Study on the Connotation and Improvement of Data Literacy of Business Students in Higher Vocational Colleges in the Context of Business Intelligence

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Abstract. This paper expounds the connotation of data literacy in the context of business intelligence, analyzes the status quo and problems of data literacy education for students in higher vocational colleges, and discusses the countermeasures to improve the data literacy of business students in higher vocational colleges in three aspects of cultivating data awareness, improving data skills and establishing data ethics.

Keywords: Business Intelligence · Vocational Business Students · Data Literacy

1 Introduction

1.1 Data Literacy Has Become Essential for Vocational Business Students to Graduate Under the Background of Business Intelligence (BI)

The Priorities for Improving Digital Literacy and Skills of the General Public in 2022 takes improving the digital literacy of the general public as an important work to build a digital China and strengthen the country through network, emphasizes the "focus on the cultivation of digital citizens with digital awareness, computational thinking, lifelong learning ability and sense of social responsibility" [1], and calls for "systematically conducting digital skill training for all links of production, continuously expanding the teams of modern industrial workers, fostering high-caliber craftsmen in the digital field, and enhancing digital production capacity". The "14th Five-Year Plan" of Shandong Province for Education Informatization points out that one of the key tasks related to education informatization during the "14th Five-Year Plan" period is "digital literacy improvement" and requires "fostering the digital transformation and development concepts of the economy and society among students and improving the abilities to adapt to intelligent upgrade of all walks of life" [2].

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It can be seen that digital literacy has become the focus of enterprise talent demand and college talent training. The popularization of the concept of big data, the application of cloud computing, and the rapid rise of social networks and mobile applications in China have promoted the rapid development of BI in China. This imposes new requirements on higher vocational education institutions aiming at training craftsmen and exporting high-tech and high-skilled graduates: In the implementation of personnel training, they should target at technological reform and train high-quality technical and skilled talents with data literacy. Higher vocational college students face the data-driven innovation challenge brought by BI and thus should possess data literacy and ability to recognize the value and negative impact of data, master data and make good use of it. At present, the new mobile intelligent tools are more and more widely recognized, which have become an important ability for higher vocational college students to acquire before graduation for employment.

1.2 The Theoretical Study on Data Literacy is Weak, and the Data Literacy Improvement and Training System for Business Students Has Not Been Formed

Some scholars are aware of the importance of data literacy, and have carried out relevant theoretical studies on the connotation and improvement mechanism of data literacy. However, due to the different data literacy needs of different disciplines and majors, there are few theoretical studies on data literacy of business students. In terms of practical application, higher vocational colleges have allocated more data literacy resources in libraries. However, relevant norms and standards and curriculum system are relatively backward, failing to meet the high requirements of the society for the data literacy of vocational college talents. Based on the current development background of BI, this paper reviews the connotation and elements of data literacy, analyzes the current situation and existing problems of data literacy education for business students in higher vocational colleges, and discusses the countermeasures to enhance data literacy of business students in higher vocational colleges in the aspects of enhancing data awareness, improving data skills and reviewing data ethics.

2 Connotation and Elements of Data Literacy in the Context of BI

2.1 Connotation

Some scholars believe that data literacy is the same as “data information literacy”, which refers to people’s ability to collect, collate, analyze, share and use data and information, and their cognitive level of data ethics and norms. However, some scholars believe that the two are not consistent. Particularly, they differ greatly in practical application. Data literacy is an important aspect of information literacy, and is the “personal data” that are generated when individuals may better participate in and use their digital practices. Domestic scholars have also conducted some studies on the meaning of data literacy, and regarded data thinking and awareness, data collection and capture ability, data processing ability, data analysis and result presentation ability, and data ethics level as important

dimensions for evaluating data literacy and competency. To sum up, this paper holds that data literacy means that an individual who has a certain data awareness acquires data knowledge and learns data-related skills under the data ethics code to improve his/her ability to acquire, process, analyze and communicate data, so as to enhance his/her quality to cope with changing data environment. It mainly includes three aspects. The first is to discover the value of data in a timely and effective manner. The second is to have a certain level of operational skills such as data capture, utilization and management. The third is to follow the code of ethics that should be adhered to in the process of data use.

2.2 Elements

For higher vocational college students, to become a qualified graduate, they need to have the literacy to accommodate new technologies and industrial changes, especially data literacy. According to the meaning of data literacy mentioned above, this paper summarizes the data literacy of students in higher vocational colleges into three basic elements: data awareness, data skill and data ethics.

2.2.1 Data Awareness

Amidst BI, various enterprises have pushed forward the application of data aggregation and analytical functions based on business needs in the digital transformation. In the process of digital transformation, enterprises use their own internal and external data to make decisions on, manage and guide business operation, so as to improve management efficiency. In the process of enterprise transformation, employees are also required to develop sensitive data awareness. Data awareness is mainly manifested in sensitivity to data, continuous attention to data, insight into and judgment of data value, etc. Vocational business graduates with strong data awareness can actively use data and data tools to improve the efficiency and quality of learning and work, and collect data and make decisions based on data in their positions. Business students' data awareness is an important aspect of their data literacy. The strength of data awareness determines whether students can have certain data thinking, effectively collect and analyze data, efficiently communicate and present data results. It is one of the professional qualities that business students should possess in the context of BI.

2.2.2 Data Skill

Data skills include the abilities to capture, process, analyze, mine, present, and communicate data. Against the backdrop of big data and BI, it is imperative for higher vocational colleges to train students on data skills to enable them to use their data skills to find rules from a large amount of data in work after graduation, quickly identify and extract required data, employ scientific methods and tools to process and analyze the data, and properly present the analysis results for decision-making, sharing and communication. Data skills are the guarantee for data literacy. In particular, data capture, processing, presentation and communication abilities can be obtained through training and long-term practice accumulation, but the improvement of data application needs long-term project practice accumulation.

2.2.3 Data Ethics

In the era of big data, the use of business data is prone to ethical problems, such as privacy breach, information security and data gap, which requires higher vocational colleges to develop norms and ethical awareness of data collection, use and dissemination among business students. Data ethics refers to establishing a correct view of data in the process of using data skills, having a certain awareness of data security and judgment ability, and operating data reasonably and legally. Business students have more access to and use business data, such as customer personal information and business operation data. The use of data in positions should abide by basic code of ethics and relevant policies, norms, laws and regulations, protect customer privacy and platform data security, and establish a correct concept of data ethics.

3 Status Quo and Problems of Data Literacy Education for Business Students in Higher Vocational Colleges

3.1 There is a Lack of Data Awareness in the Training Requirements of Business Talents in Higher Vocational Colleges, and the Orientation of Talent Training is Out of Line with the Need of Enterprises for Interdisciplinary ("Data + Business") Talents with High Data Literacy

The revolutionary development of digital information technology has boosted the application of BI-based scenarios in all walks of life. Enterprises impose increasingly high requirements on employees' data literacy, and the need for excellent "digital employees" with high data literacy is growing. So far, a complete training system for data awareness, ability and ethics has not been formed with respect to the training of business students in higher vocational colleges. There is a big gap between the demand and supply of talent quality. Prior to providing high-quality technical and skilled talents for enterprises, higher vocational colleges should cultivate the key professional quality of data literacy of business students [3].

3.2 The Curriculum System of Data Literacy Training for Business Students Has not Been Formed, and the Training Models and Methods Are Not Diverse, Which Cannot Support the Improvement of Data Ability of Business Students in Higher Vocational Colleges and Meet the New Requirements Posed by the Change of Business Technology

First, a robust curriculum system has not been formed. In order to enable business talents to meet the literacy requirements under the background of BI, higher vocational colleges should set the curriculum of data literacy education consistent with the training objectives of data literacy, and establish a curriculum training system with business training characteristics to systematically impart data knowledge, implement project practice, foster data awareness and data ethics. However, higher vocational colleges have not put in place a robust curriculum training system covering data awareness, data ability and data ethics. Secondly, training modes and methods are relatively simple, especially the data capture, processing and analysis skills need to be fully trained in actual project

exercises. At present, data skill courses in higher vocational colleges are generally set in the form of theoretical teaching such as course and lecture, which have poor teaching effect and cannot cater to the needs for training students' data literacy. Therefore, how to build a multi-level and diversified data literacy curriculum system and diverse data literacy training models is an important issue to be solved.

3.3 At Present, the Data Ethics Education for Business Students in Higher Vocational Colleges is Relatively Weak, Without Necessary Ethical Education Such as Data Security

It is proposed in the "14th Five-Year Plan" of Shandong Province for Education Informatization that, higher vocational colleges should "strengthen students' information ethics education and guide them to use the Internet and information technology tools in accordance with applicable laws and regulations". The rapid development of digital technology makes data collection, processing and sharing more convenient, but ethical issues such as data security arising from the use of data are often ignored. Due to age, experience and other reasons, business students have a weak concept of law-based data and lack of security awareness of personal data and national information. However, in the current data literacy education for business students in higher vocational colleges in China, more attention is paid to the capabilities for data collection, processing and analysis, and there is a lack of important data literacy contents such as data assessment and ethics [4].

4 Countermeasures to Improve the Data Literacy of Business Students in Higher Vocational Colleges

4.1 They Should Step up Efforts in Improving Cultural Environment of Campuses, and Develop Data Awareness of Business Students in an "All-Round Way"

Improving data literacy begins with the cultural environment of campuses. Higher vocational colleges should foster a data-first culture, encourage the use of data, and create a good environment for data literacy education. In addition to colleges, libraries and professional teaching institutions, the administrative departments such as undergraduate academic affairs office, information center and scientific research office should strengthen coordination, make overall planning for the data literacy education of business students at the school level, and create a good culture environment for campus data. They should regularly conduct various publicity lectures on data perception, security and ethics to create a good cultural atmosphere of data literacy, gradually cultivate data awareness and cognitive ability of business students, enhance soft environment (such as data culture and ethics) of campuses, and cultivate their data awareness.

4.2 According to the Characteristics of Business Students in Higher Vocational Colleges, the Training System of Data Literacy Courses Should Be Established, and Teaching Methods Should Be Diversified to Support the Capability Needs of Positions

4.2.1 The Curriculum System of Data Literacy Training with Business Characteristics Should Be Established

First, they should optimize the curriculum of data literacy education, develop characteristic and practical courses, and build a robust curriculum system of data literacy training with business characteristics. On the one hand, in light of the actual situation, higher vocational colleges should stay close to professional needs and practice, fully develop and improve the characteristic and practical courses of data literacy education with business characteristics, and increase the scenario-based case studies of data application [5]. Second, they should integrate data literacy education into various business courses. Data literacy education should be embodied in basic professional courses, core courses and practical training projects to guide students receive data skills training and improvement, and cultivate their ability to apply data to deal with problems. Third, they should cooperate with enterprises and other entities to train talents with high data literacy. The data generated by enterprises in the digital transformation to support business decision-making and other real business application scenarios should be integrated into in-class teaching to enrich teaching resources, meet the needs of students for industry frontier, and effectively enhance the effectiveness of data literacy education for college students.

4.2.2 Diversified Teaching Methods Should Be Adopted Based on the Characteristics of Business Students to Improve Their Data Skills

As mentioned above, data skills cannot be developed well only by teaching methods such as theory and lecture. Business students are characterized by innovative and dialectical thinking, expression and team work. Based on these characteristics, higher vocational colleges can make use of project-based, diversified and practical teaching methods to arouse interest in learning in class [6]. First, they can integrate enterprise cases into in-class teaching by means of curriculum projects, give full play to in-class teaching to inspire students' interest in data knowledge and skills such as data capture, processing, analysis and presentation, and actively mine data information for application. Second, they should actively organize teacher and student teams to establish associations, studios, workshops and other organizations, and participate in various enterprise projects and skills competitions to provide data analysis and technical advisory services for enterprises, so as to enhance the data thinking of new business talents. Third, they should fully integrate resources and platforms, and build an online interactive exchange platform to realize the sharing of teaching resources. They should push personalized data content based on business background, broaden the way of data literacy training and data exchange for business students, and stimulate students' interest. Through the above diversified teaching methods, they should provide personalized data awareness, knowledge and skills training for business students, and constantly improve the data literacy education system of colleges.

4.3 They Should Pay Attention to the Ideological and Political Education in an All-Round Way and Establish the Data Ethics of Business Students

Ideological and political education is the proper meaning of contemporary higher education, and data ethics of business students is also the key content of ideological and political education. Data ethics education needs not only the data security guidance from teachers in and after class but also the inspiration of practical cases of cutting-edge and real business scenarios of enterprises. Just after entering the campus, they should use the campus, teaching buildings and classrooms to guide business students to establish a correct sense of data ethics and norms, and enhance their data sensitivity and the spirit of data exploration amid BI. At the same time, higher vocational colleges should make full use of the digital smart campus management platform to strengthen the standardized application of data in the environment of big data and BI7, and build a diversified and process-oriented digital literacy evaluation indicator system based on the data awareness, attitude, skill, thinking and data ethics of business students, so as to provide a guarantee for the continuous improvement of data literacy education by colleges.

5 Conclusions

The development of BI has led to a major change in the need for vocational talents. Faced with data-driven opportunities and challenges, there exist problems (such as inconsistent with social needs, incomplete training system and lack of data ethics education) in the data literacy improvement education by higher vocational colleges for business students, failing to enable business students to meet the requirements for job and skill upgrading in the future intelligent upgrading environment of all walks of life. This paper discusses the countermeasures to improve the data literacy of business students in higher vocational colleges from the aspects of enhancing data awareness, improving data skills and establishing data ethics, hoping to provide certain reference for the data literacy education of business students by higher vocational colleges.

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