

# Practical Training Mode for Improving Teachers' Data Literacy Ability

Yuqing Sun<sup>1</sup>, Liya Wang<sup>2</sup>, Chunying Zhang<sup>2</sup>, Fengchun Liu<sup>3,\*</sup>, Aimin Yang<sup>2</sup>

<sup>1</sup>School of Economics, North China University of Science and Technology, Tangshan, Hebei, China

<sup>2</sup>College of Science, North China University of Science and Technology, Tangshan, Hebei, China

<sup>3</sup>Qianan College, North China University of Science and Technology, Tangshan, Hebei, China

\*Corresponding Author.

**Abstract:** Based on the analysis of the research status of university teachers' data literacy at home and abroad, combined with the survey results of university teachers' data literacy ability in China, this paper uses data classification and other methods to mine the core elements of university teachers' data literacy ability; Further use the scoring method to build a multi-level dynamic evaluation system of teachers' data literacy ability; For different levels of data literacy capabilities, we will build a multi-level promotion strategy plan to form a complete set of dynamic strategies for improving college teachers' data literacy capabilities, and promote and apply them.

**Keywords:** Teachers' data literacy, Dynamic evaluation system, Promotion strategy.

## 1. Introduction

With the arrival of the era of big data, traditional education and online education are seamlessly connected, and education big data analysis and decision-making will become an important force to promote education reform, innovation and development. As the key subject of education reform and innovation, teachers should not only have solid professional knowledge and strong information education ability, but also have the skills of data collection, sorting, analysis and processing in the education process, and the ability to effectively use data and promote teaching decision-making. That is to say, in the era of big data, data literacy has become a necessary skill literacy for college teachers, which puts forward updated requirements for teachers' professional development ability. However, although domestic universities and teachers have a lot of data, for a long time, schools have mainly provided data for the education administrative departments, playing the role of "data provider" rather than "data user". Teachers lack ideas and methods to effectively use and explain information to help decision-making. In terms of the development of teachers' data literacy ability, a complete idea has not been formed. At present, it is in the initial stage of theoretical discussion, lacking a practical ability framework, evaluation system, promotion scheme, application practice mode, etc.

Based on the above analysis, under the background of big data, college teachers need to rapidly improve their data literacy ability, use data to improve teaching content and teaching methods, open personalized education for students, improve teachers' teaching level and improve teaching effects.

## 2. Elements of Teachers' Data Literacy

Using big data method to analyze the content of domestic and foreign literature, teachers' data literacy is divided into four dimensions: data knowledge, data awareness, data ability, and data ethics,[1] as shown in Figure 1:

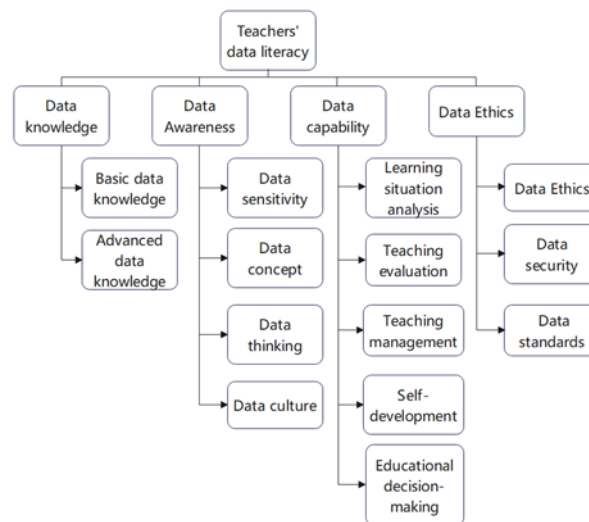


Figure 1. Elements of data literacy

### (1) Data knowledge

Data knowledge includes basic data knowledge and advanced data knowledge. Its content mainly involves data acquisition knowledge, data mining knowledge, data statistics and analysis knowledge, data management knowledge, data methods and data evaluation knowledge.

### (2) Data Awareness

Data awareness includes data sensitivity, data concept, data thinking and data culture. Among them, data sensitivity refers to the speed and sensitivity of the brain to data.[2] The concept of data refers to the recognition that data can promote education and teaching, and can recognize the importance of data in promoting teachers' personal development. Data thinking refers to the thinking logic that uses data principles, methods and technologies to solve practical education problems. Data culture refers to teachers' recognition of the value of data, including teachers' values and ideas on educational data.

### (3) Data capability

Data ability includes the ability to analyze learning situation based on data, the ability to evaluate teaching based on data, the ability to manage teaching based on data, the ability to self-development based on data, and the ability to make educational decisions based on data.

#### (4) Data Ethics

Data ethics includes data ethics, data security and data standards. Its content mainly involves respecting others' digital labor achievements, protecting others' intellectual property rights, protecting teachers' and students' privacy, and actively maintaining data security.

### 3. Constructing a Multi level and Multi level Evaluation System for University Teachers' Data Literacy Ability

This model uses the scoring method to achieve the purpose of evaluating teachers' data literacy ability through scoring. The full score of the four level indicators is 100 respectively, and the full score of each feature within the indicators is also 100. Because teachers at different levels have different requirements, in order to achieve the purpose of multi-level and multi-level dynamic evaluation, the model sets up weights between different four level indicators, and realizes dynamic evaluation through weight changes. The specific explanation of the model is given below.

If the total scores of the first, second, third and fourth level indicators are respectively  $s_1$ ,  $s_2$ ,  $s_3$  and  $s_4$ , and the weights are respectively  $w_1$ ,  $w_2$ ,  $w_3$  and  $w_4$ , the final total score  $S=s_1w_1+s_2w_2+s_3w_3+s_4w_4$ . Among them,  $s_1$  is composed of two parts with weights of 0.5 and 0.5 respectively,  $s_2$  is composed of four parts with weights of 0.2, 0.3, 0.3 and 0.2 respectively,  $s_3$  is composed of five parts with weights of 0.2, and  $s_4$  is composed of three parts with weights of 0.3, 0.3 and 0.4 respectively.

### 4. Build A Multi-level Plan for Improving The Data Literacy Ability of College Teachers

(1) Establishing a Hierarchical Digital Literacy Framework for College Teachers

Online and offline hybrid learning mode will become the main direction of future education development.[3] The mixed learning mode puts forward higher requirements for teachers' data literacy level. The introduction of a hierarchical data literacy framework will provide a standard measurement standard for evaluating teachers' data literacy level and help to clarify the development direction of teachers' data literacy.

(2) Exploring a New Approach to the Integration of Data Literacy and College Disciplines

Relevant domestic researches focus on data literacy and discipline integration, but rarely start with specific discipline characteristics and methods. Therefore, it is urgent to explore how to determine appropriate data technology for discipline knowledge integration according to the nature of discipline courses to improve the data literacy of college teachers in China.

(3) Increase the training of college teachers' data skills and improve their data based teaching ability

In the future, university teachers' data skills training should make full use of the advantages of data technology, constantly explore the teacher teaching and research model of "online+offline", build a community model for teacher data literacy training, promote universities to create high-quality data teaching resource library, excellent data teaching and learning case library, high-quality teacher training resource library, etc., so as to realize the interconnection, co construction and sharing of teacher training, and comprehensively improve university teachers' data teaching ability.

## 5. Conclusion

We start from the analysis of the current situation of data literacy research at home and abroad, carry out the survey and research on the data literacy of domestic college teachers, propose the core elements of data literacy by using big data analysis methods, build the evaluation system of data literacy ability by using the scoring method, and then propose multi-level strategies for data literacy training of college teachers. Through the use of our teaching practice, we form a dynamic adjustment training program, constantly improve it and then promote it to other colleges and universities, It provides a practical training mode for the improvement of data literacy of college teachers in China.

## Acknowledgment

Project funding information: Hebei Education and Teaching Reform Project(2017GJJG110).

## References

- [1] Liu Geping, Chen Ying, Qin Yuchao Training mode and strategy of teachers' data literacy [J] Journal of Teacher Education, 2021,8 (3): 21-30. DOI: 10.13718/j.cnki.jsjy.2021.03.003
- [2] Ma Yuanyuan, Sun Quan Dang The connotation definition and training mode construction of teachers' data literacy for smart education [J] Henan Education (University Edition), 2021 (11): 26-28.
- [3] Li Yuting, Wang Haifu Research on strategies for improving digital literacy of college teachers in the digital era [J] Digital Education, 2022,8 (1): 48-53. DOI: 10.3969/j.issn.2096-0069.2022.01.008