Innovative Research on German Education Teaching Mode in Colleges and Universities from the Perspective of BD

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Abstract. With the needs of economic development, many colleges and universities offer German courses. However, because German course has just started in domestic universities, its teaching method is more simply to apply the ordinary German teaching mode, without too much consideration of the characteristics of higher education, and its teaching effect is not satisfactory. Therefore, the purpose of this paper is to make innovative research on German teaching mode in colleges and universities from the perspective of big data (BD). Firstly, this paper discusses the current situation of German teaching mode construction and resources in Chinese universities, and summarizes the main problems existing in contemporary German teaching mode in Chinese universities. The new teaching mode of German in colleges and universities puts the feelings of college students in the main position, guides students to learn actively through behavior guidance, and pays more attention to students' communicative competence. This teaching mode also utilizes the storage architecture of data warehouse, combined with BD and other related technologies, and realizes the storage and update of various German teaching resources, which meets the innovative needs of universities for German teaching mode. Finally, this treatise compares the innovative modes of teaching German in universities with traditional modes of teaching. Experimental results show that the innovative mode of teaching German in college is recognized and loved by students, and their love for German has increased by about 30%, which plays a significant role in improving students' enthusiasm for learning German and provides an important reference for the innovative research of German teaching mode in colleges and universities.

Keywords: BD, College German Education Teaching Mode, Behavior Guide, Data Warehouse

1. Introduction
At present, in the practice of German teaching in colleges and universities, the traditional translation method or structuralism analysis method is still used[1]. In this way, students only learn the analysis and practice of language forms, but lack the cultivation of intercultural communicative competence. In practical application, the knowledge of German language is often used flexibly according to scenes and objects, resulting in communication failure[2]. The single teaching mode, which is too rigid in the
study of laws and regulations, especially for German, a complicated language, can easily make students feel boring, afraid of difficulties and tired of learning, which limits the students' learning potential [3-4]. Therefore, it is necessary to build an innovative German teaching model in colleges and universities.

Currently, with the continuous development of computerized education at universities, various educational models created using related technologies such as big data are appearing one after another.[5]. Abroad, Kageyama found that students are generally interested in German popular culture, local conditions and customs and other national conditions knowledge, which can be divided into main topics such as diet, art, film, architecture, national festivals, education, etc. According to students' interests, they are divided into several project groups, each of which is responsible for introducing a national condition theme [6-7]. In China, when explaining and practicing the knowledge of language and grammar, Yang Yang, Dong found that some teaching contents about the culture and national conditions of German-speaking countries could be carried out through project-based teaching to stimulate students' enthusiasm[8].

From a big data perspective, this article conducts innovative research on German educational models in universities. This article begins with the actual situation and describes the current situation of the German educational mode at Chinese universities, as well as the relevant views and suggestions of university students. Next, based on the survey, I summarized the main problems that exist in the German language teaching mode of the university. Finally, based on the status quo, combined with big data and other technologies, this paper proposes a new university German teaching model that pays more attention to behavioral instruction and communication skills. The innovative German educational mode at the university has significantly improved student enthusiasm and subjective initiative, and has the importance of an important reference for the further development of higher calligraphy education.

2. Innovative Technology of German Education Teaching Mode in Colleges and Universities from the Perspective of BD

2.1. BD
(1) Visual analysis (VA)
VA refers to the analytical means of conveying and communicating information clearly and effectively by means of graphical means. It is mainly applied to the association analysis of massive data, that is, the process of association analysis of scattered heterogeneous data with the help of visual data analysis platform, and making a complete analysis chart. It is simple, clear, intuitive and easy to accept.

(2) Data mining algorithm
Data mining algorithm, a data analysis method that can create data mining models to browse and calculate data. This is the theoretical core of BD analysis. Because there are different data mining algorithms, and they are based on different data types and formats, the data characteristics of different algorithms are also different. However, generally speaking, the process of creating a model is similar. That is, first analyze the data provided by the user, then look for specific types of patterns and trends, and then use the results of the analysis to define the best parameters for creating a mining model. And apply these parameters to the entire data set to extract feasible patterns and detailed statistics.

(3) Predictive analysis
Predictive analysis is one of the most important application areas of BD analysis. By combining various advanced analysis functions (special statistical analysis, predictive modeling, data mining, text analysis, entity analysis, optimization, real-time scoring, machine learning, etc.), the goal of predicting uncertain events is achieved. Will be done. It enables users to analyze trends, patterns, and the relationship between structured and unstructured data, and use these indicators to predict future events and provide a basis for action [9].

(4) Data quality management
This is to identify, measure, monitor and warn of various data quality issues that may occur at each stage of the data life cycle (planning, acquisition, storage, sharing, maintenance, application,
disappearance, etc.).

2.2. German Teaching Mode in Colleges and Universities

(1) German Teaching Content
Textbooks are the core of German teaching in colleges and universities. Each unit in all German textbooks has a different theme. Students can use the new media technology to learn the culture and art under each theme, and then cultivate the comprehensive ability of listening, speaking, reading and writing German. German learning resources include audio and video. Audio resource library, including various oral German teaching and listening questions. Video resource library, including famous German movies, German talk shows, German speech contest, etc. Of course, these resource banks can be divided into different grades and levels, so that students with different needs have various choices.

Secondly, on the basis of general teaching, German teaching in colleges and universities expands information teaching resources, accumulates reading and writing resources by using different new media technologies, and makes it adapt to the needs of the new media environment as soon as possible, broadens reading horizons and improves German writing ability and level. In addition, the translation resource database covers a wide range of fields, and usually carries out comprehensive translation work according to the college English syllabus. For example, translating important news at home and abroad, cultural propaganda at home and abroad, etc. It can enable students to achieve all-round development in the new media era and quickly improve their German quality and comprehensive level[10].

(2) German teaching methods
1) Use "brainstorm teaching method" to make students switch to German learning state in a short time
At the beginning of each class, students can use the "brainstorming" teaching method to recall and sort out the contents of the previous class. Finally, the teacher evaluates, points out possible mistakes and omissions in spelling and grammar, and then sorts out, sums up and summarizes scattered answers. In this way, students can play the role of association, come up with a large number of words and sentences related to the theme, brainstorm ideas, inspire each other, motivate each other, use both hands, actively recall and think, and quickly enter the state of German learning.

2) Explain the tedious grammar rules with the help of "situational case teaching method"
Compared with English, German grammar is tedious and complicated, and it is easy for students to feel boring if they simply memorize grammar rules. Through vivid scenes, students can more easily understand the difference between actors and recipients, and leave a deep impression on them. In this process, students actively think and participate, and their thinking dimensions diverge, thus improving their ability to understand and solve problems.

3) Using role-playing teaching to train students' oral communication ability
Role-playing teaching is an important method of behavior-oriented teaching mode. This kind of simulation training related to future occupations is of great benefit to improving vocational skills and professional quality. Because of the differences in German level among students, students can play their own roles in a specific language environment, and each role has its own lines to ensure that everyone has a chance to speak. In addition, after learning German for a certain period of time, students can practice their future career scenarios according to their professional direction.

2.3. Data Warehouse
Data warehouse is not only a data collection, but also a decision support system. It reorganizes and integrates the information from multiple data bases or other data sources, and provides a unified user interface for a topic application at the upper level, so that the end user can directly complete the query, analysis and decision of data. The related algorithm is as follows.
Let s be the training sample data set, and the category identification attribute in s has m independent values, that is, m classes are defined, i=1, ⋯,m, is the subset of the data set s
belonging to the $C_i$ class, and the number of tuples in the subset $R_i$ is expressed by $r_i$. The expected information amount of set $S$ in classification can be given by the following formula.

$$I(r_1, r_2, \ldots, r_n) = -\sum_{i=1}^{m} P_i \log_2(P_i)$$  \hspace{1cm} (1)

where $P_i$ indicates the probability that any sample belongs to $C_i$ class, $P_i = r_i / |S|$, where $|S|$ is the number of tuples in the training sample data set.

If $S_{ij}$ indicates the number of tuples belonging to $S_j$ class in subset $C_i$, the entropy of attribute $A$ for classification $C_i (i = 1, 2, \ldots, m)$ can be calculated by the following formula.

$$E(A) = \sum_{j=1}^{v} \frac{S_{ij} + \cdots + S_{mj}}{|S|} I(S_{ij}, \ldots, S_{mj})$$ \hspace{1cm} (2)

Let $w_j = \frac{S_{ij} + \cdots + S_{mj}}{|S|}$ then $w_j$ be the weight of $S_j$ subset, which indicates the proportion of $S_j$ subset in data set $S$, and the expected information amount of classification $C_j$ for each value of attribute $A$ can be calculated by the following formula.

$$I(S_{ij}, \ldots, S_{mj}) = -\sum_{i=1}^{m} P_{ij} \log_2(P_{ij})$$ \hspace{1cm} (3)

$$Gain(A) = I(r_1, \ldots, r_m) - E(A)$$ \hspace{1cm} (4)

where $P_{ij} = S_{ij} / |S_j|$ indicates the proportion of $S_j$ belonging to $C_i$ class in the subset. $Gain(A)$ is the measure of the attribute of decision classification.

3. Innovative Experimental Research on German Education Teaching Mode in Colleges and Universities from the Perspective of BD

3.1. Experimental Data

The research object of this paper is 200 randomly selected college students, including 120 boys and 80 girls. Then divide them into a and b groups on average. Group a is the experimental group and group b is the control group.

3.2. Experimental Process

First of all, the randomly selected college students were investigated by questionnaire, and the 200 college students’ understanding, liking and cognition of German teaching mode in colleges and universities were obtained, so as to more truly understand the contemporary college students’ views on German teaching mode in colleges and universities. After that, the German teaching model proposed in this paper is used to teach German for one month for group A students, and the traditional German teaching method is used to teach English for one month for group B students under the same conditions.

4. Experimental Analysis of Innovation of German Education Teaching Mode in Colleges and Universities from the Perspective of BD

4.1. College Students’ Views on German Teaching Mode in Colleges and Universities

In this treatise, 200 randomly selected college students were surveyed by questionnaire. Therefore,
you will gain an understanding, preference and awareness of modern college students' modes of German language education in college and a more true understanding of modern college students' views on German language teaching modes in college. The purpose of the first survey is to understand the German level of college students and their interest in learning German, and the second survey is the German teaching methods and traditional methods proposed in this paper. To understand the views of college students on how to teach German. The survey results are shown in Table 1 and Figure 1.

| Good grades in German | Good spoken German | Like German | Think German is very important |
|-----------------------|--------------------|-------------|--------------------------------|
| Boys                  | 93                 | 85          | 90                             | 79                             |
| Girls                 | 69                 | 75          | 70                             | 73                             |

From the survey data, it can be seen that most college students are familiar with the German teaching mode in colleges and universities, and have basically used it, but they are not satisfied with its effect. Moreover, college students' German scores are generally poor. After using the two German teaching modes in colleges and universities for one month, most of the college students in Group A think that the college English teaching resource pool proposed in this paper is more effective, interesting, interactive and rich in resources for learning German, which improves students' enthusiasm for learning German. However, the B group of college students who adopt the traditional teaching mode generally have low evaluation. This is mainly because the German teaching mode proposed in this paper adopts BD analysis technology, which can focus on the parts that students like and are interested in, so that students can acquire the German knowledge they want. BD technology first collects the opinions of college students on German learning, and then stores and analyzes these data, so as to know the German knowledge that college students are eager to learn and teach students in accordance with their aptitude. At the same time, the application of data warehouse makes the German teaching mode more widely applicable to college students.

4.2. Changes in College Students' love for German Learning

In this paper, group A students are allowed to study German for one month by using the German teaching mode in colleges and universities, and group B students are also allowed to study German for one month by using the traditional German teaching mode in colleges and universities under the same conditions. During the experiment, college students were investigated every five days, and the changes of their love for German learning were counted. We visually show the changes of college students' love for German learning in A and B groups, and curve-fit them according to the mean value respectively. As shown in Table 2 and Figure 2.

| Initial | After 5 | After 10 | After 15 | After 20 | After 25 | After 30 |
|---------|---------|----------|----------|----------|----------|----------|
Group A | days | Group B | days
--- | --- | --- | ---
50% | 55% | 50% | 53%
65% | 70% | 55% | 54%
70% | 78% | 54% | 57%
78% | 82% | 60% | 64%
88% | 88% | 89% | 89%

![Figure 2. Changes of two groups of college students' liking for German](image)

From the experimental results, it can be seen that the students in Group A who use the German teaching mode in colleges and universities are gradually increasing their love for German learning, and the increasing speed is faster than those in Group B who use the traditional German teaching mode. Moreover, students in group A love German much more than students in group B. This proves once again that the German teaching model proposed in this paper has a positive effect on college students' learning German, and greatly promotes their enthusiasm for learning German, which is of great significance, and has an important relationship with BD and data warehouse. BD has powerful data processing and analysis ability, and can teach German according to the interests and hobbies of college students. It also incorporates a lot of interesting knowledge and arouses the enthusiasm of students.

### 5. Conclusion
From the perspective of BD, this article conducts an innovative research on university German teaching mode. First, we considered the current situation of the German education model in Chinese universities and summarized the main issues. The university will adopt a new German teaching model, guide students to learn actively through behavioral guidance, and will pay more attention to their communication skills. We also use BD and other related technologies to meet the innovative needs of university German teaching models. The new model of teaching German in universities has been recognized and loved by students. It plays an important role in improving students’ interest in learning German, and is an important reference for innovative research on university German teaching models.

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