

Exploration and Practice of Mixed Teaching Mode in the Era of Big Data

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Keywords: Big Data, Blended Teaching, Teaching Mode, Teaching Mode Exploration

Abstract: With the rapid development of technology and the advent of the era of big data (BD), BD technology has gradually integrated into the education field. Education has gradually got rid of the shackles of the traditional teaching model, and the mixed teaching model is constantly reforming and developing. Big data also gets rid of the limitation that traditional teaching only pays attention to the teaching object and ignores the improvement of teachers' skills, and promotes the development of a more complete hybrid teaching model. In particular, the idea of BD has brought new opportunities to change the hybrid teaching model, and has provided great help for the hybrid teaching model. This article is based on the exploration and practice of the hybrid teaching model in the era of BD. Through the preliminary review of the rich data and the hybrid teaching model related to theory and practice, the current situation of the hybrid teaching model in the era of BD is analyzed and investigated, and relevant content is written. Based on the practical foundation of the hybrid teaching model and the characteristics of the teaching model, this article explores the hybrid teaching model suitable for the current era of BD. The main content of this article includes exploring the role of BD teaching analysis under the hybrid teaching model, teaching model reconstruction, and promoting the professional development of teacher teaching and BD technology. By analyzing the application status of BD in the hybrid teaching model, put forward the practical suggestions for the hybrid teaching mode in the era of BD. Research data shows that in the era of BD, 42% of male teachers use a hybrid teaching model, including online teaching models, for each lesson, 56% of female teachers, and 4% of male teachers 1-3 times a month on average. Teachers are not clear about the concept of hybrid teaching mode, and BD technology is unfamiliar. It is necessary to clarify the concept of teacher pair and hybrid teaching mode to improve the professionalization of the application of BD technology in hybrid teaching.

1. Introduction

Since the 21st century, with the continuous development of BD technology, education has long

transitioned from the traditional teaching model to a more advanced hybrid teaching model [1-2]. As a means of extracting valuable knowledge and providing decision support, BD technology has been widely used in all walks of life. The traditional teaching model has become a thing of the past, and the integration of BD technology and the classroom has brought about a major change in the teaching model [3-4]. The advancement of science and technology and the application of BD have brought opportunities for the transformation of traditional teaching models. The rapid development of computer education provides opportunities for in-depth study of mixed teaching models. At the same time, the application of BD technology in mixed teaching has become a hot topic in the development of education [5-6]. The use of BD technology in teaching allows teachers to use technical tools to collect, measure, process and analyze teachers' teaching data to improve and enhance teachers' teaching skills in the classroom. The integration of (BD) technology and teaching has become a kind of Growth trend [7].

In the research on the exploration and practice of mixed teaching mode in the era of BD, many scholars have conducted research on this and achieved good results. For example, Hong recommends combining courses and mixed balance points, starting with objective learning, and establishing a pre-class learning process. Chen proposed three mixed teaching methods, namely skill guidance, behavior guidance and ability-based mode.

This article explains the role of BD in the mixed teaching mode, conducts a questionnaire survey for teachers, analyzes the actual application of BD in the mixed teaching mode through research feedback, and analyzes the current mixed teaching mode based on the mixed teaching mode. According to the research results, the combined teaching function has been improved in a targeted manner, which provides a theoretical basis for solving the problems encountered in mixed exercises .

2. Exploration and Practice of Mixed Teaching Mode in BD

2.1. Effect of Big Data on the Hybrid Teaching Model

(1)Teaching analysis

The use of BD enables teachers to improve teaching behavior, discover and solve the difficulties teachers face in teaching, thereby improving teaching effects. Teaching analysis can analyze and model a large amount of teaching data. By collecting the data of students and teachers' teaching information and conducting teaching analysis during the teaching process, teachers can formulate more sensible teaching plans, improve teaching quality, and improve teachers' educational goals. At the same time, based on the knowledge and understanding of the BD of teacher's teaching behavior, the establishment of an education system has been realized, the purpose of helping teachers in teaching has been achieved, and a mixed teaching method has been implemented in teaching. In this process, it has effectively promoted the teaching effect of the mixed teaching mode.

(2) Teaching model reconstruction

In the era of BD, the differentiation of education is becoming more and more obvious. The teaching mode has changed from traditional teaching to differentiated teaching. Under this new education mode, the communication and interaction between teachers, students and educational media is more important. Relying on BD to establish a teaching system can help teachers teach more effectively and quickly, and improve students' initiative in learning.

(3) Teaching knowledge presentation

Using BD, teachers can see more vivid teaching effects, breaking the traditional teaching method of looking at teaching effects based on grades and neglecting the improvement of teachers' skills. In

the hybrid teaching mode, teachers can teach based on video resources on the Internet. The presentation of such teaching knowledge can help teachers activate the classroom atmosphere and construct the knowledge structure more systematically.

(4) Promote the professional development of teacher teaching and BD technology

Starting with BD technology, BD + hybrid teaching can bring a series of teaching experiences such as diversified teaching methods and rich teaching resources to teachers' teaching, so that BD can truly be integrated into the teaching process of frontline teachers.

2.2. Practical Suggestions for Hybrid Teaching Mode in the Big Data Era

(1) Teaching knowledge presentation

Teachers should try to collect more accurate information about the changes in the teaching process, so that they can control more effectively when faced with various situations in the teaching process, and mediate again or make a new decision.

(2) Teaching gives full play to the advantages of BD teaching

Proceed from reality, give full play to the advantages of BD, research from the direction of blended teaching, and dig out the relevance and rules of the current blended teaching phenomenon. Integrate existing teaching resources and realize that not all teaching materials are suitable for blended teaching. Teachers should make reasonable use according to the characteristics of the subject and the actual cognitive situation of learners. At the teacher level, fully stimulate the potential of teachers, improve the influence and effectiveness of teachers, and alleviate the status quo of uneven teachers.

(3) Improve teachers' information literacy

Actively change the awareness of community teaching, create a team of outstanding BD mixed teaching experts, strengthen teacher training, and initially create a mixed teaching community. Second, set a unified community teaching goal, that is, a smooth transition from blended teaching and the use of teachers' collective wisdom. In the use of specific organization and management methods in the community, special attention should be paid to teachers' attitudes towards mixed teaching in the era of BD, and attention to changes in attitudes after the implementation of mixed teaching.

2.3. Research on Incremental Learning Algorithm for Big Data

MRMRX is a feature selection algorithm with minimum redundancy and maximum correlation. The evaluation function of MRMR feature selection algorithm is

$$J(f) = I(C:f) - \frac{1}{|S|} \sum_{s \in S} I(s; f) \quad (1)$$

The redundancy between the algorithm f and the feature subset S is determined by the degree of correlation between the candidate feature f and the single selected feature S , and the redundancy between f and S is calculated based on the average value,

$$\beta = \frac{1}{|S|} \quad (2)$$

It is also possible to improve the subtraction step in the evaluation function into a division operation, which is a variant of MRMR,

$$J(f) = I(C:f) / \frac{1}{|S|} \sum_{s \in S} I(s; f) \quad (3)$$

3. Exploration and Practical Research of Blended Teaching Mode in Big Data Era

3.1. Research Methods

(1) Literature research

Collect a large number of relevant research papers through local library resources, China Journal Network, Wanfang Database, Google, etc., including keyword search documents such as BD training, mixed learning, BD + mixed learning. The theoretical literature analyzes the research status of the hybrid teaching model in the BD environment at home and abroad, and refers to the relevant research case resources, and selects the literature with certain reference value, which provides a solid theoretical foundation for the research.

(2) Expert interview

In order to understand the actual needs of teachers and discover teachers' problems through the application of the hybrid teaching model in the BD environment, interviews were conducted with school teachers who used the hybrid teaching model to further understand the teacher's satisfaction in using this teaching. Through in-depth analysis of the results of teacher interviews, the advantages and disadvantages of the hybrid teaching model in the era of BD are summarized, which can be improved.

(3) Practice research method

In this work, a related teaching case of a hybrid teaching model is designed in a large-scale data environment, and the teaching case is applied to a specific classroom practice, setting and applying the hybrid teaching process, observing the effect of classroom teaching practice and then The composition of the model is analyzed, and the result of the application is obtained. The result is realized according to the actual situation. In the process of implementation, problems were discovered, resolved, and the blended teaching model was improved.

(4) Questionnaire survey method

Make a questionnaire, use the questionnaire star on the Internet to automatically create the questionnaire URL link and some paper questionnaires, select school teachers and students and other survey items, send, fill in and return the questionnaires for detailed analysis.

3.2. Collection of Experimental Data

In this study, questionnaires were distributed to teachers and students in schools that practice blended teaching. 100 questionnaires were distributed to male and female teachers, a total of 200 questionnaires, and 196 questionnaires were returned, including 185 valid questionnaires. Through the use of Excel and Word for statistics, input and analysis of the data and text content obtained.

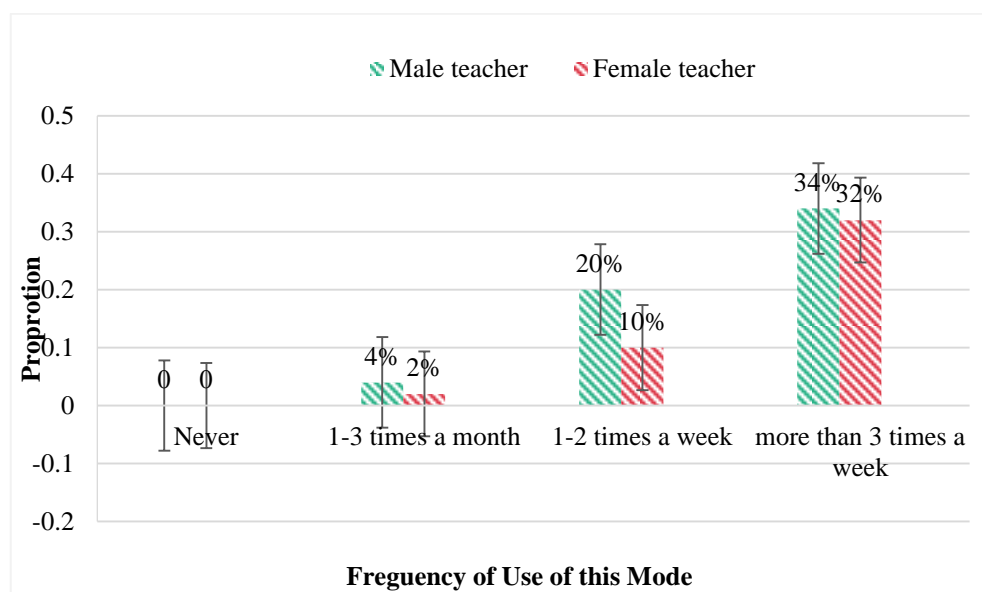
4. Investigation and analysis of hybrid teaching mode in the era of BD

4.1. Application Situation and Effect of Mixed Teaching Mode

This study investigated the frequency of use of male and female teachers in online teaching mode in the era of BD (such as micro-classes). The higher the frequency of use, the better the integration of teachers and technology. The results of the survey are shown in Table 1. In each lesson, 42% are male teachers and 56% are female teachers. On average, male teachers 1-3 times a month account for 4% and female teachers 2%.

Table 1. Frequency of use of this mode

Frequency of use of this mode	Male teacher	Female teacher
Never	0	0
1-3 times a month	4%	2%
1-2 times a week	20%	10%
More Than 3 times a week	34%	32%
Use in every lesson	42%	56%

*Figure 1. Frequency of use of this mode*

It can be seen intuitively from Figure 1 that no teacher has never used this mode. According to later interviews, it is learned that the most restrictive factor affecting the overall promotion of blended teaching is that the ideas of teachers and students have not been changed as they should, have not reached the basic consensus, and the concept of blended teaching is not clear enough.

4.2. Application Validity and Acceptance of Teaching Model

The understanding of the application validity and acceptance of the teaching model is helpful for teaching. It is very necessary to investigate whether teachers are willing to recognize and accept the continued use of the hybrid teaching model including the online teaching model. The results are shown in Table 2:

Table 2. Are you willing to accept and accept to continue the model

Approve and Accept Continued Use	Male teacher	Female teacher
Unwilling	10%	20%
It doesn't matter	20%	40%
Willing	34%	27%
Very willing to	36%	23%

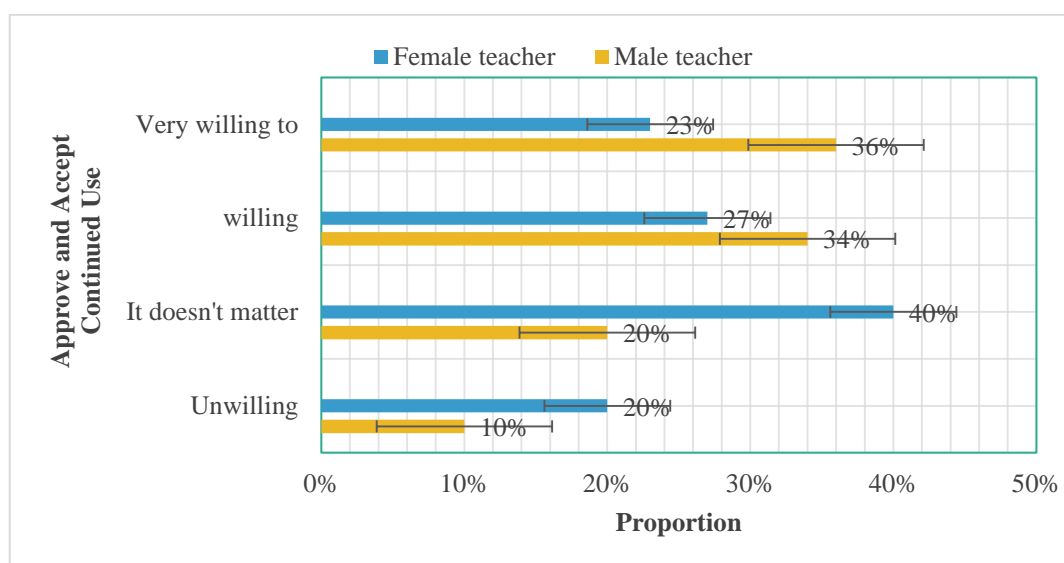


Figure 2. Are you willing to accept and accept to continue the model

It can be seen from Figure 2 that 10% of male teachers and 30% of female teachers are still unwilling to continue to use the hybrid teaching mode including online teaching mode. According to the later investigation, it can be seen that a small number of teachers have encountered obstacles in the process of using it. The burden is heavier; 20% of male teachers and 40% of female teachers do not care whether they are willing to approve and accept the mixed teaching model; a total of 61% of teachers are willing to approve and accept the continued use of this model, and 59% of teachers are very willing I am very satisfied with the classroom effect brought by this mode.

5. Conclusion

Based on the perspective of the hybrid teaching model in the era of BD, this article systematically integrates the structural elements of the teaching process at the level of the teaching model, and considers the teaching of teachers, students' learning, and technology applications as a whole, and aims to deeply explore the era of BD. The role of teaching analysis, reconstruction of teaching mode, presentation of teaching knowledge and promotion of the professional development of teacher teaching and BD technology brought by new technologies, and put forward practical suggestions for mixed teaching mode in the era of BD, which is mixed teaching The implementation of practice provides theoretical guidance and systematic solutions.

With the progress of society and the development of science and technology, the application of BD in the field of education has become more and more common. Improving the mixed teaching model is a new form and new requirement for the reform and development of information technology, information technology and education in our modern society. The advent of the era of BD has driven the development of the whole society, and education has also been profoundly affected. The penetration of advanced BD technology into a hybrid teaching model is the key to education. The integration of hybrid teaching mode and BD is the trend of future development, which will inevitably have a huge impact on the profound changes in the education field.

By drawing on the latest research results and practical application experience of BD and blended learning at home and abroad, this research explores the application status of blended teaching mode in the BD environment, and puts forward feasible suggestions based on the shortcomings for other

teachers or universities. This research has also played a certain role in promoting the development of education informatization. It has also provided a theoretical basis for other schools to promote hybrid teaching models including online teaching models. The influence and direction of development have certain reference value.

Funding

This work was financially supported by Nanchang Institute of Technology Teaching Reform Project: An Empirical Study of Blended Interpretation Teaching Mode under the Background of "Internet Plus"(No.2020JG043)& The Application of Three Dimensional Teaching Mode in the Teaching of English Viewing, Listening and Speaking in the Information Era(No. 2017JG037).

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

- [1]Li, Zhihui. *The Reform and Innovation of Chemistry Classroom Teaching Mode in the Era of Big Data. International Conference on Measuring Technology & Mechatronics Automation. IEEE*, 2017:417-421. <https://doi.org/10.1109/ICMTMA.2017.0107>
- [2]Carmen Gago-Cortés, Maria Alló Longarela-Ares N, et al. *Innovation in the Teaching-Learning Process through a MOOC: Sustainability in the Era of Big Data. Enrique de la Torre Fernández*, 2020:págs. 107-120. <https://doi.org/10.17979/spudc.9788497497756.107>
- [3]Joly M, Rocha R, Sousa L C F, et al. *The strategic importance of teaching Operations Research for Achieving High Performance in the Petroleum Refining Business. Education for Chemical Engineers*, 2015, 10:1-19. <https://doi.org/10.1016/j.ece.2014.11.001>
- [4]Yun L , Ying W , Yanli L , et al. *Practical Experience of Mixed Teaching Mode Based on SPOC in Physiology Experiment Course for International Students. Education Study*, 2020, 2(4):304-312. <https://doi.org/10.35534/es.0204030>
- [5]Haifeng C , Peisong T , Guoxiang P , et al. *Knowledge Represent and Reconstruction by "Fundamentals of Materials Science" Classroom Teaching Mode Reform. Procedia Engineering*, 2011, 15:4305-4309. <https://doi.org/10.1016/j.proeng.2011.08.808>
- [6]Hong S Y, Diamond K E. *Two Approaches to Teaching Young Children Science Concepts, Vocabulary, and Scientific Problem-Solving Skills. Early Childhood Research Quarterly*, 2012, 27(2):295-305. <https://doi.org/10.1016/j.ecresq.2011.09.006>
- [7]Chen L , Wei X , Yanting D U . *Exploration and Practice of the "Trinity" Mixed Teaching Mode of Organic Synthetic Chemistry. University Chemistry*, 2019, 34(7):52-59. <https://doi.org/10.3866/PKU.DXHX201902012>