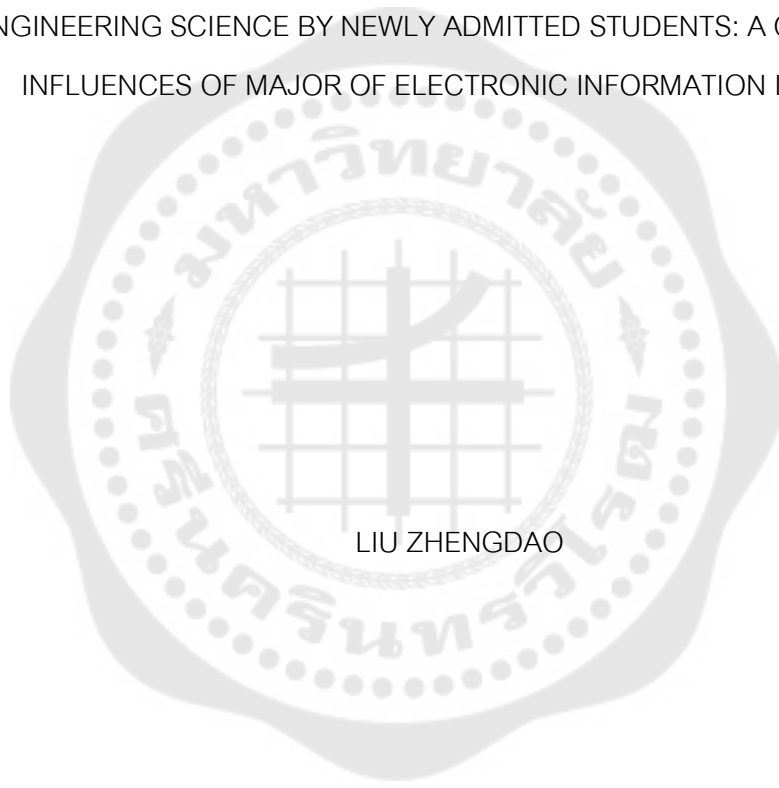




GUIDELINES FOR SELECTING MAJORS AT SHANGHAI UNIVERSITY OF
ENGINEERING SCIENCE BY NEWLY ADMITTED STUDENTS: A CASE STUDY
INFLUENCES OF MAJOR OF ELECTRONIC INFORMATION IN CHINA



LIU ZHENGDAO

แนวทางการเลือกสาขาวิชาเอกของนักศึกษาที่เพิ่งเข้าศึกษาใหม่ในมหาวิทยาลัยวิศวกรรมศาสตร์
วิทยาศาสตร์เชียงใหม่: กรณีศึกษา อิทธิพลของสาขาวิชาเอกสารสนเทศอิเล็กทรอนิกส์ในประเทศจีน



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A Thesis Submitted in Partial Fulfillment of the Requirements
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BY
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HAS BEEN APPROVED BY THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE MASTER OF EDUCATION
IN DEVELOPMENT AND MANAGEMENT OF EDUCATION AT SRINAKHARINWIROT
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This study targets first-year students, selected faculty members, and administrative staff from Shanghai University of Engineering Science's School of Electronic Information. Its core goals are to explore factors influencing freshmen's choice of electronic information majors under the broad-category enrollment policy and propose practical guidance strategies, adopting literature analysis, questionnaire surveys, and semi-structured interviews as research methods. With 230 valid questionnaires as the quantitative basis, the study conducted reliability, validity, descriptive and factor analyses. It also obtained qualitative support from interviews with five counselors and five admissions officers. Results show that major-related factors (employment prospects, major popularity, talent demand) and family factors (financial situation, parental expectations, parents' educational backgrounds) have significant impacts, with family factors being particularly prominent. In contrast, university factors (reputation/ranking, geographic location, tuition) and individual factors (personal interests, abilities) matter less, though five indicators —interests, abilities, major popularity, employment prospects, university reputation—exert strong effects. Guidance is provided for students (self-assessment, industry trend awareness, practical experience), parents (understanding children, major exploration support), and universities (professional education, curriculum optimization, advisory systems). The study acknowledges limitation of its narrow sample; future research should expand samples, cover more disciplines, and use longitudinal approaches for deeper insights.

Keyword : Thai silk, willingness to buy, demographic characteristics, 4Ps theory, demand theory

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Dear Professor Chakrit Ponathong, Professor Pawatwong Bamroongkhan, and all esteemed faculty members of Srinakharinwirot University,

Time flies, and I am about to leave campus and embark on a new journey in life. At this special moment, I am filled with both gratitude and deep appreciation. Looking back on my graduate studies, every step of my growth has been inseparable from the dedicated guidance of Professor Chakrit Ponathong and Professor Pawatwong Bamroongkhan. Your patient mentorship helped me find direction, align my interests with the field, and develop a clear path for my research.

Throughout the thesis process, your encouragement restored my confidence whenever I faced challenges, and your advice kept me on track when I strayed. Your rigorous academic standards and genuine care for students have left a lasting impression on me, showing me the true meaning of academic spirit.

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The time I spent here not only advanced my academic journey but also gave me lasting friendships and invaluable experiences. Graduation is not the end, but a new beginning. I will carry the knowledge and values I have gained into my future endeavors, striving to live up to the expectations of my teachers and my alma mater.

Finally, I wish to once again express my heartfelt gratitude to my professors and all faculty members. May you enjoy good health, success in your work, and happiness in life. May Srinakharinwirot University continue to thrive and reach new heights of excellence.

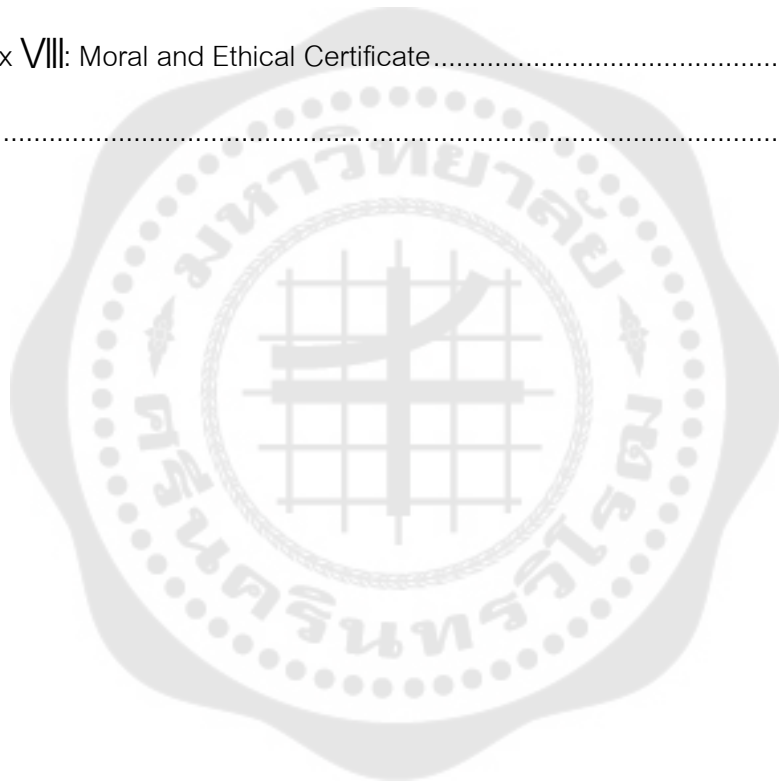
LIU ZHENGDAO

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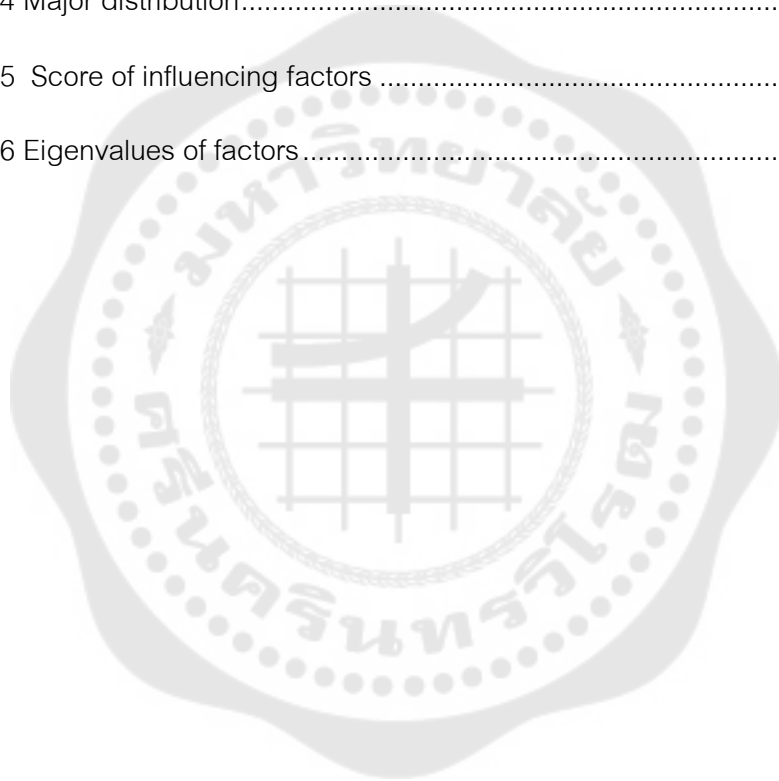


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CHAPTER I

INTRODUCTION

1.1 Background of the study

In the Outline of the 14th Five-Year Plan for Economic and Social Development promulgated by the People's Republic of China in March 2021 (referred to as the Outline of the 14th Five-Year Plan), it is clearly proposed to strengthen the national strategic scientific and technological strength, formulate the strategy of strengthening science and technology, improve the new national system, and conquer core key technologies to improve the overall efficiency of the innovation chain. At the same time, the model of broad category enrollment is gradually promoted in China. As of 2021, 137 colleges and universities in China's "double first-class" construction have implemented broad category enrollment and training, but not many ordinary colleges and universities have implemented broad category enrollment. In the above social background, the author of this paper proposes to explore the influencing factors of students' choice of electronic information major.

The academic circles have reached the following consensus on the reasons for the rise and development of broad category enrollment in China: First, with the intensification of interdisciplinary trends, the demand for talents is becoming more and more diversified. (Su, 2014); Secondly, the traditional specialty setting and knowledge-based teaching model, which are too narrow and too narrow, have been difficult to meet the actual needs of the labor market. (Huang, 2005) In response to the call of the state to "improve the quality of talent training and innovate the mode of talent training", Shanghai University of Engineering Science, as a key undergraduate university in Shanghai, has started to implement the category of electronic information in its School of Electronics and Electrical Engineering from 2021, and is one of the few ordinary undergraduates in the institutions that implement the category of enrollment. It is also the only general undergraduate college in Shanghai that implements broad class enrollment. Based on this background, the author interviewed the admissions officers, teaching professors and student management counselors of the electronic information

major of Shanghai University of Engineering Science and Technology. (See appendix for details of the interview.) The following questions can be found in the process of this interview:

First, some students in the choice of major, is chosen by parents, not according to their own interests and characteristics to choose a major. Second, the main reason for students or parents to choose electronic information majors is to pay attention to the professional talent gap and employment situation. Third, In recent years, the rise in school tuition fees has led to a decrease in the enthusiasm of students in less-developed areas in the west. According to the above questions, the author carried out the relevant investigation. First, the number of enrollment has indeed fluctuated in recent years, and the number of professional enrollment included in the electronic information category reached 497 people in 2019 before the implementation of the broad category of enrollment. After the new artificial intelligence major was opened in 2021, the number of students fell to 471 people, and only 444 people in 2023. 450 students are expected to enroll in 2024. Enrollment figures for other years are not officially released and will not be explained here. In 2023, the second Shanghai University of Engineering Technology made a tuition adjustment, and the tuition fee of the electronic information class was raised from 5,000 yuan to 7,000 yuan a year. But Shanghai's education spending has gone from 2,597 yuan per capita in 2019 to 2,194 yuan per capita in 2020 to 2,991 yuan per capita in 2021 to 2,026 yuan per capita in 2022, Due to the ups and downs of education spending in the four years from 2019 to 2022. The Shanghai University of Engineering Science's move to raise tuition fees in 2023 has indeed affected students' enthusiasm for applying.

To sum up, at present, students will have many problems when choosing majors. They do not know enough about college enrollment information, have incomplete self-understanding, and do not have the ability to reasonably weigh factors such as school, society, and individual. In addition, teachers' pursuit of prestigious schools has imperceptibly influenced students, and many students cannot choose suitable majors following teachers' pursuit of prestigious schools. And parents mainly

stand to cater to the social employment or their own good field for students to choose majors, such guidance is not scientific, so that students enter the university to study, only to find their understanding of the major and the actual situation there is a gap. In addition, electrical courses are more difficult, and some students have a feeling of weariness, which is specifically manifested as absent-minded and inattentive in class, and even skip class directly. There are also some students who are not satisfied with their major, which is not reflected in the study on campus, but in the choice of work, they will choose a job different from their major, or choose to change their major when taking the postgraduate entrance examination. Based on the background of category enrollment, this paper aims to deeply explore the influencing factors of students' choice of electronic information major, and put forward corresponding suggestions and strategies.

1.2 Research Question:

1.2.1 What are the factors that influence students to choose the major of electronic information?

1.2.2 What are the guidelines for students to choose the major of electronic information?

1.3 Objective of research

1.3.1 The study an influencing factors of students choosing electronic information major.

1.3.2 Determine the guidelines for choosing an electronic information major.

1.4 Benefit of the research:

1.4.1 Guide students in planning their careers to alleviate the pressure on the job market. The choice of major for college students is not only closely related to the students themselves and their families but also, on a broader level, is influenced by the social employment situation, economic development, and national education system

reforms. By analyzing the factors that affect students' choice of major, our aim is to provide educators with more guiding advice, helping students identify their personal interests and hobbies, clarify future career plans, and thus choose the most suitable career path for themselves, thereby easing the pressure on the social job market.

1.4.2 Reduce anxiety in family education. Provide guidance for parents on family education, helping them clarify students' learning goals and future career directions, alleviate educational conflicts between students and parents, and thus reduce anxiety in family education.

1.4.3 Provide guiding suggestions for university admission work, improve university admission strategies, enhance the adaptability of higher education institutions to social changes, and optimize the allocation of educational resources.

1.5 Scope of the study:

1.5.1 Questionnaire survey

This study uses the Shanghai University of Engineering Science as a case study. The study population consists of freshman students, some teachers and administrators in the College of Electrical and Electronic Engineering. Among them, the number of students is 450, using random sampling, based on the formula (n is the sample capacity, N is the overall capacity, e is the sampling error) this study will control the sample error within 5%, it can be concluded that the sample capacity of at least 212, taking into account the questionnaire recovery rate and the effective rate will not be 100%, the final number of questionnaires will be issued at 230.

1.5.2 Expert Interview

Professors and administrators will be interviewed, the teachers who will conduct the interviews are mainly student management staff, also known as student counselors, who are required to work for five years with graduate experience, and the number of interviews will be five. Administrators are responsible for enrollment work in the college, with more than 3 years of front-line enrollment experience, more familiar with enrollment policies, the number of interviews 2 people.

1.5.3 Research timeline

After approval by the ethics committee, the study is planned to be conducted from February to May 2025, data analysis will be carried out in May, and conclusions will be drawn to complete the project in June.

1.6 Research Variables:

The independent variable in this study is the influence factor of students choosing electronic information major, which mainly includes: Personal factors (personal interest and academic performance), family factors (family economic situation, parents' will, parents' career influence, parents' education level), major factors (major employment situation, major popularity, major talent demand), university factors (ranking and popularity of universities, geographical location of university, tuition fees and living expenses). The dependent variable is Students choose to major in electronic information.

1.7 Definition of Terms:

1.7.1 Large class enrollment

The core of the large-category enrollment system, a higher education enrollment model that leads the modern education trend, lies in the integration of several similar or closely related major categories, which are brought together into a comprehensive large category. When new students enter the university, they do not need to immediately decide on a specific major direction, but first go through a period of extensive general education. After this period of study and accumulation, students can choose a suitable major for in-depth study after careful consideration based on multiple factors such as their own interests, academic performance, and future career plans. This admission system demonstrates its unique flexibility and adaptability, which not only provides students with a broader scope of disciplinary exploration, but also effectively avoids the limitations of choice that may result from early specialization.

1.7.2 Electricity

Covering the fields of electronics technology, electrical engineering, automation, communications engineering and electronic information engineering, the Electronic information majors bring together many cutting-edge technologies and aim to carefully cultivate majors with a solid foundation and a wide range of skills. These majors cover not only core skills such as the design, development and maintenance of electronic equipment and systems, but also extend to multi-dimensional fields such as the construction of electric power systems and smart grids, the precision and optimization of communication network design, and the in-depth research and development and application of electronic information products.

1.7.3 Specialty Selection

Majors, as academic categories established in higher and secondary specialized universities to meet the needs of the social division of labor, are undoubtedly a direct reflection of society's need for specific knowledge and skills. In the context of this paper, major selection refers specifically to the choice of future direction of study made by first-year engineering students as they enter the threshold of institutions of higher learning.

1.7.4 factor

Influential factors, that is, those important factors or conditions that can influence the trajectory and outcome of things. When we explore the many factors affecting students' choice of Electronic information majors, it is not difficult to find that they cover a variety of aspects: first of all, the students' personal performance level, advantageous disciplines and interests, which is the key to determining whether the students can adapt to the major learning and enjoy the fun of it; second, the parents' wishes and expectations, as well as the family's financial conditions, also largely affects the choice of students; and then the university's geographic location, overall strength and teaching resources, as well as the major training programs for students, course curriculum and difficulty assessment, is also the students to make a choice. Secondly, the parents' wishes and expectations, as well as the family's financial conditions, also

largely affect the students' choice; furthermore, the geographical location, overall strength and teaching resources of the university, as well as the program of training, curriculum and difficulty assessment of the profession, are also important references for students to make their choices; lastly, the current situation of the employment market of the graduates of the profession and its potential for development are also a part of students' decision-making process that should not be ignored when weighing the pros and cons. In this paper, the above factors are summarized as personal factors, family factors, major factors and university factors.

1.7.5 Electronic Information Major

The electronic information category in this study refers to the electronic information category in which the Shanghai Engineering science University enrolls students. The electronic information category contains five majors: computer science and technology, automation, electrical engineering and automation, data science and big data technology, and artificial intelligence major.

1.8 Conceptual Framework:

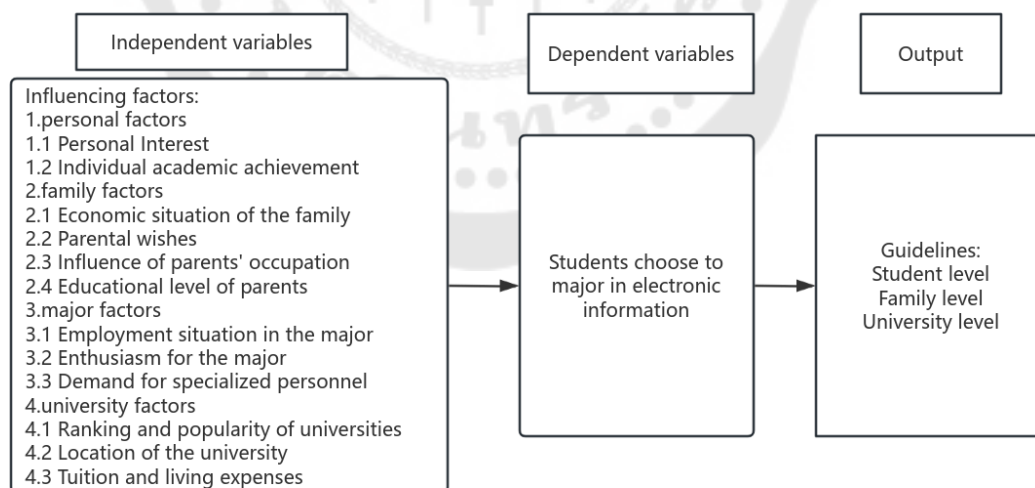


FIGURE 1 Conceptual Framework

CHAPTER II

LITERATURE REVIEW

The first part is the theoretical foundation, referencing Rational Choice Theory: Using the theory by Tierney & Venegas as a framework, it explains students' choice of electronic information majors under the background of broad-category enrollment, analyzes the pursuit of "maximum expected utility" as well as the influences of information acquisition, social environment, and structural constraints, and mentions the manifestation of "information asymmetry" and "bounded rationality" in the study.

Referencing Cumulative Advantage Theory: Based on the theory by DiPrete & Eirich, it explains the group differences in the choice of electronic information majors, including the influence of family background and the role of "institutional feedback loops" in the mutual reinforcement of geographical location and university program reputation.

The second part: Introduction to the relevant situation of Shanghai University of Engineering Science, including the college's program offerings, faculty strength (including the number of staff, educational background composition, talent situation, etc.), degree-granting points, undergraduate programs, and achievements in the development of certain disciplines.

The third part: Definition of core concepts, including broad-category enrollment, majors, and major selection.

The fourth part: Current implementation of broad-category enrollment: This part describes the implementation of the broad-category enrollment model in some domestic universities, the differences in implementation among different types of institutions, and the impact of this model on students' employment and other aspects.

Current research on factors influencing major choice: This part summarizes research findings from domestic and international scholars on the factors influencing major choice, including various aspects such as individual, family, society, university, and major, and presents scholars' viewpoints in a tabular format.

The fifth part: Literature review summary Summarizes the influencing factors in students' choice of electronic information majors, including specific contents from the four dimensions of individual, family, major, and institution; summarizes the research findings and significance of scholars from different countries on influencing factors of major selection; and points out current research shortcomings.

2.1 The theoretical foundation of this study

2.1.1 Application of Tierney & Venegas's Rational Choice Theory

Under the context of broad-category enrollment, students' choice of electronic information majors can be explained through the framework of Rational Choice Theory. Tierney and Venegas proposed that individual decision-making behavior is essentially driven by the pursuit of *maximum expected utility*, while also influenced by factors such as *information acquisition*, *social environment*, and *structural constraints*. This viewpoint aligns closely with the findings of this study: survey results indicate that factors related to “economic utility,” such as the employment prospects of the electronic information major (e.g., a 98% employment rate) and salary potential, together with “non-economic utility” factors such as personal interests and abilities, jointly constitute the core considerations in students' decision-making. (Tierney & Venegas, 2009)

Furthermore, the phenomenon of *information asymmetry* emphasized by Tierney and Venegas is particularly evident in this study—some students demonstrated insufficient understanding of the difficulty of electronic information courses or industry development trends, which led to academic dissatisfaction or a mismatch in career direction after making their choice. This supports the *bounded rationality* hypothesis within Rational Choice Theory: students' decisions are not based on complete information, but are constrained by external conditions such as the intensity of university publicity and the level of family awareness.

2.1.2 Application of DiPrete & Eirich's Theory of Cumulative Advantage

DiPrete and Eirich's theory of cumulative advantage provides an important perspective for understanding group disparities in the choice of electronic information majors. The theory argues that small initial advantages are amplified over time through mechanisms such as access to resources and social networks, eventually leading to structural inequality. This logic explains the impact of family background found in this study: for example, students whose parents work in electronic information-related industries or have higher levels of education are more likely to access professional information through family social networks, form earlier cognitive advantages in the field, and are therefore more inclined to choose electronic information majors. (DiPrete & Eirich, 2006)

In addition, the concept of *institutional feedback loops* within the theory of cumulative advantage is also applicable in this research. As a first-tier city with a strong concentration of electronic information industries, Shanghai's geographical advantage reinforces the program reputation of Shanghai University of Engineering Science. This mutual reinforcement attracts more students to choose the major, forming a cycle of "resource concentration selection preference solidification of advantages."

2.2 The current situation of the university of Electrical and Electronic Engineering and the major program of electronic information at the Shanghai Engineering Sciences University

The college of Electrical and Electronic Engineering of Shanghai Engineering Sciences University has the majors of Computer Science, Automation, Electrical Engineering, Electronic Information, Computing Center (Data Science Department), Student Innovation and Entrepreneurship Center, Experimental Center, as well as the Party and Government Comprehensive Office and the Student Work Office. There are 155 faculty members, including 115 full-time faculty members, with 87% of the faculty members having PhDs. (Shanghai University of Engineering, 2024)

The above content can be found in Figure 2.

Faculty Education Level (PhD Rate)

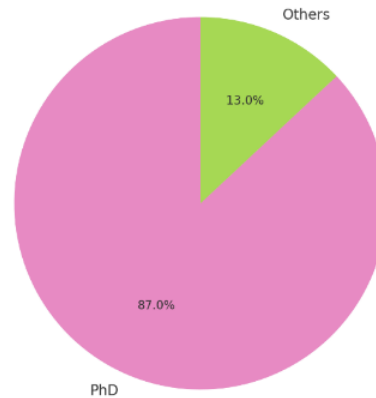


FIGURE 2 Faculty Education Level

There are 71 professors and associate professors, while vigorously introducing outstanding talents from home and abroad. There are 2 national talents, 4 provincial and ministerial talents, 11 foreign experts are appointed as overseas master teachers, 36 teachers with overseas experience are introduced and trained, which improves the international vision and international exchange ability of the teaching team. (Shanghai University of Engineering, 2024)

The above content can be found in Figure 3.

Faculty Titles Distribution

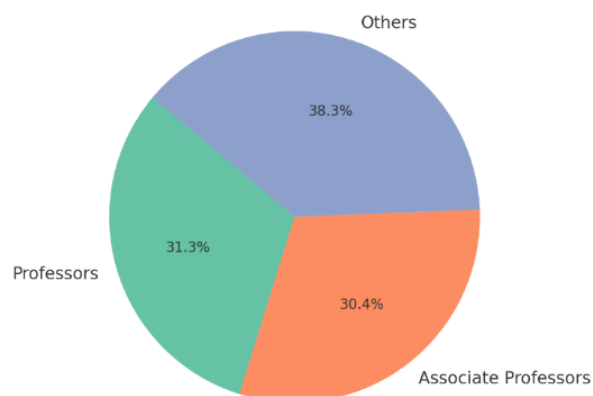


FIGURE 3 Faculty Titles Distribution

There are 15 teaching teams and 12 research teams in the college, forming a good talent training echelon. Teachers have been selected as Top1% scientists in the world and have been awarded Shanghai May 1st Labor Medal and Shanghai Yucai Award.

The college has academic master's degree in control science and engineering and professional master's degree in electronic information authorization point, with six undergraduate majors in computer science and technology, automation, electrical engineering and its automation, electronic information engineering, data science and big data technology, artificial intelligence. Among them, Computer Science and Technology has been approved as a national first-class undergraduate program construction point, Automation, Electrical Engineering and Automation has been approved as a Shanghai first-class undergraduate program construction point, and Data Science and Big Data Technology is among the first batch of majors opened in Shanghai. Computer Science and Technology and Automation have passed China Engineering Education Professional Certification, and Electrical Engineering and Automation and Automation have been approved as applied undergraduate pilot programs by Shanghai Municipal Education Commission.

The Electronic Information Major contains five majors: Computer Science and Technology, Automation, Electrical Engineering and Automation, Data Science and Big Data Technology, and Artificial Intelligence Major. Students only take general and basic courses in their first year of college, and are again streamed into majors in their second year of college. For example, the streaming plan for the 444 students in the class of 2023 is as follows: 94 students majoring in Computer Science and Technology, 141 students majoring in Automation, 110 students majoring in Electrical Engineering and Automation, 47 students majoring in Data Science and Big Data Technology, and 52 students majoring in Artificial Intelligence. (Shanghai University of Engineering, 2024)

The above content can be found in Figure 4.

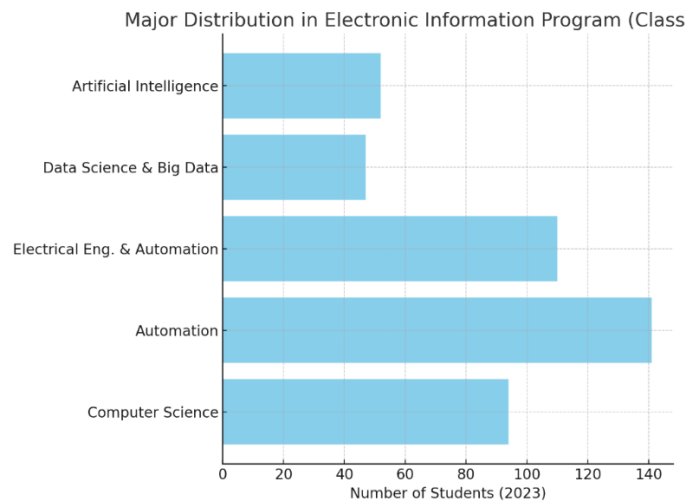


FIGURE 4 Major distribution

2.3 Core concept definition:

2.2.1 Enrollment in broad categories

The concept of "large-category enrollment" has been widely discussed in China's academic circles, and its definition and connotation have become increasingly rich. The mainstream view is that this enrollment method is aimed at enrolling undergraduates in universities in accordance with the major categories of disciplines or arts and sciences, and students do not need to explicitly choose specific majors when they enroll. (Tang, 2009) Specifically, the broad category enrollment talent cultivation mode of undergraduate education, i.e., enrollment according to the first or second level of disciplines, and unified development of teaching plans. Students will first receive basic course teaching within their disciplines, which usually lasts one to two years. Thereafter, taking into account the job market, personal interests and strengths, they will then choose a specific direction of specialization for in-depth study and practice.

Currently, there are three main modes of "large class enrollment and training". The first is to take the first discipline as a large class for enrollment and training, such as the Shanghai University of Engineering and Technology, computer science and technology, electrical engineering and automation, automation, data science and big data technology, and artificial intelligence and other majors into the electrical class for enrollment. The second type is in the form of "base class" and "experimental class", such

as Peking University's "Yuan pei Program" and Tsinghua University's "Experimental Class for Humanities". Although their forms are slightly different, they are all based on the major categories of disciplines for enrollment, aiming to cultivate composite talents. In the third type, the original major settings are completely broken, students are not divided into arts and sciences when they enter the university, and they are first given general education, and then streamed into specialties, such as Fudan University, which has all first-year and some second-year undergraduates enrolled in the four major colleges of the Fudan College, and then choose their specialties after receiving comprehensive quality education.

To sum up, the core feature of large-category enrollment lies in the fact that after enrollment, students first study the basic courses of large-category disciplines for one to two years, and then choose their majors based on factors such as social needs, personal interests and abilities. This model effectively integrates the teaching resources of multiple disciplines in universities, which helps to improve the comprehensive quality of students, and enables them to better understand major knowledge and choose major fields that are more suitable for their learning and development, thus improving the quality of talent cultivation in universities.

2.2.2 Specialization and choice of profession

"Specialty" as a proper noun in our country was first seen in 1952 "the report of the Ministry of Education on the National Conference of Presidents of Agricultural Colleges", which pointed out that: the so-called specialties, according to the national needs of a specialists standards in order to cultivate experts in the basic teaching organization. Each specialty has its own teaching system which is suitable for training specialists, and the courses necessary for the specialists are arranged in the plan. Several similar specialties may form a department. (He, 1998) The Dictionary of Education defines "specialties" as follows: they are classified according to the occupational division of labor in society, the classification of disciplines, the state of scientific, technological and cultural development, and the needs of economic construction and social development. Accordingly, higher education institutions

formulate corresponding cultivation objectives and reasonable teaching plans, and carry out enrollment, teaching, and distribution of graduates in order to cultivate and deliver various specialists needed by society for the country. (Gu, 1991)

The Dictionary of Modern Chinese explains it as: "The various disciplines required for a trade in a department of a university of higher learning or in a secondary specialized university, divided into studies according to the scientific division of labour or the social division of labour in the production sector; the various branches of business in the industrial sector divided into branches according to the different processes involved in the production of a product; a person specializing in a certain kind of work or occupation" (Dictionary Editorial Office, 2005)

For the purpose of this study, "specialization" is defined as a category of studies in higher or specialized secondary universities that is divided into a number of academic disciplines in accordance with the needs of the country. General education undergraduate specialties are defined in the Ministry of Education Catalog of Undergraduate Majors in General universities Catalog of Undergraduate Specialties in General universities" issued by the Ministry of Education. based on the Catalogue of Undergraduate Majors in General universities issued by the Ministry of Education, with the addition of new majors approved in recent years and listed in the Catalogue. As of March 2024, the catalog of majors contains a total of 12 academic disciplines (excluding Military Science), 93 major categories, and 816 majors. (Ministry of, 2024b)

The 12 disciplinary categories include 4 natural sciences: science Engineering , medicine, and agriculture; and 8 humanities and social sciences: literature, history, philosophy, economics, management, law, education, and art. (Ministry of, 2024a)

The so-called "choice", as the name implies, means "selection, selection", and the choice of specialty, also known as "selecting a specialty", that is, according to their own developmental needs in the university in which they are offered The choice of major, also known as "selecting a major", means that students choose to study the major they are interested in according to their own development needs in the academic disciplines offered by their universities.

2.4 Status of research

2.3.1 Current status of the implementation of large class enrollment

The current large class enrollment model has gained attention and recognition, and currently a number of universities in China have implemented it as a pilot reform initiative for innovative talent cultivation model. For example, large class enrollment has been implemented to varying degrees in universities of science and technology and finance and economics respectively. (Li & Chen, 2014) In recent years, although large class enrollment is gradually becoming one of the trends in the reform of talent cultivation mode in universities, some universities have canceled the enrollment of large classes again in the pilot process. (Chen, 2012) In the statistics, it is found that sports universities, art universities, language and medicine "211 project" universities currently do not implement the program of enrollment of large categories, and medical universities have gone through the process of from existence to non-existence, which to a certain extent indicates that universities with strong major characteristics are not suitable to carry out the talent cultivation program of enrollment of large categories. A survey by scholars based on the data (graduation rate, degree conferment rate at graduation, initial employment rate, and success rate of graduate university) of the first graduates of electronic information class and the previous two non-big class graduates of a university shows that the big class enrollment training mode can effectively high the employability of college students. (Zheng et al., 2018)

A questionnaire survey of first-year large-category students in a university analyzed that the adequacy of students' pre-entry preparation, the systemationess of freshmen's major counseling activities, and students' recognition of the concept of large-category education are significantly and positively correlated with freshmen's adaptability. (Zafar, 2011)

Although there is no concept of broad category enrollment in foreign countries, there are many world-class universities that select majors after enrollment, which is similar to the broad category enrollment in China. Foreign scholars have studied more about the mode of selecting majors after enrollment, and scholars generally believe that

the mode of selecting majors after enrollment is conducive to enhancing the major interests of students in universities. After students have studied for a period of time, they have a certain understanding of the teaching resources, course difficulty, and employment situation of their intended majors, and they can give full play to their own areas of expertise. (Arcidiacono, 2004; Mauldin et al., 2000) when choosing to take the corresponding major courses, and at the same time, it can help students to gradually understand and build up a better understanding of their own and the specialty fit. (Malamud, 2010)

Some scholars also believe that choosing a major after studying for a period of time under a broad category of majors will have an impact on students' graduation rate and employment choices. Some studies have shown that students who identify a major after enrollment are more likely to work in a job that matches their major, but students who identify a major before enrollment are more likely to receive a high starting salary after graduation. (Bordon & Fu, 2015; Malamud, 2011). However, studies by scholars take the opposite view, suggesting that students who choose a major after enrollment are more likely to complete college and gain a post-graduation wage earning advantage.

The United States accounts for a relatively high percentage of studies on major selection in foreign related broad enrollment, because most universities in the United States use the model of choosing majors after entering the university. According to scholars Jin Ding bing in the study of "Comparative Analysis of Undergraduate Major Selection in Seven Top U.S. Universities", we find the time of major selection in these seven top universities. It can be seen that the earliest confirmed majors among the seven universities are also at the end of the first academic year, except for the university of Chemistry, the university of Engineering, the university of Environmental Design and the university of Natural Resources at UC Berkeley, which specify their majors at the time of application. (Jin, 2006)

Among them, Harvard University, California Institute of Technology and Yale University's science majors are chosen at the end of the first year or at the beginning of the second year, and Princeton University, Massachusetts Institute of Technology,

Stanford University, University of California at Berkeley, and Yale University's liberal arts majors are chosen at the end of the second year or at the beginning of the third year. In addition to the specific timing of major selection in the seven U.S.

2.3.2 Current status of research on factors influencing the choice of specialization

To gain a deeper understanding of the complex dynamics that shape college students' decisions regarding major selection, a series of influential studies have been conducted over the past two decades, each shedding light on distinct yet interconnected factors. Among these, a notable survey led by Charles A. Malgwi and Martha A. Howe, in collaboration with Priscilla A. Burnaby, stands out for its large-scale and grade-diverse sample. The research team targeted 788 college students across various academic years (including freshmen, sophomores, juniors, and seniors) at a prominent college located in the northeastern region of the United States a demographic chosen for its representativeness of the broader American undergraduate population, which often faces a wide range of major options and career-related pressures. When analyzing the survey data, the researchers found that among all the variables examined ranging from career prospects and parental expectations to institutional resources students' intrinsic interest in subjects emerged as the most pivotal factor influencing their choice of major . (Malgwi et al., 2005)

This finding underscores the role of personal passion in guiding academic decisions, as students tend to gravitate toward fields where they feel a genuine curiosity and engagement, which often translates to greater motivation and persistence in their studies.

Complementing this focus on interest, American sociologist Simpson delved into the role of prior academic preparation in shaping major preferences, highlighting how high school performance acts as a critical "gateway" factor. Simpson's research

revealed that students who demonstrated strong academic excellence in quantitative subjects such as mathematics, physics, and chemistry during their high school years were significantly more inclined to pursue technical or STEM (Science, Technology, Engineering, and Mathematics) majors in college. (Simpson, 2001)

This trend, Simpson argued, stems from both the confidence built through past success and the practical need for a solid foundational knowledge base to thrive in rigorous technical curricula. Conversely, the same study found that these high-achieving students in math and related subjects showed relatively lower interest in liberal arts majors such as English, history, or philosophy suggesting a perceived disconnect between their quantitative strengths and the more qualitative, discussion-based focus of liberal arts fields.

Further expanding the scope of influencing factors, subsequent studies by Bottia and Chang collectively identified a set of interconnected elements that impact both college students' academic achievements and their choice of science and technology majors. These factors include not only the previously noted personal interests and academic performance but also the broader environmental context (such as the availability of STEM resources at their high school or college, peer culture around academic pursuits, and the presence of role models in technical fields) and positive academic experiences (such as successful participation in science fairs, internships, or mentorship programs). Bottia and Chang emphasized that these factors do not operate in isolation; instead, they interact to shape students' perceptions of their own capabilities and the attractiveness of STEM majors. For instance, a supportive academic environment (e.g., access to dedicated STEM teachers or after-school programs) can amplify the impact of personal interest, making a technical major feel more accessible and desirable. (Bottia et al., 2018; Chang et al., 2014)

Importantly, these studies also highlight the malleability of key influencing factors: personal interests and academic performance two of the most critical drivers of major choice are not fixed traits but can be nurtured and enhanced through targeted guidance. This guidance, as researchers note, can come from multiple sources: peers who share similar academic goals and provide mutual encouragement, teachers who offer personalized feedback and expose students to new fields, and parents who provide emotional support and help students explore potential career paths aligned with their strengths. This finding carries significant implications for educational practitioners, suggesting that interventions aimed at fostering interest in underrepresented fields (e.g., encouraging more female or minority students to pursue STEM) and strengthening academic preparation (e.g., tutoring programs for students struggling in math or science) can effectively broaden students' major options.

Adding another layer to the understanding of major selection, Maltese & Tai uncovered a crucial timeline in students' decision-making process: the majority of college students have already solidified their future major direction during their high school years, long before enrolling in college. (Maltese & Tai, 2011)

This early decision-making underscores the importance of high school as a formative period for academic exploration, as the experiences, coursework, and guidance students receive during this time lay the groundwork for their college major choices. It also implies that efforts to influence major selection whether to promote diversity in certain fields or to help students make more informed decisions should begin well before students enter college, targeting high school curricula, career counseling, and exposure to a wide range of academic disciplines.

The Under explored Role of Family and Socioeconomic Factors. Beyond individual interests, academic preparation, and environmental contexts, family-related factors and socioeconomic status have emerged as equally influential determinants of

college students' major choices, with cross-cultural research revealing nuanced patterns across regions and demographic groups.

A landmark contribution to this area comes from Song and Glick, two scholars whose research leveraged data from a large-scale American longitudinal educational study a type of research design valued for its ability to track students' development over extended periods (often years), capturing how early-life factors (like family dynamics) shape long-term academic decisions. (Song & Glick, 2004)

Unlike cross-sectional surveys that only capture a "snapshot" of choices, their longitudinal approach allowed them to isolate the lasting impact of family influences on major selection, rather than conflating them with short-term trends. Their findings demonstrated that family factors specifically parents' educational attainment (e.g., whether parents held college degrees or advanced credentials) and parental involvement in their children's education (such as attending parent-teacher conferences, assisting with coursework, or discussing college and career plans) exert a significant, often under recognized influence on students' college major choices. Notably, this effect was more pronounced among male students: sons of parents with higher education levels or greater educational involvement were more likely to pursue majors aligned with their parents' professional backgrounds (e.g., business, law, or medicine) or majors perceived as "prestigious" or career-oriented. Song and Glick posited that this gendered difference may stem from traditional family expectations that often place greater emphasis on sons' career advancement, leading parents to invest more intentionally in guiding their male children's academic and professional trajectories. While Song and Glick focused on American families, research by Chinese scholars Wang Yuanwei and Gao Wei extended the conversation to the role of family economic conditions in educational choice, offering a cross-cultural counterpoint to Western findings. (Wang & Gao, 2007) Wang and Gao concurred with global research

highlighting family SES as a key predictor of academic decisions but uncovered distinct patterns specific to Chinese students. Their work, which analyzed data from undergraduate populations across urban and rural Chinese universities, challenged the conclusions of Rochat and Demeulemeester (whose research had suggested that low-income students might prioritize "high-return" majors regardless of cost). Instead, Wang and Gao found that students from low-income families were significantly less likely to choose majors with high associated costs including art (e.g., fine arts, design), foreign languages (which often require expensive study-abroad programs or language-learning resources), journalism (with costs for equipment, internships, and media-related materials), and certain specialized engineering fields (such as aerospace or biomedical engineering, which may involve costly lab fees or textbook expenses).

Adding another layer of cultural specificity, research by Kim focused on Asian students including both East Asian (e.g., Chinese, Korean, Japanese) and South Asian (e.g., Indian, Pakistani) populations in the United States and other English-speaking countries, uncovering a unique set of priorities that diverge from the "intrinsic interest" focus observed in broader American samples. (Kim & Kim, 2014) Kim's work, which drew on surveys and in-depth interviews with Asian undergraduate students, found that career prospects (e.g., job security, salary potential) and parental expectations were the two primary drivers of major choice often taking precedence over personal interest. This aligns with cultural values that emphasize collective family well-being over individual fulfillment: many Asian students view their college major as a means to secure a stable career that can support their families (either immediately or in the future) and to honor their parents' sacrifices for their education.

Kim further noted that Asian parents play an active, often directive role in the major selection process, distinct from the more "supportive but hands-off" approach common in some Western families. Asian parents frequently provide targeted guidance

such as researching majors with high employment rates, connecting students with mentors in desired fields (e.g., engineering, medicine, or computer science), or emphasizing the importance of "practical" majors over "speculative" ones (like fine arts or creative writing). This involvement is rooted in a desire to protect their children from the uncertainty of competitive job markets, as well as cultural norms that frame parental guidance as a form of care and responsibility.

Compounding these factors, Kim 's research also touched on the role of socioeconomic status within Asian communities: students from high SES Asian families (e.g., parents with professional careers, business owners, or advanced degrees) are typically exposed to a broader range of academic and professional opportunities such as internships at multinational companies, summer programs in specialized fields, or networking events with industry leaders that shape their major choices. These students may have the financial flexibility to pursue high-cost but high-reward majors (e.g., medicine, which requires extensive postgraduate study) or even to explore less traditional fields (like international relations or digital media) if they align with family values of prestige. In contrast, low SES Asian students often face similar economic constraints to their non-Asian peers, leaning toward affordable, career-focused majors (e.g., accounting, nursing) that balance stability with minimal financial risk.

Tong Sai jun pointed out that the process of students choosing their college majors is a complex and multi-faceted decision - making process, in which four major factors, namely individuals, families, colleges and society, exert a decisive and interrelated influence. Among these, personal interest stands out as the central and driving force, as it often serves as the internal motivation that sustains students' long term engagement and enthusiasm in their chosen fields of study. When it comes to the selection of universities and corresponding majors, students take into account a series of specific attributes of colleges. A university's reputation, which is built up through

years of academic achievements, faculty strength and social recognition, is a key factor that attracts students, as it is often associated with better academic resources and more opportunities for future development. The employment rate of graduates majoring in a certain field is another practical consideration; students and their families usually regard a high employment rate as a guarantee for a stable career after graduation. Geographic location also plays an important role. Universities located in economic centers or regions with developed industries can provide students with more internship and employment opportunities, while those in areas with beautiful natural environments or profound cultural heritage may be more attractive to students who value quality of life and cultural experience. In addition, the overall competitiveness of the university, including its academic research level, teaching quality, and the quality of its student groups, as well as the degree of matching between the major and the university (that is, whether the university has advantages in the corresponding major in terms of faculty, curriculum, and practical resources) are all important factors that students carefully weigh when making their choices. (Tong, 2003)

Although in the current context of major selection, most students tend to lean towards popular majors. These popular majors are usually those that are closely related to the development of emerging industries, have broad market prospects, and are likely to bring high economic returns, such as computer science, finance, and artificial intelligence. However, for families with limited financial means, the economic factor becomes a prominent constraint in the major selection process. In such cases, students have to give priority to considering their family's financial situation. They often tend to choose majors with relatively lower tuition fees. Teacher training majors are a typical example; in many regions, teacher training majors not only have lower tuition standards, but also may enjoy various preferential policies such as scholarships and grants. Besides, students from such families may also turn to institutions that provide state subsidies. These institutions, with the support of government funds, can reduce the

financial burden of students and their families through subsidies for tuition, accommodation, and living expenses, enabling students to complete their studies without being overly troubled by economic pressures.

Social factors also have a significant and far - reaching impact on college students' choice of majors. The society's demand for various types of talents is a key social factor. In different stages of social and economic development, the demand for talents in different fields varies greatly. For example, during the period of rapid industrialization, there was a huge demand for engineering and technical talents; in the current era of digital economy, talents in the fields of data science, information technology, and digital marketing are in short supply. Students, in order to enhance their employ ability and adapt to social development, often adjust their major choices according to the changes in social talent demand. The country's economic situation is another important social factor. A booming national economy may promote the development of various industries, creating more job opportunities in multiple fields, which may make students' major choices more diverse. On the contrary, in an economic downturn, industries that are more stable, such as education, medical care, and public services, may become more popular among students when choosing majors. In addition, public opinion orientation also plays a role in guiding students' major choices. The media's reports and evaluations on different majors, the views and suggestions of social celebrities, experts, and scholars on career development, as well as the comments and experiences shared by previous graduates on social platforms, will all affect students' (perception) and understanding of different majors, thereby influencing their final choices.

In addition to the factors mentioned by Tong Sai jun, the process of choosing a major is also affected by a variety of other factors, including cultural factors, family factors (in addition to the financial situation mentioned earlier), and personal factors (in

addition to personal interests). One particularly notable aspect is that parents' expectations and cultural values have a crucial shaping effect on students' educational trajectories, which in turn affects their major choices. Parents' expectations usually stem from their own life experiences, values, and aspirations for their children. Some parents may hope that their children can choose majors that are stable and have good social status, such as medicine, law, and civil servants - related majors; others may expect their children to engage in industries that they are engaged in or have a certain understanding of, hoping to provide help and support for their children's future careers. Cultural values, on the other hand, are formed under the influence of long - term social and cultural traditions. In some cultures that attach great importance to collective interests, students may be more inclined to choose majors that are beneficial to society and the country, such as public administration, environmental protection, and agricultural science. In cultures that emphasize individual development and self - realization, students may pay more attention to whether the major can meet their own interests and personality development needs.

Furthermore, employment prospects, which are closely linked to social talent demand and the country's economic situation, are an important personal and practical factor affecting students' major choices. Students often conduct in depth investigations and analyses on the employment direction, salary level, promotion space, and industry development prospects of different majors, and take these as important bases for their choices. Academic performance is another key personal factor. Students' academic performance in middle school or the early stage of college directly determines their eligibility to apply for certain majors. Majors with high academic requirements, such as mathematics, physics, and some medical majors, usually only admit students with excellent academic performance. At the same time, students' academic strengths and weaknesses also affect their major choices. For example, students who are good at languages and literature may be more inclined to choose Chinese language and

literature, foreign languages, and other majors, while those who excel in science and engineering may prefer majors such as physics, chemistry, and mechanical engineering. In addition, parents' educational attainment also has a certain impact on students' major choices. Parents with higher educational attainment usually have a more comprehensive and in - depth understanding of the education system and various majors. They can provide more professional and targeted suggestions for their children's major selection, helping them to make more rational choices. On the contrary, parents with lower educational attainment may have limited knowledge of majors and universities, and their suggestions for their children may be more based on traditional concepts or the experiences of people around them . (Ma, 2024)

To sum up, choosing a college major is undoubtedly a pivotal decision in students' lives. This decision not only relates to their academic career in college, but also has a profound impact on their future career development and life path. As Quadlin pointed out, this crucial decision is comprehensively influenced by a variety of interrelated factors, including personal interests that serve as the internal driving force, economic opportunities that are closely related to future life quality, familial pressures that come from family expectations and economic conditions, and cultural values that are rooted in social and cultural traditions. These factors interact with each other, jointly shaping students' decision - making process in major selection, making each student's major choice a unique combination of multiple factors. (Quadlin, 2019)

Fan Ming Cheng's categorization of the influencing factors is more detailed, and he summarizes six major categories of factors: economic factors, covering the family's financial situation and tuition fees for majors; social factors, including parents' occupations, the university's geographic location, as well as teachers' and family members' and friends' advice; personal factors, involving students' academic abilities,

hobbies, and physical conditions; informational factors, such as university rankings, the hotness of majors, the job placement rate, and differences in different levels of education (undergraduate , specialty, and higher vocational); institutional factors, including college entrance examination enrollment policies, university enrollment numbers and admission scores, and the nature of the university; and university factors, which involve the level of faculty, quality of education, learning atmosphere, library collections, the degree of sophistication of teaching and learning facilities, opportunities for continuing education, and employment status, among others. (Fan, 2009)

In his study, Wang Zhi summarized the factors affecting students' choice of electrical information majors into four major categories: firstly, family factors, parents' opinions based on their own work practices and considerations of their children's future employment fields, whose opinions accounted for 13.5% in students' choice of majors. The second is social factors, mainly related to the demand of enterprises for university-recruited majors, and this factor accounts for 34.3% of the overall influencing factors. The third is university factors, including faculty strength, teaching resources, teaching style and major prospect introduction of teachers of lower-level major courses, and the influence of senior seniors. Combining these factors, from the results of the questionnaire survey, university factors accounted for 45.2% of the influence weight. The last is the individual factor, which mainly refers to the students' personal subjective will. (Wang, 2012)

Yan Kazi, on the other hand, believes that the factors affecting students' choice of major can be divided into three aspects: personal, social and family. In terms of personal factors, students' interest is dominant, according to personal interest in choosing a specialty, students will be more active in learning major knowledge; followed by students' physiological factors, such as vision, height and other conditions will also have an impact on the choice of specialty. As for social factors, students tend to choose popular majors with better employment prospects. As for family factors, students whose

parents have higher education level and better occupation are more inclined to choose traditional advantageous disciplines. (Kazi, 2011)

Hu Yu Dong, Chen Jin and other scholars have explored in depth the multiple factors that influence students' choice of major in the context of the large-category training model. The results of the study show that five main factors influence students' choices: personal traits, influence of others, family background, strength of specialization, and employment prospects. Among these factors, the influence of personal traits is particularly significant. (Hu et al., 2016)

In addition, other scholars have also categorized and integrated the factors affecting major choice. One of the more concise categorization methods is the three-categorization method, such as the categorization of personal characteristics, family background and employment expectations proposed by scholars such as Ci Xian Lu et al. on the other hand proposed a more detailed four-classification method, including major factors, individual student differences, family and peer factors, and social factors. (Lv & Li, 2014)

Yang Hua Qing further subdivided the factors influencing students' choice of major into personal factors, major career expectations, family capital (family capital includes not only economic base, but also family education, parents' education level, and relatives' social background), and university capital. It was found that personal factors had a significantly greater influence on major choice than family factors. (Yang, 2021)

The author summarizes the views of the above scholars on the influencing factors of major choice in the following table 1:

- | | | |
|---|--------------------------------------|-------------------------------|
| 1. Bottia & Chang | 2. Maltese & Tai | 3. Mingcheng Fan |
| 4. Charles & Almgwi & Martha AHowe | 5. Simpson | |
| 6. Rochat & Demeulemeester | 7. Quadlin | 8. Yan Kaazi 9. Yang hua qing |
| 10. Liu Yang & Kong Fansheng & Zhong Yuping | 11. Lu Cixian & Li Weihua | |
| 12. Song&Glick | 13. Wang Tianwei & Gao Wei Hu Yudong | 16. Kim |

2.5 Literature Review Summary

Combined with the above table, it can be clearly concluded that the factors influencing college students' choice of electronic information major are multi-dimensional and interrelated, mainly covering four core areas: personal factors, family factors, major-related factors, and university-related factors. Each area includes specific sub-factors that affect students' decisions to varying degrees, and their interactions often jointly shape the final choice.

First, personal factors are the internal driving force of major selection, as individual will and inherent conditions play a decisive role. The first key sub-factor is personal interest. Many students choose electronic information because of a genuine preference for the electrical field such as curiosity about electronic devices (smartphones, circuit boards, intelligent control systems), enthusiasm for exploring electrical engineering principles, or interest in related subjects like physics (electromagnetism, circuit theory) and computer science (electronic application programming). This interest not only motivates them to cope with difficult professional courses (e.g., analog/digital electronics, signal processing) but also helps maintain enthusiasm amid academic challenges. The second sub-factor is academic performance and subject strengths. Electronic information relies heavily on science and mathematics foundations; students with excellent grades in advanced mathematics, linear algebra, probability theory, and university physics are more confident in mastering its technical courses. In contrast, those weak in literature and history tend to avoid liberal arts-focused majors and turn to electronic information, which aligns with their analytical strengths and avoids frustration from unfamiliar subjects.

Second, family factors are important external influences, with the family environment, economic status, and parental attitudes exerting subtle yet profound effects. The first sub-factor is family economic conditions. Electronic information involves additional learning costs such as purchasing experimental equipment (oscilloscopes, development boards), participating in practical training, or investing in advanced courses. Families with stable finances can better support this choice, while those with

tight budgets may make students hesitate, leading them to choose majors with lower costs. The second sub-factor is parents' willingness and expectations. Many parents guide (or even decide) their children's major selection: some urge choosing electronic information based on their understanding of the job market, believing it offers broad prospects or high salaries to improve the family's economic situation. The third sub-factor is parental occupation and background. If parents work in electronic information (e.g., electrical engineers, communication specialists, electronics enterprise employees), children are exposed to the field earlier learning about daily work, career paths, and industry trends, which sparks interest. Such parents also provide practical advice (e.g., promising sub-fields, required skills), making children more inclined to follow suit. The fourth sub-factor is parental education level. Highly educated parents (bachelor's degree or above) have a comprehensive understanding of higher education and majors; they research electronic information's characteristics, curriculum, and employment prospects to guide rational choices. Less educated parents may rely on rumors (e.g., "this major is popular") but still influence children, who trust their opinions regardless.

Third, major-related factors are objective considerations tied to the major's inherent attributes and market performance. The first core sub-factor is employment prospects, including post-graduation employment difficulty and early-career salaries. Driven by 5G, artificial intelligence, the Internet of Things, and smart manufacturing, electronic information is in high demand. Graduates easily find jobs in tech companies (Hua wei, Tencent), communication operators (China Mobile), manufacturers, or research institutions. Their starting salaries are generally higher than those of liberal arts or traditional majors, with fast growth after 1-3 years of experience attracting students who value career stability and income. The second sub-factor is major popularity and social talent demand. National policies (e.g., "Made in China 2025," digital economy promotion) and global tech trends make electronic information a top major. Social demand for talents (hardware/software engineers, communication designers) grows annually, with shortages in cutting-edge fields (chip design, quantum communication).

This "supply-demand gap" makes students believe the major offers broad career space and promotion opportunities, prompting them to choose it to enhance competitiveness.

Fourth, university-related factors affect learning experiences and future opportunities through the school's external environment. The first sub-factor is university ranking and reputation. Top-ranked universities (national elites or local leaders) with strong electronic information programs have excellent faculty (experienced professors with cutting-edge research), advanced facilities (modern laboratories, simulation platforms), and abundant resources (international journals, enterprise cooperation). These advantages improve learning and research conditions, and their graduates are more recognized by employers so students prioritize such universities for electronic information. The second sub-factor is university location. For electronic information, which is closely linked to industry, schools in first-tier cities (Beijing, Shanghai, Guangzhou) or tech hubs (Hangzhou, Chengdu) have geographical advantages: proximity to enterprises, research institutions, and tech parks provides more internships, practical training, and employment opportunities. Developed areas also have an active innovation atmosphere, helping students track industry trends via lectures and events. Universities in less developed areas lack such resources, reducing the major's attractiveness. The third sub-factor is costs (tuition, living expenses). Public universities charge lower tuition for electronic information than private ones; living costs in first-tier cities are far higher than in small/mid-sized cities. Affordability is a key practical consideration: a student interested in a top-tier city's prestigious program may switch to a lower-cost, less developed area university if costs exceed the family's budget.

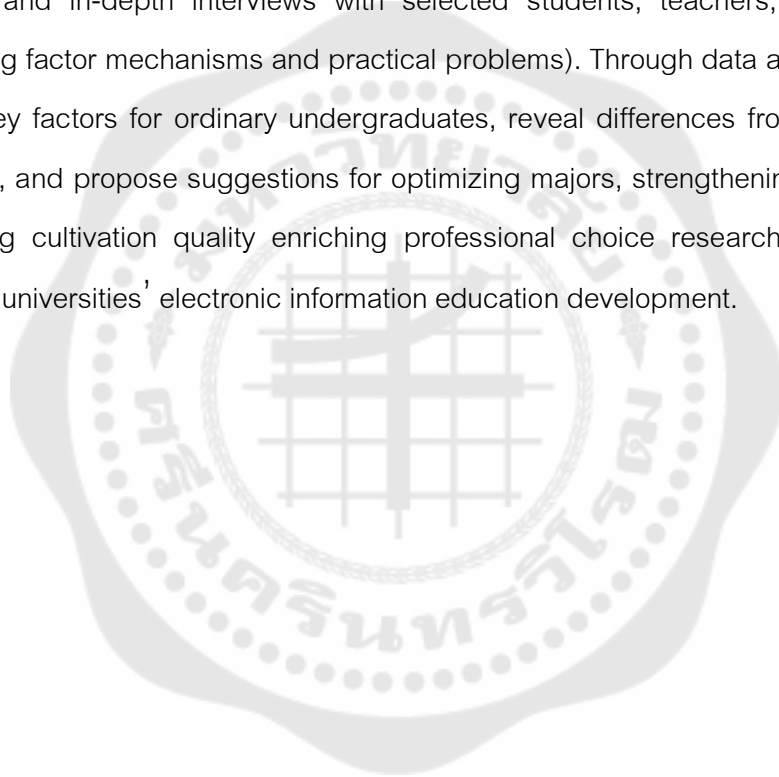
To summarize, global scholars have conducted in-depth studies on professional choice factors, covering not only the four core dimensions above but also broader areas: economic factors (regional economic development, industry income levels), teacher factors (high school guidance, university teaching quality), social factors (social values toward majors, media promotion of popular fields), and national factors (talent cultivation policies, educational investment, key industry talent demand). Using methods like questionnaires, interviews, and data analysis, they quantified factor

influences, revealed differences between student groups (urban/rural, different income families), and identified problems: blind trend-following (reducing learning enthusiasm and increasing dropout rates) and excessive economic constraints (preventing interest-based choices). They reflected on educational equity e.g., whether disadvantaged students have equal access to major information, and if regional resource gaps cause unfairness and proposed targeted suggestions: strengthening high school major guidance, improving information transparency, and establishing financial aid (scholarships, loans) to reduce economic barriers. These results guide governments to optimize educational policies (balance resources, promote enrollment fairness) and help universities improve major settings and teaching quality.

In recent years, many universities have promoted the "large class enrollment model" (admission by discipline category). Instead of enrolling by specific majors, they admit students into broad categories (e.g., "electronic information category" covering electronic engineering, communication engineering, microelectronics). Students take general education and foundational courses for 1-2 years, then choose specific majors based on grades, interests, and school needs. This model allows rational choices via in-depth major understanding but brings new challenges: assessing interests and strengths after general education, competing for popular majors, and adapting to curriculum differences.

Current research has gaps: most focus on elite universities (985, 211, "Double First-Class"), exploring factors for high-performing students from better families. Few studies target ordinary undergraduate universities, which cultivate applied talents and enroll most college students. Due to lower rankings, limited resources, and diverse student backgrounds (more rural or average-income families), ordinary undergraduates' major choice factors (especially for electronic information) differ: they prioritize practicality and employment rates over academic reputation, with family economics having a greater impact. Studying them fills research gaps and helps ordinary universities optimize enrollment, improve electronic information talent cultivation, and meet student needs.

Thus, this paper will conduct an empirical study on electronic information major choice factors, taking Shanghai University of Engineering Science (a typical ordinary undergraduate university with strong applied disciplines and representative electronic information programs) as an example. Focusing on personal, family, professional (major-related), and institutional (university-related) factors, it will use mixed methods: large-scale questionnaires among electronic information students (collecting personal characteristics, family background, major and university perceptions, and influencing factors) and in-depth interviews with selected students, teachers, and counselors (exploring factor mechanisms and practical problems). Through data analysis, it aims to clarify key factors for ordinary undergraduates, reveal differences from elite university students, and propose suggestions for optimizing majors, strengthening guidance, and improving cultivation quality enriching professional choice research and supporting ordinary universities' electronic information education development.



CHAPTER III

RESEARCH METHODOLOGY

This study adopts a comprehensive approach that combines both quantitative and qualitative methods. The research process includes questionnaire design and validation, distribution and collection, interviews, and data integration and analysis. The quantitative research involves a questionnaire for freshmen using a Likert scale, while the qualitative research focuses on interviews with administrators using a semi-structured outline. In terms of research methods, literature analysis is used to examine relevant domestic and international literature and institutional information, providing a foundation for the study.

The questionnaire method targets first-year students, covering considerations in major selection, and the data are processed using descriptive statistics and factor analysis. The interview method involves communication with administrators from the admissions office and student affairs office to gain deeper insights into students' major choices.

The research subjects include 450 first-year students majoring in Electronic Information for the quantitative part, with 230 anonymous questionnaires collected through random sampling, and 5 student affairs administrators along with 5 admissions officers for the qualitative part, with semi-structured interviews conducted. The research instruments consist of a questionnaire containing personal information and assessments of influencing factors across four dimensions (individual, family, etc.) using a 5-point Likert scale, and interview outlines designed separately for counselors and admissions personnel, focusing respectively on influencing factors of major choice and enrollment strategies.

Data collection was carried out during the first semester of the 2024 academic year, following the procedure of obtaining permission, distributing electronic questionnaires, conducting interviews, analyzing data, and summarizing the report. For data analysis, quantitative data such as frequency and mean are analyzed using Likert

scale scores and factor analysis to identify key influencing factors, while qualitative data from interviews are processed using content analysis, with suggestions proposed based on the combined findings.

3.1 Overview of the study design:

An integrated methodology combining quantitative and qualitative research was carefully designed and implemented in this study. The research process was as follows: in the quantitative research phase, the relevant literature was first interpreted in depth and the questionnaire was designed accordingly. After the questionnaire was created, Invite three experts to conduct content validity (IOC) review. The questionnaires reviewed and approved by experts will be distributed to 30 participants. After the questionnaires are collected, the reliability and validity of the questionnaires will be rigorously checked to ensure their accuracy. Once the reliability and validity of the questionnaire is confirmed, distribution and collection of the questionnaires will begin. Subsequently, based on the results of the questionnaires, the second stage, i.e., conducting interviews, was carried out. Eventually, the combined data from the questionnaires and interviews will be used to analyze and determine the main factors influencing students' choice of Electronic information majors, and make recommendations accordingly.

Quantitative part of the study: the quantitative part of this study focused on the group of freshman students who chose Electronic information majors at the Shanghai University of Engineering and Technology, and captured and collected first-hand data from the students through the systematic means of a well-designed questionnaire survey. For data organization and presentation, we adopted an intuitive tabular form to facilitate subsequent analysis and interpretation. In terms of the choice of scale, this study favors and adopts the Likert scale as the main research tool, a choice that stems from its excellent ability to accurately and meticulously reflect the personal preferences and tendencies of the respondents, thus ensuring the validity of the data while minimizing the time and resources invested by both the respondents and the researcher. The

investment of time and resources on the part of both respondents and researchers is minimized while ensuring data validity.

Qualitative part of the study: the qualitative part of this study turned its attention to the key group of student work managers and enrollment leaders of Electronic information majors at the Shanghai University of Engineering Science. In order to gain an in-depth understanding of their perspectives and experiences, we adopted semi-structured interviews as a flexible and versatile qualitative research method. During the interviews, we made a detailed outline in advance to ensure that the focus of the interviews was clear and well-organized; at the same time, we also encouraged the interviewees to flexibly adjust and expand their responses according to the actual situation and their own feelings, so as to ensure that the contents of the interviews were rich and authentic. The application of this method not only helps us obtain more in-depth and detailed information, but also further enhances the comprehensiveness and credibility of this study.

3.2 Research Methodology:

Using a variety of research methods, this study seeks to explore the target themes in a comprehensive and in-depth manner.

First, the method of literature analysis is applied. The core of this method lies in the careful reading, systematic summarization and in-depth analysis of relevant academic literature at home and abroad. We pay special attention to engineering universities and other universities that have implemented large class enrollment in Electronic information majors, and we have analyzed their recent enrollment prospectuses, enrollment summaries, teaching and management policies, large class cultivation programs, curriculum system design, student performance reports, and graduates' employment summaries and other literature. This step aims to gain a deeper understanding of the relevant theoretical research and grasp the current situation of major selection, challenges and institutional dilemmas of Electronic information majors in

the context of large class enrollment in China, so as to lay a solid foundation for the subsequent research.

Second, the questionnaire method was used. A questionnaire was carefully prepared and distributed to the target group of college students. The content of the questionnaire focused on students' major considerations in choosing Electronic information majors, as well as their self-assessment of their degree of interest in the major, the effectiveness of their major learning, their employment expectations, and their future career planning. Through large-scale data collection and analysis, we were able to get a more comprehensive picture of students' psychological motivation and actual needs when choosing Electronic information majors. Data after questionnaire data recovery data using descriptive statistical methods, mainly used to summarize and describe the basic characteristics of the data, including the mean, standard deviation, frequency distribution, etc., to provide a basis for the subsequent inferential statistical analysis. The object of the questionnaire is 450 first-year students majoring in electronic information in Shanghai University of Engineering Science., using random sampling, based on the formula $n = \frac{N}{1 + N \times e^2}$ (n is the sample capacity, N is the overall capacity, e is the sampling error) this study will control the sample error within 5%, it can be concluded that the sample capacity of at least 212, taking into account the questionnaire recovery rate and the effective rate will not be 100%, the final number of questionnaires will be issued at 230.

Finally, the interview method was implemented. This method was mainly used to conduct in-depth communication with the educational administrators of the university's admission office and student office. Through direct conversations with these educational administrators, we learned about the students' psychological motivation for the choice of Electronic information majors, their identification and adaptation status to their current majors, and their current learning status. This session provided valuable empirical materials and in-depth analytical perspectives for our study.

3.3 Research Subjects

The overall sample size for the first part of the quantitative study consisted of 450 first-year students majoring in Electrical Engineering at Shanghai University of Engineering Science. The number of questionnaires to be distributed was set at 230. The questionnaires will be distributed randomly using simple random sampling method and the students interviewed will be informed of the purpose of the survey and will complete a set of questionnaires independently using anonymity.

The second part of the qualitative study, after the quantitative, selected five student work administrators (counselors) and two people in charge of enrollment work in Electronic information majors at the Shanghai University of Engineering Science to conduct semi-structured interviews, and there is no clear requirement for determining the sample size of the qualitative study.

3.4 Research instrumentation

The research instrument for this study consisted of questionnaires and semi-structured interviews.

The first is a questionnaire about the factors influencing college students to choose Electronic information majors, which is divided into two parts: the first part is the collection of personal information of the respondents mainly related to the gender of the students, the location of the household, the literacy level of the parents, and the literacy level of the relatives and friends who often come into contact with the students. The second part of the questionnaire is the evaluation of the factors influencing the students' choice of the electrical field of study, which is based on a Likert scale with a 5-point scale from 1 (very unimportant) to 5 (very important). The questions of the questionnaire were designed to design questions from the following four perspectives: personal factors, family factors, major factors, and institutional factors.

Second, semi-structured interviews were used to survey five counselors and two admissions officers.

The interviews with the counselors were designed to fully explore the factors influencing students' choice of Electronic information majors, with the following preset questions:

Question 1: In your daily work and student contacts and observations, do the course structure and training program, the hotness of the major, and the form of employment in the major play a key role in students' choice of Electronic information majors? Could you please share some specific examples or situations to illustrate how these factors influence students to make this choice?

Question 2: What other factors do you think are important in influencing a student's choice of an electrical program?

Question 3: In what ways do you think universities and faculties can be further strengthened to better guide students to make appropriate major choices based on their own circumstances?"

The interviews with admissions staff were intended to gain a deeper understanding of the factors influencing students' choice of Electronic information majors and the development of and strategies for enrollment, with the following pre-determined questions:

Question 1: Based on your years of experience working in admissions and student inquiries, do you think the university's location, visibility, admissions outreach and strategy, and state policies have a significant impact on a student's choice of electrical program? Can you share some specific examples or trends to illustrate how these factors influence students in making their final decision?

Question 2: What other factors do you think are important in influencing a student's choice of an electrical program?

Question 3: How is enrollment working at this stage, and how do you think strategies need to be adapted in future enrollment efforts to better attract and guide aspiring electrical students as technology continues to evolve and the electrical field becomes more diverse since then?

3.5 Data collection

The purpose of this study was to investigate the first year students of Electronic information majors in Shanghai University of Engineering and Technology. Quantitative and qualitative data were collected using questionnaire and semi-structured interview methods. The data were collected in the first semester of the academic year 2024. The steps of data collection are as follows:

As a first step, the researcher wrote to first-year student counselors in the electrical program as well as the admissions staff requesting permission to collect data.

In the second step, the researcher distributed electronic questionnaires to the student group and answered students' questions within the student group until they completed the questionnaires.

In the third step, after collecting the completed questionnaires, the researcher interviewed the target person.

In the fourth step, the collected data were analyzed using a statistical analysis program to determine the answers to each research question.

In the fifth step, after the data collection and data analysis were completed, the researcher reflected and answered the research questions in the research report.

3.6 Data analysis

The first phase of this study will use the computer to analyze the frequency, mean, standard deviation, percentage, and variance of the mathematics. The second phase of the river analyzes the content of the semi-structured interviews.

Statistical data on participants' basic information was first reported as a percentage (%).

Next, a Likert scale was used to rate the factors influencing the participants in choosing an electrical program. The scale used in the questionnaire according to the criteria of Likert is as follows:

TABLE 2 Lickert Importance Score Table

Importance of influencing factors	Hierarchy
Very important	5
More important	4
Inconclusive	3
Comparatively unimportant	2
Very unimportant.	1

Again, the research question was addressed: what are the factors influencing students' choice of electrical programs? For this research question the data will be analyzed in terms of frequency, mean, standard deviation, percentage, and variance's to come up with the key influencing factors.

Finally, the semi-structured interviews were analyzed using content analysis techniques, and based on the results of the analysis as well as the findings of the study mentioned above, recommendations were made for guidance to universities, faculties and students.

CHAPTER IV

RESULTS OF THE STUDY

The first part covers respondents' basic information and the questionnaire introduction. The questionnaire consists of two parts: basic information and influencing factors. A total of 230 valid questionnaires were collected, presenting the characteristics of the sample distribution. Descriptive statistics (mean, standard deviation) and factor analysis were conducted on the questionnaire data, combined with semi-structured interview data from 5 counselors and 5 admissions staff, to analyze the influencing factors of major selection from multiple dimensions. The second part involves the reliability and validity analysis of the questionnaire. A pilot survey of 35 questionnaires (32 returned) showed a Cronbach's Alpha of 0.929, indicating good reliability; the KMO value was 0.839 and the Bartlett's test was significant ($p < 0.001$), indicating good structural validity. Factor analysis showed that all communalities were greater than 0.5, meeting the validity standard. The third part presents descriptive statistical analysis of the questionnaire results. Among the 12 influencing factors, professional factors (employment prospects, popularity, talent demand) had the highest means and were the main considerations; personal and institutional factors followed; family factors had lower means but higher standard deviations, indicating significant individual differences.

The fourth part is the factor analysis of the questionnaire results. The KMO value was 0.829 and Bartlett's test was significant, indicating suitability for factor analysis. Four factors with eigenvalues greater than 1 were extracted, with a cumulative variance explained of 82.799%, categorized as family, professional, institutional, and personal factors. The comprehensive score model showed that personal interest, ability, professional popularity, employment prospects, and institutional reputation had greater impacts; family factors had the greatest influence (0.489), followed by professional (0.237), institutional (0.166), and personal factors (0.108). The fifth part is the analysis of interview results. Feedback from counselors and admissions staff confirmed the questionnaire conclusions: professional popularity and employment prospects are

primary reasons, family influence is significant, some students make blind choices due to lack of information, schools need improvement in professional promotion and guidance, and family financial conditions also play a role. The sixth part is a summary of research findings: professional and family factors have significant influence, while institutional and personal factors have lesser impact; employment potential and family background are key, and student choices result from the combined effect of multiple factors, with some degree of blindness.

4.1 Collection of Respondents' Basic Information and Introduction to the Questionnaire

The questionnaire will be pre-administered before the formal distribution of the questionnaire, and the data results of the questionnaire will be analyzed for reliability and validity first. After the reliability of the questionnaire is good, the questionnaire is formally distributed for data collection. The questionnaire is divided into two parts: basic information and influencing factors. The first part is the basic information covering gender, household type, parents' education level, etc. The basic information of the respondents in the sample data of 230 questionnaires recovered is shown in Table 3.

TABLE 3 Basic Information Table of Respondents

Form	Frequency	Percentage
Gender between the sexes		
Male	122	53.04
Female	108	46.96
Type of household registration		
City or town account	142	61.74
Rural household registration	88	38.26
Father's education		
High school and below	50	21.74
College	66	28.7

TABLE 3 (continue)

Form	Frequency	Percentage
University undergraduate	69	30
Graduate and above	45	19.57
Mother's education		
High school and below	46	20
University college	78	33.91
University undergraduate course	72	31.3
Graduate students and above	34	14.78
Educational level of social circle		
High school and below	55	23.91
University college	67	29.13
University undergraduate course	63	27.39
Graduate students and above	45	19.57
Total	230	100

According to Table 3, a total of 230 participants in this study consisted of 122 males (53.04%) and 108 females (46.96%). Among the participants, 142 (61.74%) were from urban areas and 88 (38.26%) were from rural areas. The educational level of fathers among the participants was 50 (21.74%) in high school and below, 66 (28.70%) in college, 69 (30.00%) in undergraduate, and 45 (19.57%) in graduate school and above. The educational level of the participants' mothers was 46 (20.00%) in high school and below, 78 (33.91%) in junior college, 72 (31.30%) in undergraduate, and 34 (14.78%) in graduate and above. The literacy level of relatives and friends that the participants often contacted was 55 (23.91%) in high school and below, 67 (29.13%) in college specialties, 63 (27.39%) in undergraduate programs, and 45 (19.57%) in graduate programs and above. This basic information reflects the group characteristics of the interviewed students and provides a basis for subsequent analysis of the differences in the factors influencing the choice of majors among different groups.

The second part of the questionnaire is the influencing factors section which is designed with 12 questions from four dimensions: personal, family, major and institution, and is measured by using a 5-point Likert scale, which is used to collect data related to students' influencing factors of major choice, and the decision-making process of major choice. After that, descriptive statistical analysis and factor analysis were conducted to derive the results of the study. Descriptive statistical analysis mainly analyzes the mean and standard deviation of the scores of the influencing factors, and by analyzing the mean and standard deviation, the importance of the influencing factors can be initially derived. Next, the data will be analyzed using Factor Analysis, which is a commonly used data dimensionality reduction and variable simplification technique to simplify the structure of complex variables through data dimensionality reduction, thereby revealing potential correlations between variables and discovering deep structure. It further explains the importance of various influencing factors.

The qualitative study adopted the interview method, selecting five student counselors and five admissions staff to conduct semi-structured interviews. The outline of the interviews centered on the influencing factors of students' major choice, the problems of students in the process of major choice, and the school's measures in the guidance of major choice. Through in-depth exchanges with counselors and admissions staff, we gained a deeper understanding of their views on the influencing factors of students' major choice from different perspectives, which further enriched the research data and provided more comprehensive support for the research conclusions.

This study achieves innovative breakthroughs on multiple levels, demonstrating both unique academic value and practical significance. In terms of research scope, it innovatively focuses on the selection mechanisms of majors within the electronic information category, closely aligning with the specific characteristics of the discipline. Methodologically, it adopts a mixed-methods approach that combines quantitative questionnaires with qualitative interviews. Through multi-source data triangulation, the study not only quantifies the weights of influencing factors but also uncovers underlying motivations. Furthermore, factor analysis is employed to construct a comprehensive

scoring model, allowing for the quantification of dynamic weights across four dimensions. In terms of practical application, the study establishes an ecological guidance system featuring a three-way interaction among students, parents, and universities, providing targeted recommendations for each stakeholder group.

4.2 Analysis of the reliability of the questionnaire

Before the statistical analysis of the questionnaire-based survey research, through the pre-survey, this pre-survey issued 35 questionnaires, 32 were recovered for measuring the reliability and validity of the questionnaire, in order to study the reliability and accuracy of the influencing factors affecting the students' choice of majoring in electronic information. Reliability mainly measures the accuracy, stability and consistency of the table, that is, the size of the degree of variation caused by random errors in the measurement process, this paper adopts the internal consistency as a reliability index, internal consistency reliability refers to the consistency between all items within the questionnaire, usually using Cronbach's alpha coefficient. (DeVellis, 1991) the Cronbach's alpha coefficient is greater than 0.7 means that the questionnaire has good internal consistency. And in this questionnaire, the coefficient is much greater than 0.7, which the coefficient of this questionnaire is much larger than 0.7, indicating excellent internal consistency. (Guo, 2018)

TABLE 4 Reliability statistics scale

Reliability statistics	
Cronbach's Alpha	Term number
0.929	12

According to Table 5, the KMO value was 0.839 and Bartlett's Test was significant ($p < 0.001$), According to Kaiser , (Kaiser, 1974)a KMO value greater than 0.5 is suitable for factor analysis, and this questionnaire's KMO value reaches 0.839, which indicates that the questionnaire has good structural validity and is able to reliably

and accurately measure the factors influencing students' choice of major. (Yu & Du, 2017)

TABLE 5 KMO and bartlett's test scale

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.839
	Approx. Chi-Square	213.477
Bartlett's Test of Sphericity	df	66
	Sig.	0.000

Finally, the results of the factor analysis are shown in Table 6, and all communalities were above 0.5, indicating good construct validity, indicating that the validity of the questionnaire is good.

TABLE 6 Scale of variance of the common factor

Communalities		
	Initial	Extraction
Personal interest	1	0.659
Personal abilities	1	0.522
Economic situation of the family	1	0.756
Parental wishes	1	0.655
Influence of parents' occupation	1	0.66
Educational level of parents	1	0.754
Employment forms of the major of electronic information	1	0.603
The popularity of the major in electronic information	1	0.849
Talent demand	1	0.482
University popularity	1	0.679
Location of the University	1	0.691
All the expenses during university years	1	0.55

4.3 Descriptive statistical analysis of questionnaire results

Investigation on the Influence Factors of Students' Selection of Electronic Information Major In order to investigate the influence factors of students' selection of electronic information major, this paper sets 12 indicators (personal interest, personal ability, family's economic situation, parents' willingness, parents' occupational influence, parents' education level, employment form of the major, popularity of the major, demand for talents, popularity of the university and the ranking of the university, tuition fees and living and other expenses of the university, and the geographical location of the university), (tuition fees and living expenses, geographical location of the university).

In the first part of the analysis, two statistical methods were used to present the data: mean score and standard deviation. In this way, we were able to get a clear picture of the average level of performance of each factor as well as their range of fluctuation. Specifically, we calculated the mean for each factor, which is the sum of all data points divided by the number of data points, which reflects the central tendency of the factor. Also, we calculated the standard deviation, which measures the dispersion of the data points relative to the mean and thus provides information about the consistency of the data. Detailed information on the mean scores and standard deviations for all of these factors can be found in the accompanying Figure 5, which details the specific values for each of the factors, allowing the reader to visually compare the differences between the different factors.

As can be seen from Figure 5, in the major factors in the major employment form ($\bar{x} = 4.02$) major heat ($\bar{x} = 3.97$) talent demand ($\bar{x} = 3.91$) major factors of the mean value are relatively high, major factors become the students choose electronic information major is the main consideration of the direction of the major, in the personal factors in the personal interest ($\bar{x} = 3.58$), personal ability ($\bar{x} = 3.61$), the university's popularity and the university's rankings ($\bar{x} = 3.76$) the university's geographic location ($\bar{x} = 3.70$) the university's tuition fees and living expenses such as ($\bar{x} = 3.68$), the personal factors and university factors follow. The mean values of personal and university factors follow closely, with personal interest and ability as core drivers, and

university popularity and location as important reference indicators. In contrast, the mean values of family factors such as family's economic situation ($\bar{x} = 3.25$) parents' willingness ($\bar{x} = 3.47$) parents' occupational influence ($\bar{x} = 3.29$) parents' education level ($\bar{x} = 3.33$) family factors are relatively low, and the overall influence is weak, but the standard deviation (1.128, 1.330, 1.210, 1.205) is relatively large, and the individual differences are obvious.

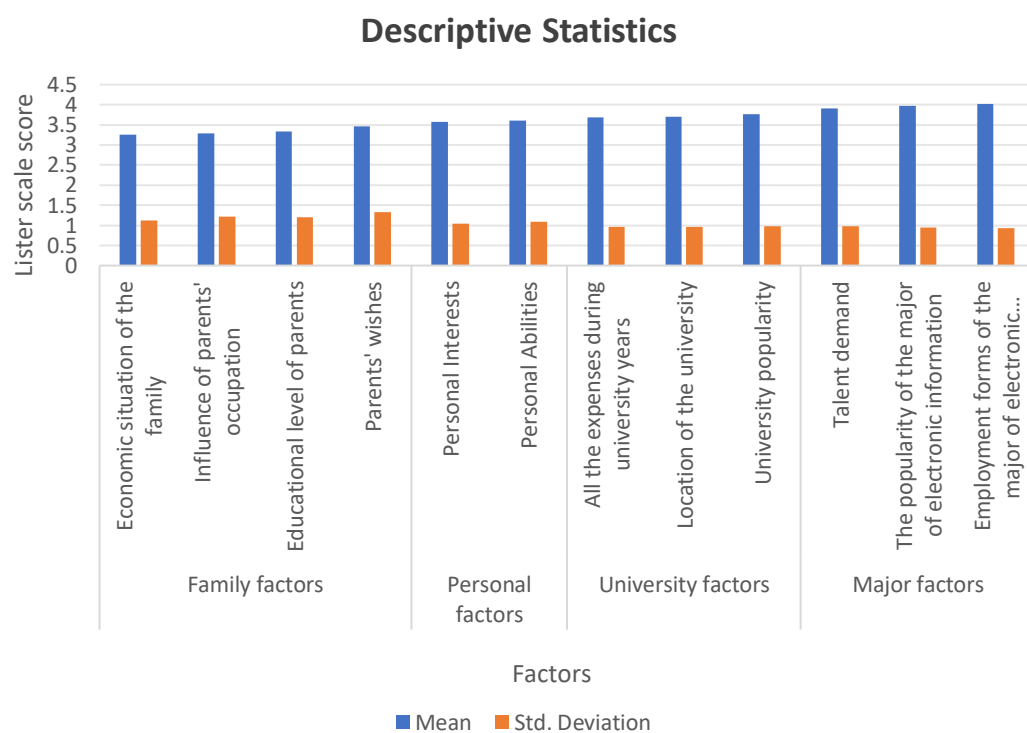


FIGURE 5 Score of influencing factors

4.4 Factor analysis of questionnaire results

The second part of the study is factor analysis, to use factor analysis, you need to test the data first KMO and Bartlett, KMO test (Kaiser-Meyer-Olkin Test) can determine whether the correlation between the variables is strong enough, usually requires $KMO > 0.6$ (the higher the value, the better the factor analysis), Bartlett's Test of Sphericity (Bartlett's Test of Sphericity) to test whether the correlation coefficient matrix is a unit matrix (i.e., whether the variables are independent). Bartlett's Test of Sphericity

(Bartlett's Test of Sphericity) tests whether the matrix of correlation coefficients is a unit matrix (i.e., whether the variables are independent of each other) If the p-value is < 0.05 , the original hypothesis is rejected, which indicates that there is a significant correlation between the variables, and that it is suitable for factor analysis.

As can be seen in Table 7, the observed value of the test statistic is 1819.813, with a significance of 0. Since the P-value is less than 0.05 and since the KMO-Value is 0.829, the original variables can be analyzed using factor analysis according to the KMO metric.

TABLE 7 KMO and bartlett's test scale

KMO and Bartlett's Test		
Kaiser-Meyer-Olk in Measure of Sampling Adequacy.		0.829
Bartlett's Test of Sphericity	Approx. Chi-Square	1819.813
	df	66
	Sig.	0.000

In order to study the degree of influence of each factor on college students' choice of major, thus the many factors are categorized and summarized for the next comprehensive analysis.

According to Figure 6, the scree plot displays the eigenvalues associated with each principal component. It is evident that the first four components have eigenvalues greater than 1, specifically 4.855, 2.358, 1.652, and 1.071. This indicates that these four components each explain more variance than a single observed variable, which meets the Kaiser criterion (eigenvalue > 1) for factor retention. After the fourth component, the eigenvalues drop sharply and remain below 1, suggesting that the remaining components contribute minimally to explaining the variance in the data. Therefore, retaining only the first four components is both statistically justified and practical for

further factor analysis. These four factors together capture the majority of the variance in the original dataset and help reduce dimensionality without significant information loss. This decision is further supported by the “elbow” observed in the scree plot between the fourth and fifth components, where the curve flattens, indicating diminishing returns for including additional components.

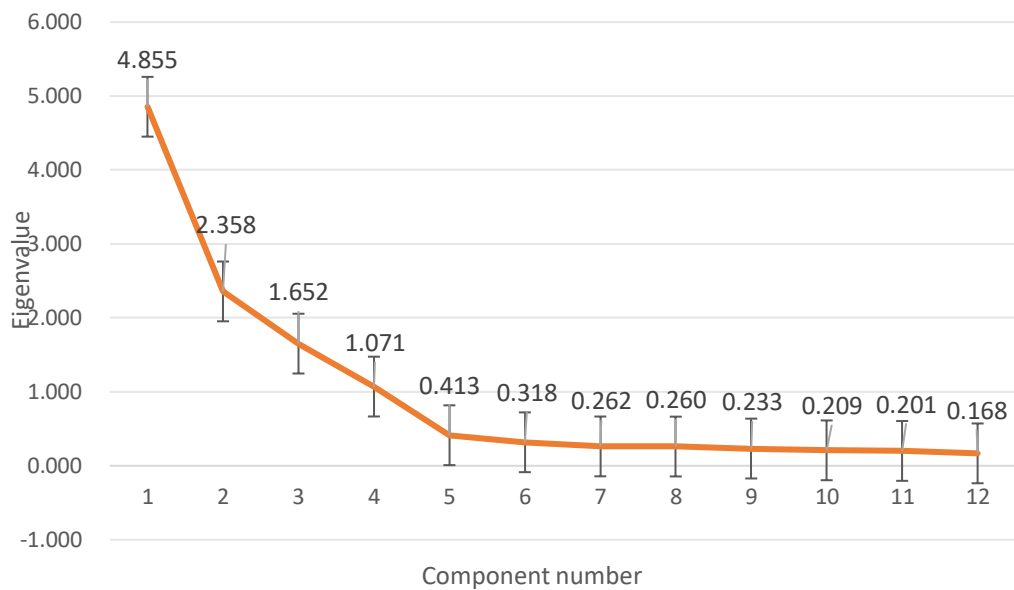


FIGURE 6 Eigenvalues of factors

In Table 8, it can be seen that the first 4 characteristic roots have larger values of 4.855, 2.358, 1.652, 1.071 respectively, and the later characteristic roots are smaller, meanwhile, in the total variance explained table, it can be seen that the first 4 factors variance explained rate reached 82.799%, so 4 factors are extracted.

TABLE 8 Total variance explained scale

Total Variance Explained			
Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.855	40.461	40.461

TABLE 8 (continue)

Total Variance Explained			
Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
2	2.358	19.652	60.113
3	1.652	13.763	73.876
4	1.071	8.923	82.799
5	0.413	3.443	86.242
6	0.318	2.653	88.894
7	0.262	2.181	91.075
8	0.26	2.167	93.242
9	0.233	1.939	95.181
10	0.209	1.743	96.924
11	0.201	1.672	98.596
12	0.168	1.404	100

After analyzing the rotated component matrix in Table 9, it can be seen that the first factor has a higher degree of explanation for the four indicators of family's economic situation (0.901), parents' willingness (0.882), parents' major influence (0.909) and parents' education (0.879), which all belong to the family factors, and therefore can be summarized as "family factor"; the second factor has a higher degree of explanation for the three indicators of major employment form (0.873), major popularity (0.881) and talent demand (0.893). "The second factor has a high degree of explanation for the three indicators of the employment form of majors (0.873), the heat of majors (0.881) and the demand for talents (0.893), which all belong to the major factor, and therefore can be summarized as the "major factor" and denoted as F2. The third factor has a higher degree of explanation for the three indicators of university popularity and ranking (0.839), geographical location of the university (0.872), and the cost of the university

(0.820), which are all university factors, and can therefore be categorized as the “University Factor” and denoted as F3; the fourth factor is the “Personal Interest” (0.902), which is a factor of personal interest. The fourth factor has a high degree of explanation for personal interest (0.902) and personal ability (0.883), both of which are personal factors, and can therefore be categorized as the “personal factor”, denoted as F4.

TABLE 9 Rotated component matrix

Rotated Component Matrix	Component			
	1	2	3	4
S1. Personal interest	0.107	0.141	0.197	0.902
S2. Individual abilities	0.122	0.093	0.268	0.883
S3. Economic situation of the family	0.901	0.108	0.082	0.069
S4. Parental wishes	0.882	0.144	0.106	0.036
S5. Influence of parents' occupation	0.909	0.121	0.082	0.108
S6. Parents' level of education	0.897	0.077	0.09	0.1
S7. The popularity of the major in electronic information	0.107	0.873	0.166	0.161
S8. Employment forms of the major of electronic information	0.206	0.881	0.19	0.057
S9. Talent demand	0.087	0.893	0.119	0.061
S10. University popularity	0.142	0.211	0.839	0.169
S11. Location of the University	0.084	0.142	0.872	0.158
S12. All the expenses during university years	0.081	0.121	0.82	0.186

In order to understand the degree to which each influencing factor is influenced by the principal components of the pairs of factors, the factor score coefficients are selected here, and according to Table 9 we can derive a comprehensive score model integrated with the expressions of each factor, we can also deduce:

$$F=0.415 \times S1 + 0.411 \times S2 + 0.197 \times S3 + 0.193 \times S4 + 0.216 \times S5 + 0.202 \times S6 + 0.284 \times S7 + 0.266 \times S8 + 0.240 \times S9 + 0.256 \times S10 + 0.234 \times S11 + 0.233 \times S12$$

According to Equation , it can be seen that: all twelve influence indicators are positively correlated to the influence of major selection, in which the factor scores of the five indicators of personal interest (0.415), personal ability (0.411), major heat (0.266), the Employment forms of the major of electronic information (0.284) and the popularity of the university and the university rankings (0.256) are higher, which indicates that these five factors have a greater influence on the students' choice of the Electronic Information major is more influential.

TABLE 10 Component score coefficient matrix

Component Score Coefficient Matrix	Component			
	1	2	3	4
S1. Personal interest	-0.039	-0.02	-0.134	0.608
S2. Individual abilities	-0.032	-0.054	-0.081	0.578
S3. Family financial situation	0.289	-0.037	-0.025	-0.03
S4. Parental wishes	0.281	-0.019	-0.007	-0.062
S5. Parents' occupation	0.289	-0.034	-0.037	-0.002
S6. Parents' level of education	0.288	-0.055	-0.024	-0.007
S7. The popularity of the major in electronic information	-0.054	0.389	-0.073	0.022
S8. Employment forms of the major of electronic information	-0.015	0.388	-0.038	-0.069

Table 10 (continue)

Component Score Coefficient Matrix	Component			
	1	2	3	4
S9. Talent demand	-0.054	0.413	-0.077	-0.042
S10. University popularity	-0.018	-0.038	0.416	-0.104
S11. Location of the University	-0.032	-0.072	0.452	-0.114
S12. All the expenses during university years	-0.031	-0.075	0.417	-0.078

Based on the four factors already summarized in Table 8 above, the combined influence factor model can be calculated by dividing the variance contribution of each common factor by the cumulative variance contribution of the common factors, and multiplying by the scores of each common factor separately, which can be obtained from

$$F = 0.489F_1 + 0.237F_2 + 0.166F_3 + 0.108F_4$$

According to Equation , it can be concluded that the "family factor" has the greatest influence on students' choice of major, with a correlation degree of 0.489, and the education level and occupation type of parents have an important influence on students' choice of major. For example, students whose parents are engaged in electronic information-related industries are more likely to be influenced by family factors when choosing their majors. (Oecd, 2019b) "Specialization factor" has a greater influence, with a correlation degree of 0.237, and the employment form, heat and talent demand of specialties are the focus of students' attention.

In the current background of the rapid development of the electronic information industry, students pay more attention to the trend of major talent demand, salary level and employment prospects, with the innovation of science and technology,

the market demand for high-skilled personnel in the electronic information class continues to rise, which provides a strong support for the explanation of the career prospects of the students when they choose to specialize in the major category of electronic information factors. "University Factor" The influence is relatively small, with a correlation degree of 0.166, and university popularity and geographic location are the main influencing factors. The influence of the university, such as the level of scientific research, faculty strength, international cooperation, etc., is closely related to the construction of the university's visibility in the field of electronic information specialization, which provides an international perspective and a macro background for analyzing the influence of the university factor on students' choice of major in electronic information.

Meanwhile, Shanghai, as an international metropolis, its superior geographic location and rich resources attract many students to enroll in the electronic information major of Shanghai University of Engineering Science. The "personal factor" has the smallest influence, with a correlation degree of 0.108, and personal interest and ability also play a role in major selection. Further analysis reveals that the factor scores of the five indicators, namely, personal interest, personal ability, popularity of the major, Employment forms of the major of electronic information and the university popularity, are higher and have a greater impact on students' choice of the major.

4.5 Analysis of interview results

This interview focuses on electronic information-related majors and was conducted with 5 counselors and 5 admission staff members to explore in depth the factors influencing students' choice of these majors. The specific content is as follows:
Characteristics of the Majors Themselves and Employment Prospects

Practicality of the Majors and Curriculum Design: These majors emphasize practical content such as circuit analysis, control systems, and engineering practice, with curricula featuring strong logic and technicality. The advantage of "broad employment scope and practical skills" has attracted many students. Meanwhile,

students are generally sensitive to future career directions. These majors offer high chances of employment in State Grid Corporation of China, design institutes, and manufacturing enterprises, thus being regarded as a "stable choice".

Disciplinary Development Trends: The interdisciplinary development trend has attracted some students with an interest in science and engineering backgrounds. In addition, the national support policies for emerging engineering disciplines have significantly increased the popularity of electronic information-related majors. Policy guidance not only influences students' choices but also has prompted many provincial key middle schools to take the initiative to contact universities for professional lectures.

Promotion and Information Acquisition: The high employment rate displayed in university prospectuses, short-video promotions and live consultation sessions during the admission season, as well as admission promotional videos, all directly affect the application rate of students. Data shows that the view rate of admission promotional videos is positively correlated with the number of applications for these majors. However, the uneven distribution of educational resources across regions leads some candidates to make choices without a clear understanding of the majors.

Scores and Major Adjustment: The match between college entrance examination scores and major requirements is one of the reasons for many students' passive choice. Some students enter these majors due to "accepting major adjustment". At the same time, the trend of the university's annual admission score line also affects students' judgment.

Personal and Family Factors
Personal Interests and Abilities: Electronic information-related majors are suitable for students with systematic thinking and an interest in science and engineering. Students who have an interest in science and engineering backgrounds are easily attracted to these majors.
Influence of Family and Peers: Family background and parents' opinions play a crucial role. The more anxious parents are, the higher their requirements for the stability of the major. Many parents strongly recommend their children to apply for these majors because they believe the

majors offer stable employment. In addition, the influence of peers cannot be ignored; many students refer to their classmates' opinions when filling out college applications.

Counselors stated that in their daily work, they have found that the popularity of the majors and employment prospects are the main reasons for students to choose electronic information majors. Some students are influenced by their families and social circles when selecting majors, among which parents' opinions often play a key role in the decision-making process. Although some students can choose majors based on their own abilities and interests, there are also some students who make blind choices due to insufficient understanding of different majors. Students from families with poor economic conditions tend to prefer majors with better employment prospects and higher expected salaries.

4.6 Summary of Research Findings

This study conducted an in-depth analysis of the factors influencing students' choice of the electronic information major through questionnaires and semi-structured interviews. The questionnaire results indicated that professional factors and family factors had relatively significant impacts, with family influence being particularly prominent, while university and personal factors had comparatively less influence. The interview findings further confirmed that the popularity of the major and employment prospects were the primary driving forces behind students' decisions, and family influence remained a significant factor. Some students also demonstrated a certain degree of blindness in their choices. Furthermore, family financial conditions affected students' decisions to some extent.

Overall, students' choice of major is the result of multiple interacting factors, including personal interests, career prospects, university conditions, and family background. Among these, employment potential and family background are especially critical.

CHAPTER V

DISCUSSION AND CONCLUSION

The first part is the research discussion. This study finds that when students choose majors within the electronic information category, family factors (such as parents' educational background, occupation, and economic status) and major-related factors (such as employment prospects and industry popularity) play a key role. This conclusion is consistent with existing domestic and international research. For example, Li et al. pointed out that parental expectations significantly influence students' choices; Shao et al. found that students from high-income families tend to prefer majors with higher social recognition; Liu Feng emphasized that information-related majors are more favored due to higher salaries and stable career prospects.

The second part is the research summary. Students' major choices are the result of multiple intertwined factors, with family support and major attractiveness at the core. In addition, the study reveals problems such as students' limited understanding of majors and biased guidance from families. Therefore, a guidance system jointly involving students, parents, and universities should be established to enhance the scientific basis of decision-making.

The third part is recommendations. At the student level, they should clarify their interests and abilities, make use of career assessment tools, pay attention to industry trends, and gain practical experience. At the family level, parents should understand their children's characteristics, provide support rather than impose choices, balance employment prospects with personal development, and promote rational decision-making. At the university level, institutions should strengthen education on

major awareness, carry out practical activities, introduce a “dual-mentor system,” and establish student growth records and exemplary case databases.

The fourth part is research limitations and prospects. This study only uses first-year students from Shanghai University of Engineering Science as the sample, which is relatively narrow in scope and has limited generalizability. Future research should expand the sample to students from different regions and universities, broaden the range of majors studied, and conduct longitudinal tracking to explore the long-term relationship between motivation and development paths, thereby enriching the research framework and practical guidance for major selection.

5.1 Research Discussion

This study finds that in the process of students selecting majors within the electronic information category, family factors and major-related factors have significant influence. In particular, parents' educational level, occupational background, and economic status play an important role in students' decision-making. This conclusion is highly consistent with the findings of several recent studies.

Firstly, regarding family factors, Li et al., based on a large national sample, pointed out that parents' educational expectations and involvement significantly impact students' academic choices and performance, especially among special groups such as “left-behind children” in China . (Li et al., 2024) Their study also found that family background influences students' educational paths through resource support, professional role modeling, and the accumulation of implicit cultural capital. Similarly, Shao et al., in a survey of students from eastern China, found that students from high-income families or major cities are more inclined to choose majors with better

employment prospects or higher social recognition such as finance, computer science, and information engineering which aligns with the current study's finding that students tend to prefer high-paying and employment-oriented majors in the electronic information field. (Shao et al., 2023)

Secondly, in terms of major-related factors, students place great emphasis on employment prospects, industry popularity, and talent demand when choosing a major. This aligns with the Education at a Glance report released by the OECD which noted that rapid technological iteration has intensified students' reliance on "practical" and "market-oriented" majors, with STEM (science, technology, engineering, mathematics) fields being particularly favored. (Oecd, 2019a)

In addition, Liu Feng, through interviews with graduates from a science and engineering university in eastern China, pointed out that information related majors are often students' top choice due to stable industry development and high salary returns especially among students under greater financial pressure or those lacking access to quality educational resources. (Liu, 2022)

In conclusion, the empirical findings of this study are largely consistent with existing domestic and international research, further confirming the central role of family background and professional prospects in students' major selection decisions. This finding also provides more targeted empirical support for the development of university admission policies and career guidance practices.

5.2 Summary of the study

Based on the above findings, students' choice of major is influenced by a combination of factors, with family and professional considerations playing key roles in

the decision-making process. At the same time, issues such as students' limited awareness and biased guidance from families have also been revealed. To optimize the major selection mechanism within the electronic information category and support students in planning their academic and career paths more scientifically, it is essential to establish a collaborative guidance system involving multiple stakeholders. As the core participants in the major selection process, students, parents, and universities each bear distinct responsibilities and functions. Therefore, it is necessary to propose targeted and practical guidance strategies from the perspectives of students, parents, and universities. This approach aims to fully leverage the strengths of each party, effectively address existing issues, and achieve a positive alignment among major selection, talent cultivation, and industry needs.

5.3 Recommendations for guidance

5.3.1 Student level

Students should thoroughly assess their personal interests and strengths and critically evaluate whether they are suitable for the electronic information major, considering the major's requirements in mathematics, physics, and programming. If necessary, they may use career assessment tools, such as the Holland Occupational Interest Test, to better understand their own interests and aptitudes. (Li et al., 2019)

They should also stay informed about industry trends and employment prospects, learning about the popular areas, competition, and academic requirements within the electronic information field through industry lectures and internships, in order to plan their academic and career paths in advance.

In addition, it is important to focus on practical experience and skill development. While learning core theoretical knowledge, students should also actively acquire programming skills in languages such as Python and C++, and participate in electronic design competitions, innovation and entrepreneurship projects, and other practical activities to enhance their professional competencies.

5.3.2 Family level

Parents should develop a thorough understanding of their children's interests and strengths through daily communication and offer reasonable advice on major selection. It is important to avoid imposing their own preferences and instead respect their children's choices. (Holland, 2016)

Parents can help their children gain a comprehensive understanding of the electronic information major by reviewing relevant information and consulting with professionals, to clarify the nature of the major, its curriculum, and career prospects. In addition, when assisting their children in choosing a major, parents should balance economic considerations with the child's individual development. Research indicates that if parents plan their child's academic path solely based on job prospects or short-term returns, it may undermine the child's initiative and even lead to choices that go against their interests. (Ezeani et al., 2023)

Therefore, parents should work with their children to develop a long-term academic plan, clarify the feasibility of various educational expenses, and at the same time encourage rational decision-making based on personal interests and abilities. This approach helps children avoid blindly following popular majors and fosters adaptability and independent decision-making skills.

5.3.3 University level

Universities should strengthen professional awareness education by offering introductory courses on various fields and inviting industry experts and successful alumni to deliver lectures. This can help students develop an early understanding of emerging technologies and trends in the field of electronic information. Practical activities such as lab visits and enterprise tours should be organized to deepen students' understanding of professional applications.

An entrance assessment system should be implemented to evaluate students' foundational knowledge in mathematics, physics, and other key areas, as well as their overall competencies, thereby enabling personalized major guidance. The curriculum design for the electronic information field should emphasize the systematic cultivation of technical skills, integrating theoretical knowledge with hands on practice

by constructing task-based models and building a technically oriented curriculum system.(Niu, 2016)

Additionally, a comprehensive guidance framework should be established, including a dual-mentor system with both academic and industry mentors to support students in academic research and career planning. A student growth portfolio should be developed to document learning progress and practical achievements. Showcasing successful alumni case studies can also inspire students, improve the alignment between students and their chosen majors, enhance learning motivation, increase employment quality and postgraduate enrollment rates, and strengthen the institution's professional brand.

5.4 Research limitations and outlook

This study focused solely on first-year students at Shanghai University of Engineering Science, limiting the scope and generalizability of the findings. In future research, the sample size could be expanded to include students from different regions and institutions, allowing for comparative analysis across groups to obtain more representative results.

Additionally, future studies could explore a wider range of majors to provide a broader reference framework for major selection and university admissions. Longitudinal studies could also be employed to track students with different motivations for choosing the same major, in order to further investigate how initial motivations influence academic and career development. Such research would offer more targeted recommendations for university major education and talent cultivation.

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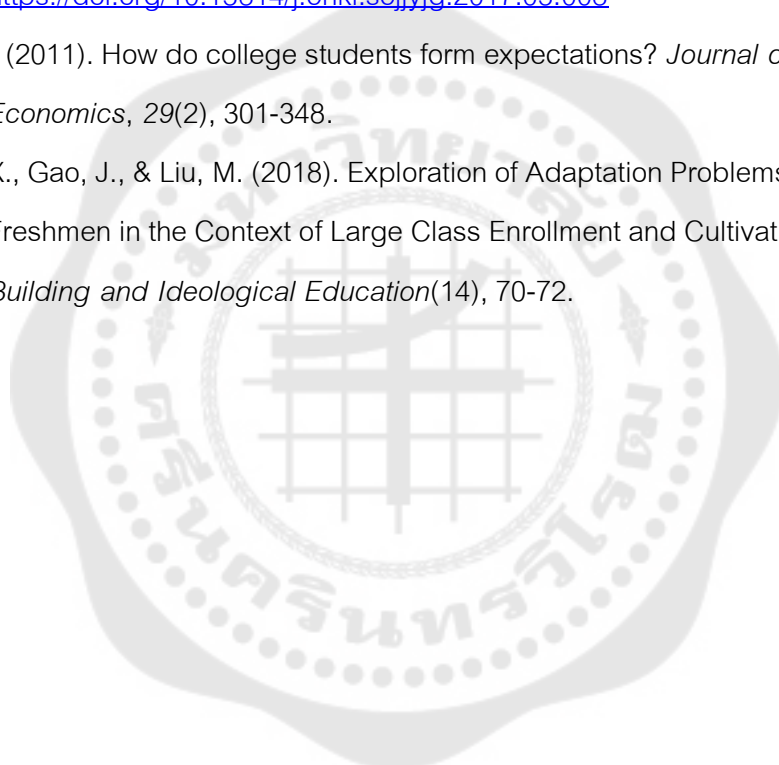
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Appendix I: Interview Record One

Interview 1: The following three questions were asked in the face-to-face counselor interview:

Question 1: In your daily work and student contacts and observations, do the course structure and training program, the hotness of the major, and the form of employment in the major play a key role in students' choice of Electronic information majors? Could you please share some specific examples or situations to illustrate how these factors influence students to make this choice?

Question 2: What other factors do you think are important in influencing a student's choice of an electrical program?

Question 3: In what ways do you think universities and faculties can be further strengthened to better guide students to make appropriate major choices based on their own circumstances?"

Interview 2: The interview with the face-to-face admissions staff had the following three questions:

Question 1: Based on your years of experience working in admissions and student inquiries, do you think the university's location, visibility, admissions outreach and strategy, and state policies have a significant impact on a student's choice of electrical program? Can you share some specific examples or trends to illustrate how these factors influence students in making their final decision?

Question 2: What other factors do you think are important in influencing a student's choice of an electrical program?

Question 3: How is enrollment working at this stage, and how do you think strategies need to be adapted in future enrollment efforts to better attract and guide aspiring electrical students as technology continues to evolve and the electrical field becomes more diverse since then?

Appendix II: Questionnaire

1、 Your gender [Single choice question] [Mandatory]

Man

Woman

2、 Your place of domicile [Single choice question] [Mandatory]

Rural

Town

3. Father's level of education [multiple choice] [mandatory]

High university and below

University College

Bachelor's Degree

Graduate students and above

4. Educational level of the mother [Single choice] [Mandatory]

High university and below

University College

Bachelor's Degree

Graduate students and above

5. Literacy level of relatives and friends who are in regular contact with them [Single-choice questions] [Mandatory]

High university and below

University College

Bachelor's Degree

Graduate students and above

6. The following is about the following is about the choice of electrical major factors affecting some of the indicators, according to your actual situation to choose the most compatible items: 1 - 5 that is very unimportant - very important

Factors influencing the choice of an electrical program	Importance level and corresponding score				
	1 point	2 points	3 points	4 points	5 points
Personal interest					
Personal abilities					
Economic situation of the family					
Parental wishes					
Influence of parents' occupation					
Educational level of parents					
Employment forms of the major of electronic information					
The popularity of the major in electronic information					
Talent demand					
University popularity					
Location of the University					
All the expenses during university years					

Appendix III : Interview Record One

Interviewee 1: the person in charge of admission

Interview question 1: At present, major enrollment is implemented. What is the enrollment status? Can you give a brief introduction

Answer: In 2021, we will start to implement major enrollment, which includes five majors. Among them, the intelligent major will be opened in 2020 and will start to enroll students in 2021. In recent years, our enrollment has fluctuated, and the number of students has decreased slightly compared with the enrollment of majors before major enrollment.

Question 2: What difficulties and obstacles have you encountered in the recruitment work? Can you give me some examples?

Answer: The first problem we often encounter is that many students still follow the wishes of their parents when applying for enrollment, instead of choosing according to their own interests and future plans. I have heard that students are very interested in their major at the school publicity conference, but their parents have consulted other majors, and in the end, students have to obey their parents' arrangement.

Second, at present, students and parents pay too much attention to the employment situation and ignore whether the children are good at the corresponding subjects. When collecting registration information, we often see students with low scores in mathematics and physics apply for the major, and these students will have difficulty in their studies when we enroll them.

The third problem, which is common in some western regions where economic development is relatively backward, is the tuition fee. Especially in the past two years, the tuition fee of my major has increased. Even though the school has corresponding subsidy policy and scholarship system, many families do not choose my major because of the tuition fee in the western region.

Interviewee 2: Professor of the university

Question 1: Hello professor, what is the current teaching status of major enrollment? Can you analyze it?

Answer: After the implementation of major enrollment, students learn general courses in the first year, and choose their majors in the second year according to their own wishes and results. In this way, students' enthusiasm for learning is much higher than before, and their comprehensive scores have improved. But there are still more than one fifth of the underachievers.

Question 2: What are the main reasons that lead to the learning difficulties of the underachievers?

Answer: I think the biggest problem among underachiever is the low interest in learning. In the communication with these underachiever, I find that most of them do not want to choose electronic information majors subjectively, but are required by their parents to come here, so they are not interested in the content of the courses after school, resulting in the slack mood for learning and become underachiever.

Question 3: Most of the students are required to apply for electronic information majors by their parents. What are the main aspects that parents value?

Answer: Parents mainly focus on the current electronic information major in the social talent gap is relatively large, the employment situation will be better after graduation, the employment is also relatively wide. Of course, parents are also more recognized our engineering large electronic information major graduates employment rate.

Interviewee 3: Student counselor

Question 1: Hello teacher counselor, the psychological problems of college students are a hot topic in the society at present, and your usual work will also involve the psychological problems of students. Are there any psychological problems for students in the electronic information category?

Answer: At present, students are more worried about two points. The first is the study in school, which is related to their professional segmentation in the sophomore year, and also closely related to college graduation requirements and future studies. However, some students have no interest or motivation in their studies. The second is that students feel more confused. Confusion mainly comes from the unknown for the future. They worry that when they graduate from college in four years, they will enter the society, whether their major will still be in demand in the society, whether they will use what they have learned after graduation, and whether the development prospect of our major will take a sharp turn for the worse.

Question 2: What are the main reasons why students are not interested in study? Can you analyze them?

Answer: In the communication with the students, I found that the students' feedback is at most two, one is that the high school study pressure is too big, and they want to self-decompress after going to university, leading to excessive lax attitude towards learning. Second, they are not satisfied with their major, the main reason for dissatisfaction is their lack of understanding of the major, the professional expectations after admission failed to meet their own ideas, and some students do not have their own ideas, are the parents, leading to their lack of interest in learning and learning motivation.

Appendix IV : Interview Record Two

Part One of the Interview: Counselor Interview Record (Total: 5 Participants)

Interviewee 1: Counselor A

Counselor A pointed out that the practicality of the curriculum and the clarity of the training program have a significant influence on students' decision-making. For example, the Electronic Information major emphasizes circuit analysis, control systems, and engineering practice. Many students are attracted by descriptions such as "broad employment prospects and practical skills" when filling out their college applications after the national college entrance examination.

He specifically mentioned that family background and parental opinions also play a key role. "Some parents believe that the Electronic Information major offers stable job prospects, so they strongly encourage their children to choose it," he said.

Counselor A believes that the university could enhance "introductory education to the major during the freshman orientation stage." He suggested that through thematic lectures and experience-sharing sessions by senior students, freshmen could gain a better understanding of the major's content and development pathways.

Interviewee 2: Counselor B

He stated that the popularity of the major and employment prospects do play an important role. Some students chose the Electronic Information major based on the "high employment rate presented in university brochures." "Matching their Gaokao (college entrance exam) scores is one of the reasons why many students passively choose this major," and some were assigned to the Electronic Information major due to "adjustment preferences." He suggested that departments could offer "career planning courses" tailored to the characteristics of each major to provide personalized guidance.

Interviewee 3: Counselor C

He emphasized that students are "generally sensitive to future employment prospects," and the Electronic Information major is seen as a "safe choice" because it offers "higher chances of entering organizations like the State Grid, design institutes, and manufacturing enterprises."

“The trend of interdisciplinary development has also attracted some students with an interest and background in science and engineering,” he added.

He recommended increasing “opportunities for industry practice and company visits” to help students develop a more realistic understanding of future careers.

Interviewee 4: Counselor D

“Many students are unclear about the course content before choosing a major,” she said, adding that the curriculum information provided by the university is still “not intuitive enough.”

“Peer influence should not be underestimated—many students refer to their classmates’ opinions when filling out their applications,” she noted.

She suggested offering a more visualized course experience “through AI simulations or virtual laboratories.”

Interviewee 5: Counselor E

“The Electronic Information major has strong logical and technical characteristics, making it suitable for students with systematic thinking,” she said. She believes that this feature should be “further emphasized” in admissions promotion.

She also pointed out that “academic pressure” can affect students’ later interest in and commitment to the major.

She recommended that departments “increase opportunities for inter-major transfers” to enhance students’ flexibility and satisfaction in choosing their academic paths.

Part Two of the Interview: Admissions Staff Interview Record (Total: 5 Participants)

Interviewee 1: Staff Member A

Staff Member A pointed out that “the university’s location in Shanghai makes it quite attractive to applicants, especially those from central and western regions of China.” He also mentioned that “national policies supporting emerging engineering disciplines have increased the popularity of the Electronic Information major.”

“The appeal of the major’s name and the language used in promotional materials are also key,” he said. For example, a combined major like “Artificial Intelligence + Electronic Information Engineering” is more likely to attract high-scoring applicants. He suggested that future recruitment strategies should “enhance promotional efforts in collaboration with enterprises to showcase realistic employment prospects.”

Interviewee 2: Staff Member B

She stated that “reputation determines the first impression, especially for students from non-key cities, where it has a significant influence.” For example, some students applied because they “heard that the university’s Electronic Information Engineering program collaborates with the State Grid.”

She emphasized that “short video promotions and live consultation during the admissions season are becoming increasingly important and can directly impact application rates.”

She recommended that the university develop a “personalized college application recommendation system” to provide precise guidance based on students’ interests, abilities, and market trends.

Interviewee 3: Staff Member C

“After the introduction of the national Emerging Engineering Education policy, many key provincial high schools actively contacted us to give admissions presentations,” she noted, emphasizing that policy orientation has a strong impact on admissions.

“The greater the parents’ anxiety, the stronger their demand for major stability—this is one reason the Electronic Information major has become popular,” she explained.

She recommended that the focus of admissions promotion should shift “from information delivery to experience-based guidance.”

Interviewee 4: Staff Member D

Staff Member D believes that geographic location is closely tied to the job market. The university is located in Shanghai, and “the well-developed surrounding industrial chain is one of the core factors attracting applicants.”

“The trend in the university’s admission cutoff scores over the years also influences students’ decision-making,” he added.

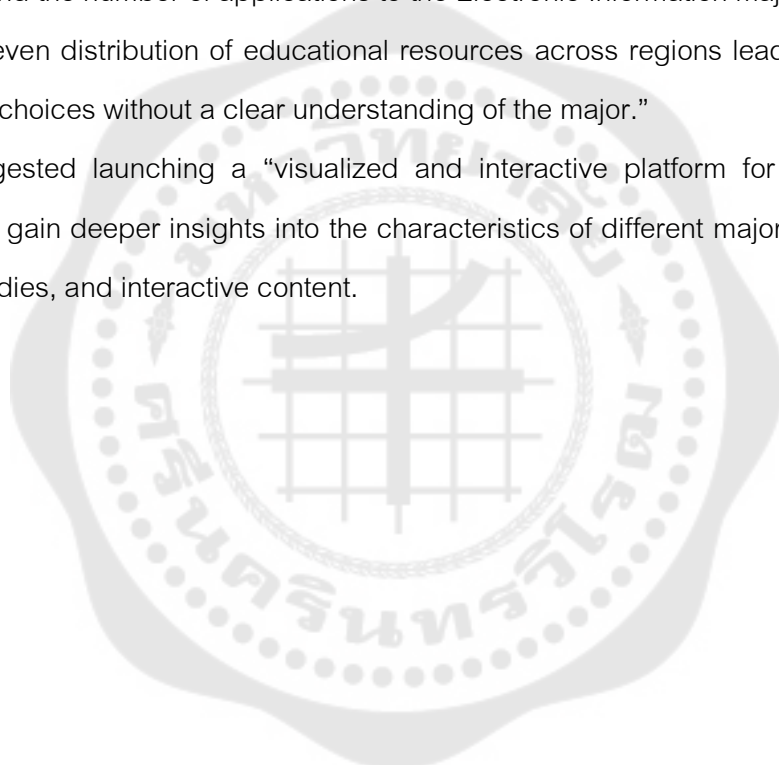
He suggested that in the future, the university should “use AI to predict major development and career paths,” leveraging technology to improve the alignment between recruitment and student goals.

Interviewee 5: Staff Member E

“Data analysis shows a positive correlation between the view count of promotional videos and the number of applications to the Electronic Information major,” he noted.

“The uneven distribution of educational resources across regions leads some students to make choices without a clear understanding of the major.”

He suggested launching a “visualized and interactive platform for majors” to help students gain deeper insights into the characteristics of different majors through charts, case studies, and interactive content.



Appendix V : Invitation from the IOC experts



บันทึกข้อความ

ส่วนงาน งานบริหารและธุรการ บัณฑิตวิทยาลัย โทร. 12412

ที่ อว 8718.1/185

วันที่ 4 กุมภาพันธ์ 2568

เรื่อง ขอความอนุเคราะห์เชิญเป็นผู้เชี่ยวชาญ

เรียน อาจารย์ ดร.กุสุมา แยมเกตุ

เนื่องด้วย นายZhengdao Liu นิสิตระดับปริญญาโท สาขาวิชาการพัฒนาและการจัดการ การศึกษา มหาวิทยาลัยศรีนครินทรวิโรฒ ได้รับอนุมัติให้ทำปริญญาโท เรื่อง “แนวทางการพัฒนาศักยภาพการ สร้างแบบจำลองทางคณิตศาสตร์ของนักศึกษาปริญญาตรีสาขาคณิตศาสตร์ในมหาวิทยาลัยครู ณ มณฑลเสฉวน” โดยมี ผู้ช่วยศาสตราจารย์ ดร.ปวีตวงศ์ บำรุงจันทร์ เป็นอาจารย์ที่ปรึกษาปริญญาโท

ในการนี้ บัณฑิตวิทยาลัยขอเรียนเชิญ ท่าน เป็นผู้เชี่ยวชาญตรวจค่าความเที่ยงตรงของ แบบสอบถาม ทั้งนี้ นิสิตได้ติดต่อประสานงานเบื้องต้นกับท่านแล้ว และจะประสานงานในรายละเอียดดังกล่าว ต่อไป สามารถสอบถามข้อมูลเพิ่มเติมได้ที่โทร. 18321762025

จึงเรียนมาเพื่อขอความอนุเคราะห์เชิญเป็นผู้เชี่ยวชาญ ให้ นายZhengdao Liu และ ขอขอบพระคุณมา ณ โอกาสนี้

(รองศาสตราจารย์ นายแพทย์ฉัตรชัย เอกปัญญาสกุล)

คณบดีบัณฑิตวิทยาลัย



บันทึกข้อความ

ส่วนงาน งานบริหารและธุรการ บัณฑิตวิทยาลัย โทร. 12412

ที่ อว 8718.1/185

วันที่ 4 กุมภาพันธ์ 2568

เรื่อง ขอบความอนุเคราะห์เชิญเป็นผู้เชี่ยวชาญ

เรียน ผู้ช่วยศาสตราจารย์ ดร.จตุพล ยงศรี

เนื่องด้วย นายZhengdao Liu นิสิตระดับปริญญาโท สาขาวิชาการพัฒนาและการจัดการ การศึกษา มหาวิทยาลัยศรีนครินทรวิโรฒ ได้รับอนุมัติให้ทำปริญญาโท เรื่อง “แนวทางการพัฒนาศักยภาพการ สร้างแบบจำลองทางคณิตศาสตร์ของนักศึกษาปริญญาตรีสาขาคณิตศาสตร์ในมหาวิทยาลัยครู ณ มณฑลเสฉวน” โดยมี ผู้ช่วยศาสตราจารย์ ดร.ปวีตวงศ์ บำรุงจันทร์ เป็นอาจารย์ที่ปรึกษาปริญญาโท

ในการนี้ บัณฑิตวิทยาลัยขอเรียนเชิญ ท่าน เป็นผู้เชี่ยวชาญตรวจค่าความเที่ยงตรงของ แบบสอบถาม ทั้งนี้ นิสิตได้ติดต่อประสานงานเบื้องต้นกับท่านแล้ว และจะประสานงานในรายละเอียดดังกล่าว ต่อไป สามารถสอบถามข้อมูลเพิ่มเติมได้ที่โทร. 18321762025

จึงเรียนมาเพื่อขอความอนุเคราะห์เชิญเป็นผู้เชี่ยวชาญ ให้ นายZhengdao Liu และ ขอขอบพระคุณมา ณ โอกาสนี้

(รองศาสตราจารย์ นายแพทย์จตุรชัย เอกปัญญาสกุล)

คณบดีบัณฑิตวิทยาลัย

HESI. 8718/143



Graduate School
Srinakharinwirot University
114 Sukhumvit 23, Bangkok 10110

4 February 2025

Subject: Invitation to Serve as an Expert Evaluator

Dear Associate Professor Shan Hong Tao,

I hope this message finds you well.

I am writing on behalf of the Graduate School of Srinakharinwirot University to formally invite you to serve as an expert evaluator for the thesis of Mr.Zhengdao Liu, a master's candidate in Master of Education Program. His thesis, entitled "Guidelines for the Selection of University Majors by Newly Admitted Students: A Case Study on Influences on Students' Choice of Major in Electronic Information at Shanghai University of Engineering Science, China," has been approved, and he is being advised by Assistant Professor Dr.Pawatwong Bamroongkhan.

Mr.Liu has initiated preliminary communications with you regarding this project and will coordinate further details as needed.

We sincerely request your esteemed assistance in this matter and express our gratitude for your consideration of this invitation.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Chatchai Ekpanyaskul'.

(Associate Professor Dr.Chatchai Ekpanyaskul, M.D.)

Dean of the Graduate School

Note: If you require any further information, please feel free to contact Mr.Liu at 18321762025

Appendix VI: Evaluation form Index of item objective congruence (IOC)

IOC questionnaire rating

(Scores given by three experts for each question)

The IOC scoring of the interview					
Question number	Expert 1	Expert 2	Expert 3	Summation	Notes
1	1	1	1	3	
2	1	1	1	3	
3	1	1	1	3	
4	1	1	1	3	
5	1	1	1	3	
6	1	1	1	3	
7	1	1	1	3	
8	1	1	1	3	
9	1	1	1	3	
10	1	1	1	3	
11	1	1	1	3	
12	1	1	1	3	
13	1	1	1	3	
14	1	1	1	3	
15	1	1	1	3	
16	1	1	1	3	
17	1	1	1	3	
18	1	1	1	3	
19	1	1	1	3	
20	1	1	1	3	
21	1	1	1	3	

The IOC scoring of the questionnaire					
Question number	Expert 1	Expert 2	Expert 3	Summation	Notes
1	1	1	1	3	
2	1	1	1	3	
3	1	1	1	3	
4	1	1	1	3	
5	1	1	1	3	
6	1	1	1	3	
7	1	1	1	3	
8	1	1	1	3	
9	1	1	1	3	
10	1	1	1	3	
11	1	1	1	3	
12	1	1	1	3	
13	1	1	1	3	
14	1	1	1	3	
15	1	1	1	3	
16	1	1	1	3	
17	1	1	1	3	

Appendix VII: Paper publishing

Journal submission: International Journal of Innovative Research and Scientific Studies,
ISSN-2617-6548


URL: <http://www.ijirss.com/index.php/ijirss> (Scopus Citescore: 2.1 Q2)

Submission date: June 9, 2025

Reception date: June 21, 2025

Publication date ■ September 9, 2025


Publication link ■ <https://doi.org/10.53894/ijirss.v8i6.9660>


INTERNATIONAL JOURNAL OF
INNOVATIVE RESEARCH AND SCIENTIFIC STUDIES

Acceptance Letter

Date: 21/06/2025
Manuscript number: IJIRSS/10904-7689/25

International Journal of Innovative Research and Scientific Studies
ISSN-2617-6548



Dear Pawatwong Bamroongkhan

Author (s): Zhengdao Liu, Pawatwong Bamroongkhan, Chakrit Ponathong

Congratulations!

We are happy to let you know that your article "*Guidelines the selection of university's majors by newly admitted students: A case study Influences on Students' Choice of Major of electronic information at Shanghai University of Engineering Science in China*" has been selected for publication in *International Journal of Innovative Research and Scientific Studies*.


The article was thoroughly evaluated in a blind review process by two referees, in addition to input from the academic editor. According to the journal's current policy, after acceptance the author (s) will need to pay USD 1500 as an online publication fee. Consequently, upon receipt of the publication processing fee, your article will be published in current issue.

Please remember to quote the manuscript number, **IJIRSS/10904-7689/25**, should you wish to make further inquiries about your manuscript.

If you require any additional information, please do not hesitate to contact me.

I look forward to hearing from you soon.

Sincerely,



Natalie Jean
Editorial Manager
International Journal of Innovative Research and Scientific Studies, ISSN: 2617-6548
Scopus Link: <https://www.scopus.com/sourceid/21101057630>
URL: <http://www.ijirss.com/index.php/ijirss>
E-mail: editor@ijirss.com

Appendix VIII: Moral and Ethical Certificate



AF19-03-03.1
August, 2023

หนังสือรับรองจริยธรรมการวิจัยในมนุษย์ หนังสือฉบับนี้ให้ไว้เพื่อแสดงว่า

ชื่อโครงการวิจัย : แนวทางการเลือกสาขาวิชาเอกของมหาวิทยาลัยสำหรับนักศึกษาที่เพิ่งเข้าศึกษาใหม่: กรณีศึกษาอิทธิพลต่อการเลือกสาขาวิชาเอกอิเล็กทรอนิกส์สารสนเทศของนักศึกษาที่มหาวิทยาลัยวิศวกรรมศาสตร์ วิทยาศาสตร์ เชียงไฮ้ในประเทศจีน

ชื่อหัวหน้าโครงการวิจัย : นาย ZHENGDAO LIU

หน่วยงานต้นสังกัด : คณะศึกษาศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ

หมายเลขรับรองโครงการวิจัย : SWUEC-682051

รายการเอกสารที่รับรอง :

- | | |
|---|------------------------------------|
| 1. แบบเสนอเพื่อขอรับการพิจารณา | ฉบับที่ 2 ลงวันที่ 4 เมษายน 2568 |
| 2. โครงการวิจัยฉบับสมบูรณ์ | ฉบับที่ 1 ลงวันที่ 23 ธันวาคม 2567 |
| 3. เอกสารข้อมูลและขอความยินยอมสำหรับอาสาสมัคร | ฉบับที่ 1 ลงวันที่ 25 ธันวาคม 2567 |
| 4. เครื่องมือที่ใช้ในการวิจัย | ฉบับที่ 1 ลงวันที่ 23 ธันวาคม 2567 |
| 5. เอกสารแสดงความยินยอมเข้าร่วมการวิจัย ต่ำกว่า 18 ปี | ฉบับที่ 2 ลงวันที่ 5 เมษายน 2568 |
| 6. ประวัติผู้วิจัย | |

ได้ผ่านการรับรองจากคณะกรรมการจริยธรรมสำหรับพิจารณาโครงการวิจัยในมนุษย์ มหาวิทยาลัยศรีนครินทรวิโรฒ โดยยึดหลักเกณฑ์ตาม Declaration of Helsinki, Belmont Report, International Conference on Harmonization in Good Clinical Practice (ICH-GCP), International Guidelines for Human Research ตลอดจนกฎหมาย ข้อบังคับและข้อกำหนดภายในประเทศ จึงเห็นสมควรให้ดำเนินการวิจัยตามโครงการวิจัยนี้ได้

วันที่รับรอง : 11 เมษายน 2568

วันที่หมดอายุ : 10 เมษายน 2569

(ลงชื่อ).....

(รองศาสตราจารย์ ดร.สิทธิพงษ์ วัฒนานนท์สกุล)

ประธานคณะกรรมการจริยธรรมสำหรับพิจารณาโครงการวิจัยที่ทำในมนุษย์

ชุดสังคมศาสตร์และพฤติกรรมศาสตร์ (ชุดที่ 2)

มหาวิทยาลัยศรีนครินทรวิโรฒ

หน่วยจริยธรรมและมาตรฐานการวิจัย
มหาวิทยาลัยศรีนครินทรวิโรฒ
อาคารนวัตกรรม ศ.ดร.สาโรช บัวศรี ชั้น 17
โทร. (02) 6495000 ต่อ 17503, 17506 โทรสาร (02) 2042590



AF20-03-03.0
May, 2023

Certificate of Ethical Committee Approval

This is to certify that:

Protocol Title: GUIDELINES THE SELECTION OF UNIVERSITY'S MAJORS BY NEWLY ADMITTED STUDENTS:
A CASE STUDY INFLUENCES ON STUDENTS' CHOICE OF MAJOR OF ELECTRONIC
INFORMATION AT SHANGHAI UNIVERSITY OF ENGINEERING SCIENCE IN CHINA

Principal investigator: Mr. ZHENGDAO LIU

Institution: Faculty of Education, Srinakharinwirot University

Protocol code: SWUEC-682051

Documents approved:

- | | |
|---|-------------------------------------|
| 1. Submission form | version no. 2 date 4 April 2025 |
| 2. Full research proposal | version no. 1 date 23 December 2024 |
| 3. Participant information sheet and consent form | version no. 1 date 25 December 2024 |
| 4. Questionnaire/data collection form | version no. 1 date 23 December 2024 |
| 5. Letter of consent to participate in research
under 18 yrs | version no. 2 date 5 April 2025 |
| 6. Investigator's biography | |

have been reviewed and approved by the Human Research Ethics Committee of Srinakharinwirot University based on Declaration of Helsinki, Belmont Report, International Conference on Harmonization in Good Clinical Practice (ICH-GCP), International Guidelines for Human Research, along with laws and regulations of Thailand. Thus, the approval for conducting the study is granted.

Date of approval: 11/04/2025

Date of expiration: 10/04/2026

(Associate Professor Sittipong Wattananonsakul, Ph.D.)

Chairman, Social Science and Behavioral Science Research Sub-Committee
of Srinakharinwirot University (Panel 2)

Ethics and Research Standards Division
Innovation Building Prof. Dr. Saroch Buasri, Floor 17
Srinakharinwirot University, 10110 Thailand
Tel.: +66-26-495000, 17503 Fax: (02) 2042590



VITA

