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Research on Red Culture Inheritance Based on Natural Language Processing Algorithm in Civic Education of Colleges and Universities in the Era of Artificial Intelligence

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Abstract Red culture brings a new "formula" for the reform and innovation of ideological education in colleges and universities, which can promote the optimization and upgrading of the presentation form and teaching method of ideological education in colleges and universities. The article establishes a red culture resource database for the Civic and Political Education in colleges and universities with B/S structure, and categorizes the red culture content through red culture data collection. Then, the LDA model and Word2Vec model are combined to design the TLAD-2Vec model to analyze the trend of theme evolution of red culture inheritance in ideological and political education in colleges and universities. Finally, the degree of understanding and the dissemination mode of college students under the red cultural heritage were statistically analyzed. The results show that under different time windows, Revolutionary Retrospective (Topic1), Red Events (Topic2) and Red Activities (Topic7) are stable and popular themes, which are highly concerned by the Civic and Political Education in colleges and universities. There are some differences in the degree of understanding of red cultural heritage among students of different genders, grades and majors, and there is a lack of intelligent communication paths for red cultural heritage. Therefore, in the era of artificial intelligence, the ideological education of colleges and universities and the inheritance of red culture need to pay attention to the construction of digital platforms, relying on a perfect regulatory mechanism to ensure that the red culture can be inherited and continued.

Index Terms B/S architecture, red culture resource base, LDA model, Word2Vec model, civic education

I. Introduction

With the development of AI, China's higher education is gradually moving towards the world-class level. In this process, ideological and political education in universities has become an important means to cultivate talents with all-round development of morality, intelligence, physicality and aesthetics, and ideological and political education is an important link to cultivate students' correct worldview, outlook on life and values [1]-[3]. Red culture inheritance and practice is one of the important contents of university civic education, aiming to guide students to carry forward the excellent traditional Chinese culture, inherit the red gene, and enhance the patriotic sentiment and sense of responsibility [4]-[6]. Red culture is the valuable wealth of Chinese revolution and construction, how to inherit red culture in the ideological education of colleges and universities and give full play to its unique value, has become an important topic of the current education reform [7], [8].

Red culture is the embodiment of the heroic deeds and noble spirit of the Chinese revolutionary martyrs, and the inheritance of red culture helps to improve students' national pride and sense of identity [9]. In the ideological education of colleges and universities, by telling red stories and promoting the red spirit, students can deeply realize the great course of the Chinese nation's rise from suffering and struggle for national rejuvenation [10]-[12]. Red culture contains rich socialist core values, such as patriotism, collectivism, hard work, etc. Through the inheritance of red culture, colleges and universities guide students to establish a correct worldview, outlook on life and values, and become socialist builders and successors with the spirit of commitment [13]-[16]. The innovative and entrepreneurial deeds and scientific and technological achievements in the heritage of red culture have a stimulating effect on the innovative spirit of students [17]. Colleges and universities should make full use of red cultural resources in ideological education to cultivate students' innovative consciousness, stimulate innovative potential, and help the country's innovative development [18], [19].

Red culture is a valuable resource formed in the process of Chinese revolution, construction and reform, and it is an important teaching resource for ideological education in colleges and universities, and the integration of red culture and ideological education is not only an important form of inheriting red culture, but also an important strategy

to improve students' cultural self-confidence, patriotism education, and to set up the correct three views. Literature [20] describes the inheritance, cohesion and motivation of red culture in ideological and political education in colleges and universities, and analyzes the integration of red culture and ideological and political education from the aspects of enriching the educational content and constructing the red culture propaganda mechanism, aiming to provide reference for the industry. Literature [21] China introduces the red culture and emphasizes that the integration of civic and political education and red cultural resources is an important path to inherit the red culture, pointing out that colleges and universities should select the red story with a clear theme based on the needs of the students, and tell the story of red through feelings. Literature [22] China started from “red gene”, analyzed the problems existing in the ideological and political education of college students, understood the meaning of “red gene” as the meaning of ideological and political education of college students, and combined with the problems and meanings, explored the meaning of “red gene” in the ideological and political education of college students. Combined with the existing problems and significance, it explores the main ways of integrating the “red gene” into the ideological and political education of colleges and universities. Literature [23] China emphasizes the feasibility and importance of the integration of red culture into ideological and political education, and discusses the significance of the integration of red culture into the ideological and political education of colleges and universities and the existing problems, and puts forward the effective path of the integration of the two, which is aimed at providing reference for the ideological and political education of colleges and universities. Literature [24] China introduces the red culture, pointing out that red has a strong symbolic meaning, represents authority and courage, and is also the epitome of the Chinese revolution, through the integration of red cultural elements in the education of college civic and political education education, it can effectively enhance the students' sense of patriotism and cherish the hard-won life. Literature [25] China takes regional red culture as an example, based on literature review and other methods to explore the importance of regional red culture integrated into the higher vocational civic education curriculum, and analyzes the way of regional red culture integrated into the civic education through rational inheritance, emotional resonance, and other strategies, in order to enhance the cultural self-confidence. Literature [26] China points out that red culture is a rich spiritual heritage, and examines the importance of red culture in this context from both theoretical and practical aspects, and reveals its significance to education by utilizing its influence in the classroom, i.e., to enhance the cultural influence of the campus, and to improve the sense of social responsibility and historical consciousness of college students. Literature [27] China shows that the red gene is the inheritance of the Chinese revolutionary spirit and the valuable wealth of the Chinese nation, and that the integration of the red gene with the ideological and political education of college students is not only an important guarantee for the implementation of the fundamental task of educating people with morality, but also a necessity for the development of socialism with Chinese characteristics. Literature [28] China based on the single content and other problems existing in the ideological and political education of colleges and universities, the combination of red culture and ideological and political education as a hand, put forward the establishment of a perfect system management system, expanding the content of practical teaching and other suggestions, in order to realize the effect of red culture in the ideological and political education of colleges and universities to maximize the effect of the red culture. Literature [29] China explored the combination of red culture and ideological and political education in colleges and universities from the characteristics of red culture and college students in the new period, emphasizing the importance of red culture and the fact that the ideological and political education in colleges and universities has a very important role in the inheritance of red culture, and that the inheritance of red culture and the ideological and political education are complementary and mutually reinforcing. Literature [30] China carries out red experiential teaching based on red culture, builds a new path of party education and training of “learning, walking, talking, thinking, acting”, and enhances the emotional identity and practical ability of college students to the teaching content of red culture and civic and political education by interpreting the typical stories and narrating the party lessons. Literature [31] in China examined the impact of the integration of red culture and Civic and Political Education from the perspective of psychology, showing that this integration can improve the psychological state of college students, increase the initiative of college students in Civic and Political Education, so as to establish correct values.

Under the specific historical background, red culture came into being, which not only has a strong spiritual influence, but also has distinctive forms of expression. The article proposes a method of analyzing the trend of red culture inheritance theme evolution based on the TLDA-2Vec model, and designs a red culture resource library for the Civic and Political Education in colleges and universities based on the B/S architecture. In the analysis of red cultural heritage theme evolution trend, the LDA model is used to obtain the theme features of red cultural heritage, and the Word2Vec model is introduced for splicing the theme features with the text word vector features, so as to judge its theme strength and similarity. Taking five colleges and universities in Province G as examples, we explored the students' understanding of red cultural inheritance in the ideological education of colleges and universities, and

analyzed the specific methods of different colleges and universities to carry out red cultural inheritance in the ideological education of colleges and universities, so as to provide reference for optimizing the path of red cultural inheritance.

II. Construction of a red cultural resource base for high school civic and political education

Red cultural resources are a vivid and lively teaching material, which vividly reproduces the noble qualities of the communists such as their lofty ideals, firm beliefs, and dedication. Combining red cultural resources with artificial intelligence technology and applying it to ideological education in colleges and universities can enhance the relevance and effectiveness of ideological work and better meet the needs of young students' growth and success. How to effectively promote the integration of new technology and red cultural resources, innovate a new path of red cultural heritage, and improve the teaching level of the civic and political theory class in colleges and universities is a problem that needs to be thought about in the civic and political education of colleges and universities.

II. A.Framework of the Red Cultural Resource Bank

II. A. 1) B/S development model

Browser/Server (B/S) structure is developed on the basis of C/S structure, which is an improvement and supplement to the C/S structure model [32]. In this structural model, the communication channel between the user and the server is the Internet, which means that the user interacts with the help of the browser and the Web server. Meanwhile, in this mode, the database server stores the data, the Web server stores the software and components used in the system, etc. The browser does not need any additional installation and testing, and only needs to be combined with the browser's multiple Script languages (e.g., VBScript, JavaScript, etc.) and ActiveX technology to realize barrier-free browsing.

(1) B/S architecture is mainly based on the Internet, the network hardware environment is extensive, commonly used broadband and ISDN, etc. can be used as a network connectivity channels, and commonly used operating systems and browsers can be accomplished on the client side of the arrangement.

(2) The B/S architecture incorporates network security and access speed into the design system, and the processing direction of information flow can be changed with good interactivity.

(3) The B/S architecture uses a wide area network and is user agnostic, so the control of security is weak. And B/S system is built on a common browser, the operator requirements are lower, and with the dynamic configuration technology, can support more users.

(4) B/S system adopts the component approach, the maintenance and upgrade of individual components does not affect the operation of the entire system, the system maintenance is simple, low-cost, and truly realize seamless upgrade.

II. A. 2) Repository architecture

Based on the B/S architecture, this paper designs a red cultural resource base for ideological and political education in colleges and universities, and its specific framework is shown in Figure 1. In order to construct a correct, reasonable and practically usable red cultural resource database for the ideological and political education in colleges and universities, firstly, the theoretical research method is adopted to analyze the content of the red cultural resources that need to be collected, to select the corresponding intelligent devices and to formulate reasonable collection principles to collect the red cultural resources intelligently. Then we design the correct digitization standard to digitize the collected red cultural resources information, and realize the collection system to complete the intelligent collection and uploading of red cultural data through software technology. Then study the content of red cultural resources that need to be managed, the functions of management, and the intelligent algorithms in management, and develop the red cultural resource management system by using software backend technology to realize digital intelligent management of the content of red cultural resources. At the same time, the cloud system for sharing red cultural resources is designed in a similar way to the research resource library management system, and is realized through software front-end technology to provide users with cloud sharing functions such as pushing red cultural resources and roaming red cultural sites in immersive scenarios. Finally, other third-party service subsystems are accessed as needed.

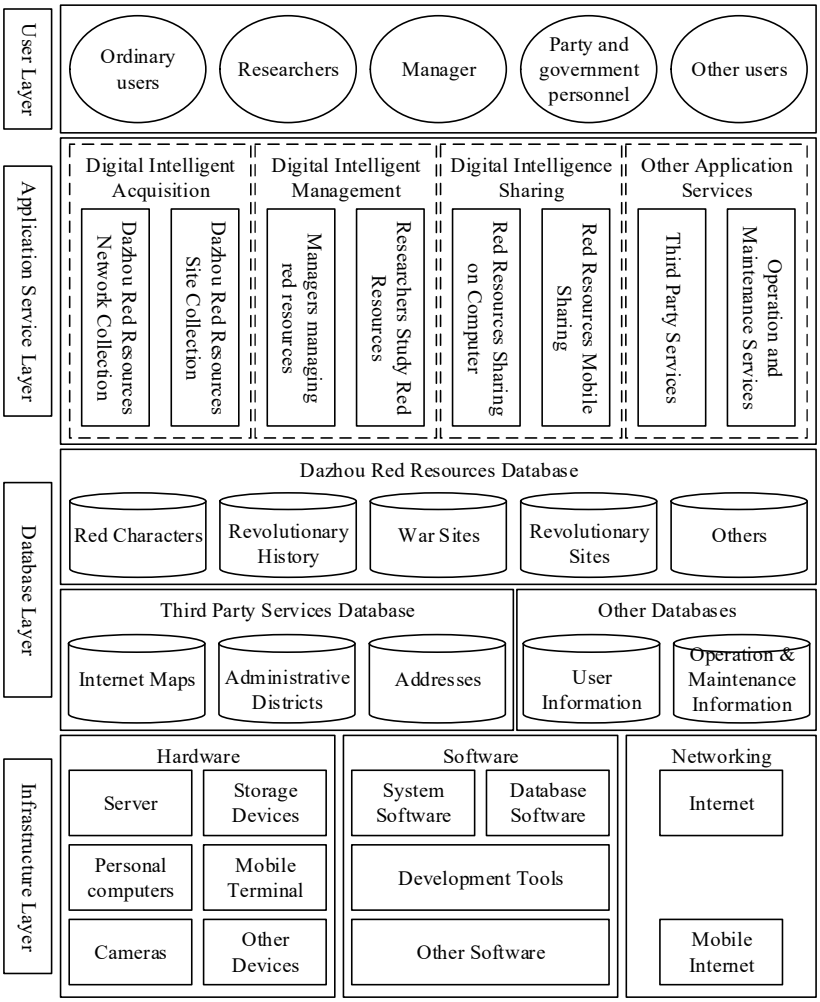


Figure 1: Red cultural repository architecture

The Red Culture Resource Base for Civic and Political Education in Colleges and Universities consists of a basic implementation layer, a database layer, an application service layer and a user layer. Among them, the basic implementation layer provides hardware, software and network for the repository, while the database layer is used to store all the red culture contents and provide data support for the management system and sharing system. The application service layer is the digitalized services provided by the repository. The top user layer is the users of the repository, including general users, researchers and managers. The important layer in the four-layer architecture is the application service layer, which mainly includes three systems: digital intelligent collection, digital intelligent management and digital intelligent sharing of red cultural resources, while other third-party service systems and operation and maintenance service systems are subsidiary services.

II. B.Collection of red cultural resources

II. B. 1) Red Culture Data Collection

For the collection of data resources in the red culture resource base of ideological education in colleges and universities, this paper mainly invites scholars in the field of archaeology, the field of red culture, and the field of design to collect red culture-related information through major museums, museum websites, and university libraries, to organize the case information of red culture, and collect and upload them together. In addition to uploading the textual information of the case interpretation, there is also a need to collect digitized information, such as pictures and videos.

(1) Text information. The information of the resource library is mainly displayed in the form of text, and the main contents include the basic information, modeling information, graphic information, functional information and cultural information of red culture. Text information is mainly displayed to the user in the form of text, GB code is a common way to encode and store text information, and ASCLL is used to encode and store English and punctuation marks.

(2) Picture material. Picture material is mainly stored in the system by the staff through shooting or scanning, and the supported formats are JPG, PNG and JPEG, the depth of the picture supports 64 bits, and the maximum limit of the picture is 12MB.

(3) Video material. Taking into account the collection process to have received the red culture of the history of the display video, it is also necessary to do some restrictions on the video material. Video material is set to the following storage formats, conventional audio and video coding mixed together in the storage of the AVI format, the movie industry common mov format and conventional for the network to the audio and video compression of the MP4 format.

II. B. 2) Classification of red cultural content

According to the characteristics of red cultural resources and collection channels, the red cultural resource base for ideological education in colleges and universities is set up with one resource database and several featured thematic databases, which mainly include Revolutionary Retrospect, Red Events, Red Tasks, Red Sites, Red Historical Photos, Red Documents, and Red Activities. Table 1 shows the categorization of red culture content. Each thematic database is further refined and optimized according to the different demand characteristics of users and the characteristics of literature, in order to realize the timely updating of red cultural resources and the continuous improvement of user experience in the effectiveness of resource utilization.

Table 1: Red culture content classification

Name	Contact
Revolution retrospect	Memorabilia, History, news reports, Communist Party organizations.
Red events	The May Fourth Movement, the First Revolutionary Civil War, the Agrarian Revolution, the War of Resistance Against Japanese Aggression, and the War of Liberation.
Red people	Revolutionary, democratic and progressive, List of organizations, veterans of the War of Resistance, revolutionary martyrs.
Red Site	The revolutionary ruins of the red war.
Red historical photos	Old photos of people, Anti-Japanese War photos, document photos, red files.
Red document	Books, audio and video, newspapers, periodicals, documents, papers, memoirs, biographies, etc.
Red activity	Red information, major events.

III. Evolution of the theme of red cultural heritage in higher education civic and political education

The digitalization of education is an important breakthrough to open up a new track of education development and shape a new advantage of education development. The teaching application of digitized red cultural resources is of great value in enhancing the accessibility of teaching resources for college civic education, innovating the “opening method” of college civic teaching, and promoting the cultivation of souls in college civic education in the era of artificial intelligence. Therefore, fully exploring the evolution trend of the theme of red culture inheritance in the process of ideological education in colleges and universities is of great practical significance and contemporary value for the reform and innovation of ideological education in colleges and universities.

III. A. LDA model and Word2Vec model

III. A. 1) Principles of LDA modeling

1) Mathematical Representation

The implicit Dirichlet (LDA) model is commonly used to mine potential topic information from text corpora with large amounts of data. In general, we feel that the vocabulary in a document always selects a certain topic through a certain probability and converges from multiple topics into a text [33]. LDA is the inverse process, which extracts the topic of the document based on the existing document and extracts the corresponding words of the topic through the topic, and repeats the iteration until all the vocabularies are traversed. The LDA model involves a great deal of mathematical knowledge such as the Gamma function, Binomial Distribution, Multinomial Distribution, Beta Distribution, Dirichlet Distribution, and Bayesian framework.

(1) Gamma function. Essentially a generalization of the factorial function to the real numbers, the factorial formula when it is an integer and its generalization formula when it is a real number are respectively:

$$\begin{cases} \Gamma(n) = (n-1)!, Integer \\ \Gamma(t) = \int_0^{\infty} x^{t-1} e^{-x} dx, \mathrm{Re}\, al \end{cases} \tag{1}$$

(2) Binomial distribution. There are generally only two values to take, is the frequency of the number of times the event A occurs in two outcomes of k experiments of the desired outcome. The outcome of each experiment is independent of the last, if B occurs with probability $P(B)$ and $P(A)+P(B)=1$. I.e:

$$P(A) = \begin{bmatrix} n \\ k \end{bmatrix} P^k (1-P)^{n-k}, (k = 0,1,2,3 \cdots n) \tag{2}$$

(3) Multinomial distributions. Just as there is a probability of shaking all six points of a lottery, there are multiple outcomes for multinomial distributions. Suppose an experiment has K possible scenarios of $A_1, A_2 \cdots A_k$, then the occurrence of n times when A_1 occurs $n1$ times... A_k occurs nk times, then $P(A_1, A_2, A_3 \cdots A_k)$ has the probability:

$$P(A1, A2, A3 \cdots Ak) = \begin{cases} P^{n1} P^{n2} \cdots P^{nk} \dfrac{n!}{n!n2! \cdots n!}, \sum_{i=1}^{k} n_i = n \\ 0, \ otherwise \end{cases} \tag{3}$$

(5) Beta distribution: A continuous probability distribution with a value interval of $[0,1]$ Beta distribution is also the conjugate distribution of the binomial distribution. Its parameters α, β have values greater than 0, and its probability density formula is expressed as Equation 2.12. where τ is the Gamma function satisfying $\Gamma(x) = (x-1)!$. Then:

$$Beta(P \mid \alpha, \beta) = P^{\alpha-1} (1-P)^{\beta-1} \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} \tag{4}$$

(6) Dirichlet distribution. Also known as the multivariate Beta distribution, it is its distribution in higher dimensions and is a k-dimensional conceptual function expressed as:

$$Dirichlet(P \mid \alpha) = \prod_{i=1}^{k} P_k^{\alpha_{k-1}} \frac{\Gamma\left(\sum_{i=1}^{k} a_k\right)}{\prod_{i=1}^{k} \Gamma(\alpha_k)} \tag{5}$$

It also has a covariance with the multinomial distribution, which can be expressed as:

$$Dirichlet(P \mid \alpha) + MultiCount(d) = Dirichlet(p \mid \alpha + d) \tag{6}$$

The overall process of LDA document generation is as follows:

Step1 Generate the subject distribution θ_m of document M by sampling from the Dirichlet distribution α, where $\theta_m = Dirichlet(a)$ and α is the distribution hyperparameter.

Step2 Generate the nth n word topic $Z_{m,n}$ of the document m by randomly sampling from the polynomial distribution of topics $Z_{m,n}$, where $Z_{m,n} = Muti(\theta_m)$.

Step3 Generate Theme $Z_{m.n}$ by randomly sampling from the Dirichlet distribution β and determine the corresponding word distribution.

Step4 $\varphi_{m,n}$ samples the final generated word $W_{m,n}$, the word $W_{m,n}$ is generated according to the parameter $Z_{m,n}$ with η, $W_{m,n} = Multi(\varphi_{m,n})$. Where $\varphi_{m,n} = Dirichlet(\eta)$, η is a V (number of all the words in the vocabulary) dimensional vector and a distributional hyperparameter. Follow document-topic-word and keep repeating until all words of the document are in place and the document is finally generated.

2) Parameter Estimation

The basic idea of Gibbs sampling algorithm is to sample only the current variable and estimate its conditional density while fixing other variables [34]. After the sampling process is stabilized by means of iteration, the parameters of the model are estimated based on the obtained sample information.

Before formally solving the LDA model using the Gibbs sampling algorithm, the two sets of random variables $\{\theta_m\}$ and $\{\varphi_k\}$ are ignored, and only the inference solving for the topic labels on each vocabulary is considered. By integrating over the parameters θ and φ, the joint density of topics z and words w is obtained as:

$$p(z, w \mid \alpha, \beta) = \prod_{k=1}^{K} \frac{B(\beta + n_{k,w})}{B(\beta)} \prod_{m=1}^{M} \frac{B(\alpha + n_{m,k})}{B(\alpha)} \tag{7}$$

where $n_{k,w}$ denotes the number of times the vocabulary w is sampled as the kth topic and $n_{m,k}$ denotes the number of times the document is sampled as the kth topic. Using the Bayesian formula:

$$p\left(z_{m,n}\left|z_{-m,n},w,\alpha,\beta\right.\right)=\frac{p\left(z,w\left|\alpha,\beta\right.\right)}{p\left(z_{-m,n},w_{-m,n},w_{m,n}\left|\alpha,\beta\right.\right)} \tag{8}$$

The conditional distribution function used by the Gibbs sampling algorithm to sample the subject z can be obtained as:

$$p\left(z_{m,n}\left|z_{-m,n},w,\alpha,\beta\right.\right)=\frac{\beta_w+n_{k,w}-1}{\sum_{w=1}^{V}\left(\beta_w+n_{k,w}\right)-1\sum_{k=1}^{K}\left(\alpha_k+n_{m,n}\right)-1} \tag{9}$$

From this, the estimates of the variables θ and φ are obtained, respectively:

$$\hat{\theta}_{m,k}=\frac{n_{m,k}+\alpha_k}{\sum_{k=1}^{K}\left(n_{m,k}+\alpha_k\right)},\hat{\varphi}_{k,v}=\frac{n_{k,w}+\beta_w}{\sum_{w=1}^{V}\left(n_{k,w}+\beta_w\right)} \tag{10}$$

The MCMC method is often used to estimate unknown or complex distributions, by sampling the distribution function to be estimated to obtain a sample of this distribution, the specific structure of the distribution can be clarified.Gibbs sampling algorithm is a simple optimized version of the MCMC algorithm, the method can be used to efficiently solve the distribution problem that can not be directly sampled or difficult to understand.

3) Determination of the number of subjects of the model

In order to select the most appropriate number of topics, this paper adopts two evaluation indexes: perplexity and consistency. An ideal range of topic numbers is estimated by analyzing the perplexity of the corpus, and then the optimal number of topics is determined within this range based on the consistency score. The core of this approach is to optimize the clustering effect of the LDA model through quantitative metrics, so as to accurately reveal the topic structure in textual data.

Perplexity is an important metric for assessing the plausibility of machine-generated translations. This metric is based on the average of the probabilities of the computed sentences, so a reasonable sentence will have a lower perplexity. This approach considers the concept of “generated document” as a set of machine-generated sentences, and measures the strength of the model by comparing the similarity of these generated sentences with the original text to determine the number of topics best suited for the dataset. The degree of confusion can be expressed as:

$$Perplexity\left(D\right)=\exp\left\{-\frac{\sum_{d=1}^{M}\log p\left(w_d\right)}{\sum_{d=1}^{M}N_d}\right\} \tag{11}$$

where (D) characterizes the entire collection, (M) refers to the number of texts included, the number of words contained in each text is represented by (N_d), and $\left(p(\omega_d)\right)$ reflects how often the words (ω_d) occurs frequently in the text.

In order to achieve a more ideal LDA topic clustering effect, this paper adopts the topic consistency index to determine the optimal number of topics. Topic consistency, as a key model optimization method, is considered to be one of the most effective means of measuring the quality of topic models and is an important tool for determining the optimal number of topics. Consistency is denoted as:

$$Coherence\left(D\right)=\sum_{i=1}^{t}\sum_{j=1}^{m}P\left(\omega_{ij}\right) \tag{12}$$

where (t) represents the total number of topics, and $\left(P(\omega_{ij})\right)$ denotes the value of the probability of occurrence of the keyword that is ranked (j) in the (i) th topic. The higher the value of consistency, the higher the concentration of high-frequency keywords within the same topic.

III. A. 2) Word2Vec modeling

Word2Vec is a word vector training tool, which realizes the mapping of words from high-dimensional space to low-dimensional space, and can transform words into vector form, which can be recognized by the computer, and through the computation between word vectors, and then can be used for the similarity computation between words [35]. Word2Vec is divided into two architectural implementations of CBOW and Skip-gram, and at the same time For easier operation, two training algorithms are included, which are Hierarchical SoftMax and Negative Sampling algorithm.

(1) For the CBOW model, the input is the word vector corresponding to the context-dependent word of a particular feature word, and the output is the word vector of this particular word. The CBOW model uses a bag-of-words model, so the distances between the input words are equal, and only whether the input word is within the context required

by the output word is taken into account. The CBOW model has three main phases, namely, the input, the mapping and the output layers, and the complexity is computed in three stages, namely, the input, mapping and output layers. Layer three stages and the formula for complexity can be expressed as:

$$q = n * d + d * v \tag{13}$$

where n is the window length of the input layer, d is the mapping layer dimension, and v is the number of words in the training dictionary.

(2) The Skip-gram model has the exact opposite structure to the CBOW model, i.e., the input is the word vector of a specific one word, while the output is the context word vector corresponding to the specific word. For the Skip-gram model, the goal of training is to maximize the following equation, i.e.:

$$\frac{1}{T}\sum_{t=1}^{T}\sum_{-c\le j\le c}\log p\left(w_{t+j}\mid w_t\right) \tag{14}$$

where c is the size of the window, T is the size of the training text, and w_t is the first t word.

The computational complexity of the Skip-gram model is denoted as:

$$q = c * \left(d + d * v\right) \tag{15}$$

The computational complexity of the model is higher relative to the CBOW model.

III. B. Theme evolution based on TLDA-2Vec

III. B. 1) Feature computation and fusion

Currently, feature fusion can be divided into two categories: pre-feature fusion and post-feature fusion. Pre-feature fusion refers to splicing different features together in a certain way before the features are input, while post-feature fusion refers to combining the intermediate products of each feature after the features are input into the model. Because of the consistency of topic features and text features in the structure and the relevance of semantic expression, the previous feature fusion is used to realize the synthesis of features, and LDA and Word2Vec are combined to establish the T-LDA2Vec model, whose purpose is to splice the topic features and the text word vector features to form the topic-text features to better analyze the evolutionary trend of red culture inheritance in the ideology and political education of colleges and universities. The purpose of the T-LDA2Vec model is to combine theme features and text word vector features to form theme-text features to better analyze the evolution trend of red culture inheritance in college ideological education.

Each topic-text feature corresponds to $x_t = \langle T, w_t \rangle$, where T refers to the topic feature vector and w_t refers to the text feature word vector.

The thematic features T are obtained by summing up the LDA training results after weighting them. Specifically, it means that the topic-word distribution will be obtained after training all the documents using LDA, which counts the global information of the documents, not the information of a single document, and it is independent of the document-topic distribution, i.e:

$$w = \left[\left(w_1, y_{M1}^{(w)}\right), \left(w_2, y_2^{(w)}\right), \ldots, \left(w_f, y_3^{(w)}\right), \ldots, \left(w_M, y_M^{(w)}\right)\right] \tag{16}$$

where M is the number of selected words. Meanwhile, for a single document, LDA will derive the document-topic distribution as:

$$t = \left[\left(t_1, y_1^{(t)}\right), \left(t_2, y_2^{(t)}\right), \ldots, \left(t_3, y_3^{(t)}\right), \ldots, \left(t_N, y_N^{t}\right)\right] \tag{17}$$

where N is the number of selected topics. For each document, its topic feature T is defined as the weighted sum of w and t, i.e.:

$$\begin{aligned} t_t &= \Sigma_j w_j * y_j^{(w)} \\ T &= \Sigma_t t_t * y_t^{(t)} \end{aligned} \tag{18}$$

Word2Vec word vectors are constructed using the negative sampling-based CBOW model in the python third-party genism library, the word vectors corresponding to each word in the document are summed up, and then the mean value is taken to obtain the textual word vector features of the document, and the textual features spliced with the LDA topic features are denoted by $x_t =< T, w_t >$ to realize feature fusion.

III. B. 2) Thematic strength and similarity

Theme intensity is one of the attributes of the theme itself, which is different from the observable direct variables such as the number of documents, the rate of change and the number of people who pay attention to the theme, but is an abstract attribute concept. In addition to the conventional observable variables, the system should also provide a scientific and reasonable abstract attribute, so as to assist the user to make comprehensive judgment

and comparative analysis of the theme with a unified standard. In this paper, theme intensity is chosen to measure the stability of the theme, and the trend of theme evolution is grasped by observing the changing trend of theme intensity over time.

The Gibbs sampling algorithm represents the degree of topic mixing in each text based on $\hat{\theta}$ obtained from Eq. Extending the text to the set of documents similarly finds the average degree of topic mixing $\overline{\theta}_l$ of the corpus for that time slice.

Let $\hat{\theta}_k^d$ be the proportion of themes k in the document d, then the intensity of themes k at the moment of t $\overline{\theta}_k^t$ is denoted as:

$$\overline{\theta}_k^t = \frac{\sum_{d=1}^{M} \hat{\theta}_k^d}{M} \tag{19}$$

Using $\overline{\theta}_k^t$ for each theme to represent the intensity of the theme k in the current time slice, a series of different values of the theme intensity in the online text stream can be derived, based on which a graph of the theme intensity change can be plotted, which can assist in grasping the trend of the theme from a macro perspective. The intensity of the theme with the TopK keywords representing the theme and the list of articles can be jointly analyzed to derive the specific meaning of the theme, to distinguish between the theme represented by the background vocabulary and the general vocabulary, and to identify the valuable themes.

The similarity between topics i and j is compared to the degree of similarity between their topic-word distributions ϕ_i and ϕ_j, and combined with the KL dispersion, the similarity between the probability distribution ϕ_i for topic i and ϕ_j for topic j is denoted as:

$$sim\left(\phi_i, \phi_j\right) = KL\left(\phi_i, \phi_j\right) \tag{20}$$

In order to recognize emergent themes, a threshold needs to be defined. When this threshold is exceeded, it is assumed that a new topic has replaced an old one, or that the focus of the topic discussion has changed significantly. The definition of this threshold is closely related to the changes in the corpus environment and the coarse-grainedness of the detection, and generally has to be combined with the TopK vocabulary of the topic and the document to comprehensively determine what changes in the topic have actually occurred.

Setting the threshold as ε, when the similarity of the topic i in neighboring time slices $sim(\phi_i^{t-1}, \phi_i^t) > \varepsilon$, the topic is considered to have changed significantly.

IV. Trends in the evolution of the inheritance of the red culture in higher education civic and political education

With the development of the artificial intelligence era, the progress of science and technology has pushed mankind into the intelligent era, and in order to better realize the rapid dissemination of information and enhance communication, the state has paid great attention to the intelligent construction and implementation of the strategy of network power and the national big data strategy. At the same time, under the intelligent environment, the red cultural inheritance is shown in a more visualized form through intelligent means, so that the red culture is full of vitality, which is integrated into the ideological and political education of colleges and universities, fully guiding the students to establish a correct view of the world, outlook on life, and values, and realizing the effective protection and inheritance of the red culture, which provides a new paradigm for the innovation of the red cultural inheritance and the enhancement of the level of the ideological and political education of colleges and universities.

IV. A. Trends in the evolution of red cultural heritage

IV. A. 1) LDA topic modeling

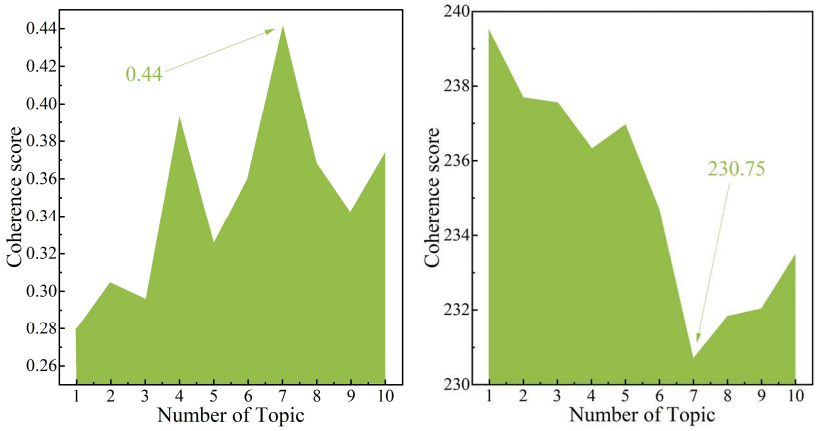
Based on the red cultural resource library for ideological and political education in colleges and universities, this paper collects data in the "red cultural resource library" with the help of a crawler tool based on Python language combined with the "Beautiful Soup" analysis library, and obtains the data required for this research. Beautiful Soup is a Python library for extracting data from HTML and XML documents, which provides a very convenient way to browse, search, and modify HTML and XML tree structures.Beautiful Soup automatically converts the input document to Unicode encoding in order to work with various HTML or XML documents. Beautiful Soup parses the HTML or XML document into a tree structure that allows the user to traverse the nodes of the tree, accessing the node's name, attributes, and text content.

After removing the null values and duplicates in the text, 3048 text files were finally obtained. In addition, in order to ensure the reliability of the subject words to improve the efficiency of the participle, four commonly used deactivation lists, namely, Baidu deactivation list, HIT deactivation list, Chinese deactivation list, and the deactivation

thesaurus of the Machine Intelligence Laboratory of Sichuan University, are selected, and appropriately added according to the text, and then constructed the deactivation thesaurus after de-weighting and integration to carry out the Jieba participle. The Jieba participle results are stored as LDA modeling corpus, and DOC0-DOC28472 are generated, totaling 28472 texts.

The experimental environment for topic modeling is Python, and the tool used is the Genism package LDA-Model with 1000 iterations. Topic modeling is a typical unsupervised learning method, and one of the important parameters is the number of topics. Choosing the appropriate number of topics is crucial; too few may result in an underfitted model, while too many may result in an overfitted model. To solve this problem, cross-validation methods are usually used to select the optimal number of topics through a series of evaluation metrics based on training multiple LDA models. By training models with different number of topics and calculating the topic consistency and perplexity metrics of each model, the curve changes between the number of topics and topic consistency as well as perplexity are plotted as shown in Fig. 2. Where Fig. 2(a)~(b) shows the curve changes between topic consistency and perplexity, respectively.

In the experiments of this paper, after repeated testing and evaluation, the conclusion that the best performance is obtained when the number of themes K is 7. This means that when 7 themes are chosen, the model has a high theme consistency (0.44) and also a relatively low perplexity (230.75). Such a choice not only ensures that the model fits the data adequately, but also ensures the model's generalization ability and interpretability, so that it can be better applied to analyzing and exploring the trend of the evolution of the themes of red cultural inheritance in the civic education of colleges and universities.



(a) Coherence (b) Perplexity

Figure 2: Theme Coherence and Perplexity

IV. A. 2) Red Cultural Heritage Hot Topics

According to the number of LDA topics selected in the previous section, the document-topic distribution (.theta file) of 28,472 texts and the lexical item distribution (.twords file) of 7 topics are obtained through 1000 iterations of training, followed by the document-topic distribution (.theta file) of 28,472 texts as shown in Table 2. Combined with the red culture resource base for the ideological education in colleges and universities, it can be seen that the seven theme categories of red cultural heritage are Revolutionary Retrospect, Red Events, Red Tasks, Red Sites, Red Historical Photographs, Red Literature, and Red Activities, i.e., Topic1~Topic7, which mainly contain relevant carriers, connotations, and manifestations for the heritage of the red culture, which also indicates to a certain degree that the T- LDA2Vec model is effective in extracting the potential themes of red cultural heritage in college ideological education.

In the face of a huge number of red culture research results with rich themes, which themes are the most concerned about the current education of ideology and politics in colleges and universities, and which research themes are gradually not being concerned. Field hotspot mining reveals the hotspot issues of current research, which can help universities discover the missing points, weak points and possible new knowledge growth points in the process of their own innovation during the reform of civic and political education, and constantly revise the direction against their own reform to avoid doing useless work. At the same time, it provides reference for the development of red cultural heritage to carry out optimized decision-making, research layout and technical support.

Table 2: Document - theme distribution

No.	Topic1	Topic2	Topic3	Topic4	Topic5	Topic6	Topic7
1	0.1049	0.0127	0.0162	0.0051	0.0185	0.0013	0.0024
2	0.0053	0.3491	0.0058	0.0107	0.0059	0.0054	0.0715
3	0.0029	0.0265	0.0815	0.2974	0.0027	0.0027	0.0048
……	……	……	……	……	……	……	……
12472	0.0103	0.0043	0.0104	0.0631	0.0037	0.0018	0.0058
12473	0.0076	0.0061	0.0063	0.0058	0.0019	0.0042	0.0096
12474	0.0051	0.1514	0.0237	0.0075	0.1042	0.0009	0.0657
……	……	……	……	……	……	……	……
28470	0.0052	0.0076	0.0659	0.0526	0.0064	0.0048	0.1253
28471	0.0049	0.1583	0.0041	0.0037	0.0035	0.0032	0.1724
28472	0.0063	0.1124	0.0058	0.0109	0.0027	0.0017	0.0845

The popularity of a topic is a probability magnitude, and topic intensity describes the degree of attention to a topic, which can be obtained by calculating the average posterior probability of a topic. In this paper, the method of theme intensity is utilized to mine the hot themes of red cultural inheritance in the ideological education of colleges and universities to measure the popularity and coldness of the themes. In order to observe the change of the intensity of each theme in different periods of the red cultural inheritance in the ideological and political education of colleges and universities, the time information of the document is utilized to observe the hot themes of the red cultural inheritance in the ideological and political education of colleges and universities with the time windows of 2012-2024, 2018-2024 and 2024, respectively, and the intensity of the themes and the distribution of the theme intensity thresholds are calculated under the different time windows according to the formulas given in the previous section Situation. Table 3 shows the hot themes of red cultural inheritance under different time windows and marks the hot themes by bolding.

As can be seen from the table, under the three time windows of 2012~2024, 2018~2024 and 2024, Revolutionary Retrospective (Topic1), Red Event (Topic2) and Red Activity (Topic7) belong to the stable popular themes, which are highly concerned by the Civic Education of colleges and universities. Relying on the revolution retrospective, red time and red activities, we can fully raise the importance of red culture among college students, promote the development of students' red culture consciousness, and provide greater help for the inheritance and development of red culture. The hot topic of red culture inheritance in the ideological education of colleges and universities from the perspective of reform and transformation, specific construction problems and other perspectives for the construction of its practice to provide theoretical references, in the face of the network environment, the impact of big data technology, the transmission of red culture inheritance method in urgent need of reform and transformation, scholars have put forward the technology integration of innovative composite inheritance path. On the one hand, from the inheritance method to keep up with the changes of the times, on the other hand, it is proposed that the digital intelligent construction of the red cultural resource base should be taken as the future valuable wisdom industry strategic thinking.

Table 3: The hot theme of Red cultural heritage

Topic	Name	2012~2024	2018~2024	2024
Topic1	Revolution retrospect	**0.0808**	**0.0824**	**0.0819**
Topic2	Red events	**0.1615**	**0.1598**	**0.1624**
Topic3	Red people	**0.2451**	**0.2628**	0.2432
Topic4	Red Site	**0.1475**	**0.1459**	0.1025
Topic5	Red historical photos	**0.1089**	**0.1134**	0.0913
Topic6	Red document	**0.0939**	**0.0921**	0.0911
Topic7	Red activity	**0.0495**	**0.0526**	**0.0597**
Intensity threshold		0.1267	0.1299	0.1189

IV. A. 3) Thematic intensity of red cultural heritage

In order to further understand the changes in the evolutionary trend of red cultural heritage in college civic education, this paper takes the year as the variable, and utilizes the document-theme matrix to derive the distribution of the intensity of each theme over different time windows (2019~2024) on the basis of the previous formula as shown in Table 4. Figure 3 shows the heat map of the intensity of the theme of red cultural heritage in college civic education from 2019 to 2024.

As shown in the figure, under the change of the color of the heat map, the theme of Topic1~Topic7 can preliminarily distinguish the evolution of the topic intensity, for example, the theme intensity of Topic 2 "Red Event" gradually increases with the development of time, and Topic 3 "Red Task" has always been the focus of college ideological and political educators. The intensity of change in Topic 1 "Revolution Retrospective" and Topic 4 "Red Sites" over time has almost remained at the same level, indicating that the development of this topic has been relatively mature.

Because of the large number of topics, the change trend of the intensity of all topics in one graph is chaotic and not obvious, and it is not easy to observe the change trend of the theme intensity of cultural education in university libraries, so the standard deviation of the evolution trend of different themes in 2019~2024 is calculated, and combined with Figure 3. If the standard deviation rises greater than 0.025, there are topics in Topic 2 and Topic 3. If the standard deviation drop value is greater than 0.025, there are Topic 1 "Revolutionary Retrospective", Topic 4 "Red Sites", Topic 5 "Red Historical Photos", Topic 6 "Red Literature" and Topic 7 "Red Activities". It's important to note up front that the declining type does not mean that these topics are less focused, and these data are only based on statistical values.

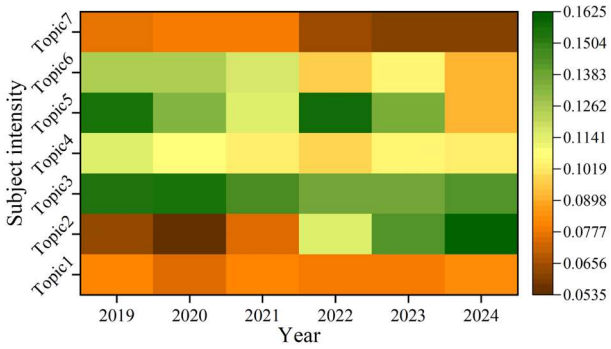


Figure 3: Thematic intensity diagram

Table 4: The distribution of the theme intensity

Topic	2019	2020	2021	2022	2023	2024	SD
Topic1	0.0814	0.0743	0.0812	0.0795	0.0791	0.0819	0.003
Topic2	0.0623	0.0539	0.0746	0.1153	0.1428	0.1624	0.035
Topic3	0.1539	0.1553	0.1451	0.1374	0.1365	0.1432	0.028
Topic4	0.1151	0.1095	0.1031	0.0982	0.1042	0.1025	0.006
Topic5	0.1548	0.1328	0.1151	0.1573	0.1349	0.0913	0.021
Topic6	0.1243	0.1257	0.1179	0.0971	0.1053	0.0911	0.013
Topic7	0.0769	0.0785	0.0792	0.0638	0.0612	0.0597	0.009

IV. A. 4) Evolution of the Red Cultural Heritage Theme

Based on the theme labels of red cultural heritage in college civic education generated by the TLDA-2Vec model and the theme intensity given in the previous section, the highest theme intensity and its keyword probability distribution in 2019~2024 are obtained by combining the model-related formulas as shown in Table 5. Then take the six time zones divided by 2019~2024 as the starting node, the keywords as the end node, and the middle flow to the theme label node, based on the probability value of the keywords as the flow value is used to determine the width of the connecting line, so as to draw the sangky diagram of the evolution of the theme of the red cultural inheritance in the college civic and political education as shown in Figure 4.

The Sankey diagram reveals the intrinsic connection and change trend between different themes, and combined with the keyword probability distribution table, it can be seen that the keywords of red cultural resource base, three-whole-parenting, moral education, red culture, and red service occupy an important position in the nodes. And there are connecting lines connected in each node from 2019 to 2024, indicating the importance and continuous influence of these themes. The keyword “red cultural resource base” is used throughout, and the width of the lines flowing to each year peaks in 2020, with a keyword probability distribution of 0.2864. The themes of “three-pronged education” and “cultivating moral character” are closely related to the “red cultural resource base”, and these two thematic flows maintain a high intensity throughout the time series. Especially in 2022-2023, the connection between them is significantly strengthened. This is related to the “Implementation Plan for the Audit and Evaluation of

Undergraduate Education Teaching in General Colleges and Universities" issued by the Ministry of Education in 2021, the first article of the basic principles of which points out that it adheres to the principle of cultivating moral integrity, keeps the direction of socialist school running in mind, builds an evaluation system with the effectiveness of cultivating moral integrity as the fundamental criterion, and strengthens the auditing of the school's direction of running the school, the process of cultivating people, the development of students, and the quality guarantee system, so as to guide the universities to build a (c) Guiding colleges and universities to build a "three-pronged approach" to educating people.

It can also be noted that, for example, the keyword "red culture" is relatively rare in 2019, but in 2024, the two emerging themes of "red culture" and "red inheritance" are closely related. The emergence of the theme is closely linked, and the width of the flow line increases, which reflects the importance and forefront of red culture and red inheritance in the research of ideological education in colleges and universities. The "three full education" can promote the integration of red cultural resources and other educational resources, and symbiosis, so that the red cultural resources to maximize the effect of educating people, to promote the inheritance of red culture and innovative development to provide a new path.

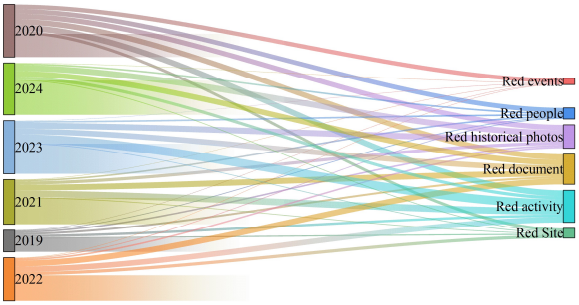


Figure 4: Theme Evolution Sankey Map 2019~2024

Table 5 The max intensity topic and its keyword probability distribution

Year	Topic	Topic intensity	Keywords (probability)
2019	Topic5	0.1548	Red cultural resource library(0.1415), Strengthen moral education and cultivate people(0.0527), Red task(0.0498), Three complete education(0.0463), Red activity(0.0421), Red document(0.0397), College student (0.0351), Red culture (0.0312), Red event (0.0284), Red resource(0.0224).
2020	Topic3	0.1553	Red culture resource library(0.2864), Three full education(0.2143), Red culture(0.0728), Moral tree people(0.0643), Red education(0.0605), Red service(0.0527), College student(0.0498), Red thought(0.0427), Red environment(0.0384), Red function(0.0378).
2021	Topic3	0.1451	Red cultural resource library(0.2152), Three complete education(0.1048), Strengthen moral education and cultivate people(0.0534), Red culture(0.0508), Red service(0.0372), Red environment(0.0295), Red function(0.0263), Service and education(0.0194), Red university(0.0165), Red resource(0.0127).
2022	Topic5	0.1573	Red cultural resource library(0.1672), Strengthen moral education and cultivate people(0.0728), Red culture(0.0512), Three complete education(0.0452), Red service(0.0376), Red education(0.0328), Red university(0.0295), College student(0.0224), Red thought(0.0152), Red consciousness(0.0117).
2023	Topic2	0.1428	Red cultural resource library(0.1757), Three complete education(0.1261), Strengthen moral education and cultivate people(0.0728), Red service(0.0514), Red education(0.0479), Red ideology(0.0425), Red consciousness(0.0398), Red resources(0.0341), Red culture(0.0295), Red practice(0.0214).
2024	Topic2	0.1624	Red cultural resource library(0.1721), Three complete education(0.0951), Strengthen moral education and cultivate people(0.0548), Red service(0.0362), Red education(0.0348), Red culture(0.0311), Red innovation(0.0278), Red practice(0.0185), Red thought(0.0121), Red consciousness(0.0101).

IV. B. Statistics on Red Cultural Heritage

IV. B. 1) Degree of understanding of red cultural heritage

The practical process of integration of red cultural heritage and ideological and political education in colleges and universities mainly refers to the work of ideological and political education in colleges and universities in integrating red cultural resources, and the result of the integration mainly refers to the current situation of college students' red cultural literacy. This study designed a questionnaire to investigate a total of 650 college students in five colleges

and universities in Province G. The questionnaire was distributed and counted through Questionnaire Star. The questionnaire adopts a five-level Likert scale, i.e., very knowledgeable, generally knowledgeable, partially knowledgeable, almost unaware and completely unaware (options A~E).

This research centers on the following aspects, namely, basic knowledge mastery, examining college students' understanding of the basic concepts of red culture, important historical events, and red venues. Understanding of spiritual connotations, exploring college students' understanding and perception of the revolutionary spirit, patriotic sentiment, hard work and other spiritual connotations embedded in red culture. Analysis of influencing factors, analyzing the influence of school education, family education, social environment, Internet information and other factors on college students' knowledge of red culture. Research on interest and identity, to understand college students' interest in red culture, willingness to participate and sense of identity. Opinions and Suggestions Collection, to encourage college students to put forward their own opinions and suggestions on how to better inherit and carry forward the red culture, to provide reference for relevant decision-making.

The data obtained from the questionnaire are organized to get the degree of understanding of college students on the inheritance of red culture under different dimensions as shown in Table 6. Based on the data in the table, the following conclusions are drawn:

(1) Gender differences. The proportion of men who are “very well informed” is higher than that of women, and the proportion of women who are “generally informed” is nearly 17% higher than that of men. Taken together, the fact that women's overall knowledge of red culture is higher than men's is a phenomenon that deserves attention.

(2) Differences in different grades. From the results of cross-tabulation analysis, it can be seen that the proportion of first-year students who “know a lot” and “know a lot” about the red culture is about 53%, which is slightly lower than that of other grades, which may be related to their short enrollment time. The proportion of students who “hardly know” and “don't know at all” about the red culture from the first to the third year of university is about 12%, and the degree of understanding of students in the fourth year of university is slightly higher. It can be seen that college students' lack of understanding of red culture is not related to the length of time of enrollment, which is one of the problems and dilemmas encountered by the ideological and political education work of colleges and universities in the process of shaping the values of college students by utilizing red cultural resources.

(3) Differences in different majors. The proportion of “very well aware” and “generally aware” of red culture is the highest among liberal arts students, which is mainly due to the fact that liberal arts students have more opportunities to contact and study related humanities and history knowledge, and also have higher interest and motivation. The proportion of students in science and medicine who “know a lot” and “know a lot” about the red culture is also high, both exceeding 50%, while students in economics have a relatively low level of knowledge about the red culture, showing a distinctive tendency of specialties and interests. In the process of ideological and political education in colleges and universities to promote and utilize the red cultural resources, some college students can not resonate with it, reducing the teaching effect of red cultural resources education, leading to the red cultural resources in colleges and universities to educate people bottleneck, it is difficult to break through.

Table 6: The degree of understanding of the inheritance of red culture (%)

Sex	A	B	C	D	E
Male	23.15	33.48	28.15	10.24	4.98
Female	17.49	50.27	25.34	6.48	0.42
Grade	A	B	C	D	E
Level 1	23.24	30.15	34.27	8.46	3.88
Level 2	20.15	42.27	25.38	8.46	3.74
Level 3	23.45	34.27	29.48	10.15	2.65
Level 4	18.24	45.37	26.45	9.16	0.78
Majors	A	B	C	D	E
Literature	16.35	52.48	26.49	4.05	0.63
Polytechnic	21.83	30.15	31.04	14.27	2.71
Medicine	22.34	38.27	29.63	4.91	4.85
Economy	7.55	36.42	32.48	19.27	4.28
Other	26.81	42.27	24.51	6.35	0.06

IV. B. 2) Analysis of the path of red culture dissemination

Red culture mainly records the activities related to China's red revolution, which has a very important role in the ideological education of colleges and universities, in which the frequency of learning about red culture is relatively

high at some relatively important time nodes. For the five colleges and universities in Province G (Y1~Y5), the frequency of red culture activities in 2024 was counted, and the statistical results of the frequency of red culture integrated into the ideological education of colleges and universities were obtained as shown in Figure 5.

As can be seen from the figure, the dissemination frequency of red cultural resources integrated into the ideological and political education of colleges and universities is high from June to July before the founding of the Party Day, in which the frequencies of June and July are 20 and 15 times respectively, ranking the first and the third respectively, which is much higher than the average frequency of 8.5 times/month. This is followed by the National Day learning boom from September to October, and also April is a peak period due to a wave of learning boom in April with the launch of learning and education in February 2021, and the end of the year is the period of summarizing learning and education. Other time periods such as February (during winter vacation) and August (during summer vacation) are at a low peak. The statistics focus on the fact that the ideological education in universities in Province G is still at the task-driven stage in terms of integrating red cultural resources, with a double peak in June-July and September-October, and another double peak in the launching period of April and the summarizing period of December, which is characterized by a clear task-driven feature.

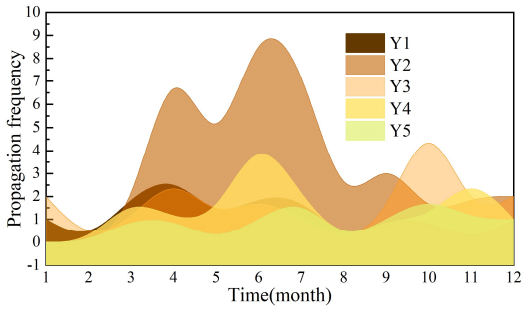


Figure 5: Statistical results of propagation frequency

For the red culture inheritance path, it is mainly through the five paths of theoretical study, practical visit, teaching video, campus culture and others in the ideological education of colleges and universities (P1~P5), and by exploring the dissemination paths under different ways, it can provide support for expanding the red culture inheritance in the ideological education of colleges and universities. Statistics are carried out for the paths of carrying out red cultural inheritance in Civic and Political Education in five colleges and universities in Province G, and their specific results are obtained as shown in Figure 6.

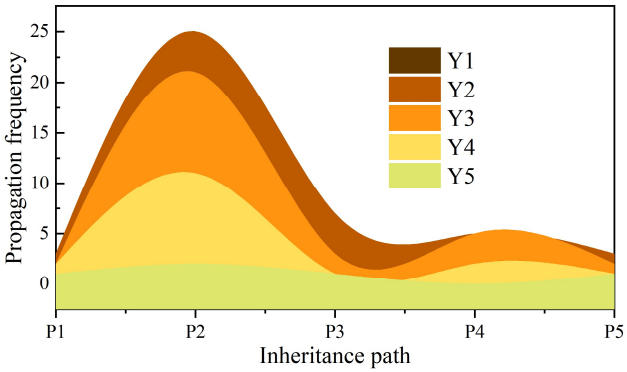


Figure 6: The path of red culture

As can be seen from the figure, in the path of red cultural inheritance in ideological and political education in colleges and universities, the number of times of using the practical visit method reaches 64 times, accounting for 59.81% of the total number of dissemination methods of integrating the red cultural resources into the ideological and political education in colleges and universities, and the second-ranked campus culture only has 14 times, in addition, there are 12 times related to the teaching video. Red cultural resources are high-quality resources for carrying out ideological and political education, while education through red resources can often achieve better educational effects and larger 'outputs', and the inputs in terms of human, financial and material resources are relatively small. In summary, the current paths of the five universities in province G to realize the inheritance of red

culture in the ideological and political education of colleges and universities are yet to be further expanded. It is necessary to fully combine modern technology to realize the digital integration of ideological education and red cultural inheritance, and to promote the inheritance and development of red culture with the help of multiple types of communication channels.

V. Conclusion

Colleges and universities must carry out the fundamental task of establishing moral education, educating contemporary college students by cultivating their roots and casting their souls, and ensuring the leading role of ideological and political education. This paper utilizes the B/S architecture to design a red culture resource base for ideological and political education in colleges and universities, and introduces the TLDA-2Vec model to explore the trend of the theme evolution of red culture inheritance in ideological and political education, and to explore the degree of current college students' understanding of the red culture, as well as the way of red culture dissemination. Through the quantitative analysis of the data, it is clear that red cultural resources need to be further promoted in the era of artificial intelligence in order to give more educational resources to the Civic and Political Education in colleges and universities. It is necessary to make full use of the red culture as an educational resource to carry out accurate civic education for college students, help them buckle the first button of life, cultivate the soul from the ideology, and realize the unity of knowledge and action from the action.

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