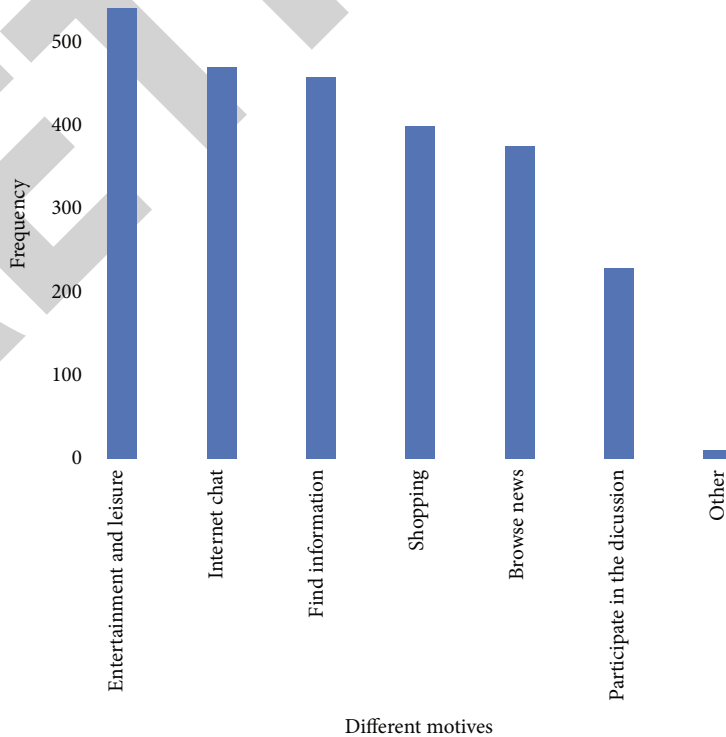


FIGURE 7: The main motivation for using intelligent device.

TABLE 7: The score of students' subjectivity ( $N = 577$ ).

Project	Minimum	Maximum	Mean	Standard deviation
Subjectivity	1.428	4.515	3.218	0.573
Autonomy level	1	5	3.355	0.715
Energetic dimension	1.374	1.439	2.962	0.582
Creativity level	1	5	3.592	0.750

The practical teaching link of AI for the course civics is divided into 3 parts: precourse, classroom, and postcourse, using a mixed teaching mode of online and offline, and the final assessment is a comprehensive evaluation of students from two perspectives: project completion and civics education, focusing on cultivating students' scientific thinking and scientist spirit and increasing the proportion of process-oriented assessment, designed as follows.

**3.3.1. Precourse Prestudy.** At the beginning of the semester, the catechism case resources related to AI practice courses are recorded in advance through the Learning Pass and Wisdom Tree catechism platforms, and the course prestudy requirements are pushed to students through the cell phone terminal before the start of class. Students are required to complete video viewing, quizzes, discussions, and other task point learning before class.

**3.3.2. Classroom Teaching**

- (1) The first stage is the assignment of the Civic Science and Politics case. The instructor adopts the teaching method of contextual substitution, introduces the actual scientific and engineering problems to be solved with the case, and stimulates the students' patriotic feelings and sense of urgency. The lectures are interspersed with audio, video, pictures, lectures, polls, questionnaires, quizzes, pop-ups, and other forms to enrich the teaching content and mobilize learning enthusiasm
- (2) The second stage is group discussion and application practice; using a flipped classroom to complete the practical teaching and using a combination of online and offline teaching methods, the teacher is from the lead of teaching into a participant and guide, in the process of participation in the implicit introduction of Civic Science elements. Students are free to form teams, and the team members take turns to report the progress of the task and the realization plan in stages. After the report is completed, the team members and the group members can further discuss and evaluate the speaking students, and the evaluation results are included in the overall assessment of civics

**3.3.3. Extension after Class.** Teachers continue to participate in discussions and answer students' questions with the help of the message area of the catechism platform, timely under-

standing of students' participation in class with the help of the platform's statistics function, reminding students with poor participation, and encouraging students with high participation. At the same time, in order to further enhance students' scientific practice ability and cultivate scientists' spirit, teachers assign some academic frontier research hotspots with relevant knowledge points after class, encourage students to consult literature or source code materials, and share the realized results on the platform.

**3.3.4. Assessment and Evaluation.** The final grade of the course is evaluated through process assessment and work completion. The process assessment includes online platform learning and classroom interaction, involving video viewing, task point completion, stage quiz, group discussion, voting, quiz, and other links. The work completion mainly includes functional implementation, major assignment report, and report defense. The students are evaluated in two dimensions: project index and ideological index, and students with outstanding performance are encouraged to participate in major innovation projects and national and provincial science and technology competitions and even directly participate in teachers' artificial intelligence concepts.

## 4. Case Study

**4.1. Survey Data Sources and Survey Sample Analysis**

**4.1.1. Survey Data Sources.** In this study, undergraduate students from the first to the third year of a university who are participating in the civics course were selected as respondents due to the realistic conditions. A university is one of the seven universities directly under the Ministry of Education in a province, with 62 undergraduate majors in 18 colleges (departments). In order to facilitate sampling, this study tried to sample the sample according to the majors, grades, and subjects involved in the civics courses based on the class schedules of the civics classes taught by the civics teachers of the university. In view of the possible differences in the use of the concept of "artificial intelligence smart devices" between university students and researchers, this study set up questions related to the concept of artificial intelligence smart devices. In the analysis, the samples with biased perceptions of the concept of AI smart devices were excluded, and the final number of qualified samples was 577, accounting for 72.9% of the valid questionnaires. The basic situation about the subjectivity of students in the teaching of civics class assisted by AI smart devices is derived from the analysis of these 577 samples. For example, the data were reentered according to the disciplinary backgrounds of "humanities and social sciences" and "natural sciences," which were originally obtained from the questionnaire in the form of fill-in-the-blank questions. The information of the survey data after recoding and entering is shown in Table 1.

## 5. Analysis of the Survey Samples

**5.1. Survey Questionnaire Reliability Analysis**

**5.1.1. Reliability Analysis.** Cronbach's  $\alpha$  reliability coefficient was used to test the reliability of the subjectivity scale of

TABLE 8: The score of students' autonomy.

Project	Minimum	Maximum	Mean	Standard deviation
Autonomy	1	5	3.55	0.717
Self-motivated learning awareness	1	5	2.857	0.813
Self-directed learning behavior	1	5	3.506	0.755

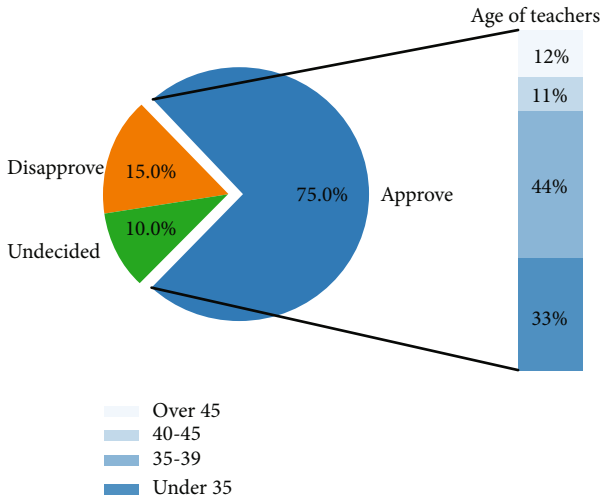


FIGURE 8: Teachers' views on the optimization plan of ideological and political education.

students. In previous studies, 0.7 is generally regarded as the threshold value of Cronbach's  $\alpha$  reliability coefficient; that is, when Cronbach's  $\alpha$  reliability coefficient exceeds 0.7, the scale is set reasonably. On the contrary, the scale is not reasonable and should be considered for reformulation (see Table 2 for details).

As shown in Table 2, after analyzing the obtained data through SPSS25.0 software, it was found that Cronbach's  $\alpha$  value of the total scale of students' subjectivity was 0.944, and Cronbach's coefficient values of all dimensions of the scale exceeded the critical value of 0.7, which indicates that the scale used in this study has good reliability and consistency, and therefore, the scale can be used to explain students' subjectivity.

**5.1.2. Validity Analysis.** According to the specific research content, this paper adopts two measures of content validity and structural validity to evaluate the effectiveness of college students' subjectivity in teaching civics with the assistance of artificial intelligence smart devices. As a subjective evaluation index, content validity refers to whether the questions set in the questionnaire match the content of the elements to be examined, which is also called logical validity. Structural validity is the degree to which the results of the test data analysis fit with the theoretical hypothesis, which can also be called conceptual validity.

In terms of content validity, the questionnaire used in this study mainly follows the following two points in the process of preparation: firstly, reference is made to the relevant achievements of academics on students' subjectivity

and students' subjectivity in the teaching of civics class; secondly, experts are asked to evaluate each question item in the questionnaire from the perspectives of the consistency between the content described by each question item and the index of the elements, and the appropriateness of the meaning expressed by each question. Based on the above compilation process, it can be considered that the final formed questionnaire for the study of students' subjectivity in teaching civics class with the assistance of artificial intelligence intelligent devices has reasonable dimension setting, clear and accurate operational definition, high degree of conformity between the content of each question item and the measurement characteristics of the dimension to which it belongs, and easy to understand expression and good content validity and can be analyzed.

In terms of structural validity, factor analysis of the questionnaire with the help of statistical analysis software is needed to verify the correspondence between the measurement items and the predefined dimensions. To test the rationality of the division of college students' subjectivity dimensions in the teaching of civics and political science with the assistance of artificial intelligence intelligent devices, this paper used AMOS23.0 statistical analysis software to conduct validation factor analysis on 13 items of 2 dimensions of the autonomy scale and 16 items of 3 dimensions of the motivation scale and 6 items of the creativity scale, respectively (see Table 3 for details).

## 5.2. The Basic Situation of Students' Subjectivity in Teaching Civics Class Assisted by Artificial Intelligence Intelligent Devices

**5.2.1. College Students' Use of Artificial Intelligence Intelligent Devices.** This part of the survey focuses on mastering the use of AI smart devices by the college student group, mainly including the frequency of using the platforms related to AI smart devices, the main information concerned about using AI smart devices, and the main motives of using AI smart devices in the context that AI smart devices have become popular.

According to the mean statistics results in Table 4, it can be known that there is a wide variety of AI smart device platforms available for students, which indicates to a certain extent that most AI smart device platforms can be effective carriers for promoting the teaching of students' civics courses in a context where mobile networks have become popular and smartphones are widely popular.

According to the statistical results, we can know (see Table 5 and Figure 6) that the information that students pay attention to online at present is mostly entertainment and leisure information (85.6%) and current affairs

TABLE 9: The relevance between news media platform and college students' subjectivity ( $N = 577$ ).

Dimension	Autonomy	Motivation	Creativity
QQ	0.04	0.075	0.044
WeChat	0.028	-0.028	-0.052
Microblog	0.050	-0.007	-0.045
Baidu posting, Zhihu, and other online Q&A communities	-0.001	-0.029	-0.055
Short video platforms such as Jieyin and Crypto	-0.146**	-0.062	-0.084*
China University MOOC, Xue Tang Online, and other platforms	0.248**	0.170**	0.035
Today's Headlines and other news and information platforms	0.207**	0.181**	0.089*

Note: \* $p < 0.05$ , \*\* $p < 0.01$ .

(76.6%), followed by social and livelihood information (55.6%) and literary works (47.1%). Meanwhile, this study also investigated the main motives of students using AI smart devices, and after statistical analysis, we can know (see Table 6 and Figure 7) that “entertainment and leisure (such as watching film and TV programs, listening to music, and playing games),” “Internet chatting,” “finding study materials,” and “online shopping” are the main motives for students to use AI devices. This indicates that, on the one hand, AI smart devices become an essential part of students' entertainment, socialization, study, and life; on the other hand, the focus of students' attention when using AI smart device platforms is still mainly on information with weak intellectual value such as entertainment and leisure, which may also adversely affect the play of their subjectivity to a certain extent.

**5.2.2. The Basic Status of Students' Subjectivity in the Teaching of Civics with the Assistance of Artificial Intelligent Devices.** In order to understand the current situation of college students' subjectivity in the teaching of civics and political science class assisted by artificial intelligent devices, this part mainly uses SPSS25.0 software to conduct descriptive statistical analysis on the obtained sample data, so as to obtain the basic current situation of college students' subjectivity in the teaching of civics and political science class assisted by artificial intelligent devices.

After statistical analysis of the dimensions of students' subjectivity (see Table 7), we found that the overall mean score of students' subjectivity in the teaching of civics class with the assistance of artificial intelligent devices is 3.22. The overall mean score of 3.22 is higher than that of the “average” option, which is 3 points higher than that of the “average” option. After further analysis, we found that the average score of subjectivity in the autonomy level was  $3.36 \pm 0.72$ , and the average score of subjectivity in the creativity level was  $3.59 \pm 0.75$ . The scores of subjectivity in these two levels were slightly higher than the overall average score of subjectivity of students ( $3.22 \pm 0.57$ ), and the average score of subjectivity in the creativity level was the highest among the three levels. In addition, the average score of subjectivity at the dynamic level is  $2.96 \pm 0.58$ , which is lower than the overall average score of students' subjectivity ( $3.22 \pm 0.57$ ) and is the lowest level of the overall average score of students' subjectivity, indicating that the subjectivity of students at the dynamic level needs to be further improved.

After a basic understanding of the general situation of students' subjectivity in teaching civics classes assisted by AI intelligent devices, this chapter will continue to analyze in detail the specific performance of students' subjectivity in teaching civics classes assisted by AI intelligent devices at three levels: autonomy, motivation, and creativity, as shown in Table 8.

We further investigated the teachers' views on the ideological and political optimization plan. The specific results are shown in Figure 8. The vast majority of teachers agree, with the majority of teachers aged between 35 and 39.

**5.2.3. Correlation Analysis of AI Smart Device Platforms and College Students' Subjectivity.** According to the correlation coefficient table (see Table 9), it can be seen that the use of short video platforms such as ShakeYin and Racer shows a significant negative correlation with autonomy and creativity, with the correlation coefficient values of -0.146 and -0.084, respectively. The use of platforms such as MOOC of Chinese universities shows a significant positive correlation with autonomy and motivation, with correlation coefficient values of 0.248 and 0.170, respectively. For news and information platforms such as Today's Headlines, the use of these platforms showed significant positive correlations with autonomy, motivation, and creativity, with correlation coefficients of 0.207, 0.181, and 0.089, respectively. The use of other platforms did not have significant correlations with the dimensions of college students' subjectivity. The results of the study indicate to some extent that the use of online learning platforms such as MOOC of Chinese universities and news and information platforms such as Today's Headlines has positive effects on college students' subjectivity, while the use of short video platforms such as Jitterbug and Racer have negative effects on college students' subjectivity.

## 6. Conclusion

The reform of the practical teaching of artificial intelligence based on the integration of artificial intelligence and intelligent device civics case captures the characteristics of the course itself closely combined with innovation, fully explores the important course civics elements, opens the pathway between the integration of artificial intelligence and intelligent devices and civics case reform, and makes students face

the scientific and engineering problems related to the construction of the country and the development of the industry in the field of artificial intelligence. The real scientific research projects transformed into the course civics cases can inspire the most simple and sincere patriotic feelings of students and cultivate their determination and courage to study hard to achieve the great rejuvenation of the Chinese nation. The course adopts a mixed online and offline teaching mode and creatively introduces the civics assessment and evaluation mechanism, while combining contextual teaching and flipped classroom and other teaching methods to bring the distance between the classroom and students closer. From the effect of the course reform, this course reform has achieved the purpose of stimulating students' patriotic sentiment and cultivating their scientific research and innovation ability, which has laid a solid foundation for further exploration of the course civics teaching combined with scientific research projects later.

### Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

### Conflicts of Interest

The author declared that they have no conflicts of interest regarding this work.

### References

- [1] D. E. Campbell, "What social scientists have learned about civic education: a review of the literature," *Peabody Journal of Education*, vol. 94, no. 1, pp. 32–47, 2019.
- [2] F. Waluyandi, R. Trihastuti, and M. Muchtarom, "Implementation of parental involvement in learning civic education," *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, vol. 3, no. 4, pp. 1686–1695, 2020.
- [3] J. A. Dewantara, I. F. Suhendar, R. Rosyid, and T. S. Atmaja, "Pancasila as ideology and characteristics civic education in Indonesia," *International Journal for Educational and Vocational Studies*, vol. 1, no. 5, pp. 400–405, 2019.
- [4] L. Sabzalian, "The tensions between indigenous sovereignty and multicultural citizenship education: toward an anticolonial approach to civic education," *Theory & Research in Social Education*, vol. 47, no. 3, pp. 311–346, 2019.
- [5] K. Komalasari, "Living values based interactive multimedia in civic education learning," *International Journal of Instruction*, vol. 12, no. 1, pp. 113–126, 2019.
- [6] D. Wu, Y. Lei, M. He, C. Zhang, and L. Ji, "Deep reinforcement learning-based path control and optimization for unmanned ships," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 7135043, 8 pages, 2022.
- [7] R. T. Knowles and A. J. Castro, "The implications of ideology on teachers' beliefs regarding civic education," *Teaching and Teacher Education*, vol. 77, pp. 226–239, 2019.
- [8] G. Cai, Y. Fang, J. Wen, S. Mumtaz, Y. Song, and V. Frascolla, "Multi-carrier MFSK-ary DCSK system with code index modulation: an efficient solution for chaotic communications," *IEEE Journal of Selected Topics in Signal Processing*, vol. 13, no. 6, pp. 1375–1386, 2019.
- [9] J. C. Fitzgerald, A. K. Cohen, E. Maker Castro, and A. Pope, "A systematic review of the last decade of civic education research in the United States," *Peabody Journal of Education*, vol. 96, no. 3, pp. 235–246, 2021.
- [10] K. Chandra, A. S. Marciano, S. Mumtaz, R. V. Prasad, and H. L. Christiansen, "Unveiling capacity gains in ultradense networks: using mm-wave NOMA," *IEEE Vehicular Technology Magazine*, vol. 13, no. 2, pp. 75–83, 2018.
- [11] S. O. Ajaps and A. N. Obiagu, "Increasing civic engagement through civic education: a critical consciousness theory perspective," *Journal of Culture and Values in Education*, vol. 4, no. 1, pp. 64–87, 2021.
- [12] F. B. Saghezchi, A. Radwan, J. Rodriguez, and T. Dagiuklas, "Coalition formation game toward green mobile terminals in heterogeneous wireless networks," *IEEE Wireless Communications*, vol. 20, no. 5, pp. 85–91, 2013.
- [13] S. Palanisamy, B. Thangaraju, O. I. Khalaf, Y. Alotaibi, S. Alghamdi, and F. Alassery, "A novel approach of design and analysis of a hexagonal fractal antenna array (HFAA) for next-generation wireless communication," *Energies*, vol. 14, no. 19, p. 6204, 2021.
- [14] S. N. Alsubari, S. N. Deshmukh, A. A. Alqarni et al., "Data analytics for the identification of fake reviews using supervised learning," *CMC-Computers, Materials & Continua*, vol. 70, no. 2, pp. 3189–3204, 2022.
- [15] D. K. DiGiacomo, E. Hodgins, J. Kahne, and S. Trapp, "Civic education in a politically polarized era," *Peabody Journal of Education*, vol. 96, no. 3, pp. 261–274, 2021.
- [16] L. Qingfeng, L. Chenxuan, and W. Yanan, "Integrating external dictionary knowledge in conference scenarios the field of personalized machine translation method," *Journal of Chinese Informatics*, vol. 33, no. 10, pp. 31–37, 2019.
- [17] A. C. Weinschenk and C. T. Dawes, "Civic education in high school and voter turnout in adulthood," *British Journal of Political Science*, vol. 52, no. 2, pp. 934–948, 2022.
- [18] S. A. Bansode, V. R. More, S. P. Zambare, and M. Fahd, "Effect of constant temperature (20°C, 25°C, 30°C, 35°C, 40°C) on the development of the Calliphoridae fly of forensic importance, *Chrysomya megacephala* (Fabricius, 1794)," *Journal of Entomology and Zoology Studies*, vol. 4, no. 3, pp. 193–197, 2016.
- [19] D. B. Sanjaya, I. K. Suartama, I. N. Suastika, S. Sukadi, and I. P. M. Dewantara, "The implementation of Balinese folklore-based civic education for strengthening character education," *Cypriot Journal of Educational Sciences*, vol. 16, no. 1, pp. 303–316, 2021.
- [20] F. A. Al-Mekhlafi, R. A. Alajmi, Z. Almusawi et al., "A study of insect succession of forensic importance: Dipteran flies (diptera) in two different habitats of small rodents in Riyadh City, Saudi Arabia," *Journal of King Saud University-Science*, vol. 32, no. 7, pp. 3111–3118, 2020.
- [21] A. Algalil, M. A. Fahd, and S. P. Zambare, "New species of flesh fly (Diptera: Sarcophagidae) *Sarcophaga* (*Liosarcophaga*) *geetai* in India," *Journal of Entomology and Zoology Studies*, vol. 4, no. 3, pp. 314–318, 2016.
- [22] A. M. Al-Azab, A. A. Zaituon, K. M. Al-Ghamdi, and F. M. A. Al-Galil, "Surveillance of dengue fever vector *Aedes aegypti* in different areas in Jeddah city Saudi Arabia," *Advances in Animal and Veterinary Sciences*, vol. 10, no. 2, pp. 348–353, 2021.

- [23] A. R. Alqahtani, A. Badry, S. A. Amer, F. M. Abd Al Galil, M. A. Ahmed, and Z. S. Amr, "Intraspecific molecular variation among *Androctonus crassicauda* (Olivier, 1807) populations collected from different regions in Saudi Arabia," *Journal of King Saud University-Science*, vol. 34, no. 4, article 101998, 2022.
- [24] R. Ali, M. H. Siddiqi, and S. Lee, "Rough set-based approaches for discretization: a compact review," *Artificial Intelligence Review*, vol. 44, no. 2, pp. 235–263, 2015.
- [25] S. E. Finkel and J. Lim, "The supply and demand model of civic education: evidence from a field experiment in the democratic Republic of Congo," *Democratization*, vol. 28, no. 5, pp. 970–991, 2021.

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