Study in the Big Data Talent Training Oriented Reform of Information Management and Information System Major under the Management Category

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Abstract. With the coming Big Data era, the curriculum system of the Information Management and Information System (IMIS for short) Major under the Management Category cannot meet the needs of modern society for talents. Many universities have taken many measures to deal with this situation, which means creating the Big Data Major among current majors or directly replacing the IMIS Major under the Management Category with the Big Data Major. In this paper, the overview of IMIS Major under the Management Category is introduced firstly, and then its problems in the Big Data era are analyzed. By referencing to relevant research results, the current situation and trend of IMIS Major under the Management Category reform under the Management Category is studied. Finally, our solution is put forwarded.

1. Introduction
IDC white paper "Data Age 2025" estimated that the global data circle will expand to 175ZB by 2025[1]. Obviously, data is growing explosively. The demand for data science related talents who should be more professional and comprehensive is growing. In order to meet the requirement, Ministry of Education of the People's Republic of China has approved many universities to establish the Big Data Majors, or created the new directions for Big Data training in related majors. IMIS Major under the Management Category under the Management Category is a highly interdisciplinary, and its curriculum system and employment direction are closely related to planning the training of Big Data talent, which provides objective basis for the reform of IMIS Major under the Management Category. This paper focuses on the reform of IMIS Major under the Management Category under management category, and studies how to achieve Big Data talent training.

2. Analysis on development of IMIS Major under the Management Category
2.1. Overview
IMIS Major under the Management Category belongs to the Management Science and Engineering Discipline with strong practicality and innovation. It is an interdisciplinary discipline integrating information technology and management science. This major mainly studies the basic theories and methods of information management, analysis, design, implementation, management and evaluation of information system. Informally, it helps us to explore wealth from a great deal of information. It aims
to train comprehensive talents who have the theoretical basis of modern management, the knowledge and application ability of computer science and technology and master the knowledge and ability in system engineering thought and analysis and management of information system.

2.2. Existing problems

Although the IMIS major has made great progress in the long-term construction, the current training model can no longer meet the talent needs, and the main problems are as follows.

1) The orientation of IMIS Major under the Management Category is not clear.

As the current IMIS Major under the Management Category is a combination or transformation of multiple majors, each type of colleges put more emphasis on its characteristic[2]. In general, there are the problems of inconsistent orientation during the teaching and management[3], and there is a big difference between the training programs.

2) The internal relevance of the curriculum system is weak.

The curriculum system of IMIS Major under the Management Category mainly includes three types of courses, which are relatively independent, presenting a simple combination of knowledge in multiple fields and unclear connections and importance among them, and lacking the overall design concept.

3) The training method of IMIS Major under the Management Category focuses on theoretical teaching.

The training method emphasizes on theoretical teaching over practice, which is a chief feature of the current IMIS Major under the Management Category. Although many universities are equipped with enough experimental facilities and various social practice bases, training of practical ability is not paid attention during the daily teaching, instead, theoretical knowledge is more emphasized[4-5].

4) The training objective of IMIS Major under the Management Category don't match the needs.

Choosing key courses is relatively casual, and there is lack of relevance among of them, it is difficult to establish strong relationships to support them. As a result, the training plan cannot meet the requirements of enterprises, and the ability of universities graduates cannot match market demands.

5) Failing to keep up with the digital transformation of enterprises.

New market demands and new data processing technologies are coming into being and promoting each other. The data era requires enterprises to complete digital transformation as soon as possible, and puts forward more requirements for the talent training of related majors. However, the IMIS Major under the Management Category failed to respond in time. Its course content and training plan have not been adjusted accordingly. In order to meet the talent needs of digital transformation of enterprises, reforming the IMIS Major under the Management Category is extremely urgent.

2.3. Current situation and trend of IMIS Major reform under the Management Category

With the coming data era, the universal application and asset value of Big Data technologies have brought subversive changes to the whole society. In the field of higher education, some measures have been taken to make the construction of related majors keep up the changes of the times. In order to better understand the current situation of data talent training in the IMIS Major, we surveyed 149 universities that have established the IMIS Majors and collected information about their curriculum systems. We focused on the classification and statistics of its big data related courses, a total of 8 categories: Data Analysis Category, Data-platform Category, Computer Science Category, Data Processing Category, Programming Category, Business Intelligence Category, Artificial Intelligence Category, Big Data Foundation Category. The proportion of these categories of courses is shown in Fig.1.

Similarly, China's universities need to reform the traditional IMIS Major under the Management Category on its basis. At present, the most common approach is to add several courses related to Big Data technology, such as Data Analysis Courses, Data Processing Courses and Management and
Development of Data Platform Courses, based on the original Curriculum system of IMIS Major under the Management Category.

Obviously, for the future IMIS Major under the Management Category professional training of Big Data talent is not only to increase the number of professional courses, but consider from the angle of macroscopic training scheme. Especially the teaching practice must meet the development of times and enterprise inevitable trend, combining with the current market demand for the ability of Big Data talent to formulate appropriate centralized teaching practice.

3. Novel Construction of IMIS Major under the Management Category

3.1. Training objective
This IMIS Major under the Management Category aims to cultivate high-quality talents who possess the knowledge of modern management science theory and the ability to apply computer science and data processing technology. They can combine professional knowledge with data thinking, and are competent for data analysis, business intelligence analysis, and decision-making information consultation in a lot of industries such as the Internet, the Business, the Finance, and the Manufacturing. They also have strong practical ability and a certain sense of innovation and broad horizons.

3.2. Leading group for the major reform
Major reform is an important way for universities to cultivate the market-requested talents. The reform of IMIS Major under the Management Category will definitely involve all aspects of universities. An efficient leading group for the reform of IMIS Major under the Management Category needs to be established to be responsible for unified management and overall arrangement of related work. This is an important measure for the reform of IMIS Major under the Management Category which will be successful or not.

The core members of leading group for the reform of IMIS Major under the Management Category should be composed of the leader of the management science and engineering disciplines and the leader of IMIS Major under the Management Category. The group leader should be the vice principal for teaching affairs. The position of the associate group leader should be assigned to the associate dean for teaching affairs. The management departments and staff in universities are shown in Fig. 2.
3.3. Faculty
The faculty is an important guarantee for the implementation of the reform of IMIS Major under the Management Category and the cultivation of new types of talents. The rationality of the faculty structure is a prerequisite. It is especially important to clarify responsibilities of the leader of major and ones of full-time teachers. An example of the suggested situation of full-time teachers is shown in Table 1.

(1) Responsibilities of the leader of major.
The leader of major should participate in revising teaching management regulations, make an overall plan for the development of IMIS Major under the Management Category, design a training plan for professional talents, and master the construction principles of curriculum system. They can also adjust the structure of existing faculty and teaching tasks, introduce high-level professional teachers, build internal and external training bases, and integrate various teaching resources to form a characteristic resource library for IMIS Major under the Management Category.

(2) Responsibilities of full-time teachers.
Full-time teachers must undertake the specific teaching tasks of IMIS Major under the Management Category, formulate syllabus and teaching plans of the courses in charge, prepare lecture notes and PPT, and make experimental instructions for the training courses. They must also participate regularly in exchange activities of teaching method such as teaching demonstrations, professional internal seminars, and teaching reform conferences. Finally, they must complete teaching research projects and teaching materials and apply for teaching achievement awards.

Table 1 The suggested situation of full-time teachers

| Professional and technical title | Ages 35 and younger | Ages 36 to 45 | Ages 46 to 55 | Ages 56 to 60 | Ages 61 and older | Teachers with Master Degree | Teachers with Ph. D. | Total |
|---------------------------------|---------------------|---------------|--------------|--------------|------------------|---------------------------|-------------------|-------|
| Senior title                    | 0                   | 1             | 2            | 0            | 0                | 1                         | 1                 | 3     |
| Deputy senior title             | 0                   | 1             | 4            | 1            | 1                | 1                         | 1                 | 7     |
| Intermediate title              | 1                   | 5             | 2            | 0            | 0                | 2                         | 3                 | 8     |
| Elementary title                | 1                   | 1             | 0            | 0            | 0                | 1                         | 0                 | 2     |
Data rules of this table 1: (1) 90 students per grade; (2) Total number of full-time teachers: total number of students in four grades = 18: 1; (3) Number of teachers with Master Degree or Ph. D. = Number of full-time teachers * 50%; (4) Number of teachers with intermediate titles and above = Number of full-time teachers * 90%; (5) Number of teachers with high-level title (Senior title, Deputy senior title) = number of full-time teachers * 50%; (6) Number of teachers with Senior title : Number of teachers with Deputy senior title = 3: 7; (7) The proportion of teachers at each of age stages = 2: 8: 8: 1: 1.

3.4. Curriculum system
In order to provide a better route for the market's requirements for Big Data talent, we have proposed a novel curriculum system of IMIS Major under the Management Category oriented to the training of Big Data talent according to the teaching situation and the goals of major reform. The curriculum system has three parts: the traditional theory courses, the new theoretical courses (Big Data-oriented theoretical courses), and the innovative practice courses, seeing Table 2 for details. Among of them, the new theoretical courses are some categories of courses aimed at the training of Big Data talent, which are mainly selected by the statistical results of Fig.3.

![Fig.3 New curriculum system of IMIS Major](image)

The structure of the curriculum system must follow the basic principle combining theoretical teaching with practical training. The IMIS Major under the Management Category adopts self-built or outsourcing methods to complete practical courses, which are not in line with the direction of Big Data training of IMIS Major reform, and are not conducive to improve the ability of data analysis and business practice for students. Therefore, we adjusted the original framework of practical curriculum and proposed an innovative solution for practical curriculum.

This solution will adopt three new school-enterprise cooperation modes which cultivate talents uniting with leading companies in the Big Data industry, provide students with a realistic hands-on operating environment, and stimulate the initiative of student to adapt to the changing society spontaneously.

(1) Co-building industrial college mode: Guided by the strategy of national education reform strategy, this mode orients Big Data, Cloud Computing, Artificial Intelligence and other advanced technologies, depends the integration of production and education, and promotes engineering
professional certifications. The new industrial college mode which is a kind of school-enterprise collaboration education cultivates cross-cutting creative talents in the new era.

(2) Student training camp mode: Based on the concept of the OBE engineering education and realistic case design, using the content setting of "Actual project, Real-world training, Field test", this mode can cultivate comprehensive talents who closely combine theory and practice, and redefine new standards for practical training. It will be in line with industry and adopt multi-dimensional evaluation system combining project-based promotion, certification and competition with the latest technology such as Big Data and Artificial Intelligence showing the effect of spiral progressive learning to improve students' comprehensive ability.

(3) Teacher study Club Mode: Focusing on the applications area of frontier technologies such as Cloud Computing, Big Data, and Artificial Intelligence, the backbone teachers will survey on leading companies in the Big Data industry, and understand the latest products, successful cases, development trends and the needs of talent. Then they will apply theoretical knowledge to practice operation, and accumulate practical experience in the industry. The backbone teachers and enterprise experts should establish normalized communication channels to realize the coordinated and integrated development of scientific research, education, and production.

4. Conclusion
From the perspective of Big Data talent training, this paper studies several problems existing in the development of IMIS Major under the Management Category and its future reform plan. Firstly, the development of IMIS Major under the Management Category is sorted out, and several main problems are summarized. Then the advantages and disadvantages of the existing reform measures of IMIS Major under the Management Category are briefly analyzed. On the basis of these results, this paper makes an in-depth study on the reform plan of IMIS Major under the Management Category oriented to Big Data talent training which involves training objective, faculty, leading group for the major reform and curriculum system. In conclusion, it is an inevitable trend for the IMIS Major under the Management Category to develop towards Big Data talent training. However, it is not only necessary to increase the number of Big Data courses, but also necessary to study the innovative design of training programs as a system engineering. In particular, it must be paid attention to design practical courses offered by universities in conjunction with leading enterprises in the Big Data industry.

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