WHAT FACTORS INFLUENCE UNDERGRADUATE STUDENTS TO STUDY IN A BIG DATA CURRICULUM: THE CASE OF A CHINESE UNIVERSITY

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ABSTRACT

With the support of the Chinese government's big data strategy, China's big data industry has achieved rapid development, which is also stimulating the talent gap of big data. As an applied university, Baise University has an inescapable responsibility for the cultivation of big data talents.

The main objectives of this study are: to study the reasons of choosing the big data as education of choice of undergraduate students of Baise University. To study the reasons of choosing the big data as education of choice of experience people. To identify the admission and college administration which can attract the students decisions.

This IS applied the sequential explanatory method of the qualitative and quantitative mixed- method. First used qualitative research, and then extend the results of qualitative research to quantitative research. In the qualitative research stage, structured interviews were used, and 10 open questions were used for interviews. The sample comes from 2 undergraduates in Baise University's IT-related

majors and 2 experienced staffs with more than 5 years of experiences in relevant data sciences fields. As for the quantitative, 56 questionnaires are randomly sampling，38 undergraduate students form computer science, mathematics and statistics, and Electronic information engineering of Baise University, 18 experienced staffs with over than 5 years of experiences in relevant data sciences fields. The questionnaires are validated the quality of 26 items by 4 experts (IOC value >.70).

The finding，respondents' awareness of big data is not high, even IT engineering professionals have little knowledge of big data. The respondents between the ages of 31 and 40 have medium to high level knowledge of big data. Experienced employees need big data more than students. Mathematics and statistics students need big data more than computer science students or electronic information engineering students. The main goals of computer science students learning big data are "mastering big data software development technology" and "improving big data literacy", the goals of professional big data learning are mainly "improving big data literacy" and "mastering big data modeling and analysis technology", the goal of electronic information engineering students learning big data is "to master the security and system maintenance technology of big data", and the goal of in-service staff to learn big data is "to master the development technology of big data application software". The biggest barrier for students to participate in big data degree education is "big data technology difficulty", followed by "not interested in big data", "economic difficulties" and "entrance difficulty", the biggest barrier for experienced employees

to participate in big data academic education is "Insufficient learning time after work." Respondents paid a lot of attention to "research strength", "teacher level" and "production and teaching integration level", followed by "school facilities", "school popularity and reputation" and "tuition fees and scholarships". Students are more concerned about "tuition fees and scholarships" than those with work experience. The higher the family's economic income, the less attention is paid to "tuition fees and scholarships". These findings can provide valuable insights into the recruitment and management of big data graduate students at Baise University.

Keywords: Education Choice, Big Data, Big Data Analytics, Big Data Education, Higher Education

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CHAPTER 1

INTRODUCTION

1.1 Research Background

As the value of data becomes more and more important, the effective use of data has become the most important engine driving the development and reform of enterprises. The use of big data is the key for enterprises to surpass their competitors. In many industries, new entrants and established competitors use data-driven strategies to compete, capture, and innovate. With the help of big data, enterprises can analyze and identify the most valuable customers to help them create new experiences, services and products and achieve various goals.

Although the term "big data" was first coined in 1997 by NASA researchers. However, the real revolutionary "big data" came from three papers published by Google from 2004 to 2006: distributed file system GFS, distributed computing framework MapReduce and NoSQL database system BigTable. Inspired by these three papers, talented programmer Doug Cutting initially implemented distributed file systems and distributed computing frameworks while developing Nutch, an open source search engine.

In 2006, these functions were separated from Nutch and a special project, Hadoop, was launched. With the advent and promotion of Hadoop, big data technology has been widely applied to all walks of life.

However, the shortage of Big Data Sciences Talent is the key factor to promote technology industrialization. In order to meet the needs of big data development. Found in 2016, JiangSu Chuanzhi Podcast education group, the largest IT training institution in China, has taken the lead in launching the big data talent training

project. As a result, JiangSu Chuanzhi mainly recruit it-related undergraduate graduates from universities and then export them to relevant employers after six months of intensive training.

From the big growth above, after that, Beijing Shangxuetang Education Group, Beijing Qianfeng Education Group, Guangzhou Xiaomage Education Group and other IT training institutions successively carried out training programs related to big data and artificial intelligence, cultivating no more than 6,000 talents per year. The high demand of Big data workforce has kept increasing in 2017, there are 32 universities offering undergraduate programs in data science and big data technology, and then the courses were increased its popularity in 2018 and 2019, into 250 and 196 universities.

In 2020, there are a total of 560 colleges and universities in China offering majors in data science and big data technology. According to the calculation that every college and university trains 100 people every year, approximately 56,000 talents were successfully trained every year. Most importantly, there are no graduates yet.

With this need, Baise University, which is one of leading university in Nanning and Guangxi, has its direction to update its big data class fit to current business and economics to align with government trends.

By doing so, is like capital university of economics and business (China) in the direction of big data on the basis of management and economics, in an attempt to cultivate interdisciplinary talents with management background.

However, the researcher needs to explore what kind of practical approach, method and content in course management which support the cultivation of big data

compound talents. Under the premise of downplaying computer software development technology and statistics, what kind of students prefer the compound big data postgraduate courses? In other words, what factors will affect students' choice of big data education?

This research is to answer what's kinds of influence of demographic variables on students' educational choices has always been the subject of academic research as "The Impact of company's Demographic Variables on Determinants of University Choice Decision: in order to entice the right target group of Baise undergraduate students, if the Baise know what kind of students have more courses to become Baise university big data graduate students? What kind of teaching and class conditions, types of big data technology and skills are they more focused on in 2020? It will be very effective to serve both seasonal workforces, and freshman undergraduate to further study in colleges.

1.2 Research Question

The research focuses on the following questions: why should we cultivate big data talents? What kind of big data talent? Baise University undergraduates, who are most likely to learn big data? What knowledge, technology and capabilities do the Baise University potential students applicants need for big data? What's kind of the admission and college training approach and administration which can attract the students' decisions?

1.3 Research Objective

Through population variable statistics, this project aims to study:

(1) to study the reasons of choosing the big data as education of choice of undergraduate students of Baise University.

(2) to study the reasons of choosing the big data as education of choice of experience people.

(3) to identify the admission and college training approach and administration which can attract the students' decisions.

CHAPTER 2

LITERATURE REVIEW

2.1 Definition of Big Data

Although big data has been getting a lot of attention around the Business world. However, the definition of big data is still varied in many aspects. The term and definition depends on the purpose of usage Big data in job or industry.

A commonly accepted definition is that

Elgendy, N. and Elragal, A. (2014) Big data is the data that exceeds the processing capacity of traditional database system.

Constantiou, I.D. and Kallinikos, J. (2015) Big data refers to data sets that are too large to be processed with traditional tools and database management systems.

Kaya, T. (2019) Big Data is to large volumes of information. This information varies from pictures, videos, texts, audios and other heterogeneous data.

Mayer-Schonberge, V. (2013) big data is not only triggered a technological revolution, but also a revolution in business models, management models and thinking models. Big data can bring a wide range of insights and benefits, such as operational optimization, actionable intelligence, identification of new markets, accurate forecasting, failure and fraud detection, more detailed records, improved decision-making, and scientific discovery.

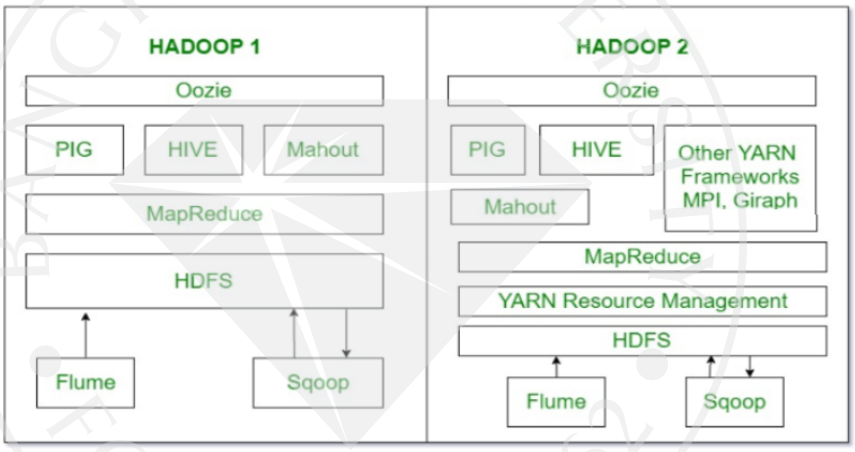
In conclusion, Big data is a data and information tool with a technological revolution, for building business models, management models and thinking models. The implication of Big data can bring a wide range of insights such as operational optimization, actionable intelligence, business forecasting, consumer behaviors study and discovery

2.2 Big data Architecture

As for the Big data Architectures which commonly used in China and Baise university education are known “Hadoop”

Hadoop is a top-level Apache project that started in 2006 (Khan, 2014). Its first version, Hadoop 1.1, was released in 2011. Two years later, Apache released version 2.06 of Hadoop, and Apache Hadoop version 3.0 was released in December 2017

As the most successful big data framework, the Hadoop ecosystem has become the model of big data framework. The figure 2.1 is a Hadoop ecosystem.



source: AnkitSelwal
https://www.geeksforgeeks.org/difference-between-hadoop-1-and-hadoop-2/?ref=rp

Figure 2.1: Hadoop Ecosystem

As figured 2.1 shown above, this Hadoop Application Architecture has redundant storage structure makes it fault-tolerant and robust. Alsom the hadoop Map Reduce is working on the principle of data locality. The Therefore decreasing network traffic which would otherwise have consumed major bandwidth for moving large datasets and make all data flow and economical wise.

2.2.1 Distribute file system component

The default file system of Hadoop is the HDFS (Sabitha, 2015), it refers to

Hadoop distributed file system, and it originated from the concept of Google File System GFS.

With HDFS, the data files are divided into block sequences and copied to the storage nodes in the cluster for storage. Hadoop clusters can access HDFS from applications in many different ways by simply adding normal servers to expand computing power, storage power, and I/O bandwidth. Essentially, HDFS provides a Java API for applications.

2.2.2 Distribute computing component

MapReduce: Just like HDFIS, MapReduce is another core component of Hadoop (Khan, Yaqoob, Hashem, Inyat, Ali, Alam, Shiraz, Gani, 2014). It provides a programming paradigm for large-scale parallel computing across many servers in a Hadoop cluster.

Spark: Spark fills the gap of Apache Hadoop in data processing. It USES the memory data processing instead of the disk data processing of MapRudece, thus achieving higher computing performance (Verma, 2018). Spark can handle both batch and real-time data.

Storm: Apache Storm is a system for processing streaming data in real time. It adds reliable real-time data processing capabilities to Enterprise Hadoop. It is suitable for solutions that require real-time analysis, machine learning and continuous monitoring of operations (Cloudera, 2020).

Unlike Storm, MapReduce and Spark all are off-line computing components.

In conclusion, Distribute Computing Components are working real-time data with off-line computing components working together as dual systems. Thus, the Big data scientist and pull out data to processing automatically through this technology.

2.2.3 Database and warehouses components

HBase: HBase is a NoSQL database in Hadoop architecture. It is a distributed management system of BigTable based on Google. HBase can be accessed through the application programming interface (API). By default, HBase is completely dependent on the ZooKeeper instance (Khan, Yaqoob, Hashem, Inyat, Ali, Alam, Shiraz, Gani, 2014).

Amit Verma (2018) explained the Database and Warehouses components which are composed of

MongoDB: MongoDB is an open source NoSQL database that is cross-platform compatible with many built-in features

Apache Cassandra: Apache Cassandra is another open source distributed database management system developed by Facebook. It is one of the best big data tools for dealing mainly with structured data sets. It has certain capabilities that other relational and NoSQL databases cannot provide

Neorj: Neorj is a graph database model. It is suitable for dealing with large amounts of network data or graphics-related problems, such as social networks or demographic patterns

Hive: Hive is the Hadoop based data warehouse. It uses its own querying language called HiveQL, this runs in all operating system (Sabitha, 2015).

In conclusion, NoSQL database makes up for the shortcomings of traditional databases to deal with unstructured data. Most NoSQL database and data warehouse components are open source software. They can be integrated into the Hadoop environment, also they can run independently, and interface with application systems through interfaces. Big database scientists can choose the appropriate database and

data warehouse components and use them in combination with Hadoop according to the type of business.

2.2.4 Big data analysis and data mining components

Data analysis is the process of examining data to discover facts, relationships, patterns, insights, and/or trends. The overall goal of data analysis is to support better decision making

In the big data development architecture, some methods or tools have been provided that can be directly used to analyze large amounts of data from different sources.

Common data analysis and mining tools include: RapidMiner/RapidAnalytics, Mahout, Orange, Weka, Hep Work, KEEL, SPMF and Shadow (Sabitha,2015).

In addition, there are several business intelligence tools in the big data analysis market.

In conclusion, The Hadoop ecological chain integrates a large number of mature data analysis and data mining components. They are the intelligent achievements of countless data scientists and engineers. Big data development engineers or scientists need to be familiar with popular data analysis components and data mining components, especially the application of their interfaces, so that big data analysis and applications can be performed efficiently.

2.3 Best Practices of Big Data Manpower Recruitment and Development

Talent shortage has always been an important factor in the development of big data industry. In order to cope with the shortage of talents, different enterprises adopt different talent strategies.

Bernard Marr (2016) proposed some specific solutions to the problem of talent

shortage, such as focusing on attracting or developing certain skills, training existing internal employees into big data talents, cooperating with universities and research institutes, sharing big data talent resources, project outsourcing and service outsourcing, etc.

As an important source of talents, colleges and universities are an important place to cultivate talents with big data. Library and Information Studies (LIS), data science, statistics and computer science are regarded as the main sources of potential big data talents (Song & Zhu, 2016).

Some LIS schools began to offer new data science and data management programs, incorporating data science, data management and data management courses into their programs.

According to statistics in 2014 (Swanstrom, 2013), nearly 170 universities in the world offer majors related to big data, among which about 150 universities offer degree courses of master degree or above. More than 60 universities in the United States offer majors related to big data, and more than 30 universities in Europe. Data science education in the United States is divided into four categories: specialty/concentration of bachelor's programs, certificate programs, master's programs and doctoral programs.

In China, the ministry of education has defined seven undergraduate majors related to the cultivation of big-data talents: information and computing science, computer science and technology, software engineering, information management and information system, information and computing science, data science, statistical data, applied statistics and big data technology. There are 2,638 colleges and universities in China

In the ministry of education undergraduate employment list released since 2012, found that the data of priority to the development of science and technology of data into two major, as a result, the ministry of education, according to the needs of the development of social economy and the existing teaching conditions, encourage universities to perfect the existing major, develop large data related to the new professional.

In 2015, the Ministry of education approved the establishment of the undergraduate program of data science and big data. Peking University, the university of international business and economics and central south university were among the first to be approved.

In 2016, 32 universities applied and were approved by 2018, more than 560 universities across the country offered the major. At the postgraduate level, with the support of the policies of the ministry of education, some dominant universities have carried out big data projects. These universities usually set up a variety of data science courses and projects by integrating the faculty of the school of computer science and statistics.

Fudan university (FDU) launched a doctoral program in data science in 2010 and a master's program in data science in 2015. In 2013, Beihang university launched a graduate program in data science. In 2014, Tsinghua university set up the data science research institute and launched a number of multidisciplinary data science master's programs.

In terms of vocational education, the ministry of education approved 50 higher vocational colleges to carry out cloud computing and application projects in 2016, and 53 higher vocational colleges to carry out e-commerce technology projects.

To make up for the undergraduate training quality and industry demand gap caused by the shortage of talent, in 2015, Jiangsu preach wisdom podcast education group first opened the big data direction talent training business, from various universities recruit related to computer science university of fourth grade students, a six-month training, then recommend a unit of choose and employ persons, won a good social effect. Later, many IT training institutions such as Beijing Shangxuetang and Beijing Qianfeng Education successively set up businesses related to big data, such as big data and artificial intelligence, cloud computing, and security operation and maintenance of big data. The business of these institutions effectively fills the vacancy of big data talents. It is understood that there are many students from outside the computer science major who have participated in the training.

In 2017, Beijing Baidu netcom technology co., ltd. launched the "Baidu artificial intelligence institute" project, jointly cultivating big data technical talents with some domestic colleges and universities. Later, Ali wait for a moment IT leading enterprise also rolled out similar project.

In conclusion, in order to cope with the shortage of big data talents, employers, institutions of higher learning, secondary vocational technical schools and social training institutions are all playing an active role. They have explored a variety of talent training programs, curriculum systems and practical models. Provide different levels of big data talents for different fields.

2.4 History of Big data Education for China Economics Growth

From the statistic of Big data industry ecological alliance (2019), in order to promote the development of big data, the Chinese government has introduced a series of policy measures. In March 2014, "big data" was written into the government

work report for the first time. In August 2015, the state council of the People's Republic of China promulgated the program of action for promoting the development of big data (The state council of the People's Republic of China).

In March 2016, big data became the national development strategy. In December 2016, the ministry of industry and information technology promulgated the big data development plan (2016-2020).

By 2019, approximately 17 provinces and cities across the country will have established big data development planning bureaus.

China's big data industry is developing rapidly. In 2012, the market size was 470 million yuan. In 2014, the market size increased to 2.32 billion yuan, up to 107.14% compared with 2013.

The market size reached 2.571 billion yuan in 2015, with a growth rate of 75.6% compared with the same period in 2014. China's big data industry reached $73 billion in 2017, up 30.6 percent from 2016. In 2018, the size of China's big data industry was 438.45 billion yuan, which is expected to reach 807.06 billion yuan in 2021.

China's big data has been widely used in government affairs, retail, transportation, medicine, education, public governance and other fields. In academic research, the number of big data papers in China jumped from 3.4 % in 2015 to 22.8 % in 2018, and its citations rose from 1.8 % in 2015 to 20.8% in 2018, surpassing the United States. China has a huge number of data professionals, 59.5% worldwide, compared with 22.4% in the United States, which ranks second (Srivastava, 2019).

In short, the rapid development of China's big data industry is closely related to the strong support of the Chinese government. The Chinese government's strategic

decision on the big data industry is to further stimulate the demand for big data talents.

2.5 Teaching Big Data and Training Approach for 2020

The relevant classifications of big data jobs and described the skills requirements of corresponding jobs. In their studies, SQL, data base, data warehousing, data analysis, extraction transformation and loading (ETL), business analysis， data modeling, business intelligence, R, Python, Hadoop, Spark, Strom, statistical, mathematics, data mining, data science, data visualization, data science are frequent concepts and skills.

Rameshwar Dubey (2014), in his article "education and training for successful career of big data and business analysis", put forward the requirements of hard skills and soft skills for the cultivation of big data talents. Among them, hard skills include: statistics, forecasting, optimization, quantitative, finance, financial accounting, multivariate statistics, multi-standard decision making, marketing, research methods, finance. Soft skills include: leadership, team skills, listening skills, learning ability, positive attitude, communication skills, interpersonal skills, patience, enthusiasm.

Il-Yeol Song (2015) conducted a research on graduate curriculum system shows that many graduate programs in American universities have set up such courses as Exploratory Data Analysis， Data Mining , Data Visualization , Statistical Modelling, Machine Learning , Information Retrieval , Information and Social Network Analysis, Data Warehouse, introduction to Data Science, Research Methods , Social Aspects of Data Science , Algorithms , Data Cleaning, etc.

Jilong Zhang (2017) studied on the development of data science education in China, the results show that many graduate programs in Chinese universities offer

common courses, such as data management, data analysis, data warehouse, data mining, web analysis and text mining, social network analysis, Internet information analysis, data storage, database systems and data structures, business intelligence, prediction and decision, competitive intelligence analysis, knowledge management, information prediction:

In the most popular big data certification system in 2020 the core contents involved in certification include: Hadoop, Spark, data preparation, statistical and visual exploration, big data programming and loading, predictive modeling, data analysis, time series, experiment and optimization.

Amit Verma, year (2020) studied about most popular tools in 2020 which are Hadoop, Apache Spark, Apache Storm, Cassandra, RapidMiner, MongoDB, R programming tool, Neo4j, Apache SAMOA, HPCC. This suggests that these technologies are the last to be looked at in 2020.

2.6 Big data Course Content in 2020

Regularly, IT and Big data training institution can better meet the needs of business processes to set up courses. For example, the Business Process Incubator training Big data institute to reskills IT engineers and scientists has structure its training courses by follows:

(1) Overview of Big Data

(2) Using Big Data in Businesses

(3) Technologies for Handling Big Data

(4) Understanding Hadoop Ecosystem

(5) Dig Deep to understand the fundamental of MapReduce and HBase

(6) Understanding Big Data Technology Foundations

(7) Databases and Data Warehouses

(8) Using Hadoop to store data

(9) Learn to Process Data using Map Reduce

(10) Testing and Debugging Map Reduce Applications

(11) Learn Hadoop YARN Architechture

(12) Exploring Hive

(13) Exploring Pig

(14) Exploring Oozie

(15) Learn NoSQL Data Management

(16) Integrating R and Hadoop and Understanding Hive in Detail

For the Baise University course syllabus big data in 2020, the course this course has important reference value.

From the 2.1-2.6 literature reviews, this research can define interview and question items to find the forms and course characteristic of big data which can attract people from all over China to further study Big data both Bachelor and Master degree level. Especially, the Nanning and Guangxi business and industrial zone.

CHAPTER 3

METHODOLOGY

3.1 Research Design

The descriptive research is the most representative research method, it includes observational methods, case-study methods and survey methods. In this study, the survey method was preferred.

Qualitative research is used to determine the factors affecting students' teaching choice and big data selection, and quantitative research is used to analyze the phenomenon in qualitative discussion.

The study was carried out according to the flow shown in figure 3.1

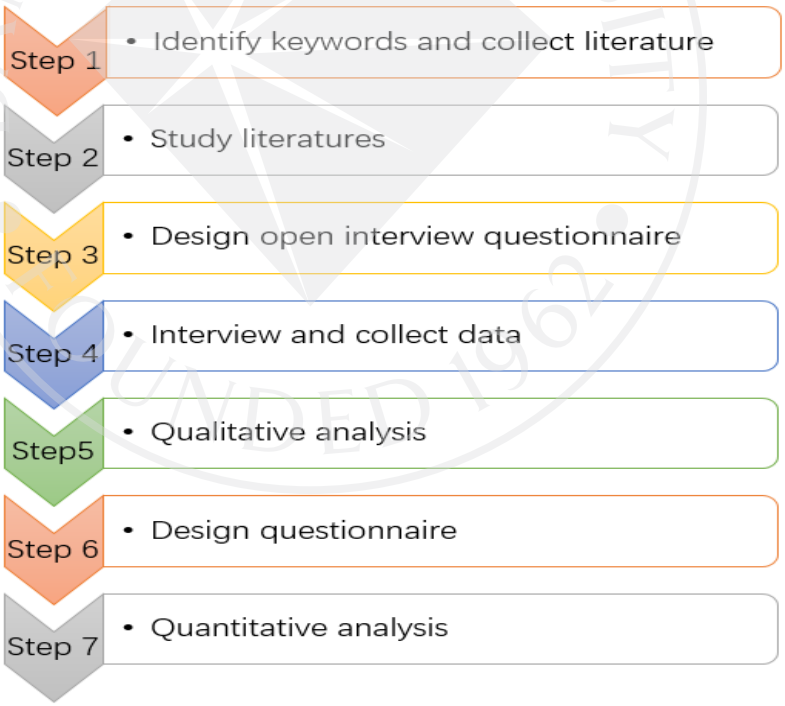


Figure 3.1: Study Process

(1) Identify keywords and collect literature. Identify the keywords which related to the research topic and search the literature from the Internet or academic journal network according to the keywords.

(2) Study literatures. Through studying literature, understand the factors that affect students' professional choices, what kind of students are interested in big data, and why are they interested in big data? What is the reason for not being interested in big data? What kind of teaching conditions, management system and curriculum system do they need? During this process, demographic variables are factors that cannot be ignored.

(3) Designing interview questionnaire. According to the results of literature study, designing a interview questionnaire in which composed of open questions.

(4) Interview and collect data. Taking the undergraduates of Baise university and experienced people as samples, the interview was conducted face to face with the questions in the questionnaire, and the interview content was recorded and audio recording was made

(5) Qualitative analysis. Sort out the interview records, identify the keywords in the interview records, and try to summarize and classify the keywords according to the literature. For example, what attracts students to big data, students' learning barriers to big data, students' expectations on teaching conditions, students' expectations on the curriculum system, etc. Finally, a conceptual framework is established for the research objectives according to the classification standards provided by relevant literature.

(6) Designing quantitative questionnaire. According to the conceptual framework obtained from qualitative research, the variables that attract students to big data are determined, and the questionnaire used in quantitative research is designed.

(7) Quantitative analysis. Questionnaires were distributed, data collected, and

data analyzed with the PSPP tool.

The qualitative analysis data were obtained from an open-ended interview questionnaire of students from Baise university. The quantitative analysis data were obtained from a questionnaire of 57 respondents, among whom 23 were undergraduate students in computer science, 15 were undergraduates in mathematics and statistics and 17 were social workers.

3.2 Sampling

This IS study is applied mixed method of research which are composed of qualitative approach and quantitative approach.

3.2.1 Qualitative research samples

After the literature study, a conceptual framework was building. It is shown in Figure 3.2.

According to this conceptual framework, 10 opened-interview questionnaires were designed and used in structured interviews. The interview questionnaire is presented in Appendixes A.

Four people were interviewed, among them, one is an undergraduate student of Baise university, one is a fresh undergraduate student of Baise university, two are the experienced staffs who graduated from Baise university 10 years ago.

After getting 4 interview dialogues, the researcher make the coding and categorizing the findings by follows:

(1) Keyword marking and narrative coding

Keywords and key sentences related to the topic were marked in the original interview records, and the relevant face changes affecting students' choice of big data were determined by coding, classification and summary according to the tag content.

The narrative coding of the original data interview and the detailed format of the topic are shown in appendix B.

(2) Qualitative research conclusion

According to narrative coding and classification, key words are found and counted to obtain the impact of college students' choice of big data graduate program, as shown in section 4.1.

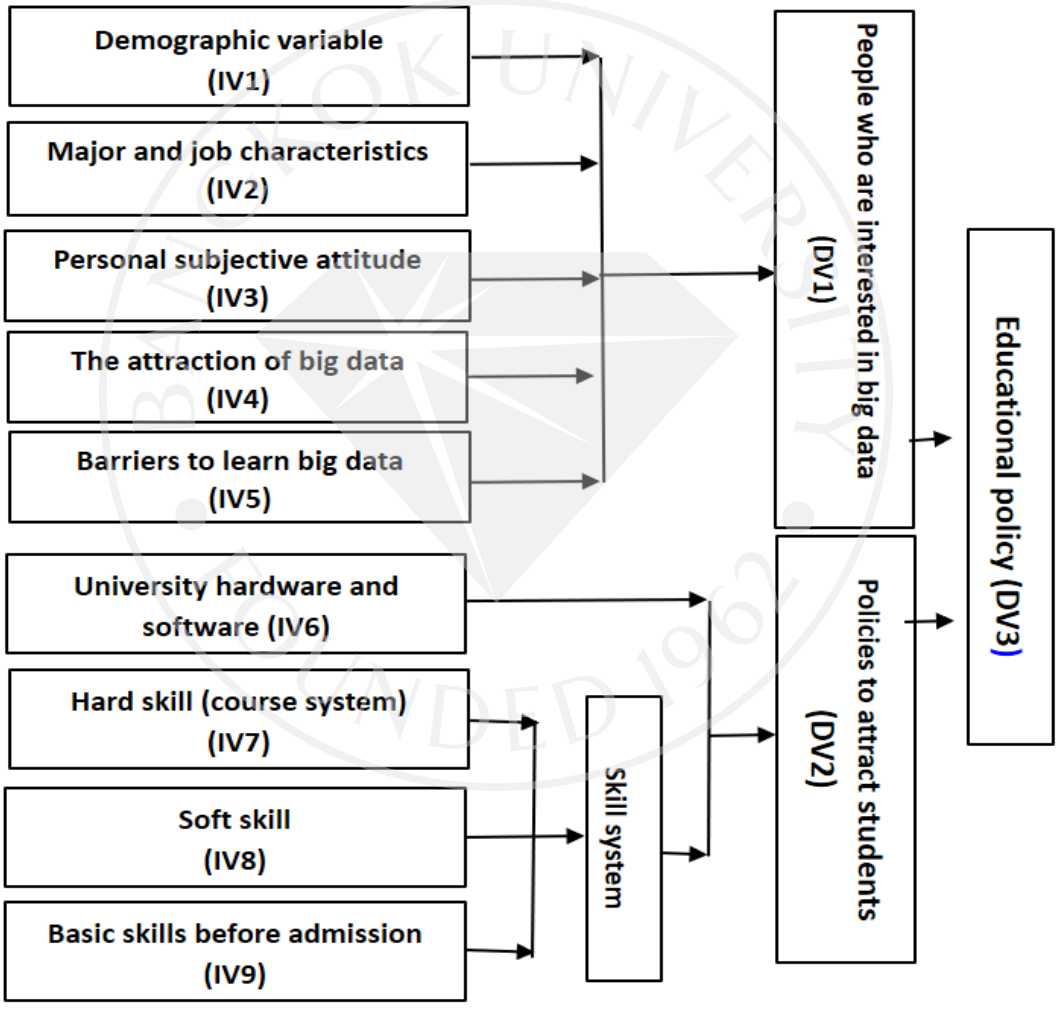


Figure 3.2: Conceptual Framework

According to the results of qualitative research, the specific factors of various variables in the conceptual framework can be further determined. The table 3.1 showing the variables which impact the students' education choice.

Table 3.1: variables in the Conceptual Framework

Categories	Variables
Demographic variable (IV1)	Gender
	Age
	Family location
	Family Income
	individual education background
	Family education background
	Individual decision making ability
	Major
	Career type
Major and job characteristics (IV2)	Bigdata need for job
	Bigdata need level
	Goal of bigdata learning
Personal subjective attitude (IV3)	Know about Bigdata
	The attitude to big data
The attraction of big data (IV4)	Career Advancement
	More Salary increment
	The megatrend of postgraduate entrance examination
	Interest in big data
	Megatrends of business world
Barriers to learn big data (IV5)	Lack of Financial Aid
	Corporate (employer) policy barriers
	Difficult entrance examination
	No interest in big data
	Big data technology is hard
	No need to upgrade degree
	Lack of study time after work
	Too senior to learn new things

(Continued)

Table 3.1 (continued): Variables in the Conceptual Framework

Categories	Variables
University hardware and software (IV6)	Education form
	Enrollment form (Admission form)
	Teaching method
	The Popularity and reputation of the school
	School facilities
	Faculty and teaching level
	Scientific research strength
	Integration level of production-teaching
	Tuition and scholarships
Major Hard skills (course system) (IV7)	Exploratory Data Analysis
	Data Mining
	Data Visualization
	Multivariate statistics and Modelling
	Machine Learning
	Data Warehouse
	Forecasting and decision making
	Big data security technology
	Introduction to Data Science
	Research Methods
	Consumer Marketing Analysis
	Finance
	Big data platform technology
	Management
	Information and Social Network Analysis
Major Soft skills (IV8)	Leadership ability
	Team skills
	Communication skills
	Listening skills
	Positive attitude
	Interpersonal skills

(Continued)

Table 3.1 (continued): Variables in the Conceptual Framework

Categories	Variables
Basic skills before admission (IV9)	Probability and Statistics
	Programming
	Discrete Mathematics
	Data Structures and Algorithms
	Database
	Data Mining

At the last, the researcher developed a questionnaire for the quantitative study based on the variables in Table 3.1

3.2.2. Qualitative research samples

The respondents were undergraduates from Baise University and social workers with work experience. Undergraduates from five majors including computer, mathematics and statistics, electronic information engineering, network engineering and Internet of things engineering took part in the sample. Among the social workers with work experience, many graduated from Baise University, and a small number are their colleagues. They are mainly engaged in big data training, software development or IT-related work, and work in Beijing, Guangzhou, Baise and other places. Using the method of simple random sampling, 60 students were invited to participate in the survey. Finally, 56 students submitted the questionnaire, and the response rate was 93.33%. All the questionnaires collected are valid questionnaires.

In order to improve the efficiency of questionnaire sample data collection and statistics, this study used the free online survey website "questionnaire star", which was created and published online. Respondents could visit the WEB, fill in and submit questionnaires online.

Table 3.2 shows the frequencies of the demographic variables. According to the descriptive statistics, the frequency of the respondents' gender was approximately equal. Of the respondents, 25 were female (44.64%) and 31 were male (55.36%). The respondents are mainly undergraduate students or fresh undergraduate students. 39 were less than 24 years old, accounting for 69.64%; 8 people aged 25 to 30, accounting for 14.29%; 8 people between 31 and 40 years old, accounting for 14.29 %; 0 people aged 41 to 45 years old, accounting for 0%; 1 person was over 45 years old, accounting for 1.79%. There are 34 respondents major in computer science(include computer science and technology, network engineering, internet of things engineering), accounting for 60.71%, 17 of them are undergraduates; There are 15 respondents major in Mathematics and statistics, accounting for 26.79%; There are 5 respondents major in Mathematics and statistics, accounting for 8.93%; There are 2 respondents major in other major(Agricultural mechanization and its automation, Casting engineering), accounting for 2.57%. 38 of the respondents are students (67.86%), 5 are big data trainers(8.93%), 5 are software development engineers (8.93%), and 8 were employees in it-related positions (14.29%).The vast majority of respondents came from rural areas and townships, including 42 from rural areas (75%), 2 from townships (3.57%) , 3 from county or county-level cities (5.36%),5 from prefecture-level cities (8.93%), 3 from provincial capital cities (5.36%) and 1 from municipality directly under the Central Government (1.79%). The family economic income is mainly concentrated between 1000 and 50000, among which, there are 11 families (19.64%) income below ￥1000 per month, 20 families (35.71%) income between ￥1000 and ￥5000, 8 families (14.79%) income between ￥5000 and ￥10000, 11 families (19.64%) income between ￥10000 and ￥20000,

and 6 family (10.71%) income is more than ￥20000 per month. The education background of the respondents almost all are bachelor, accounting for 98.21%only one is College degree, accounting for 1.79%. In terms of family education background, 14 respondents (25%) are below junior college level, 41 respondents (73.21%) are undergraduates and only one respondent (1.79%) is a master. 22 respondents (39.29%) make education choice decision by themselves, 20 respondents (35.71%) by their family, 6 respondents (10.71%) make education decision with the influence of their friends, 7 respondents (12.5 %) make education decision following the boss or their teacher, and only one respondent (1.78%) make education choice decision is influenced by other people.

Table 3.2: Frequencies of Demographic Variables of Participants (N = 56)

Demographic Variables	**f**	**%**
Gender		
Male	31	55.36
Female	25	44.64
Age		
<24	39	69.64
25~30	8	14.29
31~40	8	14.29
41~45	0	0
>45	1	1.79
Major type		
Computer science	34	60.71
Mathematics and statistics	15	26.79
Electronic information engineering	5	8.93
Other	2	2.57

(Continued)

Table 3.2 (continued): Frequencies of Demographic Variables of Participants

(N = 56)

Demographic Variables	f	%
Job type		
Student	38	67.86
Big data training lecturer	5	8.93
Software development engineer	5	8.93
Other IT related occupations	8	14.29
Family live		
Rural	42	75
Townships	2	3.57
forth-tier cities (County or county-level city)	3	5.36
third-tier cities (prefecture-level city)	5	8.93
Second-tier cities (provincial capital city)	3	5.36
First-tier cities (municipality directly under the Central Government)	1	1.79
Income of the family (TL)		
<=¥1000	11	19.64
¥1000~¥5000	20	35.71
¥5000~¥10000	8	14.79
¥10000~¥20000	11	19.64
>¥20000	6	10.71
Educational Background		
College degree or below	1	1.79
Bachelor	55	98.21
Master	0	0
Doctor	0	0

(Continued)

Table 3.2 (continued): Frequencies of Demographic Variables of Participants

(N = 56)

Demographic Variables	f	%
Family Educational Background		
Below Junior college	14	25
College or Bachelor	41	73.21
Master	1	1.79
Doctor	0	0
The people who influence on education choices		
Myself	22	39.29
My Family	20	35.71
My Friends	6	10.71
My boss or my teacher	7	12.5
Other	1	1.78

3.3 Data Collection Tool

In this study, the questionnaire was used as a data collection tool. In order to prepare the survey questions, first consult the relevant literature and preliminarily determine the relevant variables. Secondly, through qualitative research, relevant variables affecting students' choice of big data are further collected. Finally, with the suggestion of four experts in the field of big data technology, the collected variables were developed into a questionnaire.

Through literature research and qualitative research, identified 9 class variables, a 64 key factors, including nine people mouth statistical variables, specialized and professional characteristics, three individual subjective attitudes of 2, 5, the attraction of big data learning barriers data eight, nine college of software and hardware

conditions, large data system (course) 15 professional hard skills, six big data professional soft skills, and learning the basic skills of six big data. The influence inheritance (variable) was finally compiled into 23 closed questions. The questionnaire is shown in appendix D.

The questionnaire is divided into three parts. The first part is to collect demographic data of students; the second part is to collect data that influences respondents' choice of big data; the third part is to collect factors and data on how to improve the attractiveness of big data.

Respondents' expectations for objective factors were based on a likert-style 5-point scale, with responses ranging from 1 (strongly disagree/very little/very little needed/very little important) to 5 (strongly agree/very much understand/very much need/very important). In order to determine the range of likert scale, the width of the class interval was obtained by dividing the data range with the selected class number (Kan, 2009). Then find the difference between the minimum value and the maximum value (5−1 = 4), and divide this number by the number of choices in the analysis, i.e. (4/5 = 0.80). In this case, the average score of the measurement scale was evaluated, as shown in table 3.3.

Table 3.3: Class Intervals of Likert Scale

points	Evaluation	Range
5	very know/strongly need/very importance	4.21~5.00
4	Fairly know/ Fairly need/ Fairly importance	3.41~4.20
3	Somewhat know/ Somewhat need/ Moderately importance	2.61~3.40
2	Slightly know/ Slightly need/ Slightly importance	1.81~2.60
1	Not at all know/ Not at all need/ Not at all importance	1.00~1.80

The research questionnaire is divided into three parts. The first part includes nine demographic variables, the second part includes the variables that influence the respondents' choice of big data education, and the third part includes the variables that improve the attractiveness of big data. The second and third part is based on 14 questions in the literature. The list of standards and related references is shown in table 3.4.

Table 3.4: Choice Criteria and Relevant References

Mater of big data analysis Choice Selection Criteria	**Cited from**
Know about big data tech	Ambika Choudhury (2019), Anil Parma (2017)
The degree of critical need of big data for major or job	Bonnema & Van der Waldt (2008), Connor, Pearson, Court & Jagger (1996), Ambika Choudhury (2019), Anil Parma (2017)
The main reason of choice major (study big data)	Charles Malgwi (2005), Anurag (2020), Melanie Wiese (2010), Connor, Pearson, Court & Jagger (1996), Strasser, Ozgur & Schroeder (2002), Donnellan (2002), Maringe (2006), Briggs (2006), Anil Parma (2017)
The goal in learning big data	Anurag (2020), Bonnema & Van der Waldt (2008), Ambika Choudhury (2019), Anil Parma (2017)
The most attractive factor of big data	Mihartescu Ana-Andreea etc (2012), Charles Malgwi (2005), Bonnema & Van der Waldt (2008), Connor, Pearson, Court & Jagger (1996), Strasser, Ozgur & Schroeder (2002), Donnellan (2002), Maringe (2006), Briggs (2006), Ambika Choudhury (2019), Anil Parma (2017)

(Continued)

Table 3.4 (continued): Choice Criteria and Relevant References

Mater of big data analysis Choice Selection Criteria	**Cited from**
The biggest barrier to learn big data	Bonnema & Van der Waldt (2008), Strasser, Ozgur & Schroeder (2002), Anil Parma (2017)
The attitude towards the big data graduate program	Charles Malgwi (2005), Bonnema & Van der Waldt (2008), Strasser, Ozgur & Schroeder (2002), Donnellan (2002), Maringe (2006), Anil Parma (2017)
Education form	Baharun, et al. (2011), Francis Frimpong Fosu (2014), Webb (1993), Strasser, Ozgur, & Schroeder (2002), Donnellan (2002), Briggs (2006)
Enrollment form	Drewes (2006), Loren Agrey & Naltan Lampadan（2014）, Kinzie, et al., (2004), Braxton (1990), Francis Frimpong Fosu (2014), Webb (1993), Donnellan (2002), Briggs (2006), Ho & Hung (2008)
Teaching method	Keskinen et al. (2008), Sidin, et al. (2003), Soutar & Turner (2002), Francis Frimpong Fosu (2014), Webb (1993), Coccari & Javalgi (1995), Strasser, Ozgur & Schroeder (2002), Briggs (2006)
Factors to consider when choosing a university or major	Hager & Bernard shaw (2008)， Baharun, et al. (2011), Kusumwati et al. (2010), Johnson & Ford (1997), De Jager & Du Plooy (2006), Webb (1993), Coccari & Javalgi (1995), Strasser, Ozgur & Schroeder (2002), Donnellan (2002), Briggs (2006)

(Continued)

Table 3.4 (continued): Choice Criteria and Relevant References

Mater of big data analysis Choice Selection Criteria	**Cited from**
Big data curriculum system	Francis Frimpong Fosu (2014), Bonnema & Van der Waldt (2008) ,Coccari and Javalgi (1995), Strasser, Ozgur & Schroeder (2002), Donnellan (2002), Briggs (2006), Il-Yeol Song & Yongjun Zhu (2015), Jilong Zhang (2017)
Big data soft skills system	Bonnema & Van der Waldt (2008), Donnellan (2002), Rameshwar Dubey & Angappa Gunasekaran (2014)
The skill base needed to learn big data	Jilong Zhang (2017), Rameshwar Dubey & Angappa Gunasekaran (2014)

Upon completion of the questionnaire, the selected respondents were invited to participate in the online survey. During the investigation, the students were informed of the purpose of the study and when to clarify further.

3.4 Data Analysis

In this study, social science statistical software (SPSS) was used for quantitative data statistical analysis. "Questionnaire star" website provides data export function of SPSS format, and the exported questionnaire data can be directly imported into SPSS. The researcher mainly used SPSS for frequency, descriptive and exploratory analysis.

The frequency analysis function can output the main indicators of continuous and central tendency of continuous variables, as well as the distribution histogram,

mean value and skewness. The main function of this procedure is to output the frequency table.

Descriptive analysis normalizes the data and saves it as a new variable.

Exploratory analysis is based on descriptive statistics of the original data to further describe the data and provide more detailed results.

Due to the sample data of 120, the T test, analysis of variance and crosstab were not performed in this study.

In addition, this study also used EXCEL for auxiliary analysis.

3.5 Validity and Reliability

In this study, reliability analysis was not performed because each criterion was measured by a factor. Validity can be examined from different perspectives, including face, content, standardity-related, and structural validity (Oya Tamtekin Aydn, 2016). In order to ensure the effectiveness of the study, content validity was adopted in this study. Secondly, a thorough literature search was conducted to determine the inclusion of all items in the questionnaire. Third, expert advice is used to control whether or not a project should be included. In this research project, four experts were invited to evaluate the validity of the questionnaire. All of them are PHDS in computer science and have work experience in the field of big data. The validity review form is shown in appendix E.

3.6 Summary

Through literature research and interviews, we find the independent variables and evaluation indicators that influence students' choice of big data. Through in-depth analysis of the literature, reasonable independent variables and evaluation indicators are constructed to provide data support for the design of the conceptual

framework questionnaire.

The research methods and tools were determined, the interview questionnaire and questionnaire were developed, and the validity evaluation was carried out to ensure the scientific and effectiveness of the questionnaire.

CHAPTER 4

FINDINGS

4.1 Findings of Qualitative Research

According to the Narrative Coding (see Appendix B), the findings are shown in Table 4.1.

Table 4.1 Finding of Qualitative Analysis

Qualitative Findings From Question 1	
1. Financial Support for education 2. Career Advancement more Salary increment 3. Choice of educational type (technical education or academic education) 4. The employer's policy for subsidy education fee	5. The Condition of educational forms and time attendance for experience student (full-time, half-time, correspondence) 6. The impact of the general trend of postgraduate entrance examination
Qualitative Findings From Question 2	
1. Independent Making decision by oneself 2. Making a decision with family's and Influence	3. The boss's and Influence 4. The friend's suggestion and Influence
Qualitative Findings From Question 3	
1. Advantages of employment 2. The school location 3. Flexibility of learning style 4. Tuition and scholarships	5. The school's reputation 6. Interesting of class topic 7. The difficulty of admission 8. Teaching quality and practicality
Qualitative Findings From Question 4	
1. Depth of understanding 2. Application Type and Codes 3. Technical architecture 4. Specific technology	5. Sufficient lockers, sockets, coffee 6. Curriculum system 7. The market demands 8. Employment treatment

(Continued)

Table 4.1 (continued): Finding of Qualitative Analysis

Qualitative Findings From Question 5	
1. Big data application software developers 2. Big data analysis and deep research and development	3. Big data platform maintainer 4. What technologies will be used? 5. Hadoop? Or UX UI or else
Qualitative Findings From Question 6	
1. Shortage of talents in the future 2. Megatrends of business world 3. A big gap of talent 4. High pay 5. Closely related to current work	6. No any basic knowledge of core technology 7. Closely related to current work 8. Not good at mathematics 9. Too difficult
Qualitative Findings From Question 7	
1. Lack of Financial Aid 2. Difficulties of family work balance 3. Poor discipline foundation	4. Too senior to learn new things 5. Lack of study time after work 6. Difficult entrance examination
Qualitative Findings From Question 8	
1. The demand of enterprises for academic qualifications 2. The job market for undergraduates is over supply or shortage	3. Economic Return for graduations 4. Good development prospects 5. The exam is difficult 6. Lack time
Qualitative Findings From Question 9	
1. Mathematical ability 2. Programming ability 3. Platform technical capability 4. Job requirements	5. Career Path and Career Choice 6. Automatic application, platform for non IT background i.e. Python UX UI etc.
Qualitative Findings From Question 10	
1. Strengthen the propaganda via social network 2. Develop a Company and university cooperation and employment platform construction	3. Optimize majors and courses 4. Guidance and cultivate interest 5. Recruit and Select undergraduate students and training in advance

4.2 The Attractiveness Analysis of Big Data

In general, the respondents' understanding of big data, their professional demand for big data and their attitude towards big data all hide the information that they are more interested in BIGDATA. By analyzing the reasons for respondents' demand for or interest in big data, as well as their barriers to learning big data, we can further obtain what kind of interviewees are more likely to become the enrollment objects of big data graduate programs.

4.2.1 The respondents' understanding of big data

Figure 4.1 shows the frequency of "know about big data", and the descriptive statistics of know about big data is showed in table 4.2.

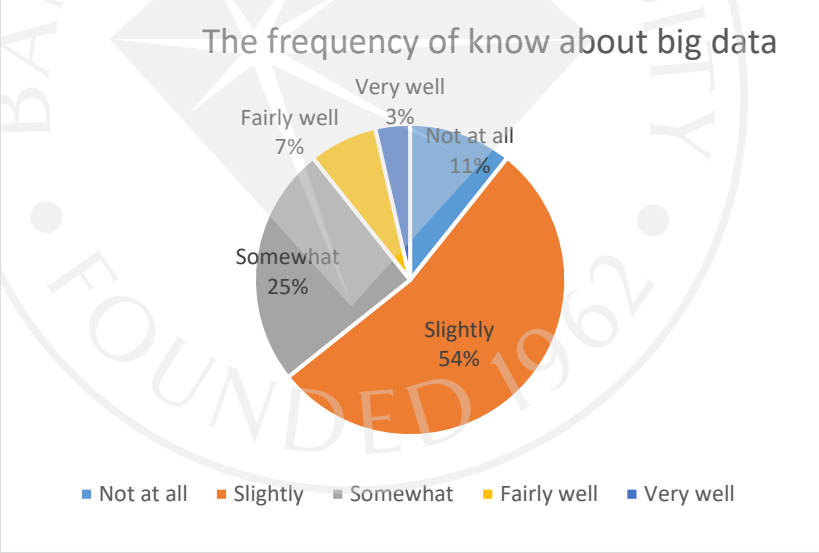


Figure 4.1: The Frequency of "Know About Big Data"

Table 4.2: Descriptive Statistics of "Know about big data" (N=56)

N	Mean	Std. Deviation	Variance	Skewness	Kurtosis
56	2.39	.908	.825	.935	1.131

As show in figure 4.1, we were told that there were 10.7 % of the respondents

not at all to know about big data, and there were more than half of the respondents slight know about of big data, accounting for 53.6%. 25% of respondents represent that they were Somewhat know about big data, and only 10.7% of respondents represent that they fairly well or very well to know about big data. In table 4.2, mean=2.39, it indicates that respondents' cognition level of big data belongs to " Slightly " level. skewness=0.935<1, It indicates that the subject group prefers to the left, that is, they have a low awareness of big data. Therefore, the respondents' cognition of big data is generally not high, which will be an important factor affecting them not to choose big data education.

It means that respondents have a low level on known about big data, only " Slightly " level.

T-test was conducted by gender, and the results are shown in table 4.3, table 4.4.

Table 4.3: Group Statistics by Gender of "know about big data"

gender	***N***	***Mean***	***Std. Deviation***	***Std. Error Mean***
male	31	2.52	.996	.179
female	25	2.24	.779	.156

Table 4.4: T-test Result of "know about big data" by Gender

	LTEV		t-test for Equality of Means			
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	1.978	.165	1.134	54	.262	.276
Equal variances not assumed			1.164	53.963	.249	.276

LTEV= Levene's Test for Equality of Variances.

In table 4.3, the mean of male is 2.52, the mean of female is 2.24, The difference between the two means is small, and both are between 1.81 and 2.60.

According to table4.4, sig=0.165>0.05, and sig.(2-tailed) =0.262>0.05. It can be concluded that gender has no significant difference in the influence of "know about big data". It means that men have a slightly better understanding of big data than women, but the difference is not significant and they all belong to the "slightly know" level.

The understanding degree of "big data" in different age groups is shown in figure 4.2.

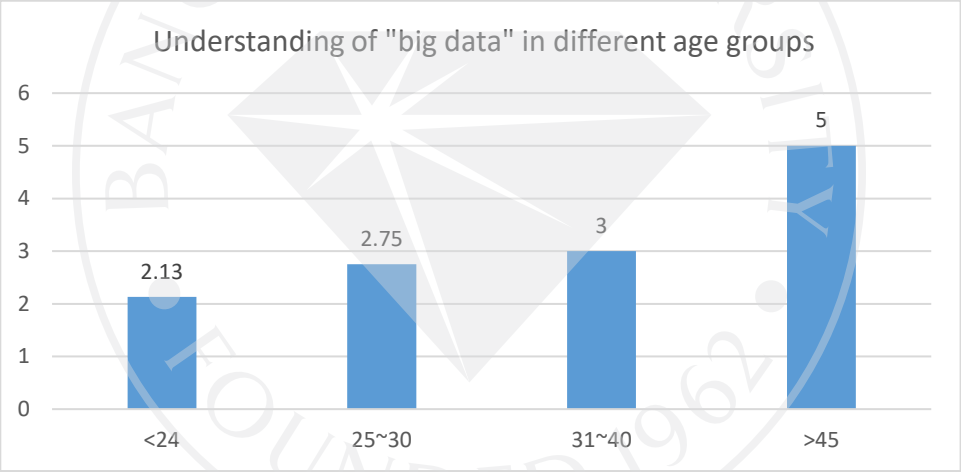


Figure 4.2: The Frequency of Understanding of "Big Data" in Different Age Groups

According to Figure 4.2, the mean knowledge level of respondents <24 years old on "big data" was 2.13, which was on the "modest know" level. The average value of 25~30 respondents was 2.75, which was in the "Somewhat know" level; the average value of 31~40 respondents was 3.0, which was also in the "Somewhat know" level; the average value of BBB 0 45-year-old respondents was 5.0, which was also in the "very know" level. It means that older people know more about big data than younger people.

Table 4.5 shows the mean comparison between "students" and "experienced employees" in "understanding big data".

Table 4.6 shows the result of T-test of “know about BIGDATA” by “role”.

Table 4.5: The Mean of “student” and “experienced staff” “know about BIGDATA”

Role	N	Mean	Mode	Std. Deviation	Variance	Min	Max
Student	38	2.11	2	.689	.475	1	4
Experienced staff	18	3.0	2	1.029	1.059	2	5

According table 4.5, the mean of students is 2.11(range 1.81~2.60, Slightly know); the mean experienced staffs is 3.0(range 2.61~3.40, somewhat know), the minimum of student is 1, the minimum of experienced staff is 2; the maximum of student is 4 and the maximum of experienced staff is 5. It indicates that students' understanding of big data is only at the "slightly know" level, and experienced staffs' understanding of big data is higher than that of students, reaching the "somewhat know" level.

Table 4.6: T-test of “know about BIGDATA” by “role”

	Levene's Test for Equality of Variances		T-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Equal variances assumed	3.728	.059	-3.852	54	.000
Equal variances not assumed			-3.350	24.486	.003

As table 4.6 shows, the sig of “equal variances assumed” is 0.059(>0.05) and the

sig.(2-tailed) of “equal variances assumed” is 000(<0.05), and it shows that there is a significant difference in "know about BIGDATA" between students and experienced staffs.

It means the level of students' understanding of big data is very low, only at the "slight know" level. The experienced staffs' understanding of big data is significantly higher than that of students, reaching the " Somewhat know" level.

Table 4.7 shows the mean values of "understanding big data" among students of different majors.

Table 4.7: Undergraduates of Different Majors "know big data" Averages

Major	know about “Big data”		
	Mean	N	Std. Deviation
Computer science	2.06	18	.539
Mathematics and statistics	2.20	15	.941
Electronic information engineering	2.00	5	.000
Total		38	

According table 4.7, for undergraduates in the university, the msean of computer science major is 2.06, the mean of mathematics and statistics major is 2.20, the mean of electronic information engineering is 2.00, and the total mean value is 2.11, with little overall difference. It means This shows that undergraduates of different majors have no significant difference in their understanding of big data.

Table 4.8 shows the mean and standard deviation of " experience people" 's understanding of big data.

Table 4.8: Mean Value and Standard Deviation of People in Different Positions' Understanding of Big Data

Job	*Mean*	*N*	*Std. Deviation*
Big data training lecturer	4.20	5	.837
Software development engineer	2.40	5	.548
Other IT related occupations	2.63	8	.744
Total	\	18	

Table 4.8 shows that among those with work experience, the big data training lecturer has the highest degree of understanding of big data, with an average of 4.2; the average degree of understanding of the interviewees of Other IT related occupations is 2.63; the Software development engineer does not have a high degree of understanding of big data, with a mean of only 2.40. It mean that big data training lecturers have a much better understanding of big data than software development engineers or other IT related employees.

4.2.2 Major or job need big data

Figure 4.3 shows the frequency of respondents need big data for major or job.

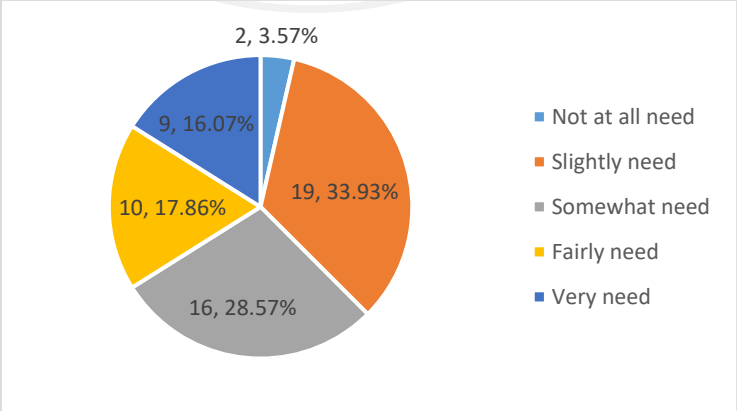


Figure 4.3: The Frequency of Respondents Need Big Data for Major or Job

As shows in Figure 4.3, 2 people indicated "Not at all need", accounting for 3.57%; 19 respondents expressed " Slightly need " (33.93%); 16 respondents expressed "Somewhat need" (28.57%), 10 respondents expressed "Fairly need" (17.86%), and 9 respondents expressed "Very need" (16.07%).

Table 4.9: Descriptive Data of Respondents "need big data for major or job"

N	*Mean*	*Std. Deviation*	*Mode*	*Skewness*	*Kurtosis*
56	3.09	. 1.149	2	.343	-.937

According to table 4.9, the mean of respondent “need big data for major or job” is 3.09, the mode is 2, and std. deviation is 1.149, It indicates that respondents' need for big data is " somewhat need " (mean range 2.61~3.40, Slightly need), and the vast majority of respondents indicate " Slightly need " (mode=2).

It means that the average level of respondents' demand for big data is not high, only at the "somewhat need" level, while the vast majority of respondents' demand for big data is only at the "slightly need" level.

Table 4.10 and Figure 4.4 show the extent to which "students" and "experience staff" need big data.

Table 4.10: The Means Comparison between Students and Staffs in "need big data or major or job"

Role	Mean	N	Std. Deviation	Mode	Kurtosis
Student	2.95	38	1.161	2	-.844
Experience	3.39	18	1.092	3	-1.114

As shown in table 4.22, the mean value of students was 2.95 (range 2.61~3.40, modest need), mode=2, indicating that the majority of students chose "2" (modest

need), the mean value of employee was 3.39 (range 2.61~3.40, modest need), and mode=3 indicating that the majority of students chose "3" (Somewhat need). It means experienced staffs needs big data more than student.

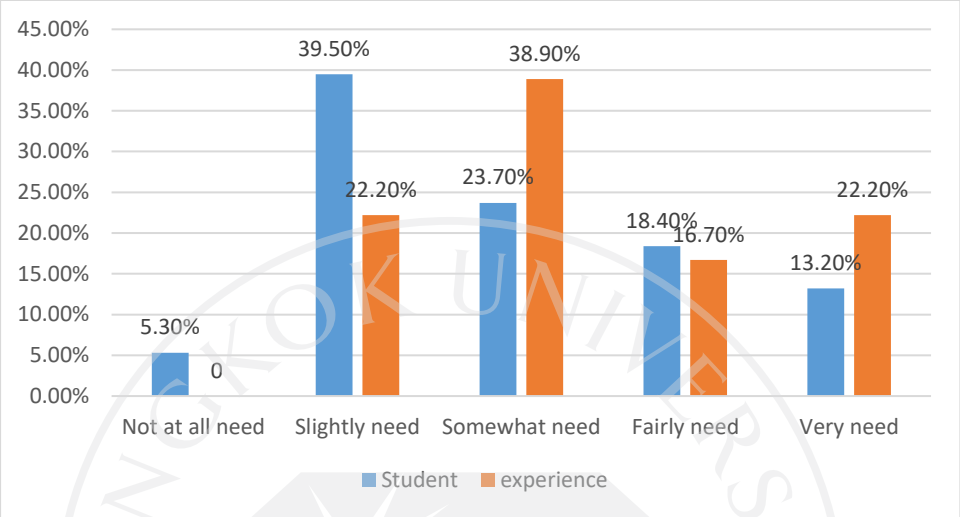


Figure 4.4: The Frequency of Students and Employees about "Need Big Data"

As shown in Figure 4.4, 23.7% of students expressed "Somewhat need BIGDATA", 39.5 students expressed "Slightly need BIGDATA", and even 5.3% expressed "Not at all need BIGDATA", 18.4% expressed Out of "fairly need BIGDATA", 13.2% of students expressed "very need BIGDATA". In addition, 4 experience staff expressed "Slightly need BIGDATA", accounting for 22.2%; 7 experience staff expressed "Somewhat need BIGDATA", accounting for 38.9%, and 3 experience staff expressed "Fairly need BIGDATA ", accounting for 16.7%, and 4 experience staff expressed" very need BIGDATA ", accounting for 22.2%.

That means experienced people are more interested in big data than students.

Table 4.11 shows the statistical information of the degree of big data demand by students of different majors.

Table 4.11: The Statistical Information of “need BIGDATA for major or job” between Difference Majors

Major	Mean	N	Std. Deviation
Computer science	2.83	18	1.200
Mathematics and statistics	3.20	15	1.265
Electronic information engineering	2.60	5	.548
Total	2.95	38	1.161

According to Table 4.24, mathematics and statistics have a higher demand for BIGDATA, with a mean of 3.2, which is the " Somewhat need " level; Computer science is next, with an mean of 2.83; Next is Electronic information engineering, the mean is 2.6, lower than the total mean (2.95).

It means that students majoring in mathematics and statistics have a higher demand for big data than students majoring in computer science or students majoring in electronic information engineering.

Table 4.12 shows the statistical information of the degree of big data demand of employees in different positions.

Table 4.12: The Mean of “need BIGDATA for job” for Difference Staff

Job	Mean	N	Std. Deviation
Big data training lecturer	4.40	5	.894
Software development engineer	2.60	5	.548
Other IT related occupations	3.25	8	1.035
Total	3.39	18	1.092

According to Table 4.12, for experienced staffs, big data training lecturer has the highest demand for big data, with an average value of 4.4; Other IT related

occupations is followed by an average value of 3.25, while the mean value of software development engineer is only 2.6.

Conduct variance analysis on the degree to which experienced employees need big data (detail as in appendix G Table A1). The sig is 0.018(<0.05), it shows that there are significant differences in grouped data.

Take the K-independent sample test on the degree of demand for big data by experienced staffs (detail as in appendix G Table A2). the sig of “big data training lecture” and “software development engineering” is 0.006, less than 0.05, it shows that there is statistically different between “big data training lecture” and “software development engineering”. The sig of “big data training lecture” and “other IT related occupations” is 0.039, it less than 0.005, and it show that has a statistically different between “big data training lecture” and “other IT related occupations”.

Obviously, "big data trainers" have a higher demand for "big data" than "other it-related personnel" and "software development engineers", and on-the-job personnel with work experience have a higher demand for big data than undergraduates. Among undergraduates, "mathematics and statistics" students have a stronger demand for big data than "computer science" and "electronic information engineering" students, but there is no significant difference between them, they are all in the category of "somewhat need".

4.2.3 Main reason for study big data

There were 13 students whose purpose of "learning big data" was "For practical investigation, scientific research project, paper writing". All of them were undergraduates, accounting For 23.2% of the total respondents and 34.2% of the undergraduates. The purpose of "learning big data" of 27 respondents is "In order to

improve the performance of the current work", accounting for 48.2 of the total number of respondents. Among them, 14 are undergraduates, accounting for 36.8 % of the total number of undergraduates, and 13 are "experienced staff", accounting for 72.2 % (detail as in appendix G Table A3). It means that the main purpose of the interviewees to "learn big data" is " Working in IT or planning to work in the future ", while the secondary purpose is "For practical investigation, scientific research project, paper writing".

With "gender" as the grouping condition, T test was performed on "main purpose of learning big data", and the test results are shown in appendix G Table A4 and appendix G Table A5.

According to appendix G Table A4, the mean value of males was 3.39, with little difference. In appendix G Table A5, sig=0.654 sig.(2-tailed)=0.717>0.05, indicating that the influence of "gender" on "Main reason for study big data" is not different.

In general, the purpose of the respondents to learn big data is mainly to "work in IT or planning to work in the future", while the secondary purpose is "For practical investigation, scientific research project, paper writing", which is mainly reflected in the students. Factors such as gender and specialty have little influence on "the purpose of learning big data", while factors such as family location and family income cannot be further explored because the data do not meet the statistical requirements.

4.2.4 The goal for learning big data

The frequency statistics of respondents on "learning big data goals" is showed in appendix G Table A6. According to it, among the student respondents, 28.9% took "Master big data software development technology" as "the goal of learning big data"

and "Master big data modeling and analysis techniques". "Master big data security and system maintenance technology" and "Master big data software development technology" accounted for 18.4% respectively, "Master the skills of using big data tools" and "Other" accounted for 18.4% respectively. Among the experienced personnel respondents, those who took "Master big data software development technology" as the target reached 44.4%, those who took "Improve big data literacy" as the target reached 16.7%, those who took "Master big data modeling and analysis techniques" as the target, "Master big data security and system maintenance technology" and "Other" accounted for 11.1% respectively, and "Master the skills of using big data tools" accounted for 5.6%.

It means that there is a big difference in the goal of learning big data between students and experienced staff. The main goal for college students to learn big data is to "improve the quality of big data", followed by "master the software development technology of big data", "master the modeling and analysis technology of big data" and "master the security and system maintenance technology of big data". The main goal for experienced staff to learn big data is to "master big data software development technology", followed by "improve big data literacy". The distribution of goals for students to learn big data is relatively balanced.

Frequency comparison analysis shows that "Gender" has no obvious influence on undergraduates' "goal of learning big data" (detail as in appendix G Table A7).

The frequency statistics of learning big data goals for students of different majors (detail as in appendix G Table A8) shows that there is no significant difference in the learning objectives of big data among students majoring in "computer science", which are mainly "Master big data software development

technology" and "Improve big data literacy", accounting for 33.3% and 22.2% respectively. Other learning objectives also account for a relatively advanced proportion. The "goal of learning big data" of students majoring in Mathematics and statistics is mainly to "Improve big data literacy" and "Master big data modeling and analysis techniques", accounting for 40.0% and 33.3% respectively. However, "Master big data security and system maintenance technology" accounts for up to 60.0% of students majoring in Electronic information engineering.

It means that students in different majors have different goals for learning big data. The main goals for students majoring in computer science to learn big data are to "master big data software development technology" and "improve big data literacy", accounting for 33.3% and 22.2% respectively. The big data learning objectives of mathematics and statistics majors are mainly "improving big data literacy" and "mastering big data modeling and analysis technology", accounting for 40.0% and 33.3% respectively. Students majoring in electronic information engineering learn big data mainly to "master the security and system maintenance technology of big data", accounting for up to 60%.

Figure 4.5 describes the frequency of "The goal for learning big data" between different job positions of the interviewees with work experience.

As show in Figure 4.5, the goal of big data training lecturer to learn big data is "master big data software development technology", accounting for up to 80%, and 20% of big data training lecturer's goal to learn big data is "master big data modeling and analysis" techniques ". Software development engineer's goal of learning big data is also "Master big data software development technology", accounting for 40%, followed by "Improve big data literacy" and "Master big data security and system

maintenance technology", each accounting for 20%. Other IT related occupations have no obvious difference in the goals of learning big data. The main goals are "Master big data software development technology" and "Improve big data literacy", each accounting for 25%. The remaining goals all occupy a certain proportion, but the difference is not significant.

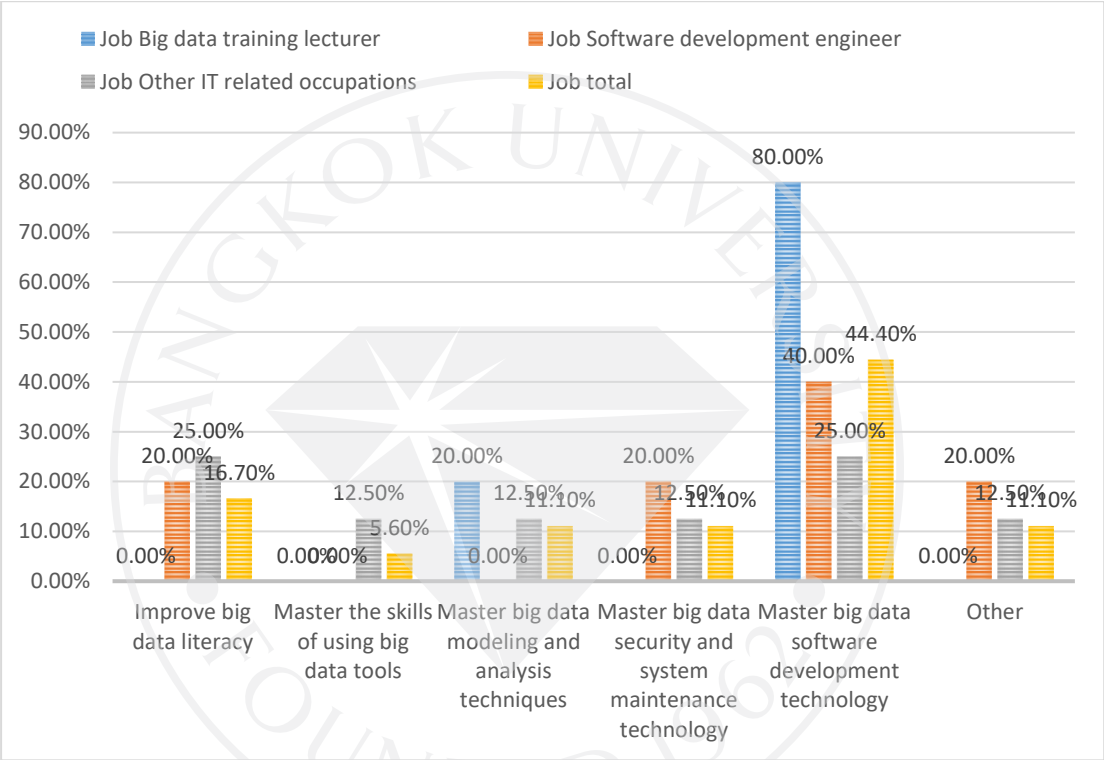


Figure 4.5: The Difference Goal of Learn BIGDATA between Difference Job

In a word, the goal of experienced personnel learning big data is to "master big data software development technology". However, there are some differences between different career types. Big data training lecturers' main goal of learning big data is to "master big data software development technology", accounting for as much as 80%. The main goal for software development engineers to learn big data is to "master big data software development technology", accounting for 40%, followed by "improve big data literacy" and "master big data security and system maintenance

technology", accounting for 20% respectively. There is no significant difference in the main goals of other it-related professions in learning big data. The main goals were "mastering big data software development technology" and "improving big data literacy", each accounting for 25%.

Perform statistics on the correlation between "gender" and "big data learning goals" for experienced employees (detail as in appendix G Table A9). The result is sig = 0.046 (<0.05), indicating that there is a clear correlation between “gender” and “The goal for learning big data”, that is, the purpose of male in-service personnel learning big data is significantly different from that of women.

According to "gender" for further frequency statistical analysis, the results are shown in Figure 4.6.

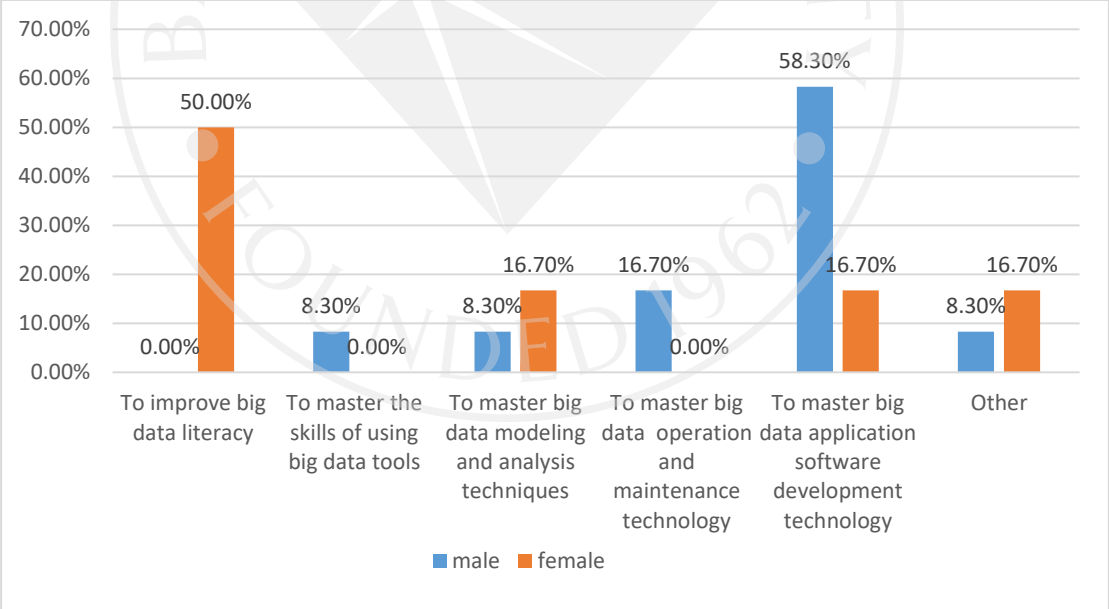


Figure 4.6: The Frequency of "The goal to learning big data" between Difference Gender of Experienced Staffs

As can be seen from Figure 4.6, the goal of male experienced employees to learn big data is to "master big data application software development technology",

accounting for 58.6%, while the goal of female experienced employees to learn big data is to "improve big data literacy", accounting for 50%. It means that the goal of male experienced employees to learn big data is very different from that of women. The main goal of male experienced employees is to "master big data application software development technology", while the main goal of women is to "improve big data literacy".

4.2.5 The most attractive factor for big data master

Figure 4.7 show the frequency data of “Big Data Attractiveness Factor”.

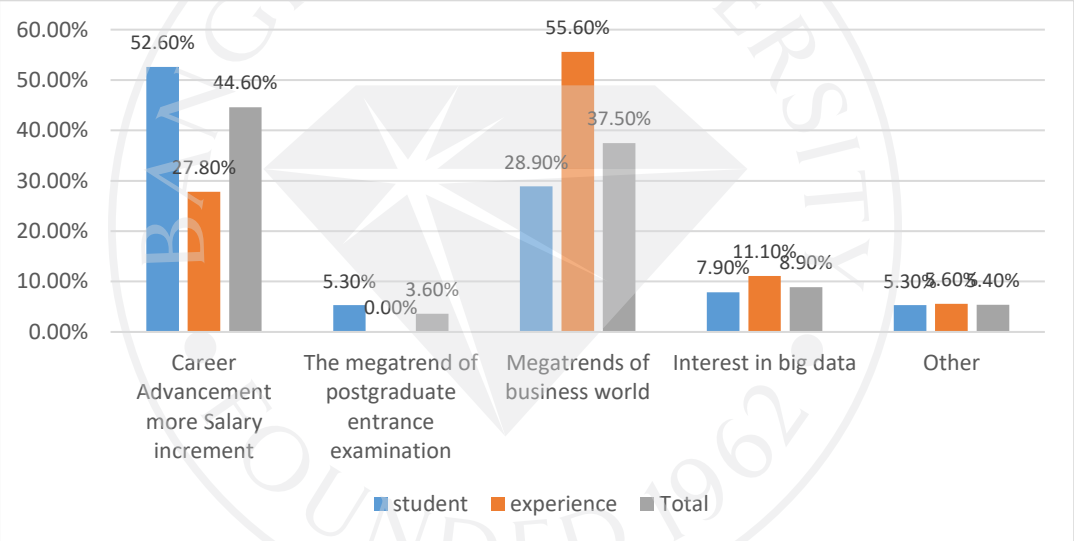


Figure 4.7: The Frequency Data of "Big Data Attractiveness Factor"

According to Figure 4.7, 44.6% of the respondents believe that “the biggest attraction of big data” is “Career advancement and more salary income”, and 37.5% of the respondents believe that “the biggest attraction of big data” is “Megatrends of business world ", the sum of the two exceeds 82%. Students and work-experienced respondents have very different views on "the most attractive factor for big data." For student respondents, 52.60% of them think that "the biggest attraction of big data" is

"Career advancement and more salary income", and 28.9% think it is "Megatrends of business world". However, for those with work-experience respondents, 55.6% of the them believe that "the biggest attraction of big data" is "Megatrends of business world", and 27.8% of them think it is "Career advancement and more salary income".

It means, the most attractive factor for big data is "Career advancement and more salary income", and the secondary attractive factor is "Megatrends of business world".52.60% of student repute that "the biggest attraction of big data" is "Career advancement and more salary income", and 55.6% of the experience staffs believe that "the biggest attraction of big data" is "Megatrends of business world".

The frequency relationship between different genders on “Big Data Degree Attraction Factor” show that 41.9% of men and 48.0% of women are considered “The most attractive factor for the master of BIGDATA” as “Career Advancement more Salary increment” by different gender groups, and 38.7% of men and 36.0% of women think of “The most attractive factor for the master of BIGDATA” "Attractive factor for the master of BIGDATA" is "Megatrends of business world". Only 6.5% of men and 12.0% of women think "The most attractive factor for the master of BIGDATA" is "Interest".

Obviously, in terms of "Attractive factor for the master of big data", men and women do not show obvious differences.

Figure 4.8 describes the frequency distribution of different majors in “The most attractive factor for the master of BIGDATA” among undergraduates.

According to Figure4.8, for the computer science major, 44.4% of the respondents think that "The most attractive factor for the master of BIGDATA" is "Career Advancement more Salary increment", and 38.9% of the respondents think it

is "Megatrends of business world", 11.1% of the respondents thought it was “The megatrend of postgraduate entrance examination”, and 5.6% of the respondents thought it was “Interest”. For Mathematics and statistics students, 73.3% of the respondents think that "The most attractive factor for the master of BIGDATA" is "Career Advancement more Salary increment", and 13.3% of the respondents think it is "Megatrends of business world", 6.7% of the respondents think it is "Interest", 6.7% of the respondents think it is "Other". For Electronic Information Engineering students, 20% of the respondents think that "The most attractive factor for the master of BIGDATA" is "Career Advancement more Salary increment", and 40% of the respondents think it is "Megatrends of business world", 20% of the respondents think it is "Interest", and 20% of the respondents think it is "Other".

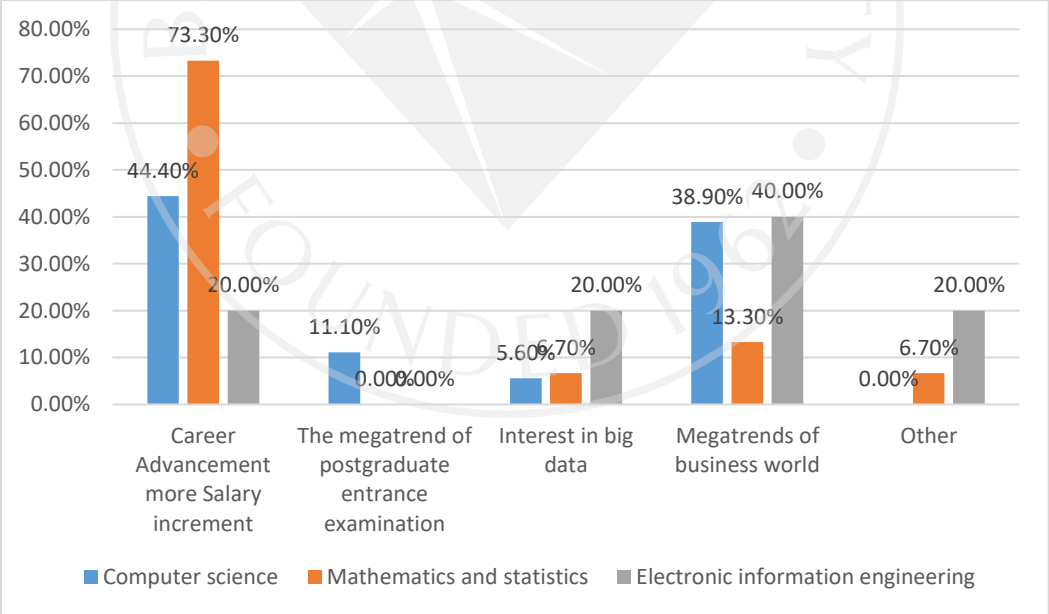


Figure 4.8: Frequency of Students of Different Majors and "The most attractive factor for the master of BIGDATA"

Obviously, different majors have different understandings of "The most attractive factor for the master of BIGDATA".

Through correlation analysis, this paper explores the differences between different major students in choosing "the most attractive factors of big data masters". The result is that the sig value of Mathematics and statistics to Electronic information engineering is 0.035 (<0.05), it means that the two majors have a clear difference in the choice of "The most attractive factor for the master of BIGDATA".

Figure 4.9 shows the frequency of “The most attractive factor for the master of BIGDATA” selected by different jobs

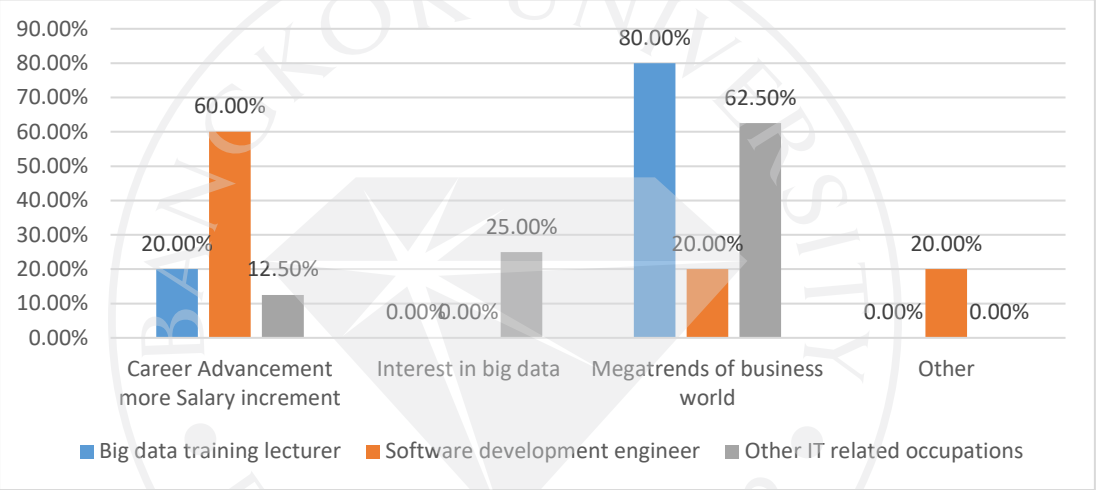


Figure 4.9: Frequency of "Most attractive factor for BIGDATA master" for "Job"

According to Figure 4.9, for Big data training lecturer, 20% of the respondents think that “The most attractive factor for the master of BIGDATA” is “Career Advancement more Salary increment”, and 80% of the respondents think it is “Megatrends of business world”. For Software development engineer, 60% of the respondents think “The most attractive factor for the master of BIGDATA” is “Career Advancement more Salary increment”, 20% of the respondents think it is “Megatrends of business world”, 20% The interviewee considered it "Other". For Other IT related occupations, 12.5% of the respondents think “The most attractive

factor for the master of BIGDATA" is "Career Advancement more Salary increment", 62.5% of the respondents think it is "Megatrends of business world", 25% Of respondents think it is "Interest".

Obviously, there is a certain degree of difference to the most attractive factor for the master of BIGDATA in various jobs. According to the correlation analysis results of "major" and "most attractive factor for the master of BIGDATA" (detail as in appendix G Table A12), there is a clear difference between "Software development engineer" and "Other IT related occupations" (sig = 0.038 <0.05).

In summary, the interviewees believe that the most important "the most attractive factor for the master of BIGDATA" is "Career Advancement more Salary increment", followed by "Megatrends of business world".

4.2.6 The biggest barrier to join big data master education

Figure 4.10 shows the frequency distribution statistics selected by the respondents for "the biggest barrier to join big data master education".

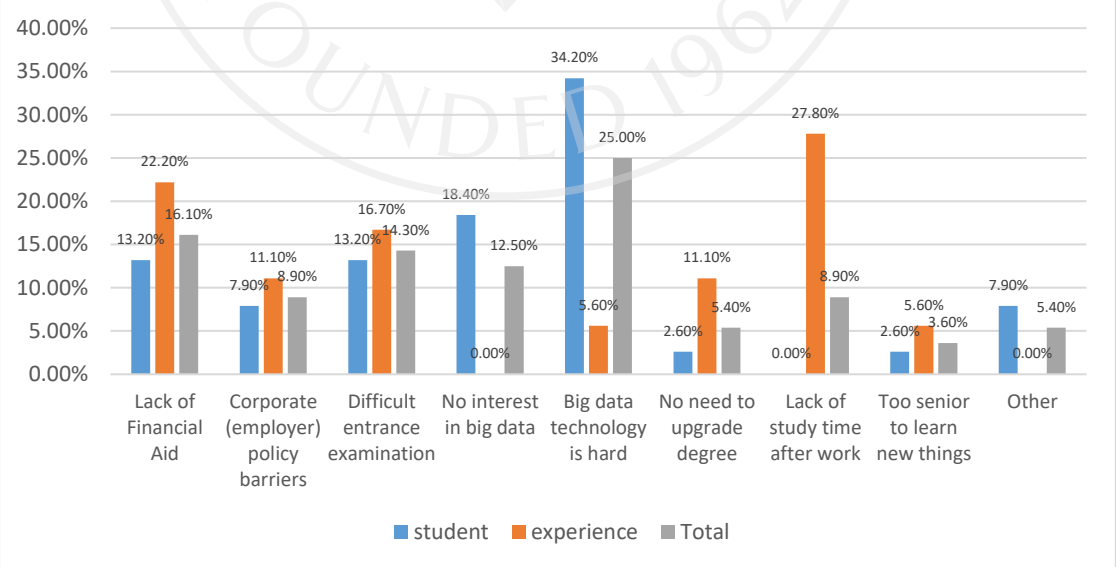


Figure 4.10: Frequency of "The Biggest Barrier to Participating in Big Data Degree Education"

According to Figure 4.10, for student respondents, 13.2% of respondents believe that the biggest barrier to participation in big data degree education is "Lack of Financial Aid", and 7.9% of respondents believe that it is "corporate (employer) policy barriers". 13.2% of the respondents thought it was "difficult entrance examination", 18.4% of the respondents thought it was "no interest in big data", 34.2% of the respondents thought it was "big data technology is hard", and 2.6% of the respondents. The interviewees thought it was "no need to upgrade degree", 2.6% of the interviewees thought it was "Too senior to learn new things", and 7.9% of the interviewees thought it was "Other". For the respondents with work experience, 22.2% of the respondents believe that the biggest barrier to participation in big data degree education is the “Lack of Financial Aid”, 11.1% of the respondents believe that they are “corporate (employer) policy barriers”, 116.7% Of respondents think it is "difficult entrance examination", 5.6% of the respondents think it is "big data technology is hard", 11.1% of the respondents think it is "no need to upgrade degree", 27.8% of the respondents Think of it as "Lack of study time after work", and 5.6 %% of the respondents think it is "Too senior to learn new things". For all respondents, 16.1% of the respondents believe that the biggest barrier to participation in big data degree education is the "Lack of Financial Aid", and 8.9% of the respondents believe that it is "corporate (employer) policy barriers", 14.3% Of respondents think it is "difficult entrance examination", 12.5% of the respondents think it is "no interest in big data", 25.0% of the respondents think it is "big data technology is hard" and 5.4% of the respondents Think of it as “no need to upgrade degree”, 8.9% of respondents think it is “Lack of study time after work”, 3.6% of them think it is “Too senior to learn new things”, and 5.4% of them Think of it as

"Other".

It means that the biggest barrier for students to participate in the degree education of big data is "the difficulty of big data technology" (34.2%), followed by "not interested in big data" (18.4%), "economic difficulties" (13.2%) and "the difficulty of college entrance examination" (13.2%). The biggest barrier for experienced employees to participate in big data academic education was "insufficient learning time after work" (27.8%), followed by "lack of financial assistance" (22.2%), and the third was "difficult college entrance examination" (16.7%).

Figure 4.11 shows the frequency of “the biggest barrier to join big data master education” among undergraduate students.

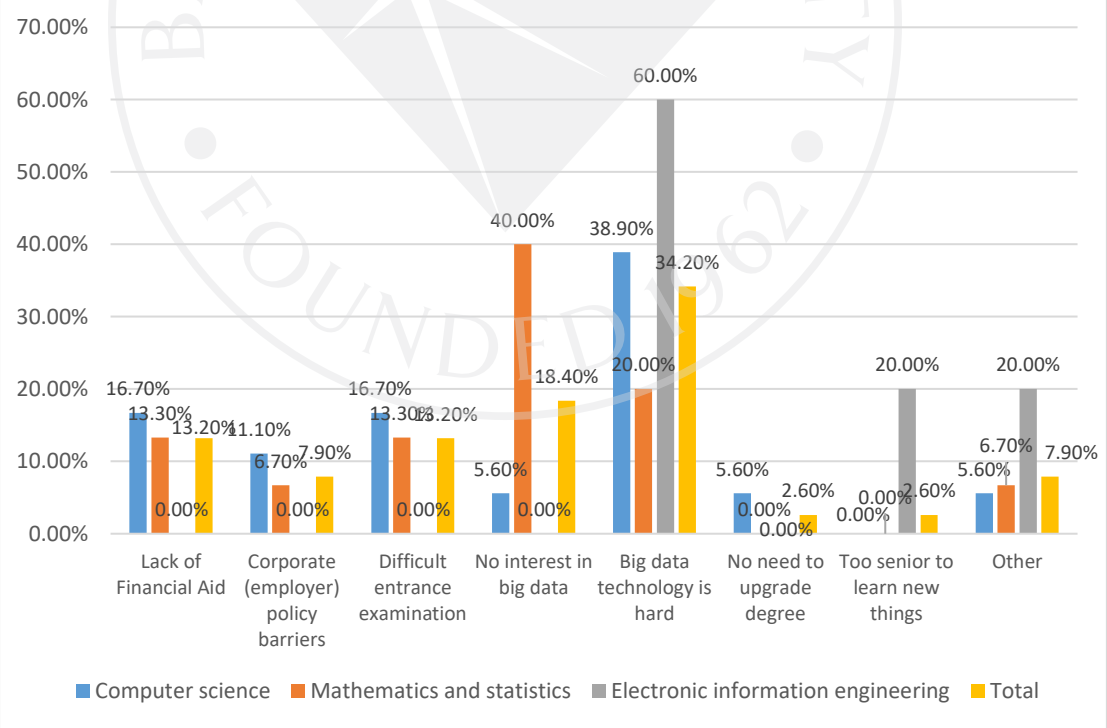


Figure 4.11: Frequency of “the biggest barrier to join big data master education” by students of different majors

According to Figure 4.11, for undergraduates, students major in computer science think that the biggest barrier to learning big data is "Big data technology is hard", accounting for 38.9%, and students major in mathematics and statistics think that it is "No interest in big data", accounting for 40.0%, students major in electronic information engineering considers it as "Big data technology is hard", accounting for 60%. It means that for students of different majors, the biggest barrier for them to learn big data are not exactly the same. Students majoring in computer science and students majoring in electronic information engineering believe that the biggest barrier to learning big data is "big data is too hard", while students majoring in mathematics and statistics believe that the biggest barrier to learning big data is "not interested in big data".

Figure 4.12 shows the frequency distribution of different job positions and “the biggest barrier to join big data master education” among experienced staffs.

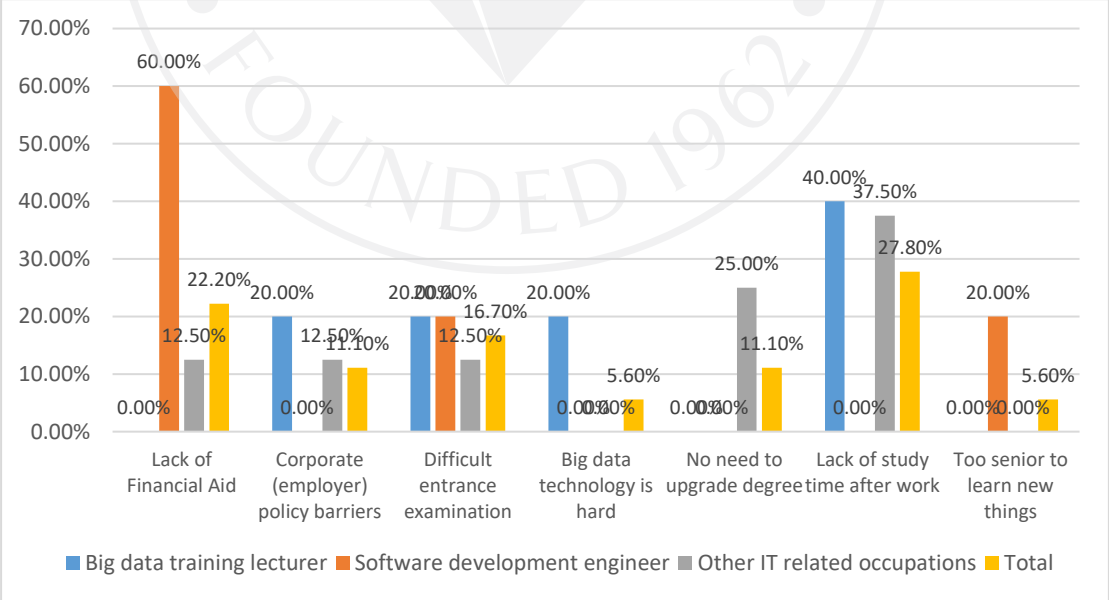


Figure 4.12: Frequency of “the biggest barrier to join big data master education” in Different Job Positions

According to Figure 4.12, for "Big data training lecturer" respondents, 40% of the them think that "the biggest barrier to join big data master education" is "Lack of study time after work", and 20.0% of them think it is" Big data technology is hard ", 20.0% of the them think it is" Difficult entrance examination ", and 20.0% of them think it is" Corporate (employer) policy barriers ".

For "Software development engineer" respondents, 60% of them think that "the biggest barrier to join big data master education" is "Lack of Financial Aid", 20.0% of them think it is" Difficult entrance examination ", 20.0% Of them think it is "Difficult entrance examination", and 20.0% of them think it is "Too senior to learn new things".

For "Other IT related occupations" respondents, 37.5% of the them think that "the biggest barrier to join big data master education" is "Lack of study time after work", and 25.0% of the them think it is "No need to upgrade degree" ".

It means that “big data training lecturer” and “Other IT related occupations” believe that the main barrier to learning big data is "Lack of study time after work", and Software development engineers believe that the main obstacle to learning big data is "Lack of Financial Aid".

Figure 4.13 shows the frequency of “the biggest barrier to join big data master education” affected by different genders.

According to Table 4.46, gender has no obvious effect on the factors of "learning big data barriers", and the proportion of each factor is not much different. The biggest factor is "Big data technology is hard", and the proportion of men is 19.4 %, Women accounted for 32%. It means that gender has no significant influence on the factors of "learning big data disorder".

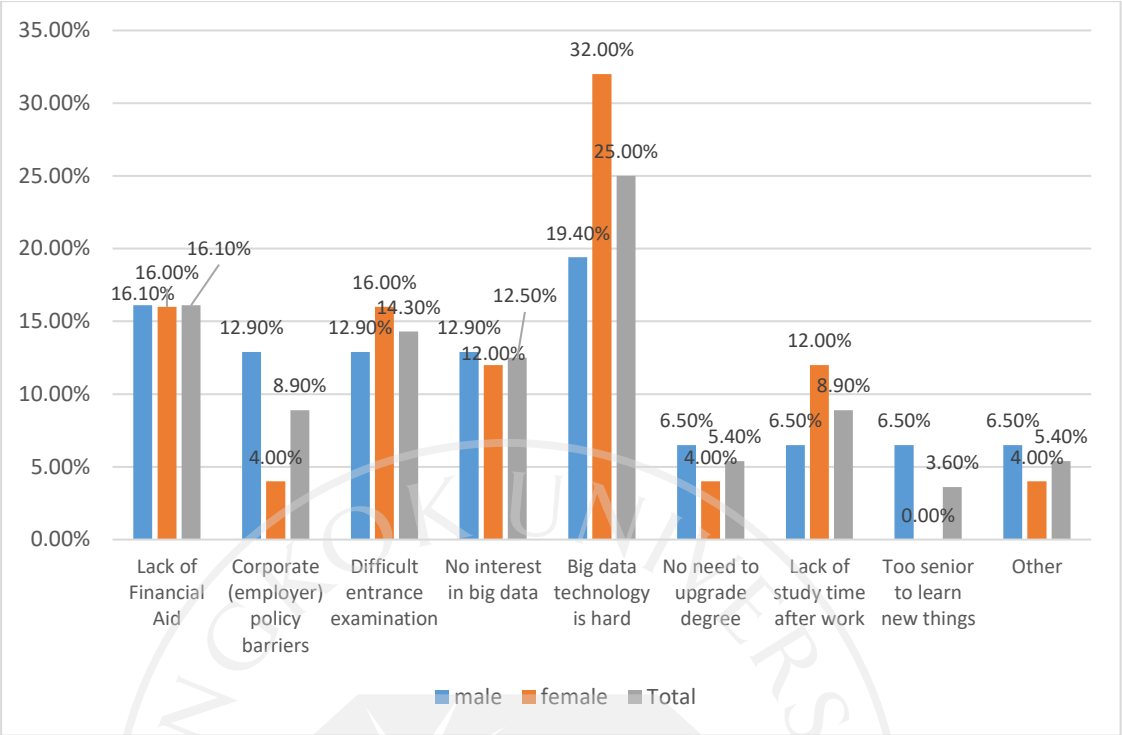


Figure 4.13: Frequency of "gender" * "the biggest barrier to join big data master education"

Table 4.13 is the ANOVA analysis of "age" and "the biggest barrier to join big data master education".

Table 4.13: ANOVA of"the biggest barrier to join big data master education"*"age"

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.364	3	3.121	.591	.624
Within Groups	274.619	52	5.281		
Total	283.982	55			

In table 4.13, sig = 0.624(> 0.05), it means that different age groups have no obvious influence on the choice of "the biggest barrier to join big data master education".

Table 4.14 is the ANOVA analysis of "family economic income" and "the

biggest barrier to join big data master education".

Table 4.14: "the biggest barrier to join big data master education"*"family economic income" ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.622	4	10.655	2.252	.076
Within Groups	241.361	51	4.733		
Total	283.982	55			

According to Table 4.14, sig = 0.076> 0.05, indicating that different "family economic income" groupings have little effect on "the biggest barrier to join big data master education".

4.2.7 Attitude to big data graduate program

Table 4.49 is the statistical description of "Attitude to BIGDATA graduate program"

Table 4.15: Statistics of Attitude to Big Data Graduate Program

N	*Mean*	*Mode*	*Std. Deviation*	*Variance*
56	3.29	3	1.155	1.335

According to Table 4.15, mean = 3.29 (range 2.61 ~ 3.40), indicating that the overall "Attitude to BIGDATA graduate program" is the "Somewhat need" level. Model = 3, indicating that the vast majority of respondents chose the third option (Somewhat need). It means that the respondents' demand for "big data graduate program" is not very high, only at the "somewhat need" level.

Figure 4.14 shows the frequency of "Attitude to BIGDATA graduate program".

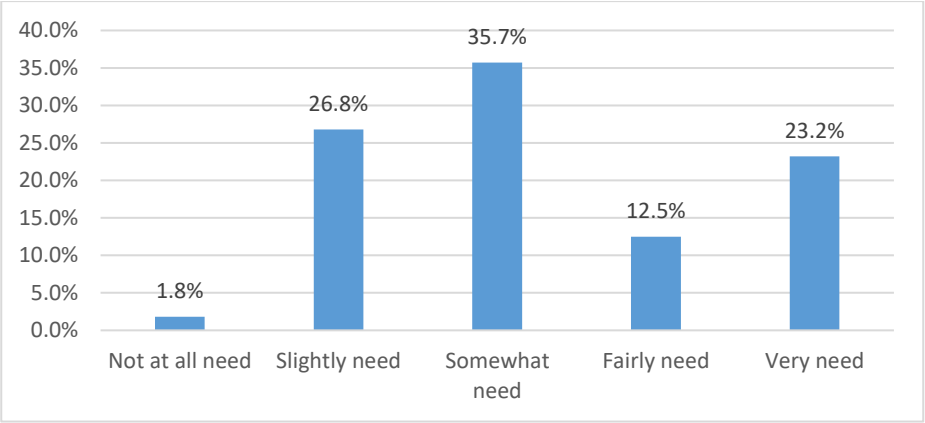


Figure 4.14: The Frequency of "Attitude to BIGDATA graduate program"

According to Figure 4.14, "Somewhat need" has 20 people, accounting for 35.7%, "Slightly need" has 15 people, accounting for 26.8%, "Very need" has 13 people, accounting for 23.2%, and "Fairly need" has 7 people, accounting for 12.5 %, "Not at all need" has only 1 person, accounting for 1.8%. Obviously, the number of respondents who really need big data is not large, with the "fairly need" and "very need" levels accounting for only 35.7% of the total.

According to the mean value and standard deviation of "Big Data Graduate Program Demand" by gender, role, age and other attributes (detail as in appendix G table A13), the following findings are obtained:

(1) The mean of male respondents' “Big Data Graduate Program Demand” is 3.32, the standard deviation is 1.166, the mean of female respondents is 3.24, the standard deviation is 1.165, the total mean is 3.29, and the standard deviation is 1.155. It can be seen that the male and female interviewees' needs for big data graduate programs are not different, and they are both at the level of "somewhat need" (range 2.61 ~ 3.40).

(2) The mean of the student respondents’ demand for the big data graduate

program is 3.32 (range 2.61 ~ 3.40, somewhat need), the standard deviation is 1.151, and the mean of the working staff with work experience is 3.56 (range 3.41 ~ 4.20, fairly need), standard the difference is 1.149, which means that respondents with work experience have a greater demand for big data than student respondents, but the difference is not very large.

(3) For student respondents, the mean of computer science students is 2.83 (range 2.61 ~ 3.40, somewhat need), the standard deviation is 1.043, and the mean of mathematics and statistics respondents is 3.67 (range 3.41 ~ 4.20, fairly need) , The standard deviation is 1.113, the mean of respondents in the electronic information engineering profession is 2.80, (range 2.61 ~ 3.40, somewhat need), and the standard deviation is 1.304. Therefore, respondents in mathematics and statistics majors need big data graduate program more than those in computer science majors and electronic information engineering majors, but the difference is not obvious.

(4) For experienced staff, the mean of "Big data training lecturer" for big data graduate programs is 4.40 (range 4.20 ~ 5.0, very need), the standard deviation is 0. .894, and the mean of "Other IT related occupations" It is 3.38, (range 2.61 ~ 3.40, somewhat need), the standard deviation is 1.302, the mean of "Software development engineer" is 3.00 (range 2.61 ~ 3.40, somewhat need), the standard deviation is 0.707. It shows that "big data training instructors" have higher demand for big data graduate programs than people of other occupation types.

(5) In terms of age, the mean of respondents under the age of 24 is 3.18 (range 2.61 ~ 3.40, somewhat need), the mean of respondents between 25 and 30 years old is 3.13 (range 2.61 ~ 3.40, somewhat need), and the age of 31 ~ 40 Is 3.75 (range 3.41 ~ 4.20, fairly need), there is only 1 person over 45 years old, which does not

meet the statistical requirements. It means, 31 to 40-year-old respondents have greater demand for big data graduate programs.

4.2.8 The attitude to recommend big data graduate project

Figure 4.15 shows the frequency of the respondents' "The attitude to recommend big data graduate project".

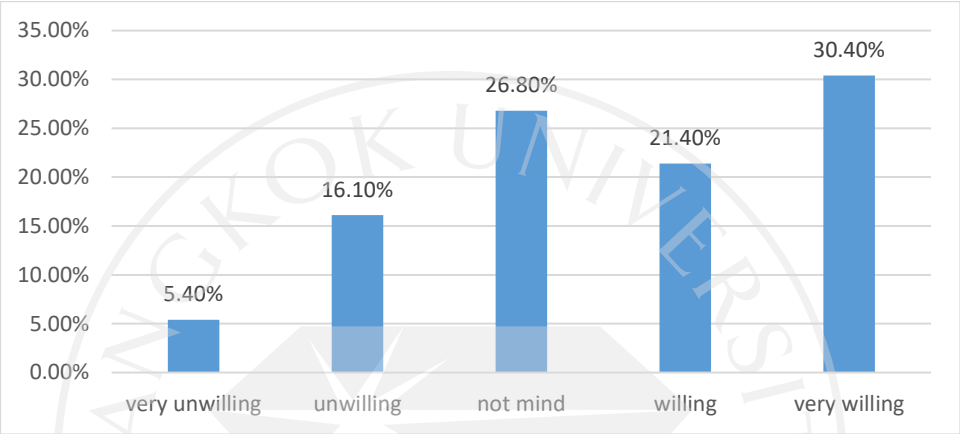


Figure 4.15: Frequency of Interviewees on "The attitude to recommend big data graduate project"

As shown in Figure 4.15, 17 respondents (30.4%) are very willing to recommend big data and graduate programs to people in the deep table, 12 respondents (21.4%) expressed their willingness to recommend, and 15 respondents (26.8) indicated "It doesn't matter", 9 respondents (16.1%) said "unwilling", and only 3 respondents (5.4%) said "very unwilling". In other words, more than 51% of the respondents are quite willing or very willing to recommend the big data graduate program to the people around them.

Table 4.16 shows the respondents ’further descriptive statistics on “ The attitude to recommend big data graduate project ”.

Table 4.16: Descriptive Statistics of "The attitude to recommend big data graduate project"

N	Mean	Mode	Std. Deviation	Variance	Skewness	Kurtosis
56	3.55	5	1.235	1.524	-.338	-.934

As shown in Table 4.16, mean = 3.22 (range 3.41 ~ 4.2 fairly willing), Mode = 5, Std. Deviation = 1.235, Variance = 1.524, Skewness = -0.338, Kurtosis =-. 934. It shows that most of the respondents are fairly willing to recommend big data graduate programs to those around them. It means that a large number of respondents are very willing to recommend the big data graduate program to the people around them, and the overall willingness has reached the level of "fairly willing".

4.3 Respondents' Expectations of Enrollment Forms and Teaching Management

Enrollment forms and teaching management are important factors for attracting students. By adjusting the enrollment methods and teaching management forms, the attraction of graduate students to students can be effectively improved.

Figure 4.16 shows the frequency of respondents' selection of “education form”.

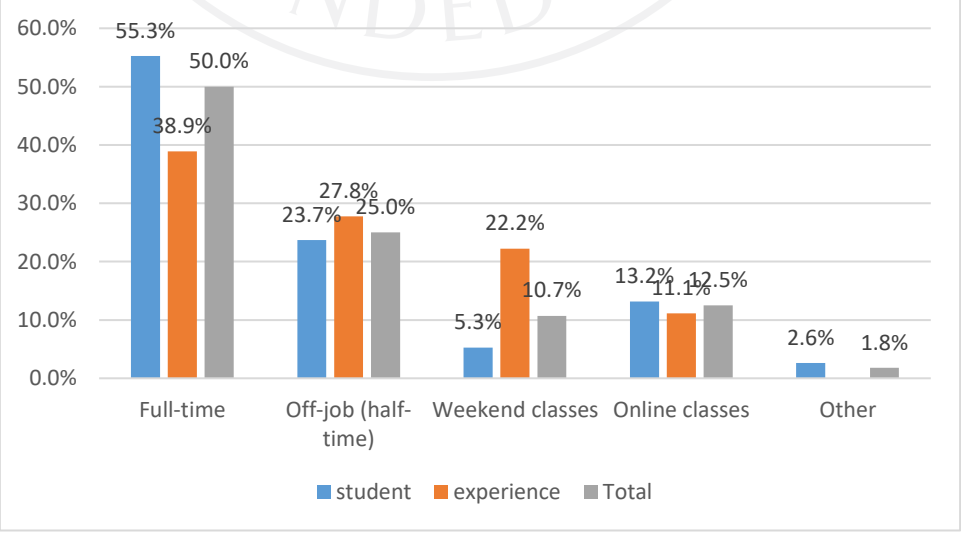


Figure 4.16: Frequency of "education forms"

According to Figure 4.16, for the “total”, 50% of the respondents prefer the "Full-time" teaching format, 25% of the respondents prefer the "Off-job (half-time)" format, and 10.7% of the respondents. The respondents chose the "weekend class" format, and 12.5% of the respondents chose the "online class" format.

For experienced staffs, 38.9% of the respondents prefer to choose the "Full-time" teaching format, 27.8% of the respondents prefer the "Off-job (half-time)" format, and 22.2% of the respondents. The respondents chose the "weekend class" format, and 11.1% of the respondents chose the "online class" format.

It means that the most popular form of education was "full-time", accounting for a whopping 553% of the student sample and 38.9% of experienced staffs. The second most popular form of education was "off-job(half-time)", with 23.7% of the student sample and 27.8% of experienced staffs. In addition, 22.2% of the experienced staff were interested in "weekend class".

Figure4.17 shows the frequency of respondents' selection of "enrollment form"

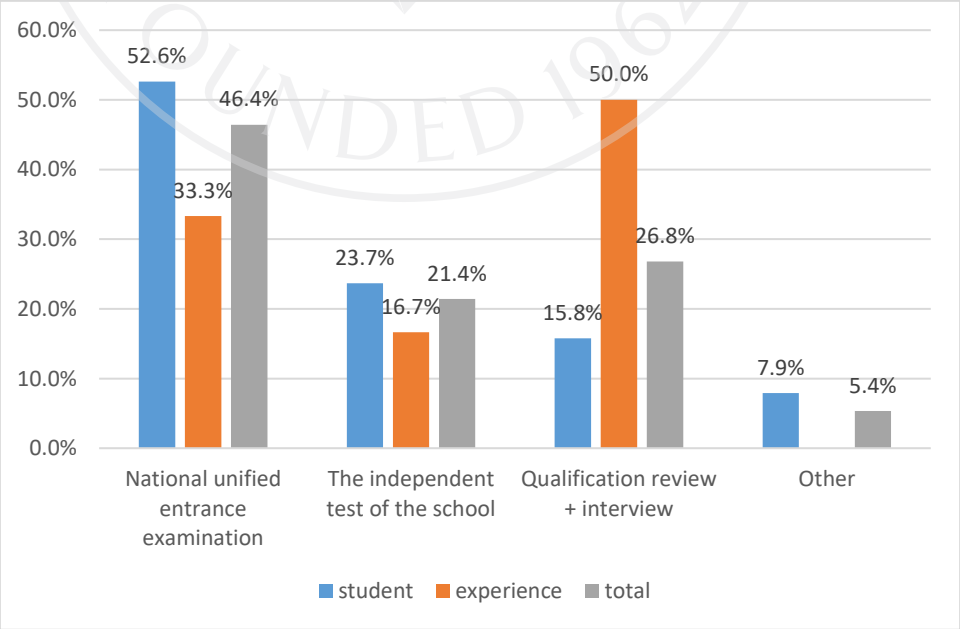


Figure 4.17: Frequency of "enrollment form"

According to Figure 4.17, in total, 46% of the respondents are willing to pass the "National unified entrance examination" to apply for the big data graduate program, and 21.4% of the respondents prefer to obtain the admission qualification through the form of "The independent test of the school". 26.8% of the respondents favored the "Qualification review + interview" form of enrollment.

For undergraduates at school, 52.6% of the respondents are willing to apply for the "National unified entrance examination" to apply for the big data graduate program, 21.4% of the respondents are willing to obtain the entrance qualification by means of "The independent test of the school", 15.8% Of the interviewees are willing to obtain admission qualification through the form of "Qualification review + interview".

For staff with work experience, 33.3% of the respondents are willing to apply for the "National unified entrance examination" to apply for the big data graduate program, and 16.7% of the respondents are willing to obtain the admission qualification through the form of "The independent test of the school" , 50.0% of the respondents are willing to obtain admission qualification through the form of "Qualification review + interview".

In a word, the respondents' favorite form of admission is the national unified entrance examination. But there are big differences between students and experienced staff. More than 50% of the students are willing to pass the "national unified entrance examination" to obtain the admission qualification, while more than half of experienced staffs are willing to pass the "qualification examination + interview" to obtain the admission qualification, and 33.3 % of the on-the-job workers are willing to pass the "national unified entrance examination".

Figure 4.18 shows the frequency of respondents' selection of "Teaching method"

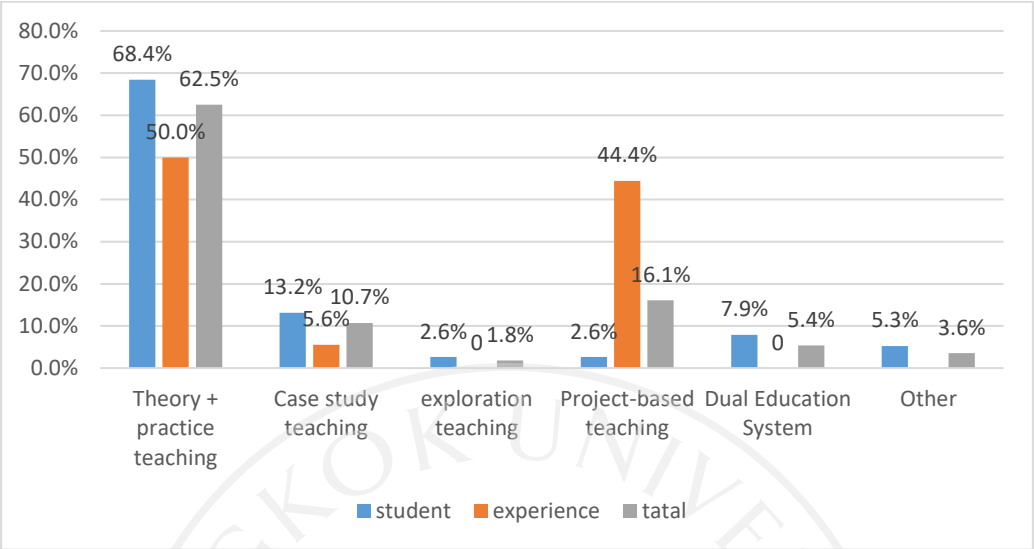


Figure 4.18: Frequency of "Teaching method"

As show in Figure 4.18, 62.5% of the respondents favored the "theory + practice teaching" teaching model, 10.7% of the respondents preferred the "Case study teaching" teaching model, and 1.8% of the respondents preferred For the "Exploration teaching" teaching model, 16.1% of the respondents favored the "Project-based teaching" teaching model, and 5.4% of the respondents favored the "Dual Education System" teaching model.

For undergraduates at school, 68.4% of the respondents favored the "theory + practice teaching" teaching model, 13.2% of the respondents favored the "Case study teaching" teaching model, and 2.6% of the respondents favored the " "Exploration teaching" teaching model, 2.6% of the respondents favored the "Project-based teaching" teaching model, and 7.9% of the respondents favored the "Dual Education System" teaching model.

For experienced staff, 50.0 %% of the respondents favored the "theory + practice teaching" teaching model, 5.6 respondents favored the "Case study teaching"

teaching model, and 44.4% preferred it in the "Project-based teaching" teaching model.

It is clearly, the most popular form of instruction is " theory + practice teaching " (62.5%), which accounts for a high proportion of both the student sample and the working staff sample.

4.4 School and Major Choices

In this study, six factors including "The Popularity and reputation of the school" and "Tuition and scholarships" were used as indicators for students to choose schools and majors. Table 4.17 shows the mean and variance of each indicator.

Table 4.17: Mean and Standard Deviation of "Selected Schools and Professional Indicators"

Variable	Mean	Std. Deviation	N
Scientific research strength	4.39	0.779	56
Faculty and teaching level	4.38	0.822	56
Integration level of production-teaching	4.32	0.789	56
	(4.21-5.0)		
School facilities	4.07	1.006	56
The Popularity and reputation of the school	3.8	1.034	56
Tuition and scholarships	3.71	1.074	56
	(3.41 4.20)		

According to Table 4.17, the mean of the variable "Scientific research strength" is 4.39, the Std. Deviation is 0.779; the mean of the "Faculty and teaching level" is 4.38, the Std. Deviation is 0.822; the mean of the "Integration level of production-teaching" is 4.32, Std. Deviation is 0.789. The mean of these three variables is greater than 4.2 (range 4.20 -5, very important).

In addition, the mean of the variable "School facilities" is 4.07, the mean of the variable "the popularity and reputation of the school" is 3.81, and the mean of the variable "Tuition and scholarships l" is 3.71. The mean of these three variables is greater than 3.41 (range 3.41 ~ 4.20, fairly important).

In summary, when interviewees choose schools and majors, they pay more attention to "Scientific research strength", "Faculty and teaching level" and "Integration level of production-teaching", and their mean is greater than 4.2, reaching " very important "level. The second most important indicators include "School facilities", "The Popularity and reputation of the school" and "Tuition and scholarships", and their mean is greater than 3.41, reaching the level of "fairly important".

This study analyzed the correlation of variables, and found that there is a significant correlation between some variables.

Table 4.18 shows the correlation analysis between the demographic variable "role" and “Tuition and scholarships”.

Table 4.18: Correlation between the Variable "role" and "Tuition and scholarships"

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	6.423	1	6.423	6.084	.017
Within Groups	57.006	54	1.056		
Total	63.429	55			

As shown in Table 4.18, the sig of "role" and "Tuition and scholarships" is 0.017 (<0.05), indicating that there is a significant correlation between them, that is, the different groups of "role" affect "Tuition and scholarships" obviously.

Table 4.19 is the comparison of the average value of "Tuition and scholarships"

between different "role" groups.

Table 4.19: Means of "Tuition and scholarships" in different "role" Groups.

Role	Mean	N	Std. Deviation
Student	3.95	38	.985
Experience	3.22	18	1.114
Total	3.71	56	1.074

According to Table 4.19, the mean of "student" is 3.95 (range 3.41 ~ 4.20, fairly importance), and Std. Deviation is 0.985, and the mean of "experience" is 3.22 (range 2.61 ~ 3.40, moderately importance), and Std. Deviation is 1.074

It means that students' respondents think that the scholarship is more important than experienced staffs' respondents when they choosing a school or choosing a major. The student's expectation is "Fairly importance" level, and experienced staffs' expectation is "Moderately importance" level.

Carry out correlation analysis between "major" and the variables of school's choice factors. The results showed that: the SIG between "Major" and "The Popularity and reputation of the school" is 0.02 (<0.05), the SIG between "Major" and "School facilities" is 0.013 (<0.05), the SIG between "Major" and "Faculty and The sig value for teaching level is 0.002 (<0.05), and the SIG between "Major" and "Scientific research strength" is 0.037 (<0.05). It means that "major" has obvious correlation with "The Popularity and reputation of The school", "school facilities", "Faculty and teaching level", and "Scientific research strength" (shows in appendix G table A14).

In order to further understand the relationship between "major" and these

variables, further mean comparison analysis is performed. The result showed in table A15 of appendix G.

For "The Popularity and reputation of the school", "Mathematics and statistics" has the largest mean of 4.13 (range 3.41 ~ 4.20, fairly importance), and "Computer science" has a mean of 4.11. "fair importance" level, while the mean of "Electronic information engineering" is only 2.8, which belongs to the "moderately importance" level.

For the "School facilities", the mean of "Mathematics and statistic" is 4.33, which is higher than the mean (4.17) of "Computer science", while the mean of "Electronic information engineering" is only 2.80, which only belongs to the "moderately important" level.

For "Faculty and teaching level", the mean of "Computer Science" is as high as 4.56, the mean of "Mathematics and statistics" is 4.33, and they all belong to the "very importance" level, while the mean of "Electronic information engineering" is only 3.0, which belongs to " moderately importance "level. The gap between "Electronic information engineering" and "Computer science" or "Mathematics and statistics" is obvious.

For "Scientific research strength", the mean of "Computer science" is 4.5, and the mean of "Mathematics and statistics" is 4.33. Both majors belong to the "very importance" level. The average value of "Electronic information engineering" is only 3.40, which is close to the "fairly importance" level, but it still belongs to the "moderately importance" level.

In short, when choosing a school, students major in "computer science" or "Mathematics and statistics" pay more attention to "The Popularity and reputation of

the school", "School facilities", "Faculty and teaching" and " Scientific research strength " than those major in "Electronic Information Engineering", and show a clear gap.

According to the correlation analysis between students' "family economic income" and "schools and schools"(shows in table A16 of appendix G), sig = 0.027 (<0.05). It means that there are obvious differences in the choice of “Tuition and scholarships” among different family income levels in the student population.

Table 4.20 gives the further analysis of their differences.

Table 4.20: The Impact of Students' Family Income on "Tuition and scholarships"

Family's economic income	***Mean***	***N***	***Std. Deviation***
<=¥1000	4.18	11	.874
¥1000~¥5000	4.17	18	.924
¥5000~¥10000	3.67	6	.816
¥10000~¥2000	2.50	2	.707
>¥20000	2.00	1	.

As shown in Table 4.20, the mean of the item “<= ¥ 1000” is 4.18, “¥ 1000 ~ ¥ 5000” mean is 4.17, “¥ 5000 ~ ¥ 10000” mean is 3.67, “¥ 10000 ~ ¥ 2000” mean is 2.5, and the "> ¥ 20000" mean is 2.0. Obviously, the higher the family's economic income, the lower the concern for "Tuition and scholarships". Students with family incomes "<= ¥ 1000" and "¥ 1000 ~ ¥ 5000" pay special attention to "Tuition and scholarships".

In summary, the interviewees care about these factors when choosing a school. Their attention to factors such as "Scientific research strength", "Faculty and teaching level" and "Integration level of production-teaching" reached the level of

"very important", while to "School facilities", "The Popularity and reputation of Factors such as "the school" and "Tuition and scholarships" have also reached the "fairly important" level.

In contrast, student respondents pay more attention to "Tuition and scholarships" than those with work experience. Students with lower family income pay more attention to "Tuition and scholarships". "Computer science" and "Mathematics and statistics" students pay more attention to "The Popularity and reputation of the school", "School facilities", "Faculty and teaching level" and "Scientific research" than "Electronic Information Engineering" students strength ".

4.5 Respondents' Expectations of the Curriculum and Skill System

Table 4.21 is the mean and standard deviation of the respondents' expectations for the course. According to Table 4.21, “Big data security technology” is the most desired course for respondents, and mean is 4.23 (> 4.2), which belongs to the level of “very importance”. The mean of the remaining courses are between 3.41 and 4.20, with the largest mean being 4.20 and the smallest mean being 3.79. It shows that the interviewees believe that these courses are more important and reach the level of "fairly important".

This further test result shows that there are no demographic variables that are correlated with these courses. It shows that the interviewees' expectations of these courses have no influence on factors such as gender, major, age, and family income.

Table 4.21: The Mean and Standard Deviation of Respondents' Expectations of the Course

Variable（course）	Mean	Std. Deviation	N
Big data security technology	4.23	0.874	56
	(4.21-5.0)		
Data Mining	4.20	0.883	56
Big data platform technology	4.14	0.903	56
Research Methods	4.14	0.773	
Data Warehouse	4.09	0.859	56
Information and Social Network Analysis	4.09	0.880	56
Exploratory Data Analysis	4.07	0.89	56
Data Visualization	4.02	0.944	56
Multivariate statistics and Modelling	4.00	0.953	56
Forecasting and decision making	4.00	0.934	56
management	3.95	0.942	56
Introduction to Data Science	3.95	0.961	56
Machine Learning	3.88	1.028	56
Consumer Marketing Analysis	3.82	1.011	56
Finance	3.79	0.986	56
	(3.41-4.20)		

Table 4.22 is the mean and standard deviation of respondents' expectation of soft skills. According to Table 4.22, the respondent's most expected soft skills are "Positive attitude", mean is 4.23, reaching the level of "very important", the remaining soft skills are at the level of "fairly important", the smallest mean is 3.71, the largest The mean is 4.02. This shows that respondents generally think that these soft skills are very important.

Table 4.22: Mean and Standard Deviation of Respondents' Expectations on Soft Skills

Variable (soft skill)	Mean	Std. Deviation	N
Positive attitude	4.23	0.831	56
	(4.21-5.0)		
Team skills	4.02	1.000	56
Communication skills	4.02	0.820	56
Listening skills	3.91	0.940	56
Interpersonal skills	3.84	0.968	56
Leadership ability	3.71	1.057	56
	(3.41-4.20)		

Deeper test results indicate that there are no demographic variables that have a significant correlation with these soft skills. That is to say, the interviewees' expectations of these soft skills will not be affected by demographic attributes.

Table 4.23: Frequency and Standard Deviation of Respondents' Expectation of Basic Skills before Enrollment

Variable(course)	Mean	Std. Deviation	N
Data Structures and Algorithms	3.89	0.947	56
Database	3.89	0.985	56
Programming	3.79	0.967	56
Data Mining	3.75	1.083	56
Discrete Mathematics	3.71	0.967	56
Probability and Statistics	3.70	1.008	56
	(3.41-4.20)		

As shown in Table 4.23, the respondents believe that these courses are very important before accepting big data graduate education. The mean is between 3.41

and 4.2, the largest is 3.89 and the smallest is 3.7.

Table 4.24 is the correlation analysis data of “gender” and “Probability and Statistics”. In the table, sig = 0.042 (<0.05), indicating that “gender” and “Probability and Statistics” have obvious correlation.

Table 4.25 is the mean and standard deviation of “Probability and Statistics” under different gender groups.

Table 4.24: The Correlation between "gender" and "Probability and Statistics"

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	4.162	1	4.162	4.349	.042
Within Groups	51.677	54	.957		
Total	55.839	55	S		

Table 4.25: Mean and Standard Deviation of "Probability and Statistics" by Gender

Probability and Statistics*gender	***Mean***	***N***	***Std. Deviation***
Male	3.45	31	1.028
Female	4.00	25	.913
Total	3.70	56	1.008

According to Table 4.25, the mean between men and “Probability and Statistics” is 3.45, and the mean between women and “Probability and Statistics” is 4.0, indicating that women ’s expectation of “Probability and Statistics” is significantly higher than that of men.

In summary, in the given curriculum system, the respondents believe that "Big data security technology" is the most important, reaching the "very important" level, and the rest of the courses have also reached the "fairly important" level. In the given

soft skill system, the interviewees believe that "Positive attitude" is the most important, reaching the "fairly important" level, and the rest of the soft skills belong to the "somewhat important" level. Respondents believe that the given pre-school courses belong to the "somewhat important" level, especially "data Structures and Algorithms" and "database".

CHAPTER 5

CONCLUSION & DISCUSSION

5.1 Summary of Research

In This chapter is composed of the summary of research and discussion and IS research implication and recommendations for future research. From the qualitative study, the decision whether further study in Bigdata at Baise University, depended on

First, source of financial support for education, to recruit more students into to this Master program in big data, the university must promote and support the Career Advancement more salary increment.

Second, choice of educational type (technical education or academic education), promote to the corporate which employer's policy for subsidy education fee, opened for part time study or 6 months block leave.

Third, major influential persons to further study are the students themselves, their family’s influence and their boss's and Influence. For the right program and preparation before entering the students always ask for friend's suggestion.

Forth, for the location and school facility, the big data case must be applicable for corporate practice in nowadays and the school location should be in downtown or the industrial parks that can study easily after work.

Fifth, the program should provide 3 award scholarship for top students to attract talent to study as ideal person with high achievement to other students, Flexibility of learning style, and must promote good side Baise University ’s reputation. The key message in promoting the course into public must use interesting and modern course to attract people.

Sixth, as for the college preparation before launching new curriculum, reduce

the criteria before admission or have pre university class regarding programing as certificates to eliminate the barriers and difficulty of admission.

Seventh, the BIG data Program director and academic officer must have in-depth of understanding, Clear basic skills requirement both IT application and codes of students' applicants, who have skills and knowledge in Technical architecture. With the clear basic pre requisite students, the school need to fix specific technology into curriculum system which fit to the market demand.

Eight, for the benefits of further studying big data that should use for advertising are application value to market, Big data application software developers, Big data analysis and deep research and development, Big data platform maintainer/

Ninth, to remove all barriers of talents who good at Mathematics and programming are lack of financial aids, poor mathematics, no basic programming.

Lastly, for 2021 launch, the language should be Hadoop or UX UI or else that common use in corporates because the applicants will have "Positive Drive" to earn higher pay due to shortage of talents in the future and it's megatrends of business world.

For the quantitative results, there are key critical finding from the statistical analysis

1) Age 31-40 and 45 have medium to high level of Big data knowledge while the fresh grad and bachelor students have no idea what 's big data and why it's so important to business world.
2) Even the IT and IT engineering bachelor students still know very few about Big data meaning
3) The average level of respondents' demand for big data is not high, only at the

"somewhat need" level, while the vast majority of respondents' demand for big data is only at the "slightly need" level.

4) Experienced staff needs big data more than student.

5) Students majoring in mathematics and statistics have a higher demand for big data than students majoring in computer science or students majoring in electronic information engineering.

6) Obviously, "big data trainers" have a higher demand for "big data" than "other it-related personnel" and "software development engineers", and on-the-job personnel with work experience have a higher demand for big data than undergraduates. Among undergraduates, "mathematics and statistics" students have a stronger demand for big data than "computer science" and "electronic information engineering" students,

7) In general, the purpose of the respondents to learn big data is mainly to "work in IT or planning to work in the future", while the secondary purpose is "For practical investigation, scientific research project, paper writing", which is mainly reflected in the students. Factors such as gender and specialty have little influence on "the purpose of learning big data", while factors such as family location and family income cannot be further explored because the data do not meet the statistical requirements.

8) There is a big difference in the goal of learning big data between students and experienced staff. The main goal for students to learn big data is to "improve the quality of big data", followed by "master the software development technology of big data", "master the modeling and analysis technology of big data" and "master the security and system maintenance technology of big

data". The main goal for experienced staff to learn big data is to "master big data software development technology", followed by "improve big data literacy". The distribution of goals for students to learn big data is relatively balanced.

9) Students in different majors have different goals for learning big data. The main goals for students majoring in computer science to learn big data are to "master big data software development technology" and "improve big data literacy", accounting for 33.3% and 22.2% respectively. The big data learning objectives of mathematics and statistics majors are mainly "improving big data literacy" and "mastering big data modeling and analysis technology", accounting for 40.0% and 33.3% respectively. Students majoring in electronic information engineering learn big data mainly to "master the security and system maintenance technology of big data", accounting for up to 60%.

10) There are some differences between different career types, big data training lecturers' main goal of learning big data is to "master big data software development technology", accounting for as much as 80%. The main goal for software development engineers to learn big data is to "master big data software development technology", accounting for 40%, followed by "improve big data literacy" and "master big data security and system maintenance technology", accounting for 20% respectively. There is no significant difference in the main goals of other it-related professions in learning big data. The main goals were "mastering big data software development technology" and "improving big data literacy", each accounting for 25%.

11) the goal of male experienced employees to learn big data is very different from that of women. The main goal of male experienced employees is to "master big data application software development technology", while the main goal of women is to "improve big data literacy".

12) The most attractive factor for big data is "Career advancement and more salary income", and the secondary attractive factor is "Megatrends of business world".52.60% of student repute that "the biggest attraction of big data" is "Career advancement and more salary income", and 55.6% of the experience staffs believe that "the biggest attraction of big data" is "Megatrends of business world".

13) There is a clear gap between " Mathematics and statistics" students and "Electronic information" students in the "sThe most attractive factor for the master of BIGDATA".

14) the biggest barrier for students to participate in the degree education of big data is "the difficulty of big data technology" (34.2%), followed by "not interested in big data" (18.4%), "economic difficulties" (13.2%) and "the difficulty of college entrance examination" (13.2%). The biggest barrier for experienced employees to participate in big data academic education was "insufficient learning time after work" (27.8%), followed by "lack of financial assistance" (22.2%), and the third was "difficult college entrance examination" (16.7%).

15) For students of different majors, the biggest barrier for them to learn big data are not exactly the same. Students majoring in computer science and students majoring in electronic information engineering believe that the biggest barrier

to learning big data is "big data is too hard", while students majoring in mathematics and statistics believe that the biggest barrier to learning big data is "not interested in big data".

16) “big data training lecturer” and “Other IT related occupations” believe that the main barrier to learning big data is "Lack of study time after work", and Software development engineers believe that the main obstacle to learning big data is "Lack of Financial Aid".

17) The different “family economic income” groupings have little effect on “the biggest barrier to join big data master education”.

18) The respondents' demand for "big data graduate program" is not very high, 31 to 40-year-old respondents have greater demand for big data graduate programs.

19) more than 51% of the respondents are quite willing or very willing to recommend the big data graduate program to the people around them.

20) when interviewees choose schools and majors, they pay more attention to "Scientific research strength", "Faculty and teaching level" and "Integration level of production-teaching", reaching " very important "level. The second most important indicators include "School facilities", "The Popularity and reputation of the school" and "Tuition and scholarships", reaching the level of "fairly important".

21) Students are more concerned about " Tuition and scholarships " than working people.

22) Students major in "computer science" or "Mathematics and statistics" pay more attention to "The Popularity and reputation of the school", "School

facilities", "Faculty and teaching" and " Scientific research strength " than those major in "Electronic Information Engineering", and show a clear gap.

23) the higher the family's economic income, the lower the concern for "Tuition and scholarships". Students with family incomes "<= ¥ 1000" and "¥ 1000 ~ ¥ 5000" pay special attention to "Tuition and scholarships".

24) in the given curriculum system, the respondents believe that "Big data security technology" is the most important, reaching the "very important" level, and the rest of the courses have also reached the "fairly important" level. In the given soft skill system, the interviewees believe that "Positive attitude" is the most important, reaching the "fairly important" level, and the rest of the soft skills belong to the "somewhat important" level. Respondents believe that the given pre-school courses belong to the "somewhat important" level, especially "data Structures and Algorithms" and "database".

5.2 Discussion and Interpretation of Findings

From our main 5 parts of research findings comparing to other previous researchers and articles in Chapter 2 it’s found as follows:

Students are more concerned with “scholarships” when choosing admissions, which is consistent with the results of demographic research on university selection (Aydın & Firat, 2016). The higher the family's economic income, the less attention is paid to "tuition fees and scholarships". Students with family incomes of "<= ¥ 1000" and "¥ 1000 ~ ¥ 5000" should pay special attention to "tuition fees and scholarships".

Students pay more attention to the academic level and infrastructure of the school, which is consistent with the results of Sezgin and Binatlı (2011). That is, the academic characteristics of universities and the technical infrastructure of education

are important factors that affect students' choice of universities.

The influence of school reputation on students ’choice of school is very large, which is consistent with the findings of Manoku (2015) on the importance of institutional reputation, location and the importance of opportunities for exchange courses in the university selection process.

Students 'recognition of Exploratory Data Analysis, Data Mining and other courses is very high, which is consistent with the results of Il-Yeol Song (2015)' s research on the US graduate course system. Many universities in the United States have started these courses in big data graduate programs.

Respondents' recognition of soft skills such as positive attitude is quite high. This is exactly the same as the soft skill requirements put forward by Rameshwar Dubey (2014) in “Education and Training of Successful Career and Business Analysis of Big Data”.

5.3 Significance of the Study

The result can help Baise University design Master degree in Big data that support and attract talents into this programs easier with practical curriculum which support China ‘s national policy.

5.4 Recommendations for Further Research

The research recommendations are as follows:

1) Strengthen the "big data" knowledge education for undergraduates in school to improve students' awareness of big data. For example: add the knowledge of big data to the course of "Big Data Computer Basics"; set up "Introduction to Big Data" as an elective course in the course system of related majors.
2) For the benefits of further studying big data that should use for advertising

are application value to market, Big data application software developers, Big data analysis and deep research and development, Big data platform maintainer.

3) Guided by students' learning goals, set up different training goals and curriculum systems.
4) Increase the scale of scholarship investment, and at the same time, enterprise grants can be introduced to solve students' financial difficulties.
5) choice of educational type (technical education or academic education), promote to the corporate which employer's policy for subsidy education fee, opened for part time study or 6 months block leave.
6) For experienced staff, the focus is on local admissions.
7) Encourage undergraduates in schools to pass the national unified entrance examination to obtain admission qualifications. Admit in-service employees in a flexible way of entrance examination to reduce the difficulty of admission.
8) The necessary basic skills assessment is added to the entrance interview to ensure that students' basic skills in mathematics and programming meet professional learning requirements.
9) Appropriately set up some soft skills courses to cultivate soft skills such as " positive attitude ".
10) the language should be Hadoop or UX UI or else that common use in corporates because the applicants will have “Positive Drive” to earn higher pay due to shortage of talents in the future and it’s megatrends of business world.

5.5 The Future Researches Should Add on More Research Design by Follows:

1) Increase the types of majors covered by the sample, so that the research covers all majors of Baise University as much as possible, and the research results are more real and effective.

2) Increase the number of samples for each major, and allow samples for each major to cover different grades as much as possible.

3) With Baise University as the center, we conducted interviews and surveys with working employees in and around Baise to further understand the demand for big data by local employees in Baise.

4）Separate the research part of the curriculum system, set up a research project separately, and conduct interview research on the subjects with experience in curriculum design.

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APPENDICES

Appendix A

Intervivew Questionnaire

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

INTERVIEW QUESTIONNAIRE ON WHAT FACTORS INFLUENCE UNDERGRADUATE STUDENTS TO STUDY IN A BIG DATA CURRICULUM: THE CASE OF A CHINSES UNIVERSITY

Ladies and gentlemen:

I am a student of Bangkok University, major in Master of Business Innovation. Order to finish my Independent Study(IS)-- WHAT FACTORS INFLUENCE UNDERGRADUATE STUDENTS TO STUDY IN A BIG DATA CURRICULUM: THE CASE OF A CHINSES UNIVERSITY, I would like to make an interview to you about education choice. I need your cooperation, thanks a lot.

I promise that the content of the interview will only be used for studying, not for any business purposes, and I will remain confidential.

Your gender: ☐male ☐female

Your age: ☐18~25 ☐25~30 ☐30~35 ☐35~40 ☐>40

Your career：_____ Your major：_____

Index	Questions	Answers	备注
Q1	In 5 years, do you have any plan to go to graduate school? why?		
Q2	When you make some important decisions (like taking the postgraduate entrance exam), who has the most influence on your decision? Why is that?		

Q3	What are the main factors you consider when choosing a major or school? Why is that?		
Q4	Do you know about big data technology and big data major? What exactly did you learn? Like where it has important applications.		
Q5	Where do you use big data in your study or work? What technologies will be used?		
Q6	Are you willing to choose "big data" as your postgraduate major? Why is that?		
Q7	If you are going to major in big data, what are your difficulties? When the school makes adjustments, which adjustments (including policies, courses, etc.) would make you prefer to participate in the master of big data education?		
Q8	What do you think is the reason that affects candidates' choice or not to choose the major of master of big data? Why is that?		
Q9	Who do you think are more likely to pursue a master's degree in big data? Why is that?		
Q10	What Suggestions do you have on how to increase students' interest in "big data"?		

Appendix B

Respondents' Raw Recorded Data

QUESTION1: In 5 years, do you have any plan to go to attend BIG DATA graduate school? why?

Respondent 1 Answers:

In the recent five years, I have **no intention to take the postgraduate entrance examination。Because I must to work hard to pay my house loans and car loans**(keyword1.1.1)。

Although my income is over 15,000 yuan/month, the expenses are huge. Mortgage 4000 yuan/month, car loan 2500 yuan/month, two children a year expenditure of about 30,000 yuan, insurance a year expenditure of more than 40,000 yuan. **Financial pressure is relatively big, so there is no energy to go to graduate school**.(keyword 1.1.2)

Our company also does not attach great importance to academic qualifications, So **a degree has little impact on jobs and earnings.**（1.1.3）

Respondent 2 Answers:

At present there is no intention to take an examination of graduate school, because for the current occupation, the current degree is enough, there is **no need to improve the degree.**（2.1.1）

At present, **more attention is paid to the improvement of technology**.（2.1.2）

when the degree upgrade is need in the future, I will do it.（2.1.3 ）

So, at present have an opportunity or take an exam to attend technical training, rather than take an examination of graduate school to promote record of formal schooling.

Respondent 3 Answers:

There is no intention to take the postgraduate entrance examination, the condition is not allowed.

Currently, the **company does not have a full-time continuing education policy** and mechanism, and employees are **not allowed to take time off to study.**（3.1.1）**Employees are encouraged to improve their skills or qualifications through other means, such as correspondence courses**（3.1.2）

Respondent 4 Answers:

I have plans to take the postgraduate entrance exam. Because **current undergraduate obtain employment pressure is bigger**（4.1.1）。Want to find a

satisfactory job after graduation **a good degree is an important stepping-stone to success**(4.1.2) . Especially for the undergraduates of the second - and third-rate undergraduate institutions , the **postgraduate entrance examination is a good choice**（4.1.3). Secondly, **it is the general trend to take the postgraduate entrance examination**（4.1.4）, which can improve one's horizon while attending graduate school.

QUESTION 2. When you make some important decisions (like taking the postgraduate entrance exam), who has the most influence on your decision? Why is that?

Respondent 1 Answers:

I will **make a decision by myself**（1.2.1）, and I will **consider my financial ability**（1.2.2） and what **my family thinks**.（1.2.3） After all, communication and trust are more important in a family. The partner's opinion is more important, and if you have her support, you will be able to handle your finances and family work.

If **it is related to the company's business**, the boss's opinion is also very important, so **I will listen to the boss's opinion**（1.2.4）.

Respondent 2 Answers:

When I make a decision, it is my **parents who mainly influence my decision**（2.2.1）， Of course **I listen to my friends**。All undertakings must have the support of relatives and friends to do smoothly; Because at present, some **economic factors are not completely independent, also rely on parents**（2.2.2）.

In addition, **there are some things that parents have already had their plans and arrangements**（2.2.3）. **A friend's opinion is sometimes useful**（2.2.4）.

Respondent 3 Answers:

It was my **family members who influenced my decision more**（3.2.1）， such as parents or lover.

If the decision to do a thing, the family's current living habits and quality of life has a greater impact（3.2.2）, will be very careful to consider, after all, the responsibility in front of the old and young.

In a company, you may **listen more to your boss and colleagues**（3.2.3）.

Respondent 4 Answers:

I still listen to my parents' opinions on the postgraduate entrance exam, because now all the fees are dependent on my parents (keywork: 4.2.1). The postgraduate entrance exam needs to consider whether you want to take the postgraduate entrance exam on the job or prepare for it whole-heartedly (without work). No matter which kind of choice has its advantage and disadvantage sex, this should see the support of family economy. Parents' views and attitudes (keywork:4.2.2) are also important. Of course, my parents are very supportive of my postgraduate entrance exam.

QUESTION 3. What are the main factors you consider when choosing a major or school? Why is that?

Respondent 1 Answers:

When I choose my major, I mainly consider the issue of employment, and mainly see whether the employment is easy (3.1.1). If the graduation is not easy to find a job, we certainly do not want to read. The major has the development prospect (1.3.2), has the development space, in this field can be continuously proposed. Also, the factor to consider is income (1.3.3).

The location of the university should be in the same city (1.3.4), which can save the travel time. Tuition is not too high, it is better to have a scholarship (1.3.5), can reduce the pressure of tuition。The school has a high level of teaching and can really learn technology (1.3.6), which can help the future work.

Respondent 2 Answers:

It mainly depends on the popularity of the school (2.3.2) and the prospect of the major. The university has a reputation of 211 or above. A good professional prospect (2.3.2) means a good development space and a long survival time. More social work positions, easier employment (2.3.3), better income (2.3.4) , Stability is not an easy career. (2.3.5).

Respondent 3 Answers:

One is to consider whether it is helpful to the current career (3.3.1); The second is to consider the school's teaching ability (3.3.2) and brand influence (3.3.3); Third, personal financial affordability .

The time and place of classes are as convenient as possible(3.3.4). for example, In the same city, or in a city less than three hours' drive away (3.3.5). They can attend classes on weekends or for one month in summer and winter vacations (3.3.6).

Respondent 4 Answers:

First consider whether you are interested in the major and want to further study (4.3.1)

Secondly, the development prospect of the major (4.3.2) and the teaching status of the major in schools across the country (4.3.3) are considered.

Finally, consider the degree of difficulty of the subjects tested by the major (4.3.4 degree of difficulty of entrance examination) and the admission score line and the number of students

QUESTION 4. Do you know about big data technology and big data major? What exactly did you learn? Like where it has important applications.

Respondent 1 Answers:

Know something about big data, but not a lot (1.4.1). In the preceding paragraph, the company ali group provided training in the aspect of big data, so as to understand and contact some.

At present, before the loan risk control, we can use big data to evaluate the credit of the loan object, so as to reduce the risk of loan issuance.

Use big data to analyze customers, understand their consumption habits, and find potential customers. Big data can be used to analyze personal living habits and hobbies, which can be used to recommend favorite things to customers to achieve precision marketing; big data can be used to analyze which people's diseases are caused by bad living habits or eating habits; big data can be used to grow and improve the level of autopilot, etc. (1.4.2)

I am not very familiar with the technical aspects, and I probably use Hadoop, data analysis, etc. (1.4.3)

Respondent 2 Answers:

I have heard a lot, but I don't really understand it. Especially in the application field, I have heard that there are many places that can be applied (2.4.1). For example, smart home, smart agriculture, Internet of vehicles, and collaborative highway system all need to use big data.

I think everyone in the industry attaches great importance to it. Many software companies in guangzhou now undertake projects involving big data technology (2.4.2). Many people in the industry are turning to big data (2.4.3). I haven't been exposed to it, and I don't know the specific technology (2.4.4).

Respondent 3 Answers:

I have worked in the information department before, and I have done some basic data mining (3.4.1), which is mainly used in customer portrait and market operation analysis. （3.4.2）

Basic understanding of the overall technical architecture, but no specific practice. (rule 3.4.3)

I don't know much about the courses offered by the school. (3.4.4)

Both the national and local governments attach great importance to it, and the country has issued a series of policies and guidelines to promote the development of big data. (3.4.5)

Respondent 4 Answers:

A little bit. In the era of data-oriented information, data is everywhere. Through data collection, analysis and processing, data will become more valuable (4.4.1). Big data technology also conforms to the trend of contemporary development and has achieved good development in marketing, medical treatment, finance and other aspects (4.4.2).

Not familiar with specific techniques and courses (4.4.3)

QUESTION 5. Where will you use big data in your study or work? What technologies will be used?

Respondent 1 Answers:

In our current work, we do not use big data technology, but in our daily life, we are the beneficiaries of big data (1.5.1), such as travel, shopping, etc.

The company can use big data in many fields, but the traditional management information system can still meet the needs of the business, so the company has no plans to introduce big data at present. In the future, big data may be used to transform the existing information system (1.5.1).

Respondent 2 Answers:

At present, we have not touched the application development of big dataAt present, many companies in Guangzhou have plans to use big data in their projects. In terms of development, we may use big data technology to help customers develop projects. Data modeling, data analysis, application system development, domain tool development, or deep learning development may be involved (2.5.2).

Respondent 3 Answers:

The company has used big data technology in customer management. Include customer portrait, customer demand analysis, user map, etc. At the technical level, the head office is mainly responsible for the research and development of the system, and the technical department of our payroll company is responsible for the operation and maintenance (3.5.1). The employees of each department use data through platform software or carry out simple data processing through some tools. (3.5.2)

Respondent 4 Answers:

As an undergraduate, I have not been exposed to big data application at present. In my daily study, data collection will use MySQL database for data management.In the future, I may also choose the cold night of software development and become a big data technology application developer.

QUESTION 6. Are you willing to choose "big data" as your postgraduate major? Why is that?

Respondent 1 Answers:

No, big data is a new concept proposed in recent years, which is similar to "e-commerce". Learn everything, but almost nothing about the core.（1.6.1）

Respondent 2 Answers:

This is a good choice because it is currently a hot topic (keyword:2.6.1).

We are talking about big data, artificial intelligence. Many organizations are focused on big data or have plans to introduce big data technology (keyeord 2.6.2).

It is promising because the development of artificial intelligence is the general trend, and big data is the foundation for the development of artificial intelligence, so big data will also become a trend (2.6.3). There will be more and more demands for talents, and there will be a shortage of talents in the future (2.6.4). Big data the job market is relatively good in first-tier cities this year (2.6.5), and there is a small demand in second-tier cities. I will consider learning big data after two years.

Respondent 3 Answers:

I'd love to learn about big data, because it strongly related to the occupation (3.6.1). Before doing too much data management related work, there is a certain basis.

Respondent 4 Answers:

I don't want to, because the technology is too difficult (4.6.1), the basic knowledge required is too many and difficult, especially mathematics, I am not good at mathematics (4.6.2).

QUESTION 7. If you are going to major in big data, what are your difficulties? When the school makes adjustments, which adjustments (including policies, courses, etc.) would make you prefer to participate in the master of big data education?

Respondent 1 Answers:

The main difficulties are funds (1.7.1) and families. Families mainly take care of the elderly and children(1.7.2).

There are mathematics and algorithms that need to be taken back to the textbook （1.7.3）， With the growth of age (1.7.4), family chores, etc., are barriers to further learning.

Financially, some schools seem to have a scholarship system (1.7.5), which could ease their financial problems.

Respondent 2 Answers:

The main difficulty is the lack of time (2.7.1), and the current time is to study Java development in depth

The biggest possibility is the ability of algorithm design (2.7.3), and the other is the condition of learning big dataFor example, the server used in the experiment, and the data

Respondent 3 Answers:

The main reason is that time is not allowed (3.7.1), and students can complete their studies in fragmented time, such as weekends and evenings (2.7.2)The mathematics foundation is still a little difficult (3.7.23 after all, many data analysis models need mathematics.

Respondent 4 Answers:

For me, the entrance exam is the most difficult (4.7.1), especially mathematics, which is required for this major (4.7.2). I am not very good at mathematics. Secondly, my basic professional courses (4.7.3) are not very reliable, there is no great advantage.

The school can arrange more basic courses, and apply big data-related technologies to guide students to further study step by step, so as to participate in the master's education of big data (it is hoped that the school can start from the foundation and guide students to the master's education of big data step by step (4.7.4).

QUESTION 8. What do you think is the reason that affects candidates' choice or not to choose the major of master of big data? Why is that?

Respondent 1 Answers:

The specific reason is not very unknown

Many colleagues around me agree that big data is the big trend of the future. The possible reason is that enterprises pay more attention to technology and experience rather than academic qualifications, so many people focus on improving their skills rather than taking the postgraduate entrance exam. (, version 1.8.1)

Respondent 2 Answers:

At present, the employment situation in the IT industry is relatively good, and many people directly choose employment after graduation (2.8.1). Except for state-owned enterprises and a few large enterprises, it seems that they do not attach much importance to the academic degree, so there is not much temptation to take the postgraduate entrance exam (2.8.2).

Respondent 3 Answers:

I think time and money are the main reasons for not applying for the exam (3.8.1)

The latter is the benefit of learning to use (3.8.2)

Respondent 4 Answers:

I may choose this major because it has a good development prospect (4.10.1). Now that it is the Internet information era, it may be easier for me to get employed.

2. The reason for not choosing this major is that the exam is difficult and the requirement for the candidate's professional knowledge is high (4.10.2). Want to combine oneself study circumstance and understanding to this major, consider the possibility that oneself can go ashore successfully.

QUESTION 9. What do you think a basic and pre requisite requirement knowledge /skills before entering school to pursue a master's degree in big data? Why is that?

Respondent 1 Answers:

Mathematics, statistics and computer, because mathematics and statistics majors have advantages in mathematics (1.9.1). Computers have advantages in programming, algorithm design and platform technology.(1.9.2)

Criminal investigation, finance, accounting, medicine, marketing, tourism management, etc., because their business is closely related to big data (1.9.3)

Students of other majors will have difficulties in algorithm analysis and design, platform technology, etc.(1.9.4)

Respondent 2 Answers:

The students who major in related to computer scence, and want to be engaged in the work related to big data, such as electronic information engineering and communication engineering (2.9.1).

Some majors with relatively good mathematics and computer foundation, such as physics and chemistry (2.9.2)

Mathematics and statistics (2.9.3)

They may encounter difficulties in areas such as weak computer infrastructure and programming capabilities, and platform technologies（2.9.4）

Respondent 3 Answers:

In the enterprise IT technical backbone, engaged in the management data analysis supervisor

For the IT technical backbone, this is the need of the company's business development. They need to build the big data platform of the company through technology to ensure the journey of the company's IT system (3.9.1).

For data analysis supervisors, they need to discover the company's problems and opportunities through big data analysis technology and make further decisions for the company (3.9.2).

Respondent 4 Answers:

1. Undergraduates majoring in big data have a more solid foundation than others; (4.9.1)

2. Computer related students, similar majors, preparation for the exam is relatively easy. (4.9.2)

3. People who are interested in big data. (4.9.3)

QUESTION 10. What Suggestions do you have on how to increase students' interest in "big data"?

.

Respondent 1 Answers:

Strengthen the publicity, let the examinee know the demand for big data and career prospects, and have certain cases and data description (1.10.1).

Orientation training, to attract candidates for employment. (1.10.2). For example, a large enterprise, large group order training, students after graduation directly to these large group employment.

Strengthen cooperation with enterprises and publicize through enterprise platforms (1.10.3).

Respondent 2 Answers:

Can demonstrate some big data applications and employment prospects (2.12.1)

Many people think big data is too much to learn and technology is too difficult. According to the social division of labor, the training direction of big data technology can be more refined and clear (2.10.2), the curriculum system can be more streamlined and targeted, and the learning difficulty can be reduced (2.10.3).

The division of labor in the technical level or technical field should be clearer .

Respondent 3 Answers:

Use success stories, such as the case of a successful candidate (3.10.1)

Strengthen cooperation with the government, meet the needs of writer talent cultivation, and publicize national forms and policies (3.10.2).

Let the employers contact more undergraduates (3.10.3), so that students can know the needs of enterprises and understand the benefits of big data.

Respondent 4 Answers:

Guide students in the knowledge of big data during their college years (4.12.1); Secondly, big data can be applied to the teaching of relevant courses to make students interested (4.12.2).

Selection in the university, preparation for the examination in advance, and training in advance (4.10.3). For example, tutorial classes were started in the second year.

Appendix C

Narrative Coding and Theme from Raw Data Interview

QUESTION 1: In 5 years, do you have any plan to go to attend BIG DATA graduate school? why?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.1.1 I have **no intention to take the postgraduate entrance examination, because I must to work hard to pay my house loans and car loans.** 1.1.2 **Financial pressure is relatively big, so there is no energy to go to graduate school.** 1.1.3 **a degree has little impact on jobs and earnings.**	2.1.1 the current degree is enough, and needn't to improve the degree. 2.1.2 At present, more attention is paid to the improvement of technology. 2.1.3 when the degree upgrade is need in the future, I will do it.	3.1.1 Currently, the company does not have a full-time continuing education policy and mechanism, and employees are not allowed to take time off to study. 3.1.2 Employees are encouraged to improve their skills or qualifications through other means, such as correspondence courses	4.1.1 Planning to take the postgraduate entrance exam. Because current undergraduate obtain employment pressure is bigger(4.1.1) 4.1.2 Want to find a satisfactory job after graduation a good degree is an important stepping-stone to success 4.1.3 for the undergraduates of the second - and third-rate undergraduate institutions , the postgraduate entrance examination is a good choice 4.1.4 it is the general trend to take the postgraduate	Because the house loan, car loan, family expenses and other economic pressure, so do not plan to graduate school. The current degree is sufficient, and a higher degree doesn't have much impact on current job opportunities or earnings, so I don't plan to go to graduate school Improving my skills is more important than improving degree The company does not allow full-time study, but encourages half-time, weekend or correspondence study to improve degree. I took the postgraduate entrance examination because of the employment pressure. It is	Financial Support for education Career Advancement more Salary increment Choice of educational type (technical education or academic education) The employer's policy for subsidy education fee The Condition of educational forms and time attendance for experience student (full-time, half-time, correspondence) The impact of the general trend of

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
			entrance examination	easier to find a good job with a high degree, especially for students from second-tier and third-tier undergraduate colleges. Postgraduate entrance examination is a trend	postgraduate entrance examination

QUESTION 2: When you make some important decisions (like taking the postgraduate entrance exam), who has the most influence on your decision? Why is that?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.2.1 I will **make a decision by myself** 1.2.2 I will **consider my financial ability** 1.2.3 I what my **family thinks.** 1.2.4 If **it is related to the company's business**, the boss's opinion is also very important, so **I will listen to the boss's opinion**	2.2.1 When I make a decision, it is **my parents who mainly influence my decision** 2.2.2 at present, some economic factors are not completely independent, also rely on parents 2.2.3 **there are some things that parents have already had their plans and arrangements** 2.2.4 A friend's opinion is sometimes useful	3.2.1 It was my **family members who influenced my decision more，such as parents or lover.** 3.2.2 If the decision to do a thing, the family's current **living habits and quality of life has a greater impact**, will be very careful to consider, after all, the responsibility in front of the old and young. 3.2.3 In the company, I may **listen to my boss and colleagues** more.	4.2.1 I still listen to my **parents' opinions on the postgraduate entrance exam, because now all the fees are dependent on my parents.** Parents' views and attitudes (keywork:4.2.2) are also importan	I will make a decision by myself, but I will consider my family thinks and my family economic. I will make a decision with my parents and my partner's advice, because of family life. I will make a decision with my parent's advice, because of my financial ability is limited. Sometime I make a decision with my boss's advice A friend's opinion is sometimes useful	Independent Making decision by oneself Making a decision with family's and Influence The boss's and Influence The friend's suggestion and Influence

QUESTION 3: What are the main factors you consider when choosing a major or school? Why is that?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.3.1 When I choose my major, I mainly consider the issue of employment, and mainly see whether the employment is easy 1.3.2 The major has the development prospect , has the development space, in this field can be continuously proposed. 1.3.3 Also, the factor to consider is income (1.3.3). 1.3.4 The location of the university should be in the same city , which can save the travel time. 1.3. 5 Tuition is not too high, it is better to have a scholarship 1.3.6 The school has a high level of teaching and	2.3.1 t mainly depends on the popularity of the school，the university has a reputation of 211 or above. 2.3.2 A good professional prospect (2.3.2) means a good development space and a long survival time. 2.3.3 More social work positions, easier employment 2.3.4 better income 2.3.5 Stability is not an easy career	3.3.1 One is to consider whether it is helpful to the current career 3.3.2 the school's teaching ability 3.3.3 brand influence 3.3.4 The time and place of classes are as convenient as possible 3.3.5 In the same city, or in a city less than three hours' drive away 3.3.6 They can attend classes on weekends or for one month in summer and winter vacations	4.3.1 First consider whether you are interested in the major and want to further study 4.3.2 the development prospect of the major 4.3.3 the teaching status of the major in schools across the country 4.3.4 consider the degree of difficulty of the subjects tested by the major	Easy to obtain employment Jobs are stable and not easy to lose. There are prospects for employment High income The school is not too far and it is convenient to go to school Study time as flexible as possible, can be taught on weekends or winter and summer vacation. Have a scholarship Helpful for your current career High level of teaching, can learn true technology The school has high popularity (brand influence) Interesting Whether the current situation of professional development is	Advantages of employment The school location Flexibility of learning style Tuition and scholarships Teaching quality and practicality The school's reputation Interesting of class topic The difficulty of admission

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
can really learn technology				mature The entrance examination should not be too difficult	

QUESTION 4: Do you know about big data technology and big data major? What exactly did you learn? Like where it has important applications.

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.4.1 Know something about big data, but not a lot 1.4.2 Use big data to analyze customers, understand their consumption habits, …big data can be used to grow and improve the level of autopilot, etc. 1.4.3 I am not very familiar with the technical aspects, and I probably use Hadoop, data analysis, etc. 1.4.4 Technical architecture and curriculum are not well understood. 1.4.5 Only know the attention is very high, the market recruitment talent is also quite a lot, the salary is quite high.	2.4.1 IEspecially in the application field, I have heard that there are many places that can be applied . For example, … 2.4.2 Many software companies in guangzhou now undertake projects involving big data technology 3.4.3 Many people in the industry are turning to learn big data 3.4.4 I haven't been exposed to it, and I don't know the specific technology	3.4.1 I have worked in **the information department before, and I have done some basic data mining** , which is mainly used in customer portrait and market operation analysis. 3.4.2 which is mainly used in customer portrait and market operation analysis 3.4.3 Basic understanding of the overall technical architecture, but no specific practice. 3.4.4 I don't know much about the courses offered by the school. 3.4.5 Both the national and local governments attach great importance to it, and the country has issued a series of policies and guidelines to promote the development of big data.	4.4.1 Through data collection, analysis and processing, data will become more valuable 4.4.2 Big data technology also conforms to the trend of contemporary development and has achieved good development in marketing, medical treatment, finance and other aspects 4.4.3 Not familiar with specific techniques and courses	Know a little bit about big data, but not much. Know a few about the it applied. Not understanding its technical architecture I don't know the course structure of big data The attention is very high, the recruitment talent is many, the salary is high Many software projects involving big data technology Many people in the industry are turning to learn big data I don't know the specific technology I have done some work related to big data the country has issued a series of policies and guidelines to promote the development of big data. Know the application value of big data	Depth of understanding Application Type and Codes Technical architecture Specific technology Curriculum system The market demand Employment treatment National policy Application value to market

QUESTION 5: Where will you use big data in your study or work? What technologies will be used?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.5.1 In our current work, we do not use big data technology, but in our daily life, we are the beneficiaries of big data (1.5.1), such as travel, shopping, etc. 1.5.2 In the future, big data technology may be used to transform the existing information system	2.5.1 we may use big data technology to help customers develop projects. 2.5.2 Data modeling, data analysis, application system development, domain tool development, or deep learning development may be involved	3.5.1 the technical department of our payroll company is responsible for the operation and maintenance 3.5.2 The employees of each department use data through platform software or carry out simple data processing through some tools.		We are not the technology holders of big data, but we are the beneficiaries of big data technology. Transform the existing information system with big data Develop application system or tool with big data technology Data analysis, modeling and other in-depth work with big data technology Big data platform operation and maintenance Use big data tools to analyze data	Big data application software developers Big data analysis and deep research and development Big data platform maintainer What technologies will be used? Hadoop? Or UX UI or else

QUESTION 6: Are you willing to choose "big data" as your postgraduate major? Why is that?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.6.1 No, big data is a new concept proposed in recent years, which is similar to "e-commerce". Learn everything, but almost nothing about the core.	2.6.1 This is a good choice because it is currently a hot topic 2.6.2 Many organizations are focused on big data or have plans to introduce big data technology 2.6.3 It is promising because the development of artificial intelligence is the general trend, and big data is the foundation for the development of artificial intelligence, so big data will also become a trend 2.6.4 There will be more and more demands for talents, and there will be a shortage of talents in the future 2.6.5 Big data the job market is relatively good in first-tier cities this year	3.6.1 I'd love to learn about big data, because it strongly related to the occupation	4.6.1 I don't want to, because the technology is too difficult 4.6.2 I am not good at mathematics	Big data learn everything, but almost nothing about the core , I don't like it. I am willing to learn big data because it is hot and highly concerned. many companies plans to introduce big data technology,t here is a big demand for technology and a promising career With the development of artificial intelligence, big data technology has become a trend. There is a shortage of big data talents I'd love to learn about big data, because it strongly related to the occupation the technology is too difficult I am not good at mathematics	Positive Drive shortage of talents in the future megatrends of business world A big gap of talent High pay Negative Drive No any basic knowledge of core technology Too difficult Not good at mathematics

QUESTION 7: If you are going to major in big data, what are your difficulties? When the school makes adjustments, which adjustments (including policies, courses, etc.) would make you prefer to participate in the master of big data education?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.7.1 The **main difficulties are funds** and families 1.7.2. Families mainly take care of the elderly and children 1.7.3 There are **mathematics and algorithms** that **need to be taken back** to the textbook 1.7.4 **growth of age** **17.5** some schools seem to have a **scholarship** system	2.7.1 **The main difficulty is the lack of time** **2.7.2** The biggest possibility is the ability of **algorithm design**	**3.7.1** The **main reason is that time is not allowed** **3.7.2** students can complete their studies in fragmented time, such as weekends and evenings 3.7.3 **mathematics foundation is still a little difficult**	4.7.1 For me, **the entrance exam is the most difficult** (4.7.1), s 4.7.2 especially **mathematics**, which is required for this major 4.7.3 Secondly, my **basic professional courses** (4.7.3) are not very reliable, there is no great advantage.	The one difficulty is funds. The one difficulty is family work, sometime must to take care of the elderly and children. It is difficult to review some basic knowledge such as mathematics and algorithms. With the growth of age, study turn more and more difficult. Maybe scholarships can solve the financial problem The main difficulty is the lack of time Perhaps a flexible teaching model can solve the time problem. The entrance exam is the most difficult	Lack of Financial Aid difficulties of family work balance Poor discipline foundation Too senior to learn new things Lack of study time after work (existing job is 7X24) Difficult entrance examination

QUESTION 8: What do you think is the reason that affects candidates' choice or not to choose the major of master of big data? Why is that?s

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.8.1 The possible reason is that **enterprises pay more attention to technology and experience rather than academic qualifications**, so many people focus on improving their skills rather than taking the postgraduate entrance exam.	2.8.1 At present, the employment situation in the IT industry is relatively good (2.8.1), and many people directly choose employment after graduation 2.8.2 Except for state-owned enterprises and a few large enterprises, it seems that they do not attach much importance to the academic degree	**3.8.1** I think time and money are the main reasons for not applying for the exam 3.8.2 The latter is the benefit of learning to use	4.8.1 I may choose this major because it **has a good development prospect** 4.8.2 The reason for not choosing this major is that **the exam is difficult and the requirement for the candidate's professional knowledge is high**	enterprises pay more attention to technology and experience rather than academic qualifications the employment situation in the IT industry is relatively good, employment is more attractive than graduate school the main reason is lack time. The economic benefit of graduate school is not obvious it has a good development prospect the exam is difficult	**<u>Positive Drive</u>** The demand of enterprises for academic qualifications The job market for undergraduates is over supply or shortage Economic Return for graduations Good development prospect International Skills ***** (Should add more this Q&A) **<u>Negative Drive</u>** the exam is difficult lack time

QUESTION 9: What do you think a basic and pre requisite requirement knowledge /skills before entering school to pursue a master's degree in big data? Why is that?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.9.1 Mathematics, statistics and computer, because mathematics and statistics majors **have advantages in mathematics** **1.9.2** Computers **have advantages in programming, algorithm design and platform technology.** 1.9.3 Criminal investigation, finance, accounting, medicine, marketing, tourism management, etc., because **their business is closely related to big data** **1.9.4** Students of other majors	2.9.1 The students **who major in related to computer scence, and want to be engaged in the work related to big data**, such as electronic information engineering and communication engineering 2.9.2 Some majors with **relatively good mathematics and computer foundation**, such as physics and chemistry 2.9.3 Mathematics and statistics 2.9.4 They may encounter difficulties in areas such as **weak computer infrastructure and programming capabilities, and platform technologies**	3.9.1 For the **IT technical backbone**, this is the need of the company's business development. They need to build the big data platform of the company through technology to ensure the journey of the company's IT system 3.9.2 For **data analysis supervisors**, they need to discover the company's problems and opportunities through big data analysis technology and make further decisions for the company	4.9.1 **Undergraduates majoring in big data** have a more solid **foundation** than others; 4.9.2 Computer related students, similar majors, **preparation for the exam is relatively easy**. 4.9.3 People who are **interested in big data**.	Someone with a mathematical advantage People who have the advantages of computer algorithms and platform technology Students of majors closely related to big data application, such as marketing. Computer science similar professional, interested in big data work. Who use big data technology in his work, such as IT technical backbone, data analysis supervisors Undergraduates with a more solid	Mathematical ability Programming ability Platform technical capability Job requirements Career Path and Career Choice Automatic Application , platform for non IT background i.e. Python UX UI etc.

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
will **have difficulties in algorithm analysis and design, platform technology**, etc.				foundation in majors such as data science and big data technology It is easier for students to prepare for exams in majors such as computer science or similar majors. People who are interested in big data	

QUESTION 10: What Suggestions do you have on how to increase students' interest in "big data"?

Respondent 1 Interview dialogues	Respondent 2 Interview dialogues	Respondent 3 Interview dialogues	Respondent 4 Interview dialogues	Narrative Coding	Categorizing / Theme
1.10.1 **Strengthen the publicity**, let the examinee know the demand for big data and career prospects, and have certain cases and data description 1.10.2 Orientation training, to attract candidates for employment. 1.10.3 Strengthen cooperation with enterprises and **publicize through enterprise** platforms	2.10.1 Can demonstrate some big data applications and employment prospects 2.10.2 According to the social division of labor, the **training direction of big data technology can be more refined and clear** **2.10.3** the **curriculum system can be more streamlined and targeted**, and the **learning difficulty can be reduced**	3.10.1 Use success stories, such as the case of a successful candidate **3.10.2** Strengthen **cooperation with the government**, **meet the needs of writer talent cultivation**, and publicize national forms and policies 3.10.3 Let the **employers contact more undergraduates** , so that students can know the needs of enterprises and understand the benefits of big data.	4.10.1 **Guide students in the knowledge of big data during their college years** **4.10.2** Secondly, big data can be applied to the teaching of relevant courses to **make students interested** **4.10.3** Selection in the university, **preparation for the examination in advance, and training in advance** (4.10.3). For example, tutorial classes were started in the second year.	Promote the advantages of big data Directional training, ensure employment advantage School-enterprise cooperation, enterprises to assist publicity The training direction is more precise, the curriculum is optimized, and the difficulty is reduced. Cooperate with the government to develop the talents needed by the government. The enterprise is directly connected with the undergraduate students Strengthen the guidance of undergraduate postgraduate entrance examination Select undergraduate students and training in advance	Strengthen the propaganda via social network Develop a Company and university cooperation and employment platform construction Optimize majors and courses Guidance and cultivate interest Recruit and Select undergraduate students and training in advance

Appendix D

Questionnaire

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

THIS QUESTIONNAIRE ARE A PART OF INDEPENDENT STUDY (IS) WHAT FACTORS INFLUENCE UNDERGRADUATE STUDENTS TO STUDY IN A BIG DATA CURRICULUM: THE CASE OF A CHINSES UNIVERSITY. 2020 BY LUO MINGSHAN.

My name is Luo Mingshan, and I am now studying for a master's degree in MBI (master of business innovation) at Bangkok university. "Education choice VS big data education" is the topic of my master's thesis. The topic is to study which undergraduate students in Baise university are more interested in big data postgraduate education. Through what course adjustment and policy adjustment strategy, can attract more students? Therefore, this questionnaire survey was organized. I hereby promise that this survey data will only be used for dissertation research and will not be used for any other commercial purposes. Please answer the questionnaire objectively and truthfully. Thank you very much!

Please fill out the following questionnaire according to the facts, and mark '**X**' on the '☐' of the answer options and the '**Rating Scales**' column.
(https://www.wjx.cn/jq/74547414.aspx)

Your Name: Your Major:

Your work unit: Your job post:

Q1. What's your your Gender?

☐ Male ☐ Female

Q2. What's your age range?

☐ <24 ☐ 25~30 ☐ 31~40 ☐ >40

Q3. Where are you come from(Nationality-City)?

☐Rural ☐Township ☐Forth-tier cities ☐Third-tier cities

☐Second-tier cities ☐first-tier cities

Q4 What is your family's economic income range ?

☐<=¥1000 ☐¥1000~¥5000 ☐¥5000~¥10000 ☐¥10000~¥2000 ☐>¥20000

Q5. What is your educational background?

☐ College degree or below ☐Bachelor ☐Master ☐Doctor

Q6. What is the highest level of education for a member of your family?

☐ Below Junior college ☐College or Bachelor ☐Master ☐Doctor

Q7. Who influenced your education or career choice the most?

☐Myself ☐My Family ☐My Friends ☐My boss or my teacher ☐Other _____

Q8. How well do you know about “Big data”?

☐Not at all ☐Slightly ☐Somewhat ☐Fairly well ☐Very well

Q9. What’s the degree of critical need of big data for your major or job?

☐Not at all need ☐Slightly need ☐Somewhat need ☐Fairly need ☐Very need

Q10. What's the main reason you might study big data?

☐ For practical investigation, scientific research project, paper writing, etc.

☐ Business analysis for customers and other groups

☐ Personal interest

☐ Working in IT or planning to work in the future

☐ In order to improve the performance of the current work.

☐ Other _____

Q11. What is your goal in learning big data?

☐ To improve big data literacy

☐ To master the skills of using big data tools

☐ To master big data modeling and analysis techniques

☐ To master big data security and operation and maintenance technology

☐ To master big data application software development technology

☐ Other _____

Q12. When you choose big data as your postgraduate major, what do you think is the most attractive factor for big data?

☐Career Advancement more Salary increment

☐The megatrend of postgraduate entrance examination

☐Interest in big data

☐Megatrends of business world

☐ Other _____

Q13. When you chose big data as your graduate major, what was the biggest barrier to you?

☐ Lack of Financial Aid

☐ Corporate (employer) policy barriers

☐ Difficult entrance examination

☐ No interest in big data

☐ Big data technology is hard

☐ No need to upgrade degree

☐ Lack of study time after work

☐ Too senior to learn new things

☐ Other _____

Q14.What is your attitude towards the big data graduate program?

☐Not at all need ☐Slightly need ☐Somewhat need

☐Fairly need ☐Very need

Q15. When you consider taking part in the big data graduate program, what kind of education form do you want to choose?

☐Full-time ☐Off-job (half-time) ☐Weekend classes ☐Online classes ☐Other ___

Q16. What kind of enrollment form do you hope to take in the big data postgraduate study?

☐National unified entrance examination ☐The independent test of the school

☐Qualification review + interview ☐Other _____

Q17. What do you think is the most effective teaching method for big data graduate courses?

☐Theory + practice teaching ☐Case study teaching ☐exploration teaching

☐Project-based teaching ☐Dual Education System ☐Other _____

Q18. What is your reason what you choose for further study Big data? (please circle one number on the following scale)

factors	Not at all Important	Slightly Important	Moderately Important	Fairly Important	Very Important
The Popularity and reputation of the school	1	2	3	4	5
School facilities	1	2	3	4	5
Faculty and teaching level	1	2	3	4	5
Scientific research strength	1	2	3	4	5
Integration level of production-teaching	1	2	3	4	5
Tuition and scholarships	1	2	3	4	5

Q19. In your opinion, What is hard sciences of Big data? (please circle one number on the following scale)

Course	Not at all Important	Slightly Important	Moderately Important	Fairly Important	Very Important
Exploratory Data Analysis	1	2	3	4	5
Data Mining	1	2	3	4	5
Data Visualization	1	2	3	4	5
Multivariate statistics and Modelling	1	2	3	4	5
Machine Learning	1	2	3	4	5
Data Warehouse	1	2	3	4	5
Forecasting and decision making	1	2	3	4	5
Big data security technology	1	2	3	4	5

Introduction to Data Science	1	2	3	4	5
Research Methods	1	2	3	4	5
Consumer Marketing Analysis	1	2	3	4	5
Finance	1	2	3	4	5
Big data platform technology	1	2	3	4	5
management	1	2	3	4	5
Information and Social Network Analysis	1	2	3	4	5

Q20. How important In your opinion, What's important soft skills system of big data graduate students? (please circle one number on the following scale)

Soft skill	Not at all Important	Slightly Important	Moderately Important	Fairly Important	Very Important
Leadership ability	1	2	3	4	5
Team skills	1	2	3	4	5
Communication skills	1	2	3	4	5
Listening skills	1	2	3	4	5
Positive attitude	1	2	3	4	5
Interpersonal skills	1	2	3	4	5

Q21. What is suitable course election for big data opened in 2021 ? (please circle one number on the following scale)

Course	Not at all need to master	Slightly to master	Moderately to master	Fairly to master	Very master
Probability and Statistics	1	2	3	4	5
Programming	1	2	3	4	5
Discrete Mathematics	1	2	3	4	5

Data Structures and Algorithms	1	2	3	4	5
Database	1	2	3	4	5
Data Mining	1	2	3	4	5

Q22. Are you willing to recommend the big data graduate program to others around you?

☐ very unwilling ☐ unwilling ☐ not mind ☐ willing ☐ very willing

Appendix E

IOC Item Content validity

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

IOC Item Content Validity

Title: What Factors Influence Undergraduate Students to Study in a Big Data Curriculum: The Case of a Chinese University?

Objective: The methods of qualitative analysis and quantitative analysis are used to conduct exploratory analysis on students' educational choices, so as to understand which undergraduates and experienced personnel of Baise university are most likely to be the students of the big data graduate program of Baise university.To understand which policies ansd courses can be adjusted to more effectively attract students to big data graduate programs.

Student ID: 7620202353 **Student Name:** LUO MINGSHAN

Date of Collection 14th April 2020

Questions	Expert1	Comment & Suggestion
	Dr Zhuli Qiu	
Part 1 Demographics and background		
1) What's your gender?	1	
2) What's your age range ?	1	
3) Where you come from? Nationality-City (*Family live in)*	1	
4) What is your family's economic income range ?	1	
5) What is your educational background?	1	
6) What is the highest level of education for a member of your family?	1	
7) Who influenced your education or career choice the most?	1	
8) How well do you know about "Big data"?	1	

Questions		Expert1 Dr Zhuli Qiu	Comment & Suggestion
Part 2 Motivation and attractiveness of Big data education			
9) What's the degree of critical need of big data for your major or job?		1	
10) What's the main reason you might study big data?		1	
11) What is your goal in learning big data?		1	
12) When you choose big data as your postgraduate major, what do you think is the most attractive factor for big data?		1	
13) When you chose big data as your graduate major, what was the biggest barrier to you?		1	
14) What is your attitude towards the big data graduate program?		1	
15) When you consider taking part in the big data graduate program, what kind of education form do you want to choose?		1	
16) What kind of enrollment form do you hope to take in the big data postgraduate study?		1	
17) What do you think is the most effective teaching method for big data graduate courses?		1	
18)What is your reason what you choose for further study Big data ?s	The Popularity and reputation of the school	1	
	School facilities	1	
	Faculty and teaching level	1	
	Scientific research strength	1	
	Integration level of production-teaching	1	
	Tuition and scholarship	1	

Questions		Expert1	Comment & Suggestion
		Dr Zhuli Qiu	
19) How important In your opinion, What's important soft skills system of big data graduate students?	Analytical Skills and	1	
	Visualization skills	1	
	Communication skills Story tellingssss	1	
20) In your opinion, What is hard sciences of Big data	Exploratory Data Analysis	1	
	Data Mining	1	
	Data Visualization	1	
	Multivariate statistics and Modelling	1	
	Daat base	0	Should master before enrolling
	Machine Learning	1	
	Data Warehouse	1	
	Text Mining	0	It should not be taken as an independent course.
	Forecasting and decision making	1	
	Big data security technology	1	
	Introduction to Data Science	1	
	Research Methods	1	
	Consumer Marketing Analysis	1	
	Finance	1	
	Big data plat-form technology	1	

Questions		Expert1	Comment & Suggestion
		Dr Zhuli Qiu	
21) What is suitable course election for big data opened in 2021 ?	Probability and Statistics	1	
	Programming	1	
	Principle of computer	0	Big data doesn't care much about hardware.
	Discrete Mathematics	1	
	Data Structures and Algorithms	1	
	Database	1	
	Data Mining	1	
22) Are you willing to recommend the big data graduate program to others around you?		1	

Approved and Endorsed:

(……)

Department of Technology

Baise University

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

IOC Item Content Validity

Title: What Factors Influence Undergraduate Students to Study in a Big Data Curriculum: The Case of a Chinese University?

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Student ID: 7620202353 **Student Name:** LUO MINGSHAN

Date of Collection 14th April 2020

Questions	Expert1	Comment & Suggestion
	Dr Zhenjun Tang	
Part 1 Demographics and background		
1) What's your gender?	1	
2) What's your age range?	1	
3) Where you come from? Nationality-City (*Family live in)*	1	
4) What is your family's economic income range ?	1	
5) What is your educational background?	1	
6) What is the highest level of education for a member of your family?	1	
7) Who influenced your education or career choice the most?	1	
8) How well do you know about "Big data"?	1	

Questions		Expert1 Dr Zhenjun Tang	Comment & Suggestion
Part 2 Motivation and attractiveness of Big data education			
9) What's the degree of critical need of big data for your major or job?		1	
10) What's the main reason you might study big data?		1	
11) What is your goal in learning big data?		1	
12) When you choose big data as your postgraduate major, what do you think is the most attractive factor for big data?		1	
13) When you chose big data as your graduate major, what was the biggest barrier to you?		1	
14) What is your attitude towards the big data graduate program?		1	
15) When you consider taking part in the big data graduate program, what kind of education form do you want to choose?		1	
16) What kind of enrollment form do you hope to take in the big data postgraduate study?		1	
17) What do you think is the most effective teaching method for big data graduate courses?		1	
18)What is your reason what you choose for further study Big data ?	The Popularity and reputation of the school	1	
	School facilities	1	
	Faculty and teaching level	1	
	Scientific research strength	1	
	Integration level of production-teaching	1	
	Tuition and scholarships	1	

Questions		Expert1	Comment & Suggestion
		Dr Zhenjun Tang	
19) How important In your opinion, What's important soft skills system of big data graduate students?	Analytical Skills and	1	
	Visualization skills	1	
	Communication skills Story telling	1	
20) In your opinion, What is hard sciences of Big data	Exploratory Data Analysis	1	
	Data Mining	1	
	Data Visualization	1	
	Multivariate statistics and Modelling	1	
	Data base	0	It should be an undergraduate course.
	Machine Learning	1	
	Data Warehouse	1	
	Text Mining	0	Can be included in data mining courses.
	Forecasting and decision making	1	
	Big data security technology	1	
	Introduction to Data Science	1	
	Research Methods	1	
	Consumer Marketing Analysis	1	
	Finance	1	
	Big data plat-form technology	1	

Questions		Expert1	Comment & Suggestion
		Dr Zhenjun Tang	
21) What is suitable course election for big data opened in 2021 ?	Probability and Statistics	1	
	Programming	1	
	Principle of computer	0	Has little impact on big data technology.
	Discrete Mathematics	1	
	Data Structures and Algorithms	1	
	Database	1	
	Data Mining	1	
22) Are you willing to recommend the big data graduate program to others around you?		1	

Approved and Endorsed:

[redacted]

(……)

Department of Technology

Guangxi Normal University

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

IOC Item Content Validity

Title: What Factors Influence Undergraduate Students to Study in a Big Data Curriculum: The Case of a Chinese University?

Objective: The methods of qualitative analysis and quantitative analysis are used to conduct exploratory analysis on students' educational choices, so as to understand which undergraduates and experienced personnel of Baise University are most likely to be the students of the big data graduate program of Baise University.To understand which policies and courses can be adjusted to more effectively attract students to big data graduate programs.

Student ID: 7620202353 **Student Name:** LUO MINGSHAN

Date of Collection 14th April 2020

Questions	Expert1	Comment & Suggestion
	Dr Yufu Song	
Part 1 Demographics and background		
1) What's your gender?	1	
2) What's your age range ?	1	
3) Where you come from? Nationality-City (*Family live in)*	1	
4) What is your family's economic income range ?	1	
5) What is your educational background?	1	
6) What is the highest level of education for a member of your family?	1	
7) Who influenced your education or career choice the most?	1	
8) How well do you know about "Big data"?	1	

Questions		Expert1 Dr Yufu Song	Comment & Suggestion
Part 2 Motivation and attractiveness of Big data education			
9) What's the degree of critical need of big data for your major or job?		1	
10) What's the main reason you might study big data?		1	
11) What is your goal in learning big data?		1	
12) When you choose big data as your postgraduate major, what do you think is the most attractive factor for big data?		1	
13) When you chose big data as your graduate major, what was the biggest barrier to you?		1	
14) What is your attitude towards the big data graduate program?		1	
15) When you consider taking part in the big data graduate program, what kind of education form do you want to choose?		1	
16) What kind of enrollment form do you hope to take in the big data postgraduate study?		1	
17) What do you think is the most effective teaching method for big data graduate courses?		1	
18)What is your reason what you choose for further study Big data ?	The Popularity and reputation of the school	1	
	School facilities	1	
	Faculty and teaching levels	1	
	Scientific research strength	1	
	Integration level of production-teaching	1	
	Tuition and scholarships	1	

Questions		Expert1 Dr Yufu Song	Comment & Suggestion
19) How important In your opinion, What's important soft skills system of big data graduate students?	Analytical Skills and	1	
	Visualization skills	1	
	Communication skills Story telling	1	
20) In your opinion, What is hard sciences of Big data	Exploratory Data Analysis	1	
	Data Mining	1	
	Data Visualization	1	
	Multivariate statistics and Modelling	1	
	Date base	1	
	Machine Learning	1	
	Data Warehouse	1	
	Text Mining	0	There is no such independent course.
	Forecasting and decision making	1	
	Big data security technology	1	
	Introduction to Data Science	1	
	Research Methods	1	
	Consumer Marketing Analysis	1	
	Finance	1	
	Big data plat-form technology	1	

Questions		Expert1	Comment & Suggestion
		Dr Yufu Song	
21) What is suitable course election for big data opened in 2021 ?	Probability and Statistics S	1	
	Programming	1	
	Principle of computer	0	It is a core undergraduate course in computer science
	Discrete Mathematics	1	
	Data Structures and Algorithms	1	
	Database	1	
	Data Mining	1	
22) Are you willing to recommend the big data graduate program to others around you?		1	

Approved and Endorsed:

(……)

Department of Technology

Baise University

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

IOC Item Content Validity

Title: What Factors Influence Undergraduate Students to Study in a Big Data Curriculum: The Case of a Chinese University?

Objective: The methods of qualitative analysis and quantitative analysis are used to conduct exploratory analysis on students' educational choices, so as to understand which undergraduates and experienced personnel of Baise University are most likely to be the students of the big data graduate program of Baise University. To understand which policies and courses can be adjusted to more effectively attract students to big data graduate programs.

Student ID: 7620202353 **Student Name:** LUO MINGSHAN

Date of Collection 14th April 2020

Questions	Expert1	Comment & Suggestion
	Drss Yufu Song	
Part 1 Demographics and background		
1) What's your gender?	1	
2) What's your age range ?	1	
3) Where you come from? Nationality-City (*Family live in)*	1	
4) What is your family's economic income range ?	1	
5) What is your educational background?	1	
6) What is the highest level of education for a member of your family?	1	
7) Who influenced your education or career choice the most?	1	
8) How well do you know about "Big data"?	1	

Questions		Expert1 Drss Yufu Song	Comment & Suggestion
Part 2 Motivation and attractiveness of Big data education			
9) What's the degree of critical need of big data for your major or job?		1	
10) What's the main reason you might study big data?		1	
11) What is your goal in learning big data?		1	
12) When you choose big data as your postgraduate major, what do you think is the most attractive factor for big data?		1	
13) When you chose big data as your graduate major, what was the biggest barrier to you?		1	
14) What is your attitude towards the big data graduate program?		1	
15) When you consider taking part in the big data graduate program, what kind of education form do you want to choose?		1	
16) What kind of enrollment form do you hope to take in the big data postgraduate study?		1	
17) What do you think is the most effective teaching method for big data graduate courses?		1	
18)What is your reason what you choose for further study Big data ?	The Popularity and reputation of the school	1	
	School facilities	1	
	Faculty and teaching level	1	
	Scientific research strength	1	
	Integration level of production teaching	1	
	Tuition and scholarships	1	

Questions		Expert1	Comment & Suggestion
		Drss Yufu Song	
19) How important In your opinion, What's important soft skills system of big data graduate students?	Analytical Skills and	1	
	Visualization skills	1	
	Communication skills Story telling	1	
20) In your opinion, What is hard sciences of Big data	Exploratory Data Analysis	1	
	Data Mining	1	
	Data Visualization	1	
	Multivariate statistics and Modelling	1	
	Data base	0	It for undergraduate students
	Machine Learning	1	
	Data Warehouse	1	
	Text Mining	0	Repeat with the content of the data mining
	Forecasting and decision making	1	
	Big data security technology	1	
	Introduction to Data Science	1	
	Research Methods	1	
	Consumer Marketing Analysis	1	
	Finance	1	
	Big data plat-form technology	1	

Questions		Expert1 Drss Yufu Song	Comment & Suggestion
21) What is suitable course election for big data opened in 2021 ?	Probability and Statistics	1	
	Programming	1	
	Principle of computer	1	
	Discrete Mathematics	1	
	Data Structures and Algorithms	1	
	Database	1	
	Data Mining	1	
22) Are you willing to recommend the big data graduate program to others around you?		1	

Approved and Endorsed:

[redacted]

(……)

Department of Technology

Baise University

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

IOC score table

Questions	Expert 1 Dr.Zhuli Qiu	Expert 2 Prof.Dr. Zhenjun Tang	Expert 3 Dr.Yufu Song	Expert 4 Dr. Weihong Song	IOC	Comment
Part 1 Demographics and background						
1) What's your gender?	1	1	1	1	1	
2) What's your age range?	1	1	1	1	1	
3) Where you come from? Nationality-City (*Family live in)*	1	1	1	1	1	
4) What is your family's economic income range ?	1	1	1	1	1	
5) What is your educational background?	1	1	1	1	1	
6) What is the highest level of education for a member of your family?	1	1	1	1	1	
7) Who influenced your education or career choice the most?	1	1	1	1	1	
8) How well do you know about "Big data"?	1	1	1	1	1	
Part 2 Motivation and attractiveness of Big data education						
9) What's the degree of critical need of big data for your major or job?	1	1	1	1	1	
10) What's the main reason you might study big data?	1	1	1	1	1	

Questions		Expert 1 Dr.Zhuli Qiu	Expert 2 Prof.Dr. Zhenjun Tang	Expert 3 Dr.Yufu Song	Expert 4 Dr. Weihong Song	IOC	Comment
11) What is your goal in learning big data?		1	1	1	1	1	
12) When you choose big data as your postgraduate major, what do you think is the most attractive factor for big data?		1	1	1	1	1	
13) When you chose big data as your graduate major, what was the biggest barrier to you?		1	1	1	1	1	
14) What is your attitude towards the big data graduate program?		1	1	1	1	1	
15) When you consider taking part in the big data graduate program, what kind of education form do you want to choose?		1	1	1	1	1	
16) What kind of enrollment form do you hope to take in the big data postgraduate study?		1	1	1	1	1	
17) What do you think is the most effective teaching method for big data graduate courses?		1	1	1	1	1	
18)What is your reason what you choose for further study Big data ?	The Popularity and reputation of the school	1	1	1	1	1	
	School facilities	1	1	1	1	1	
	Faculty and teaching level	1	1	1	1	1	
	Scientific research strength	1	1	1	1	1	
	Integration level of production-teaching	1	1	1	1	1	
	Tuition and scholarships	1	1	1	1	1	

Questions		Expert 1	Expert 2	Expert 3	Expert 4	IOC	Comment
		Dr.Zhuli Qiu	Prof.Dr. Zhenjun Tang	Dr.Yufu Song	Dr. Weihong Song		
19) How important In your opinion, What's important soft skills system of big data graduate students?	Analytical Skills and	1	1	1	1	1	
	Visualization skills	1	1	1	1	1	
	Communication skills Story telling	1	1	1	1	1	
20) In your opinion, What is hard sciences of Big data	Exploratory Data Analysis	1	1	1	1	1	
	Data Mining	1	1	1	1	1	
	Data Visualization	1	1	1	1	1	
	Multivariate statistics and Modelling	1	1	1	1	1	
	Data base	0	0	1	0	0.25	It for undergraduate students; It should be an undergraduate course. Should master before enrolling
	Machine Learning	1	1	1	1	1	
	Data Warehouse	1	1	1	1	1	
	Text Mining	0	0	0	0	0	Repeat with the content of the data mining; Can be included in data mining courses. It should not be taken as an independent course.

Questions		Expert 1	Expert 2	Expert 3	Expert 4	IOC	Comment
		Dr.Zhuli Qiu	Prof.Dr. Zhenjun Tang	Dr.Yufu Song	Dr. Weihong Song		
	Forecasting and decision making	1	1	1	1	1	
	Big data security technology	1	1	1	1	1	
	Introduction to Data Science	1	1	1	1	1	
	Research Methods	1	1	1	1	1	
	Consumer Marketing Analysis	1	1	1	1	1	
	Finance	1	1	1	1	1	
	Big data platform technology	1	1	1	1	1	
21) What is suitable course election for big data opened in 2021 ?	Probability and Statistics	1	1	1	1	1	
	Programming	1	1	1	1	1	
	Principle of computer	0	0	0	1	0.25	It is a core undergraduate course in computer science; There is no such independent course. Has little impact on big data technology. Big data doesn't care much about hardware.
	Discrete Mathematics	1	1	1	1	1	
	Data Structures and Algorithms	1	1	1	1	1	
	Database	1	1	1	1	1	
	Data Mining	1	1	1	1	1	

Questions	Expert 1	Expert 2	Expert 3	Expert 4	IOC	Comment
	Dr.Zhuli Qiu	Prof.Dr. Zhenjun Tang	Dr.Yufu Song	Dr. Weihong Song		
22) Are you willing to recommend the big data graduate program to others around you?	1	1	1	1	1	

Approved and Endorsed:

[redacted]

(.....)

Department of Technology

Baise University

Appendix F

Letter of IOC Expert Invitation

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA

14th April, 2020

Dear Dr. Zhuli Qiu,

Subject Expert for IOC Item Content Validity

My name is Dr.Varalee Chinerawat, Lecturer of MBI program The Institute for Knowledge and Innovation Southeast Asia of Bangkok University (IKI-SEA).

I would like to invite you to be tool validation expert for IS study of our international student, Mr. Luo Mingshan from China, who effected from COVID 19 and delayed his data collection in urgent need for his graduation in May, 2020.

The IS Title: What Factors Influence Undergraduate Students to Study in a Big Data Curriculum: The Case of a Chinese University?

Please print and sign and scan it back to my email varalee.c@bu.ac.th. For original document with signature, we will wait until free of Covid 19 situation.

If you have any query please do not hesitate contact me at +66 812787871

Best Regards,

Dr. Varalee Chinerawat
IKI-SEA

The Institute for Knowledge and Innovation – South-East Asia (IKI-SEA)
Bangkok University - Rama 4 Road – Klong Toey - Bangkok – 10110 – Thailand
Phone: +668 1 278 7871
varalee.c@bu.ac.th | Internet: http://www.iki-sea.org

Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA

14th April, 2020

Dear Dr. Zhenjun Tang,

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Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA

14th April, 2020

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Master in Business Innovation

IKI-SEA THE INSTITUTE FOR KNOWLEDGE & INNOVATION SOUTH-EAST ASIA BANGKOK UNIVERSITY

14th April, 2020

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Appendix G

Some Tables of Data Analysis

Table A1: Correlation statistics between "job" and "need BIGDATA for job"

	Sum of Squares	***df***	***Mean Square***	***F***	***Sig.***
Between Groups	8.378	2	4.189	5.280	.018
Within Groups	11.900	15	.793		
Total	20.278	17			

Table A2: The result of K-independent sample test of " need BIGDATA for job" by experienced staffs.

(I) job	***(J) job***	***Mean Difference (I-J)***	***Std. Error***	***Sig.***	***95% Confidence Interval***	
					Lower Bound	***Upper Bound***
Big data training lecturer	Software development engineer	1.800*	.563	.006	.60	3.00
	Other IT related occupations	1.150*	.508	.039	.07	2.23
Software development engineer	Big data training lecturer	-1.800*	.563	.006	-3.00	-.60
	Other IT related occupations	-.650	.508	.220	-1.73	.43
Other IT related occupations	Big data training lecturer	-1.150*	.508	.039	-2.23	-.07
	Software development engineer	.650	.508	.220	-.43	1.73

*. The mean difference is significant at the 0.05 level.

Table A3: frequency of respondents' purpose of "learning big data" （N=56）

Reasons	***Student***		***experienced***		***total***	
	f	***P(%)***	***f***	***P(%)***	***f***	***P(%)***
For practical investigation, scientific research project, paper writing	13	34.2	0	0	13	23.2
Business analysis for customers and other groups	2	5.3	1	5.6	3	5.4
Personal interest	4	10.5	0	0	4	7.1
Working in IT or planning to work in the future	14	36.8	13	72.2	27	48.2
In order to improve the performance of the current work.	4	10.5	3	16.7	7	12.5
Other	1	2.6	1	5.6	2	3.6
Total	38	100.0	18	100	56	100.0

Table A4: Mean influence of "gender" on "purpose of learning big data"

Gender	***Main reason for study big data***			
	N	***Mean***	***Std. Deviation***	***Std. Error Mean***
male	31	3.39	1.498	.269
female	25	3.24	1.508	.302ssss

Table A5: T-test of "gender" on the "main reason of learning big data"

Main reason for study big data	***Levene's Test for Equality of Variances***		***T-test for Equality of Means***		
	F	***Sig.***	***t***	***df***	***Sig. (2-tailed)***
Equal variances assumed	.203	.654	.364	54	.717
Equal variances not assumed			.364	51.380	.717

Table A6: frequency of respondents' "learning big data goals"

The goal for learning big data	***student***	***experience***
Improve big data literacy	28.9%	16.7%
Master the skills of using big data tools	7.9%	5.6%
Master big data modeling and analysis techniques	18.4%	11.1%
Master big data security and system maintenance technology	18.4%	11.1%
Master big data software development technology	18.4%	44.4%
Other	7.9%	11.1%
Total	100.0%	100.0%

Table A7: frequency of "learning big data goals" for students of different genders

The goal for learning big data	***male***	***female***
Improve big data literacy	31.6%	26.3%
Master the skills of using big data tools	5.3%	10.5%
Master big data modeling and analysis techniques	10.5%	26.3%
Master big data security and system maintenance technology	21.1%	15.8%
Master big data software development technology	21.1%	15.8%
Other	10.5%	5.3%
Total	100.0%	100.0%

Table A8: Frequency of "learning big data goals" among students of different majors

The goal for learning big data	***Major***		
	Computer science	***Mathematics and statistics***	***Electronic information engineering***
Improve big data literacy	22.2%	40.0%	20.0%
Master the skills of using big data tools	11.1%	6.7%	0.0%
Master big data modeling and analysis techniques	11.1%	33.3%	0.0%
Master big data security and system maintenance technology	16.7%	6.7%	60.0%
Master big data software development technology	33.3%	6.7%	0.0%
Other	5.6%	6.7%	20.0%
Total	100.0%	100.0%	100.0%

Table A9: the correlation statistics between “gender” and “The goal for learning BIGDATA” for experienced staff

Gender* The goal for learning BIGDATA		***The goal for learning big data***	***gender***
The goal for learning big data	Pearson Correlation	1	-.476*
	Sig. (2-tailed)		.046
	N	18	18
gender	Pearson Correlation	-.476*	1
	Sig. (2-tailed)	.046	
	N	18	18
*. Correlation is significant at the 0.05 level (2-tailed).			

Table A10: Frequency of different genders on “attractive factors of big data degree”

The most attractive factor		***Male***	***Female***	***Total***
Career Advancement more Salary increment	f	13	12	25
	%	41.9%	48.0%	44.6%
The megatrend of postgraduate entrance examination	f	1	1	2
	%	3.2%	4.0%	3.6%
Interest in big data	f	2	3	5
	%	6.5%	12.0%	8.9%
Megatrends of business world	f	12	9	21
	%	38.7%	36.0%	37.5%
Other	f	3	0	3
	%	9.7%	0.0%	5.4%
Total	f	31	25	56
	%	100.0%	100.0%	100.0%

Table A11; The influence of different majors on the choice of "The most attractive factor for the master of BIGDATA"

(I) Computer science	***(J) Computer science***	***Mean Difference (I-J)***	***Std. Error***	***Sig.***	***95% Confidence Interval***	
					Lower Bound	***Upper Bound***
Computer science	Mathematics and statistics	.589	.501	.248	-.43	1.61
	Electronic information engineering	-1.011	.724	.172	-2.48	.46
Mathematics and statistics	Computer science	-.589	.501	.248	-1.61	.43
	Electronic information engineering	-1.600*	.740	.038	-3.10	-.10
Electronic information engineering	Computer science	1.011	.724	.172	-.46	2.48
	Mathematics and statistics	1.600*	.740	.038	.10	3.10

*. The mean difference is significant at the 0.05 level.

Table A12: The influence of different majors on “most attractive factor for the master of BIGDATA”

(I) job	*(J) job*	*Mean Difference (I-J)*	*Std. Error*	*Sig.*	*95% Confidence Interval*	
					Lower Bound	*Upper Bound*
Big data training lecturer	Software development engineer	1.000	.899	.283	-.92	2.92
	Other IT related occupations	.025	.810	.976	-1.70	1.75
Software development engineer	Big data training lecturer	-1.000	.899	.283	-2.92	.92
	Other IT related occupations	-.975	.810	.247	-2.70	.75
Other IT related occupations	Big data training lecturer	-.025	.810	.976	-1.75	1.70
	Software development engineer	1.600*	.740	.038	.10	3.10

Table A13: mean and standard deviation of "Attitude to big data graduate program"

DV	*Attitude to big data graduate program*			
	Items	*Mean*	*N*	*Std. Deviation*
gender	Male	3.32	31	1.166
	Female	3.24	25	1.165
	Total	3.29	56	1.155
Role	Student	3.16	38	1.151
	Experience	3.56	18	1.149
	Total	3.29	56	1.155
Major(student)	Computer science	2.83	18	1.043
	Mathematics and statistics	3.67	15	1.113
	Electronic information engineering	2.80	5	1.304
	Total	3.16	38	1.151
Job (experience)	Big data training lecturer	4.40	5	.894
	Software development engineer	3.00	5	.707
	Other IT related occupations	3.38	8	1.302
	Total	3.56	18	1.149
age	<24	3.18	39	1.144
	25~30	3.13	8	1.126
	31~40	3.75	8	1.165
	40~45	0	0	0
	>45	5.00	1	.
	Total	3.29	56	1.155

Table A14: Correlation between the variable “major” and the variable of each school ’s choice index

		Sum of Squares	df	Mean Square	F	Sig.
Tuition and scholarships	Between Groups	1.761	2	.881	.903	.415
	Within Groups	34.133	35	.975		
	Total	35.895	37			
The Popularity and reputation of the school	Between Groups	7.584	2	3.792	4.378	.020
	Within Groups	30.311	35	.866		
	Total	37.895	37			
School facilities	Between Groups	9.261	2	4.631	4.967	.013
	Within Groups	32.633	35	.932		
	Total	41.895	37			
Faculty and teaching level	Between Groups	9.591	2	4.795	7.707	.002
	Within Groups	21.778	35	.622		
	Total	31.368	37			
Scientific research strength	Between Groups	4.782	2	2.391	3.634	.037
	Within Groups	23.033	35	.658		
	Total	27.816	37			
Integration level of production-teaching	Between Groups	4.271	2	2.136	3.109	.057
	Within Groups	24.044	35	.687		
	Total	28.316	37			

Table A15: Means of “major” grouping and school choice correlation variables

Student.Major		The Popularity and reputation of the school	School facilities	Faculty and teaching level	Scientific research strength
Computer science	Mean	4.11	4.17	4.56	4.50
	N	18	18	18	18
	Std. Deviation	.963	1.043	.705	.786
Mathematics and statistics	Mean	4.13	4.33	4.33	4.33
	N	15	15	15	15
	Std. Deviation	.743	.724	.724	.724
Electronic information engineering	Mean	2.80	2.80	3.00	3.40
	N	5	5	5	5
	Std. Deviation	1.304	1.304	1.225	1.140
Total	Mean	3.95	4.05	4.26	4.29
	N	38	38	38	38
	Std. Deviation	1.012	1.064	.921	.867

Table A16: Correlation between students' "family economic income" and "Tuition and scholarships".

Student.FEM		***Sum of Squares***	***df***	***Mean Square***	***F***	***Sig.***
Tuition and scholarships	Between Groups	9.925	4	2.481	3.153	.027
	Within Groups	25.970	33	.787		
	Total	35.895	37			

(FEM: family economic income)

BIODATA

Name: Mr. Mingshan Luo

Permanent Address: No. 21, Zhongshan 2nd Road, Youjiang District, Baise City, Guangxi Province, China

Email: 43915346@qq.com

Education Background: From September 1995 to June 1999 I studied at Longlin High School in Baise city Guangxi province; From September 1999 to June 2003 I got my bachelor degree at Guangxi Normal University in Guilin city Guangxi province. From 2019 till now studying at Bangkok University for master degree

Bangkok University

License Agreement of Dissertation/Thesis/ Report of Senior Project

Day 17 Month December Year 2020

Mr./ ~~Mrs./-Ms~~ Mingshan Luo now living at No. 21

Soi _____ Street Zhongshan 2th Road

Sub-district _____ District Youjian, Baise

Province Guangxi, China Postal Code 533000 being a Bangkok University student, student ID 7620202353

Degree level ☐ Bachelor ☒ Master ☐ Doctorate

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