Exploring the Current Situation and Improvement Path of College Counsellors' Big Data Literacy

--Taking Jiangsu University of Science and Technology as an example

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Abstract. Enhancing counselors' big data literacy is an effective way for colleges and universities to cope with the new requirements of ideological and political education in the era of big data, and to promote careful education, fine management and precise service in ideological and political work. The article constructs a "three-level, six-dimensional" model of counselors' big data literacy ability, and through a questionnaire survey, it is found that there are still deficiencies in the awareness of college counselors in dealing with problems based on big data, the degree of mastery of the skills of big data refinement and analysis, and the ability to apply the results of big data analysis to work practice. It is recommended to improve the big data literacy of college counselors by establishing data thinking and building a new environment for counselors to apply big data; strengthening the supply of resources and building a new platform for counselors to apply big data; organizing professional training and innovating a new mode of cultivating big data for counselors; and strengthening the construction of systems and improving a new mechanism for assessing big data for counselors.

Keywords: colleges and universities; counselors; big data literacy

1 Introduction

With the in-depth implementation of the national big data strategy and the wide application of digital technology in college student affairs, big data ideological and political education has become the development trend of college student management. General Secretary Xi Jinping pointed out at the National Conference on Ideological and Political Work in Colleges and Universities that "to do a good job of ideological and political work in colleges and universities, we should utilize new media and new technologies to make the work come to life, promote the high degree of integration between the traditional advantages of ideological and political work and information technology, and enhance the sense of the times and attractiveness" [1]. Faced with the new requirements of the ideological and political education work in colleges and universities in the new era, how to improve their own big data literacy and promote the ideological and

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versities in the new era, how to improve their own big data literacy and promote the ideological and political work of colleges and universities to carefully educate, finely manage and accurately serve is the problem that college counsellors must face and solve.

2 The Basic Connotation of Big Data Literacy for College Counsellors

2.1 Big data literacy

At present, research on ‘big data literacy’ is still in its infancy in the aca-demic world, and in the relevant research results, it focuses more on ‘data literacy’. Literally, ‘big data’ is ‘big’ data, not much different from traditional data, but with a larger scale, more sources, faster rate of change, lower value density and higher commercial value.

The concept of 'data literacy' first appeared in the paper 'Information Literacy, Statistical Literacy, and Data Literacy', which argues that data literacy refers to the ability to master different metrics and to grasp multiple types of data in scientific research and draw correct inferences from them [2]. In 2012, the American Library Association (ALA) defined 'data literacy' as the ability to retrieve, under-stand, evaluate, create, and communicate digital information using information and communication technologies [3]. Although the concept of 'data literacy' is constantly evolving, its basic connotation still revolves around understanding data, accessing data, using data, evaluating data, etc., and its content broadly includes data awareness, data ethics, data literacy, data analysis, data application, and so on.

Big data literacy is the inheritance and development of traditional data literacy based on the development of Internet science and technology [4]. According to domestic scholar Liu Hongda, big data literacy refers to the scientific cognition and ability to utilize big data, including setting up big data thinking, mastering big data knowledge, applying big data technology, expanding big data application, and regulating big data ethics [5]. In terms of content, there is not much difference with data literacy, which roughly also includes big data awareness, big data knowledge, big data acquisition, big data analysis, big data application, and big data ethics. Big data literacy can be said to be a further upgrade of data literacy, but big data literacy is more prominent in data and information awareness, and more emphasis on in-depth digging and analysis, in order to get through the isolated and static data, and then reach a new value.

2.2 Big Data Literacy for Counsellors

Big data literacy for counsellors is a comprehensive literacy with multiple attributes [6]. Based on the findings of previous research, combined with the con-notation of big data literacy, this study defines big data literacy for counsellors as the awareness and ability to acquire, analyse and apply big data for the purpose of improving the quality and efficiency of student management in colleges and universities, in accordance with

the premise of data ethics and within the scope of relevant laws and regulations. Specifically, it includes big data awareness, big data ethics, big data knowledge, big data acquisition, big data analysis and big data application. Meanwhile, integrating the discussions of other researchers on the data literacy index system, this study constructs a 'three-level, six-dimensional' model of college counsellors' big data literacy competence. The 'three levels' include the ideology level, knowledge level and skill level, where the ideology level includes the dimensions of big data awareness and big data ethics, the knowledge level includes the dimension of big data knowledge, and the skill level includes the dimensions of big data acquisition, big data analysis and big data application (see the table 1 below).

Table 1. Big Data Literacy Competency Model for Counsellors

Level	Dimension	Content
ideological level	Big Data Awareness	Perceptiveness and attention to elements of big data resources, technologies, platforms and applications
	Big Data Ethics	Awareness of compliance with relevant laws, industry statutes, public order and morals in the context of big data activities
knowledge level	Big Data Knowledge	Mastery of the body of knowledge of big data science, principles, methods and laws
skill level	Big Data Access	Degree of mastery of big data acquisition channels, acquisition methods and acquisition techniques
	Big data analytics	Degree of mastery of analytical methods, analytical tools and analytical skills for big data
	Big Data Application	Degree of mastery of big data application methods, application techniques and application strategies

3 Analysis of the Current Situation of Big Data Literacy of College Counsellors

3.1 General overview of the survey

3.1.1 Methodology of the survey.

In order to effectively measure the actual level of college counsellors' big data literacy, the author conducted a pre-survey among the counsellors of Jiangsu University of Science and Technology based on comprehensive domestic and international research on big data literacy, and finally determined the content of the questionnaire. The questionnaire is divided into three parts, the first part of the demographic information, the second part of the survey of university counsellors' big data literacy, including big data awareness, big data ethics, big data knowledge, big data access, big data analysis and big data applications, and other six dimensions, each aspect of the content of five questions, according to the choice of 'very inconsistent' to 'very inconsistent', using the Likert 5-level scoring method. The higher the score, the higher the

corresponding ability level, and the corresponding ability is calculated by taking the average value of 5 questions. The third part is a survey on the willingness of university counsellors to improve big data literacy, mainly to understand the willingness, influencing factors and ways to improve the big data literacy of university counsellors. willingness, influencing factors and ways to improve.

3.1.2 Subject of the survey.

The survey took Jiangsu University of Science and Technology as a sample and used Questionnaire Star to carry out the questionnaire survey, and a total of 120 valid questionnaires were returned. The respondents were classified according to age, education, title, professional background, working experience, etc., in which 74 male counsellors and 46 female counsellors participated in the survey, and other demographic information is shown in Table 2. The questionnaire was used to analyse the data using SPSS 21.0, and the Cronbach. α coefficient of the questionnaire was tested to be 0.917. The Cronbach. α coefficients of the six dimensions were 0.823, 0.909, 0.905, 0.899, 0.934, 0.918 respectively, which were all greater than 0.6, indicating that the questionnaire as a whole and the dimensions had a more satisfactory reliability, and the results of the survey basically reflected the general situation of college counsellors' big data literacy.

Table 2. Demographics of survey respondents

gender-based	age		educational background		professional background		professional title			working experience		
	Under 40 years old	Above 40 years old	undergraduate	postgraduate	science and technology	liberal arts	teaching assistant	tutors	Associate Professor	Under 5 years	5-10 years	Over 10 years
male	56	18	2	72	46	28	24	48	2	34	20	20
female	34	12	0	46	14	32	18	26	2	22	6	18
total	90	30	2	118	60	60	42	74	4	56	26	38

3.2 Statistics and analyses of survey results

Through the survey, it was found that the overall level of counsellors' big data literacy showed a positive and positive development, but there are still some problems and deficiencies.

3.2.1 The level of big data awareness among counselors.

In the dimension of tutors' awareness of big data, the questionnaire mainly investigated five elements, such as "believe that data is becoming more important in tutors' work" (see Table 3). The results of the survey showed that the average score of this dimension was 4.28, of which element B1.1 scored the highest with 4.6, and 93.33% of tutors acknowledged the importance of data in tutors' work. The importance of data in the work of counsellors; elements B1.3, B1.4 and B1.5 scored lower than the average score of 4.25, 4.13 and 4.15 respectively, indicating that although more and more counsellors have begun to be aware of the importance and superiority of big data, the

awareness of collecting data and dealing with problems based on data in their work with students needs to be strengthened.

Table 3. Results of the Big Data Awareness Survey

Title\Option	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	average score
B1.1 Considers data to be increasingly important in the workplace	0(0%)	0(0%)	8(6.67%)	32(26.67%)	80(66.67%)	4.6
B1.2 Knowing that data has a life cycle	0(0%)	6(5%)	16(13.33%)	36(30%)	62(51.67%)	4.28
B1.3 Good at capturing the data you need at work	0(0%)	2(1.67%)	22(18.33%)	40(33.33%)	56(46.67%)	4.25
B1.4 Focus on analysing problems in the workplace on the basis of relevant data	0(0%)	2(1.67%)	20(16.67%)	58(48.33%)	40(33.33%)	4.13
B1.5 Focus on using the results of data analyses rather than making decisions based on intuition	0(0%)	2(1.67%)	22(18.33%)	52(43.33%)	44(36.67%)	4.15
Subtotal	0(0%)	12(2%)	88(14.67%)	218(36.33%)	282(47%)	4.28

3.2.2 The state of big data ethics for counselors.

In the dimension of tutors' big data ethics, the questionnaire mainly investigated five elements, including “recognizing data security issues and the risk of data leakage” (see Table 4), and the survey results showed that the average score of this dimension was the highest among the six dimensions, with a score of 4.48, which indicated that the tutors' ethical status of big data was at a higher level, with B2.3 and B2.5 elements scoring 4.57 and 4.6 respectively. B2.3 and B2.5 elements scored 4.57 and 4.6 points respectively, indicating that counselors are increasingly concerned about complying with relevant laws and regulations, ensuring the compliance and legality of the data as well as the protection of students' personal privacy in the process of utilizing big data.

Table 4. Results of the Big Data Ethics Survey

Title\Option	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	average score
B2.1 Recognize data security issues and the risk of data breaches	0(0%)	0(0%)	12(10%)	42(35%)	66(55%)	4.45
B2.2 Understanding the intellectual property, privacy and other issues involved with data	0(0%)	0(0%)	14(11.67%)	48(40%)	58(48.33%)	4.37
B2.3 Comply with relevant laws and regulations and obtain target data legally	0(0%)	0(0%)	8(6.67%)	36(30%)	76(63.33%)	4.57
B2.4 Respect other people's data	0(0%)	0(0%)	18(15%)	34(28.33%)	68(56.67%)	4.42

B2.5 Do not disclose the data privacy of others without permission	0(0%)	0(0%)	8(6.67%)	32(26.67%)	80(66.67%)	4.6
Subtotal	0(0%)	0(0%)	60(10%)	192(32%)	348(58%)	4.48

3.2.3 The State of Big Data Knowledge for Counselors.

In the dimension of tutors' knowledge of big data, the questionnaire is mainly from "familiar with the connotation of data, sources, attributes, types and other basic knowledge of data" and other five elements of the survey (see Table 5), the results of the survey show that the average score of this dimension is 3.82 points, relative to the score of the other dimensions, is at a relatively low level, which indicates that tutors are not optimistic about the degree of mastery of big data knowledge, of which B3.3 and B3.4 elements scored 3.68 and 3.37 points respectively. The degree of mastery of big data knowledge is not optimistic, of which the scores of B3.3 and B3.4 elements are 3.68 and 3.37 respectively. Among the survey respondents, 41.67% of the counselors are "unable to familiarize themselves with the basic principles and methods of big data skills", and 45% of them "do not understand or do not understand very well the analysis of different types of data". do not understand the analysis methods and contexts of different types of data", indicating that although counselors are willing to use big data to solve problems in student work, they are still far from mastering the skills of big data.

Table 5. Results of the Big Data Knowledge Survey

Title\Option	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	average score
B3.1 Familiarity with data basics	0(0%)	4(3.33%)	28(23.33%)	54(45%)	34(28.33%)	3.98
B3.2 Understand big data policies, dynamics, and trends	2(1.67%)	4(3.33%)	32(26.67%)	54(45%)	28(23.33%)	3.85
B3.3 Familiar with the basic principles of big data skills	2(1.67%)	10(8.33%)	38(31.67%)	44(36.67%)	26(21.67%)	3.68
B3.4 Understanding big data analytics and contexts of use	0(0%)	8(6.67%)	46(38.33%)	36(30%)	30(25%)	3.73
B3.5 Familiarity with the use of big data processing tools	0(0%)	6(5%)	36(30%)	48(40%)	30(25%)	3.85
Subtotal	4(0.67%)	32(5.33%)	180(30%)	236(39.33%)	148(24.67%)	3.82

3.2.4 The State of Big Data Access Capabilities for Counselors.

In the dimension of counselors' big data acquisition ability, the questionnaire mainly investigates five elements, including "being able to skillfully acquire the required data on various digital platforms provided by the school and social platforms com-

monly used by students" (see Table 6), and the results of the survey show that the average score of this dimension is 4, which is in the middle to upper level, of which B4.1, B4.3 elements scored 4.08 points. Among the survey respondents, 78.33% of the counselors were "able to obtain the required data through various types of platforms" and "able to effectively select the data collection methods for data collection", indicating that counselors still have a good grasp of the access to big data in their work with students. This shows that counselors have mastered the relevant skills and methods of acquiring big data in their work with students.

Table 6. Results of the Big Data Access Capabilities Survey

Title\Option	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	average score
B4.1 Skilled in accessing required data on digital and social platforms	0(0%)	2(1.67%)	24(20%)	56(46.67%)	38(31.67%)	4.08
B4.2 Knowledge of one or more web-based data collection tools and skills	2(1.67%)	2(1.67%)	34(28.33%)	50(41.67%)	32(26.67%)	3.9
B4.3 Ability to effectively select data collection methods for data collection	0(0%)	0(0%)	26(21.67%)	58(48.33%)	36(30%)	4.08
B4.4 Ability to accurately interpret all types of explicit and implicit data	0(0%)	4(3.33%)	30(25%)	60(50%)	26(21.67%)	3.9
B4.5 Ability to categorize and store acquired data	0(0%)	0(0%)	32(26.67%)	52(43.33%)	36(30%)	4.03
Subtotal	2(0.33%)	8(1.33%)	146(24.3%)	276(46%)	168(28%)	4

3.2.5 The State of Big Data Analytics Capabilities for Counselors.

In the dimension of tutors' big data analysis ability, the questionnaire mainly investigates five elements such as "being able to identify the validity and accuracy of various data, and eliminate invalid or incorrect data" (see Table 7), and the results of the survey show that the average score of this dimension is 3.93, which is at a medium level, and the score of B5.3 element is only 3.83, indicating that nearly 36.67% of the survey respondents have not fully mastered the skill of "using various statistical software and data management work to analyze data". 3.83 points, among the survey respondents, nearly 36.67% of the counselors have not fully mastered the skills of "using a variety of statistical software, data management work to analyze the data", indicating that the counselors do not have a high degree of mastery of the skills of summarizing, refining and analyzing the big data, which is one of the focuses of the subsequent training on the counselors' big data literacy. This is also one of the focuses of the subsequent training on big data literacy for counselors.

Table 7. Results of the Big Data Analytics Capabilities Survey

Title\Option	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	average score
B5.1 Ability to recognize the validity and accuracy of various data	0(0%)	0(0%)	32(26.67%)	56(46.67%)	32(26.67%)	4
B5.2 Ability to recognize the limitations of data to reflect reality	0(0%)	0(0%)	32(26.67%)	56(46.67%)	32(26.67%)	4
B5.3 Ability to analyze data using multiple data management tools	0(0%)	4(3.33%)	40(33.33%)	48(40%)	28(23.33%)	3.83
B5.4 Ability to use visualization to characterize data	0(0%)	2(1.67%)	32(26.67%)	54(45%)	32(26.67%)	3.97
B5.5 Ability to detect hidden trends and changes in data	0(0%)	4(3.33%)	36(30%)	54(45%)	26(21.67%)	3.85
Subtotal	0(0%)	10(1.67%)	172(28.67%)	268(44.67%)	150(25%)	3.93

3.2.6 The State of Big Data Application Capabilities for Counselors.

In the dimension of tutors' ability to apply big data, the questionnaire mainly investigated five elements such as “being able to summarize the core viewpoints of data analysis and express them in data-oriented language” (see Table 8), and the survey results showed that the average score of this dimension was 3.89, and the scores of the five main points were all below 4, which was at a medium-low level, indicating that the ability of tutors to apply the conclusions of big data analysis to specific student work practices was still insufficient. The ability of counselors to apply the conclusions of big data analysis to specific student work practices is still insufficient, which will be one of the focuses of the subsequent training of counselors on big data literacy.

Table 8. Results of the Big Data Application Capabilities Survey

Title\Option	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	average score
B6.1 Ability to express core ideas of data analysis in data-driven language	0(0%)	4(3.33%)	28(23.33%)	58(48.33%)	30(25%)	3.95
B6.2 Ability to write research reports utilizing data analysis results	0(0%)	6(5%)	30(25%)	56(46.67%)	28(23.33%)	3.88
B6.3 Willingness to make their data public	0(0%)	4(3.33%)	30(25%)	62(51.67%)	24(20%)	3.88

B6.4 Ability to communicate and share data results	0(0%)	2(1.67%)	36(30%)	60(50%)	22(18.33%)	3.85
B6.5Ability to predict changes in student behavior based on the results of data analysis	0(0%)	4(3.33%)	30(25%)	60(50%)	26(21.67%)	3.9
Subtotal	0(0%)	20(3.33%)	154(25.67%)	296(49.33%)	130(21.67%)	3.89

4 The Path to Enhancement of Big Data Literacy among College Counselors

4.1 Establish data thinking and build a new environment for counselors' big data application

First of all, it is necessary to cultivate the concept of big data for counselors, reverse the rejection or contempt for big data, and strengthen the cognition of the importance of big data and the use of big data, so as to consciously strengthen the learning and use of big data. Secondly, it is necessary to enhance counselors' big data thinking, guide counselors to take the initiative to learn the national policies related to the development of big data, and gain a deeper understanding of the significance and path of the integration of big data and the development of higher education. Thirdly, it is necessary to strengthen the counselor's critical awareness of big data, combined with the actual daily education and management of students, in order to comply with the relevant laws, industry statutes, public order and morals as a prerequisite, to strengthen the sense of responsibility, and to protect the privacy and rights and interests of students. Finally, colleges and universities should strengthen data synergy, open up data barriers between departments, and optimize the overall environment for big data application.

4.2 Strengthen the supply of resources and build a new platform for counselors' big data application

First, a big data technology platform should be established to rationally optimize the allocation of resources, especially to combine the educational management resources of colleges and universities with the advantages of the information technology environment. Secondly, the research and development of big data application results of students' daily education and management should be increased to promote the refined management of student work. Third, the transformation of existing big data application results should be increased. In particular, it is necessary to increase the push of big data application results to counselors, and distinguish big data analysis of different majors, grades, groups, time periods, etc., in order to meet the personalized needs of counselors' work [7]. Finally, the core technology team of big data for daily education and management of students should be set up to support the application of big data for

counselors, and excellent talents can be selected among counselors with science and technology background to set up a big data technology team with core competitiveness.

4.3 Organize professional training and innovate a new mode of big data training for counselors

First of all, it is necessary to highlight the training objectives and strengthen the theoretical training of counselors in big data. Through expert lectures, tutorial reports and other forms, the basic theory of big data is integrated into the training content to create a curriculum system that meets the logical framework of big data technology and is acceptable to the majority of counselors. Secondly, it is necessary to highlight skill enhancement and strengthen the practical training of counselors in big data application. Through joining the counselor team, participating in big data practice projects, going to big data enterprises for practical training, and exchanging and discussing relevant cases with peers, we can cultivate counselors' practical skills of acquiring, analyzing, and applying big data. Third, it is necessary to highlight the classification and stratification, and carry out counselor big data training in a targeted manner. For counselors with a science and engineering background, focus on training them to master the core technology of big data and have excellent data mining, analysis and application skills; for other first-line counselors, focus on training them to be able to work according to the actual work, and to skillfully use big data thinking and methodology to solve practical problems; for counselors who are older and have a weaker ability to apply network science and technology means, take the approach of For older counselors who are less capable of applying network technology means, we adopt the training mode of “bringing the old with the new” to form a team and lead them to try the learning and application of big data, so as to comprehensively improve the level of big data literacy of the counselor team.

4.4 Strengthen system construction and improve the new mechanism of big data assessment for counselors

First of all, it is necessary to establish a sound big data security early warning mechanism, through the development of big data workflow, clear scope of the counselor's authority, to prevent the leakage of student information, to avoid the emergence of ethical problems of data from the source, so that big data can be reasonably and legally applied to the daily management of students. Secondly, it is necessary to establish a sound assessment and evaluation mechanism for counselors' big data. On the one hand, it is necessary to regularly assess the counselors' big data learning and training and application, so as to achieve the purpose of “promoting learning through examination”; on the other hand, it is necessary to combine the big data knowledge system and ability requirements to establish the evaluation standard of big data literacy for college counselors, and promote the college counselors to set up a sense of big data, master the knowledge and improve the skills of big data through the evaluation of the feedback. On the other hand, the evaluation standard of big data literacy for college

counselors should be established in conjunction with the knowledge sys-tem and ability requirements of big data [8]. Finally, it is necessary to establish a big data encouragement and incentive mechanism, combining big data literacy with the evaluation of prizes and merits, and the promotion of grades and positions, so as to establish a scientific and reasonable evaluation mechanism.

5 Conclusion

This paper takes the counselor group of Jiangsu University of Science and Technology as the research object, and uses the combination of online and offline research to carry out the research, to explore the path of big data literacy enhancement of college counselors, and to provide a reference for the future research related to big data literacy. At the same time, there are some limitations in this study, such as the lack of comparative analysis of the current situation of counselors' big data literacy, in the subsequent study, the analysis can be refined by category, so as to improve the path of counselors' big data literacy improvement.

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