Analysis of AI Immersive Interpretation Teaching Evaluation Based on Data Mining

Siying He[a]
Foreign Language Department, Sichuan University Jinjiang College, Meishan, Sichuan, 62080, China

Keywords: VR, AR, Immersive Teaching, Embodied Cognition, Data Mining.

Abstract: The rapid development of China has led to an urgent demand for qualified English interpreters. However, the interpretation classes in universities fail to build immersive teaching spaces as well as corresponding teaching resources and evaluation systems, which makes it difficult to meet the demand. Upon the trend of intelligentization of foreign language education. This study introduces the operating mechanism and characteristics of AR and VR, constructs an AI immersive interpretation teaching evaluation model, and uses data mining technology to mine and analyze teaching-related data. Based on the theory of embodied and immersive teaching, five- dimensional evaluation index is established to accurately reflect the learning effect of students. This paper focuses on the application of data mining technology in AI immersive interpretation teaching evaluation, which can promote the quality of school teaching and has great significance for AI immersive interpretation teaching evaluation.

1 INTRODUCTION

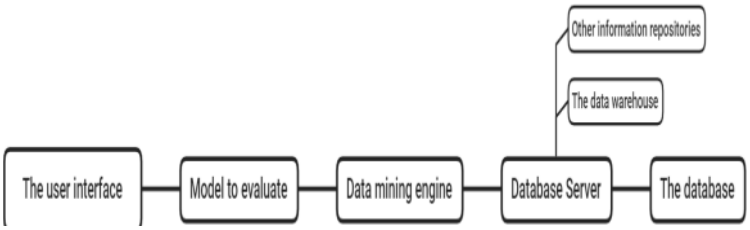
With the rapid development of emerging technologies such as AI, 5G, virtual reality (VR), internet of things and big data, human society has entered an era of intelligence. Among them, the massive use of extended reality (XR) and holographic technology is creating lifelike virtual environments, providing people with new immersive experience. “The Action Plan of Education Informatization 2.0” by Ministry of Education (2018) clearly proposes to “carry out the reform of education mode with new technology support and accelerate the construction of intelligent learning spaces with virtual simulation experimental teaching projects”. Upon this policy, AI technologies have led to significant changes in language teaching industry. Meanwhile, with the implementation of such new national initiatives as “One Belt, One Road”, “Building a Shared Future of Human Being” and “Telling the Chinese Story”, China is in an urgent need of qualified interpreters with specialized abilities and cross-cultural awareness. In “Teaching Guidelines for Undergraduate Foreign Language and Literature Majors in General Higher Education Institutions”, Ministry of Education (2020) proposed that modern technologies should be integrated into interpretation teaching. Thus, it can be seen that actively introducing AI technologies to improve or innovate teaching mode is an effective way to reconstruct interpretation education ecology and successfully cultivate high-quality interpreters for foreign trade and cultural communication of China.

Data mining is mainly cloud architecture computing technology, and cloud architecture computing is the development and integration of distributed computing, Internet technology and large-scale resource management technology. Its applications and research include resource virtualization, information security, and massive data processing (Luo, and Li, 2014). The structure of the data mining system is shown in Table 1.

[a] https://orcid.org/0000-0002-9078-6064

He, S.
Analysis of AI Immersive Interpretation Teaching Evaluation Based on Data Mining.
DOI: 10.5220/0011908900003613
In *Proceedings of the 2nd International Conference on New Media Development and Modernized Education (NMDME 2022)*, pages 192-196
ISBN: 978-989-758-630-9

Table 1 Structural Diagram of Data Mining System



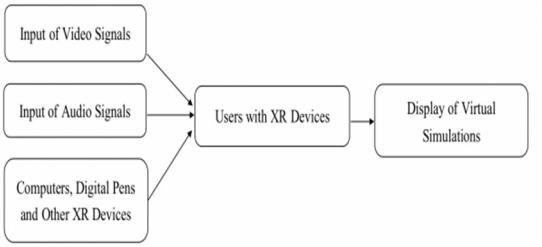
2 AI TECHNOLOGIES APPLICABLE IN IMMERSIVE TEACHING OF INTERPRETATION

Based on the embodiment-based immersive teaching theory, we choose the following AI technologies to empower the practice of the theory.

VR, AR and other XR technology are the core for creating immersive teaching environments. VR technology mainly includes dynamic environment modeling, 3D graphics generation. Based on computer technology and various display devices, combined with generation, multi-sensing interaction and display technologies, VR technology allows users to interact with each other and the environment in 3D space in real time. AR technology, on the other hand, mainly includes 3D registration, human-computer interaction. AR technology provides users with holographic glasses and other devices to perceive information and the environment. Mixed Reality technology is a fusion of VR and AR.

All three work logically by first inputting audio and image signals and then using computers, smartphones and other devices to present a simulated environment. Then, through voice recognition, voice interaction, and human-computer dialogue, users can interact with the virtual world and reality through the computer. They construct a "real" learning context, and enhance the "sense of presence" of learners. In general, XR technologies provide experience and contextual support for immersive teaching.

Table 2 The Working Mechanism for VR, AR and XR



3 CONSTRUCTION OF AN EVALUATION MODEL FOR AI IMMERSION INTERPRETATION TEACHING

3.1 Establishment of Five Dimensions Evaluation Index

The curriculum of "AI immersive interpretation teaching" is selected as the action research sample. This study combines process evaluation and summative evaluation and constructs a five-dimensional evaluation model for blended learning from three aspects: learning process, learning effect and learning attitude. Among them, the learning process evaluation mainly investigates the students' participation and interaction of online courses; The evaluation of learning results is realized by the effectiveness degree. The evaluation of learning attitude was calculated by the questionnaire of adaptability and satisfaction.

(1) Participation

As an example, students must participate in the entire course from task design to implementation (Song, and Chen, 2018). In this study, only students' online participation was calculated, which mainly includes login times (Q1), times of entering courses (Q2), times of submitting course assignments (Q3), times of participating in course questionnaires (Q4) and online hours (Q5).

For ease of calculation, this study uses a five-point Likert scale to calculate each dimension of the evaluation model. Assume that participation Q=Q1+Q2+Q3+Q4+Q5, each of which counts for 1 point to simplify the calculation ; Assuming that the actual value of the above items is Qi (i=1,2,3,4,5), the theoretical value is Q'i, n is the number of parameters, and the total number of people is N, then the participation can be calculated as follows:

$$Q = \sum_{i=1}^{n} \frac{Q_i}{Q_i' \times N} (n = 5) \quad (1)$$

Qi/N is the actual average value of a parameter, and Qi/(N×Q' i) is the actual value/theoretical value, that is, the degree of completion of the theoretical value. If Qi/(Q' i×N)≥1, the value of this item is 1, and the theoretical goal is achieved ; If Qi/(Q' i×N)<1, the theoretical goal is not achieved. The value of n will also increase with the iteration of THEOL platform, and the formula (1) from this study can also be applied.

(2) Interaction

Due to the unavailability of data from real-time interactive classroom, but only network interaction, this study mainly include the number of reading teaching materials (J1), the number of class discussion topic (J2), group discussion area (J3), according to the number of palindrome course discussion is palindrome number (J4) and the number of reading course notice (J5).

$$J = \sum_{i=1}^{n} \frac{J_i}{J_i' \times N} (n = 5) \quad (2)$$

Ji/S is the actual average value of a parameter, and Ji/(N×D 'i) is the actual value/theoretical value, that is, the degree of completion of the theoretical value. If Ji/(J 'i ×N)≥1, then the value is 1, and the theoretical goal is achieved. If Ji/(J' i×N)<1, the theoretical goal is not achieved.

(3) Adaptability

Since students have different levels of knowledge and experience, the adaptability of blended learning will be different. The adaptability of blended learning mainly examines students' recognition of the new learning style (R1), task difficulty (R2), teamwork (R3), re-engagement (R4) and recommendation index (R5).

$$R = \sum_{i=1}^{n} \frac{R_i}{R_i' \times N} (n = 5) \quad (3)$$

Ri/N is the actual average value of a parameter, and Ri/ (N×R' i) is the actual value/theoretical value, that is, the degree of completion of the theoretical value. If Ri/(R 'i ×N)≥1, then the value is 1, which achieves the theoretical goal. If Ri/(R' i×N)<1, the theoretical goal is not achieved.

(4) Satisfaction

In distance training, student satisfaction is usually used to evaluate student response. Trainees' response to the training theme, online training course, online tutor, and online training organization make up the main aspects of online training.

(5) Effect

This study proposes that the effectiveness evaluation of students' learning effects of blended learning mainly includes two parts: ① the evaluation of students' experimental results is carried out by combining teachers' evaluation and students' mutual evaluation; ② The students' mastery of thematic skills was investigated by questionnaire. (Yin, and Qiao, 2017)

3.2 SVM Algorithm for Evaluating Teaching

A Quadratic programming will be used to solve the support vector machine (SVM) algorithm. (Zhang, Li , and Fu, et al. 2005) In the case of the existing samples, assuming that $\omega x + b = 0$ on the sample set defines two classes. Which training $sets(x_i, yi), x_i' \in R,\ y_i C - \{-1, +1\} i = 1, \cdots n$ then have a hyperplane can make two types of samples and its distance can reach the maximum, then the plane as the hyperplane, and hyperplane calculation formula is:

$$m \frac{1}{2} \|w\| + C_1 \sum_{i=1}^{n} \xi, (\xi \geq 0, i = 1, ,2, n) \quad (4)$$

$$f(x) = sgn\left(\sum_{i=1}^{n} \alpha_i^1 y_i k(x_i, y_i) + b \right) \quad (5)$$

To sum up, this study evaluated students' blended learning in online courses from five dimensions, including participation, interaction, effect, adaptability and satisfaction, and expected to improve the blended teaching design through the

evaluation results, so as to provide a basis for the next teaching practice. (Zhao, Shi, and Wang, 2006)

4 AI INTERPRETATION TEACHING QUALITY EVALUATION DATA ANALYSIS AND DISCUSSION

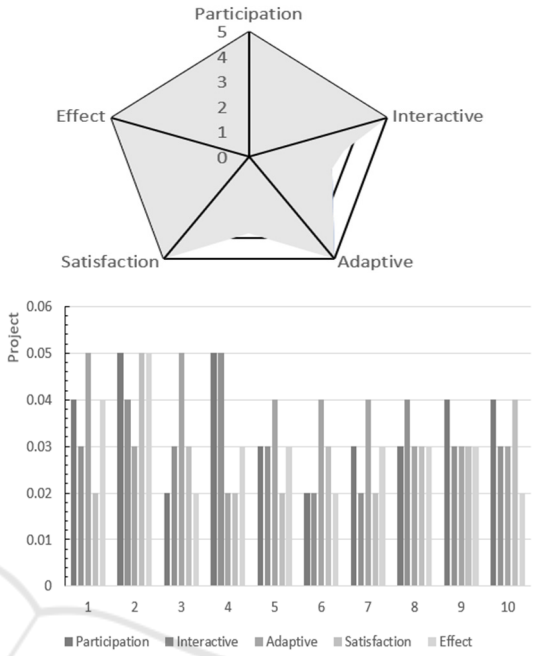
Students' participation, satisfaction, and effect degree of online courses are relatively high based on the results of the five-dimensional evaluation model (Table 4) ; One semester of study showed good adaptation to blended learning, but poor interaction with it. The results also show that hybrid learning has achieved obvious results. (Romdhani S, Torr P, Scholkopf B, et al. 2004). In particular, it has achieved remarkable results in enhancing students participation enthusiasm, strengthening operation consciousness and exercising knowledge and skills.

In the classroom, the simulated environment integrates various factors of context, text and situation in the interpretation through VR and AR. In traditional interpretation training, students only need to complete the basic task of language conversion. In the virtual classroom, students have to face all kinds of challenges in the virtual world, and accidents may happen at any time. Using the five-dimensional evaluation model, the interaction of students on the network platform is mediocre. As a result, not only is there no student interaction on the network platform, but the hybrid teaching practice also suffers from poor interaction design.

Table 3 Learning Evaluation Results

Project	Participation	Interaction	Adaptability	Average
A1	3	5	3	3.7
B2	4	4	3	3.7
C3	3	4	4	3.7
D4	4	4	3	3.7
E5	5	4	3	4.0
F6	4	4	4	4.0
G7	5	2	4	3.7
H8	4	3	5	4.0
I9	3	4	2	3.0
J1	4	3	4	3.7

Table 4 Learning Evaluation Results of the Evaluation Model



5 CONCLUSION

The immersive learning environment provides interpreters with visually, audibly and emotionally interactive experience through AI technologies. In other words, it is an environment where the physical, the social, the cultural, and the psychological situation are simulated. It enables learners to input and input language scientifically and efficiently with the support of the environment so as to realize the internalization of language ability. More importantly, in the environment, an interpreter's meta-cognitive level can be enhanced, which in turn promotes the role of their non-intellectual factors and enhances their learning effectiveness. On the other hand, the dynamic and open nature of the immersive embodied teaching environment makes the time and space of teaching more diversified and the relationship between teachers and students more equal.

This study expects to improve the five-dimensional evaluation model of mixed learning through teaching practice. Based on three aspects: learning attitude, learning process, and learning effect, this study constructs a five-dimensional evaluation model for blended learning. In this study, the blended learning model is

used as a framework to guide immersive interpretation teaching. Finally, through data collection and questionnaire survey, students were evaluated from five dimensions of participation, interactivity, adaptability, satisfaction and effectiveness, and the design of blended learning was constantly fed back and adjusted. In addition to improving the learning effect of students, the five-dimensional evaluation model verifies the effectiveness of the model and its positive incentive effect.

REFERENCES

Chen Guang-xi, Xu Jian, Cheng Yan. (2009). Cluster method of support vector machine to solve large-scale data set classification. J. Computer Science.3, 184-188.

Luo Xiao, Li Shan. (2014). Construction of research-based Teaching evaluation System for Statistics Major Curriculum. J. Curriculum Education Research. 7, 240-241.

Ministry of Education. (2018). Education Informatization 2.0 Action Plan. [online] available at <http://www.moe.gov.cn/srcsite/A16/s3342/201804/t20180425_334188.html>[Accessed 18 April 2018].

Ministry of Education. (2020). Teaching Guide for Undergraduate Foreign Language and Literature Majors in Ordinary Colleges and Universities (I) - Teaching Guide for English Majors. N. Foreign Language Teaching and Research Press.

Romdhani S, Torr P, Scholkopf B, et al. (2004). Efficient face detection by a cascaded support-vector machine expansion. J. Pattern Recognition. 62-70.

Song Cheng, Chen Xiao. (2018). Empirical Research on the Learning Effect of online Open Courses for Higher Vocational Students. J. Shaanxi Education (Higher Education).11, 5-56+69.

Yin Yang, Qiao Ailing. (2017). Analysis and Design of Flipped Classroom Learning Evaluation based on MOOC platform. J. Information Technology Education in primary and secondary schools. 5, 38-42.

Zhang Min, Li Wuping, Fu Jufang, et al. (2005). Application of clinical nursing teaching quality evaluation database in clinical practice management. J. Nursing Research.19, 1773-1774.

Zhao Xiu-feng, Shi Ke-Xue, Wang Chuan-long. (2006). Design and Implementation of College Teaching Quality Evaluation System Based on ASP and Web Database. J. Educational Information Technology. 13, 54-55.