Analysis on Influencing Factors of College Students' Information Ability in Big Data Environment

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Abstract: Information ability is the basis and premise of college students' survival and career development, the condition of their lifelong learning, and the necessary ability of innovative talents. In order to adapt to the rapid development of the current information society, college students, as an important force of social construction, must cultivate good information ability. Firstly, this paper analyzes the position of college students' information ability in the ability structure. Secondly, it analyzes the constituent elements of college students' information ability in the big data environment. Thirdly, it analyzes the current situation of information ability training of economic and management college students under the big data environment. Finally, combined with the actual situation of Anhui University of Finance and Economics, through the questionnaire, this paper investigates and analyzes the current situation of economic and management college students' information ability, in order to explore the main factors affecting college students' information ability.

Keywords: Big data; Information capability; Influencing factors; Questionnaire investigation.

1. Introduction

In the 21st century, the information revolution has really come. The ability to obtain and process information has become a new skill necessary for people in modern society. Information has become a powerful driving force to promote social progress and development, and information has gradually become the first productive force. From the perspective of ontology, information is the sum of all aspects of social development and social phenomena. Information is a form of reflecting the characteristics of things through certain ways, such as data and signals [1]. In addition to general information, information also includes information on professional knowledge. Accordingly, college students' curriculum learning is also a process of receiving professional information. With the advent of the big data era, the importance of information has gradually become prominent, and the acquisition and processing of information has gradually become the main activity of social production. At the same time, information has become the most valuable embodiment of knowledge, the most active factor in economic and social development, and constantly promote social progress. The mining, utilization and management of information resources directly affect the development of individuals, society and countries. The ability to control information knowledge has increasingly become the basic ability in the new era. From the significance of cultivating college students' information ability, information ability is the basis and premise of college students' survival and career development, the condition of lifelong learning, and the necessary ability of innovative talents. In order to adapt to the rapid development of the current information society, college students, as an important force of social construction, must cultivate good information ability. If we fail to meet the requirements in this regard, we will not be able to meet the requirements of modern social life, study, work and competition, and will eventually be eliminated by the times. The cultivation of college students' information ability is a systematic project, which involves multi-party efforts and

cooperation, and is affected by many factors.

2. The Position of College Students' Information Ability in the Ability Structure

Information capability is the sum of the capabilities required by the information subject in different stages of the whole information activity process from information demand to information utilization. Information capability is the ability of the information subject to effectively use information technology to obtain information and flexibly and actively use and use information. There is a close relationship between information ability, information technology and information quality. Information technology mainly enables the information subject to master various retrieval technologies and make them learn to apply in daily production and life. Information technology focuses on technology itself, while information ability pays more attention to judgment, analysis, processing and application. Information ability needs to rely on scientific methods and objective analysis, so it is of more significance to individual learning and social education [2]. Information ability includes not only information acquisition ability, information processing ability, information evaluation ability and information application ability, but also self-learning methods and skills in the current information environment, as well as the ability to use the obtained information to solve practical problems and process and create new ideas.

College students should have certain information processing ability, so that they can have independent learning ability in school classroom, extracurricular life and various environments, and accurately use information resources to obtain the required information. With the continuous expansion of the total amount of knowledge in modern society, the time and energy of school education are limited after all. They can only teach basic scientific knowledge and learning methods, and can not achieve comprehensive coverage. Moreover, after entering the job, the problems encountered in

practice need more professional and reliable knowledge to solve. Therefore, everyone should have the ability of lifelong learning. In this way, after graduation, you can constantly recharge yourself without being eliminated in the rapid development of society. Lifelong learning ability includes lifelong learning awareness, self cognition and evaluation, career development planning and follow-up learning ability [3]. Through interdisciplinary and integrated teaching and learning, college students can cultivate their information ability in school. Cultivating information ability is to master the methods and skills of obtaining information. In this way,

no matter what kind of work they engage in after entering the society, they can quickly integrate into their post roles, complete their own work excellently and realize their life value. Information ability is a necessary ability to help the subject understand things, master knowledge and solve practical problems by determining objectives, collecting data, evaluating useful information and creating applications from the contents contained in various information forms such as messages, signals and instructions. Among the various abilities that people need to master, information ability occupies a very important position.

Figure 1. Schematic diagram of information capability status

As can be seen from the above figure, information ability embodies a person's thinking ability, which is the best way to realize expression ability and practical ability. First, thinking ability is the core basis for guiding college students to carry out all activities. To ensure the smooth development of various activities, we should have the ability of scientific, calm and objective reasoning, have a critical eye on things, and can't just accept them. Second, college students should have strong information acquisition ability, information processing ability and information analysis ability, so that they can have independent learning ability in school classroom, extracurricular life and various future environments, and accurately use information tools and technologies to obtain the required information.

3. Elements of College Students' Information Ability in the Big Data Environment

Many scholars or research institutions at home and abroad have conducted special research on the constituent elements of college students' information ability. Based on a large number of literature summary, it is found that there are mainly three types of constituent models: process type, arrangement type and combination type.

Typical process models include SCONUL model and Big6 model. SCONUL model clearly describes the knowledge and skills that learners should have to cultivate learning ability, including seven levels: 1) Clarify the information needs; 2) Identify the content and scope of required information; 3) Build strategies for obtaining and searching information; 4) Accurately obtain and obtain information; 5) Compare and evaluate information from different information sources; 6)

Organize and effectively use information in combination with situations; 7) Comprehensively analyze and create new knowledge based on existing information [4]. Big 6 model aims to cultivate students' information ability and critical thinking through six steps: determining tasks, formulating information search strategies, retrieving and obtaining information, using information, information integration and learning evaluation, and emphasizes that the focus of students' information ability training should be on information retrieval, browsing and understanding. Big6 information capability model is shown in Figure 2.

In the permutation typical model, Doyle model summarizes the information ability into ten abilities: identifying information, identifying information needs, locating problems, determining information sources, formulating retrieval schemes, obtaining information, evaluating information, organizing information, integrating information and critical thinking. ALA & AECT model puts forward that college students' information ability is mainly manifested in nine abilities: using information tools, obtaining information, processing information, generating information, creating information, giving full play to the role of information, information cooperation consciousness, information immunity and information behavior [5].

In the combined model, Bruce model is a typical representative. The model divides learners' information ability into seven levels: information technology, information source, information processing, information control, information construction, wisdom and knowledge extension concept, and makes an in-depth discussion on information ability based on each level [6]. The seven levels of Bruce model information capability are shown in Table 1.

Figure 2. Big 6 information capability model

Table 1. Seven levels of Bruce model information capability

Category	Constitute
Information technology concept	Information technology utilization ability, information retrieval ability and information exchange ability
Information source concept	Ability to identify information sources and obtain information
Information processing concept	Information processing capability
Information control concept	Information control capability
Knowledge construction concept	Personal knowledge base construction ability
Wisdom idea	Ability to use information
Knowledge extension concept	Information combination ability and new knowledge discovery ability

Based on the above analysis, as a necessary ability of the information society, information ability includes the knowledge of information consciousness. It is the ability to clarify information needs, retrieve information, evaluate information, effectively organize and create information, and use information to solve the problems faced. We can sum up the core elements of information capability, mainly including the ability to determine information demand, the ability to retrieve and obtain information, the ability to evaluate and use information, the ability to organize and create information, and the ability to process and communicate information. These five are also the information capabilities that college students need for their future survival and development in the era of big data, and are important evaluation criteria for high-quality enterprise management talents.

4. Current Situation of Information Ability Training of Economics and Management College Students under the Big Data Environment

In the era of big data, the information ability of economic and management professionals has become an important content of their core literacy training. According to the training results of economic and management professionals, most of their information ability show certain characteristics, master basic library skills and it skills, but lack the ability of information synthesis, utilization and creation. For example, under the training of economics and management courses, most economic and management students can better master professional theoretical knowledge and integrate it into specific problems according to the needs of enterprise business development. However, in practical application, enterprise activities contain a lot of data information, and only a few students can make practical decisions in combination with multiple data such as customers, commodities and sales. What's more, they lack good thinking ability, can't use information to solve problems, and can't adapt to the new generation of information processing programs.

According to the current teaching practice of economics and management majors, the cultivation of college students' information ability mainly follows the traditional teaching methods. Teachers teach computer courses, literature retrieval courses and information technology courses. After the course, the further cultivation of information ability needs to rely on students' own consciousness. China's traditional teaching model makes students accustomed to passively accepting knowledge and imitating knowledge, lack of subjective initiative and necessity in actively looking for relevant information, less opportunities to choose and use information sources, more random information search, and lack of deep-seated and extensive requirements for searching information. These "congenital deficiencies" are also common problems for students majoring in economics and management, which are not conducive to the development and utilization of

information, restrict the cultivation of students' sporadic and innovative thinking, and affect the development of their comprehensive literacy. With the continuous development of science and technology and information technology, the pace of the new era of artificial intelligence is accelerating, and information application ability will become a necessary skill for college students.

5. Analysis on Influencing Factors of Information Ability Training of Economics and Management College Students under Big Data Environment

Many universities at home and abroad have investigated the information ability of college students, such as the University of Wisconsin and California State University. Huang Xiaobin, a domestic scholar, investigated the Internet use of some undergraduates of Zhoushan University. Based on the existing research, combined with the actual situation of Anhui University of Finance and economics, this paper investigates and analyzes the current situation of economic and management college students' information ability through a questionnaire, so as to explore the main factors affecting college students' information ability and provide a basis for building a multidisciplinary and integrated talent training system in the era of big data.

5.1. Survey Method and Questionnaire Design

The questionnaire consists of three parts: the basic information of the respondents, the basic situation of college students' information ability and construction, the level and main influencing factors of college students' information ability. Among them, the second part of the survey on the basic situation of college students' information ability and construction includes: the respondents' understanding of information ability, network use, information awareness, information knowledge, information demand determination ability, information retrieval and acquisition ability, information evaluation and utilization ability, information organization and creation ability Information processing and communication ability, information ethics and law. The third part is the investigation of college students' information ability level and main influencing factors, including school information ability evaluation system, school information resources, curriculum and teaching methods. The first and second parts adopt the questionnaire form of selection and filling in the blank, and the third part is the degree evaluation and scoring. This survey adopts sampling survey, takes Anhui University of Finance and economics college students as the survey object, and carries out the questionnaire survey through face-to-face distribution, e-mail, questionnaire platform and other methods. It mainly involves 22 majors including economics, management and related majors. A total of 700 questionnaires were distributed, 637 questionnaires were recovered, and 612 valid questionnaires.

5.2. Descriptive Statistical Analysis

The questionnaire data are described and statistically analyzed, the sample mean and standard deviation of each influencing factor are calculated, and sorted according to the mean to reflect the importance of each influencing factor to the cultivation of information ability. The results of statistical analysis are described as follows.

Table 2. Importance description and statistical analysis of influencing factors of college students' information ability (n = 612)

Influence factor	Mean value	Standard deviation
Curriculum	4.8983	0.85185
Teacher quality	4.8681	0.78882
Joint guidance of teachers and Librarians	4.8123	0.94581
teaching method	4.7932	0.93292
Scientific research participation	4.7823	0.80605
Library Construction	4.7473	0.97423
Librarian	4.4573	0.94203
Special lectures and activities	4.4431	0.05165
Information capability evaluation system	4.4402	0.9164
Network Center	4.3632	0.95327
National information capacity policy	4.1791	0.87576
National information infrastructure construction	4.1672	0.94206
School attention	3.7877	0.96081
School enterprise cooperation	3.7632	0.93290
Multimedia network classroom	3.0078	0.85899
Relevant information law	2.9474	0.97883
Intermediary service organization	2.7943	0.83121

It can be seen from table 2 that among the 17 influencing factors for the cultivation of college students' information ability, curriculum, teachers' quality and the joint guidance of teachers and librarians have the greatest influence. The influence degree scores of these three factors are more than 4.8, indicating that they play an important role and belong to key influencing factors in the cultivation of college students' information ability. Among them, the curriculum has the greatest impact, indicating that the surveyed college students generally believe that the cultivation of information ability is closely related to the curriculum. The second important factors are teaching methods, scientific research participation and library construction. The influence degree scores of these three factors are more than 4.7, indicating that they are more important factors in the cultivation of college students' information ability. In turn, the influence degree scores of librarians, special lectures and activities, information ability evaluation system and other six factors are more than 4.1, indicating that they have a general influence on the cultivation of college students' information ability. The scores of school attention, school enterprise cooperation and multimedia network classroom are all below 4.0, indicating that they have little impact on the cultivation of information ability and belong to secondary factors.

5.3. Cluster Analysis of Influencing Factors

The purpose of cluster analysis is to classify similar elements into classes and classify research objectives according to the degree of similarity. According to different classification objects, cluster analysis can be divided into Q-type and R-type. Type E classifies the investigated n indicators according to a certain similarity principle to analyze the affinity between variables.

This paper analyzes the 17 influencing factors of the survey results by using R-type cluster analysis, combined with systematic cluster method and ward method. The analysis

results are presented by cluster icicle diagram. As shown in Table 3.

Table 3. Cluster analysis of influencing factors of College Students' information ability training

Influence factor	Number of clusters															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
School enterprise cooperation	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×	×	×				
School attention	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×														
Multimedia network classroom	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×									
Information intermediary service organization	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×						
Relevant information law	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×															
Teacher quality	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Scientific research participation	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Curriculum	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×											
Teaching method	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×	×	×	×			
Information capability evaluation system	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×													
National information infrastructure construction	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Librarian	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×												
Special lectures and activities	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×	×	×					
Joint guidance of teachers and Librarians	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×								
Network Center	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×										
National information capacity policy	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	×	×	×							
Library	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×

As can be seen from table 3, the cluster analysis results of college students' information ability training are: curriculum, teachers' quality, teaching methods, scientific research participation and information ability evaluation system; The construction of national information infrastructure and librarians are classified into one category; The joint guidance of teachers and librarians, network center, library, special

lectures and activities, and national information capacity policy are classified into one category. Multimedia network classroom, relevant information law and information intermediary service institutions fall into one category. The analysis results are basically consistent with the statistical analysis results described above.

5.4. Impact Factor Analysis

Based on the above analysis results, since the multimedia network classroom, information intermediary service institutions and relevant information laws have little impact on the research objectives, they belong to secondary impact

factors, which are not studied here. Therefore, the main impact factors of college students' information ability training can be divided into four categories: National factor; School factor; Library factor. Teachers and teaching factors. The main influencing factors of college students' information ability training are shown in Figure 3.

Figure 3. Main influencing factors of college students' information ability training

It can be seen from Figure 3 that the cultivation of college students' information ability is affected by many factors. In the past, the school's economics and management majors did not recognize the importance and influencing factors of the cultivation of information ability, resulting in the bottleneck of the development of "traditional economics and management". In the big data environment, cultivating college students' information ability should be based on national factors, school factor, library factor. Starting from the main influencing factors such as teachers and teaching factors, the key factors such as curriculum, teachers' quality, scientific research participation and teaching methods should be taken as the focus of university work. Here, the main ideas of cultivating college students' information ability are as follows:

(1) Improving teachers' information technology teaching ability: in the current big data era, Internet plus has penetrated into all aspects of social life and learning. In order to adapt to the changes in the digital age, teachers should cultivate the thinking mode of "Internet plus education" and "Education + information technology", and continuously expand and reorganize their own ability elements. Teachers should understand and master various methods and skills of big data processing, software application and data mining, and master research tools and technologies, learning methods and skills in the big data environment, so as to help students improve their learning and research ability as much as possible.

(2) Integrate teaching methods and methods: the teaching of economics and management majors should adhere to the problem oriented approach, and constantly update the development trend of the economics and management disciplines such as "Ai + management" and "Internet plus management" in the new era, requiring teachers to focus on the teaching method of combining learning with thinking, and advocating exploration, heuristic and participatory teaching. Strengthen the ability of training teachers to use information technology to carry out education and teaching, make them make full use of the new technology in the era of big data, stimulate the learning initiative and innovation of economics

and management students, take students as the center, integrate the new generation of information technology in teaching methods, management methods and evaluation methods, and comprehensively improve the teaching level of economics and management. The application of modern teaching information technology can greatly enrich teachers' teaching content, make the curriculum form more intelligent, visual and three-dimensional, and stimulate students' learning enthusiasm and classroom participation enthusiasm.

(3) Improve all kinds of information resource facilities: according to the school running orientation, build perfect information electronic resource facilities, strengthen the construction of information organization, enhance the construction of information system guarantee, and constantly explore, practice and innovate in enriching electronic resources, optimizing network structure and building smart campus, so as to fully meet the resource needs of school information technology. By enabling the global authoritative core collection database Web of science containing SCIE, SSCI, Insites, JCR, ESI and other resources, and organizing several lectures and activities such as project training and database use, it provides a strong electronic resource guarantee for cultivating the information ability of students majoring in economics and management.

(4) Building an interdisciplinary teaching mode: technological innovation and competition activities are important means to cultivate students' innovative consciousness and information ability. We should promote the "Classroom + competition" mode, guide students to participate in various science and technology competitions, and compete in the innovation and entrepreneurship competitions such as "Challenge cup" and "Internet plus". Promote the close combination of theoretical learning and practical application through competition, and improve students' innovation and entrepreneurship awareness and curriculum learning enthusiasm. In the practice of cultivating students' information ability, we can also promote the "Information technology + curriculum" model, such as

"Economics + information technology", "Management + information technology", "Economic management + computer", so as to realize the interdisciplinary and integrated development and enhance students' theoretical basis and information ability.

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