

Analysis on Learning Behavior of English Learners on Basis of Data Mining Technology

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Abstract: Specific analysis on basis of English learners' learning behavior characteristics is the key factor of accomplishing individualized teaching. This paper mainly researches how to further dig out English learners' behavior characteristics with help of data mining technology, and conducts discussion and analysis.

Data mining technology has many research points and application ranges. Especially in nowadays when economy is rapidly developed, it has become very mature for researches in financial field. However, there is scarcely any specific application in English learning behavior. This paper uses all kinds of theoretical knowledge of data mining to conduct in-depth analysis and discussion of English learners' learning behavior, and achieves an exact analyzed result in order to better instruct English learners' learning status.

1. Induction of data mining technology

We live in an age when network information is developing rapidly. The rapid development of computer technology, communication technology and network technology has changed the whole society. In especial, the development of large-sized databases and plenty of databases makes people's life closely linked with information. The emergence of large amounts of information has brought not only convenience but also many troubles and problems. Firstly, there is too much information which can not be digested; secondly, the manifestation patterns of information are different and difficult to deal with uniformly; thirdly, the security of information can not be guaranteed; fourthly, information of true and false can not be identified. Faced with all these problems, data mining technology takes advantage of this opportunity and solves all the problems. Data mining refers to a research domain which integrates statistics, intelligentsics and database. It is a process of refining the most-derived, unknown, and useful knowledge and information from unclear and random data or data with noise. It is to dig out the information and knowledge difficult for people to discover or even the information which completely violates truth and law. Although the information excavated is generally beyond imagination, it is the most valuable.

2. Orientation of data mining technology

2.1 Explicit objective

Before data mining, the most important is to know background knowledge and grasp clients' requirements. If the understanding of background knowledge is lacked, problems can not be truly solved and the most high-quality data information can not be prepared for conducting mining let alone elaborating the mined results. If we want to play the fullest value of data mining, we should make clear what the objective is and how to achieve it.

2.2 Building data mining base

First of all, the resource status of data should be made clear before data mining. In general, the data which need to be mined will be unified into a same database rather than the former one. The reason is that most data will be mined and the external data can also be used in mining process. In addition, data mining is an in-depth analysis of complicated information in another sense.

2.3 Analyzing data

Data analysis refers to the process of deep research and investigation. The final objective is to find out the rule existing in data, make clear the influences of various factors and the complicated

relationship, and discover the universal relation of all aspects.

2.4 Mediating data

When conducting operation on basis of the above steps and understanding the tendency and situation of data, we should further make clear and grasp the problems. Data should be appropriately deleted in accordance with the universal relationship among problems and the whole mining process of data should be recombined in order to further present the status.

2.5 Building model structure

When further mediating data structure and contents, we can build knowledge model as needed. This step as the core of data mining generally uses methods like decision-making tree, statistical pattern, neural network, etc to build model structure.

2.6 Judging and interpreting

The model obtained in above step may have no practical value and practical significance in actual application process. It may not correctly reflect the meaning of data and even be opposite or inconsistent with reality in application. Therefore, it needs to be evaluated to make sure that the data are useful and valid. One way of evaluation is directly using the established database to check; the second way is to look for new data for check; the third way is to test the latest data in operation process.

3. Learning behavior characteristics of English learners

As for English learners, it is the learning behavior characteristic which is also named as the personality characteristic of students that affects students' learning. English learners' knowledge structure system and style constitution are the characteristics of learning behavior. Knowledge structure to some extent presents the English learners' knowledge of all aspects is integrated in what way. Learning style is the way with personality characteristics which English learners insist in using, and also the combination of learning strategies and learning tendency. Learning strategies refer to a series of methods which English learners have adopted to accomplish their learning tasks. One way or one method of these strategies can be turned to learning approach. Learning tendency means English learners' learning attitude and emotion presented in learning process. People are born with characteristics of physiology, psychology and sociality. In contrast, the elements of learning style can also be grouped into three levels namely physiological level, psychological level and social level. Physiological elements mainly contain individuals' external environment stimulus like luminosity, temperature, sound, etc, rule of time everyday, and feeling of receiving outside information. Psychological elements contain cognition aspect, affection aspect and consciousness aspect. Social elements mean the English learners' communication ability. In order to deal with English learners' characteristics, this paper mainly divides on-line English learners' characteristics into the following four elements:

3.1 Knowledge Construction

Procedural knowledge and declarative knowledge are two types of knowledge. Status of grasping each kind of knowledge can be grouped into three aspects namely motor skill scope, affection scope and cognition scope. The objectives of cognition scope have many aspects because on-line education in China mainly focuses on learning and understanding of cognition field.

3.2 Information processing type

Information processing types can be divided into visual type, haptic type and auditory type.

3.3 Social characteristics

Individual English learners or cooperated English learners

3.4 Main types of English learners

According to the diversity of English learners' rational level, control point and motivation for success, English learners can be divided into selective type, positive type and passive type. English learners of positive type have great passion and responsibility for study. When facing difficulties, they can encourage themselves and strive to achieve success. English learners of selective type merely have passion for contents they are interested in. They hope to succeed with fewer efforts. English learners of passive type have no passion for study. They are not willing to study and afraid

of failure.

4. Application of data mining in English learners' leaning behavior analysis system

English learners' personal characteristics will determine their concrete behavior and will be presented in study. The best advantage of on-line education is providing better service for learners. Personalized information service is to build appropriate service environment fit for individualized requirements in accordance with users' knowledge system, behavioral pattern, mental tendency, etc. It can to some extent provide oriented service and information, and help users use this system. Network distance education system should provide characteristic information service for English learners. Firstly, it should fully grasp learners' characteristics in learning and provide information service environment suitable for English learners in line with their learning characteristics, so carrying out personalized service will not be paper talk. However, how to make sure on-line English learners' concrete learning characteristics? This paper takes advantage of related knowledge of data mining technology, conducts analysis and research on learners' basic situation and on-line learning activities, and finally confirms the English learners' learning characteristics.

4.1 Information collection module

The main function of information collection module is to manage and collect all the basic information related to English learners. It keeps all the collected valid information in database and makes good preparation for analyzing English learners' learning characteristics. On the whole, information collection module usually needs to collect information of two aspects. One aspect is static information which preserves English learners' basic information like name, character, education background, learning style, etc. The way of obtaining the information is very simple. It can use the opportunity of investigating English learners or English learners' self-introduction. The other aspect is dynamic information such as website that English learners usually visit, keywords they inquire, data they access, spare time online, leaning situation, homework performance, etc. The information can be acquired through using network communication technology and tracking English learners' specific learning activities in real time. The vital data sources come from webpage journal file which is able to timely record the whole browsing history of English learners and provide significant record for deeply mining English learners' learning characteristics.

4.2 Metadata information

The initial data record is incomplete even with noise. In order to better improve the quality and speed of data mining, we strictly transform and arrange the initial data again in line with data standards. Data's extraction pattern, changing pattern, purification pattern and preservation pattern are stipulated in metadata, which also determines the quality and speed of data mining. On basis of education department's relevant documents of setting learning object model and English learner model, two types of metadata need to be defined. They are respectively learners' metadata and learning objects' metadata. Learners' metadata are mainly used to standardize the collected learners' characteristics. Learning objects' metadata are mainly used to present the characteristics of learning materials. On basis of related standards, English learners' metadata and learning objects' metadata are defined as follows:

English learners' metadata mainly contain the following eight types: (1) Individual basic information includes name, telephone number, identification, external identification, extended information, etc. (2) Study basic information includes learning objective, identification, external identification, extended information, etc. (3) Management basic information includes tuition information, reward and punish situation, identification, external identification, extended information, etc. (4) Relation basic information includes relation, identification, external identification, extended information, etc. (5) Security basic information includes security evidence, identification, external identification, extended information, etc. (6) Preference basic information includes previous preference set, subsequent preference set, identification, external identification, personal affection, personal interest, extended information, etc. (7) Performance basic information includes record and effective date, identification, external identification, experience achievement, performance coding and data, validation certification, extended information, etc. (8) Work basic

information includes identification, external identification, identification type, quoted learners' metadata, quoted performance information, extended information, etc.

Learning objects' metadata mainly cover the following four types: (1) General basic information includes title, key words, cognitive direction, teaching method, organization structure, etc. (2) Technical level basic information includes software environment and hardware environment. (3) Relation basic information includes relation among other learners and position in a classification system. (4) Evaluation basic information includes teaching objectives' evaluation at different places.

Transformed data can go on conducting data mining, further mine the main characteristics of English learners, and keep them in model base. Models provided by data mining technology have two types. One is model prediction. It uses the existing data to build a model which is able to show the predicted numerical value of various kinds of data. The other is model description which describes the existing data model and guide decision making.

4.3 Model base invocation

By using data mining technology, English learners with diversified characteristics can be classified in line with their learning characteristics and be put in model base. Teachers can use model base to conveniently and timely know English learners' effective information like need, interest, cultural background, etc. They can also combine English learners' personal characteristics on basis of reflected information, set diversified educational programs, and truly realize the individualized teaching goal.

5. Conclusion

By using data mining technology, English learners' learning behavior can be effectively analyzed and researched. It rapidly helps us to know English learners' study status, further understands English learners' major way of learning English, guides the improvement and construction of English teaching system, and truly improves English learners' learning effects.

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