

The Influence of Family Income Level on the Future Major Selection Approaches of Chinese Ordinary High School Students and the Potential Solutions

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Abstract

Education is an essential cornerstone of national rejuvenation and social progress, and the lifeblood of national development. The optimal allocation of educational resources is crucial. Due to the particularity of China's college entrance examination system (Gaokao system), students must define their major at the age of 16. However, due to the differences in family income levels, there are numerous unscientific decision-making phenomena, including but not limited to cognitive bias and self-interest dilemma. The theory of information asymmetry is the main reason for the above problems. Therefore, establishing and improving the planning guidance mechanism of major selection for senior high school students is an effective way to reform and break through the above difficulties.

Keywords: education, Gaokao system, family income levels, theory of information asymmetry, major selection, university

1. Introduction

Education is a critical cornerstone of national rejuvenation and social progress, and the lifeblood of national development. The optimal allocation of educational resources is crucial. Since China resumed the college entrance examination system (Gaokao system, officially called Nationwide Unified Examination for Admissions to General Universities and Colleges) in 1977, subject selection, examination preparation, voluntary application and major selection have become the checkpoints that every Chinese ordinary high school student must solve.

Different from the college selection and teaching methods in the United States, Chinese examinees typically need to choose their own examination mode and subject collocation before the end of Grade 10, and this collocation mainly depends on the students' major direction, so that they can learn relevant knowledge in advance and devote themselves to in-depth research in the corresponding major in the first year of college. The United States, on the other hand, tends to promote liberal education. Numerous universities do not require students to choose a major until the third year of college, and the choice can still be changed later. It means that under China's Gaokao system, for the best possible test preparation and professional career, students must define their major at age 16 — six years earlier than in the United States.

However, due to the imbalanced economic development, coupled with the expectation of contemporary Chinese families for the development of the younger generation, the family income level restricts the choice of major. The essence of this phenomenon comes from the difference of approaches and the asymmetry of information. Therefore, this paper will analyze the influence of family income level on the future major choice of ordinary high school students in China from the perspective of information asymmetry theory.

In addition, most of the fewer developed areas of China were not equipped with the planning guidance

mechanism of major for senior high school students, the related mechanism of the first-tier cities also need to be perfect—does not improve the students' cognitive biases, choose to take an examination of science, because of the influence of the family income level self-interest in dilemma, based on the information loss caused by asymmetric information, etc. However, 11.93 million Chinese examinees in 2022 are faced with 771 alternative majors in various universities, and numerous students are faced with problems such as unclear interests and insufficient knowledge of professional content of majors (Gan & Xu, 2022). The improper choice of major not only affects the individual's future, but also reflects the urgency of optimizing the allocation of resources. Therefore, in addition to the analysis of the impact of family income level on senior high school students' major choice, it is highly vital to analyze and point out the feasibility of establishing and improving the planning guidance mechanism of major selection for senior high school students.

2. Literature Review

2.1 Existing Similar Literature

The existing paper topics mainly focus on two perspectives of the current topic. The first is the analysis of the impact of income level on people's decision-making in society, including but not limited to the perspectives of employment, housing, and mate selection. People with higher incomes, for example, have more resources and access to choose careers and housing, but they take fewer factors into account and are significantly more assertive in their decisions (Niu, 2022). That's the result of the current study. In terms of other social factors, information asymmetry does not significantly affect decisions, because for wealthier people, the outcomes of decisions in these areas are less important than educational investments and therefore have lower reference value.

Secondly, the influence factors of college major selection, including but not limited to interest direction and achievement factors. Numerous domestic and foreign literature suggest that people choose to go to university and choose their preferred major to satisfy their personal ideals, while the way they choose is more related to their personal interests. These literature used models such as framing effect to analyze the decision-making process, but the objects of their analysis were mainly the cases of high school students in developed countries and economically developed areas in China, which lacked comparability and practical significance (Du & Jin, 2016). The existing literature has carried out a lot of efficient quantitative analysis in the above aspects, but a lot of qualitative analysis is too general, lacking practicality and feasibility. In addition, most of the discussion on college major selection is confined to the stage of voluntary application after high school graduation and college entrance examination, and it is rare to advance the discussion and attention to the stage of high school education.

The research will try to combine the income level and the college major selection strategy to fill the gap of high-quality qualitative analysis in such issues. The discussion and attention on the strategy of college major selection will be brought forward to the stage of senior high school education, focusing on the lack of understanding, clarity and understanding of senior high school students' major selection, and designing feasible plans to improve it.

2.2 Theory of Information Asymmetry

The theory of information asymmetry came into being in the 1970s, which is an influential theory of information economics. It is produced in order to eliminate the dilemma that the assumption of complete information symmetry in traditional economics contradicts the information asymmetry of both sides in the real transaction. Information asymmetry refers to the asymmetric state of information possessed by both parties in market transactions when one party in the market is unable to monitor and supervise the behavior of the other party or cannot obtain complete information about the behavior of the other party, or when the cost of monitoring and supervision is high. According to this theory, under the condition of market economy, the asymmetry of information distribution in different levels is an objective existence, which is manifested by the asymmetry of information quantity, quality, time and space held by different subjects. After decades of evolution and development, this theory has gradually matured and been widely used in the fields of economy, education, management and so on (Zhang & Li, 2021).

In the process of China's college entrance examination reform, due to the diversity of information content, the audience group selectively accepts the reform information and the limited access to information, the reform information obtained by different stakeholders is not equal. It can be said that this directly leads to the abnormal choice of major for ordinary high school students for various reasons, such as excessive influence by family income level.

2.3 Importance of Major Selection

Donald E. Super (1993), an American career management scientist and psychologist, puts forward a systematic and whole-process career development theory model based on the scale of people's lives and the change and fluidity of career. According to the theory, career planning includes the growth stage, exploration stage,

establishment stage, maintenance stage and decline stage. Each stage has its specific development needs and tasks to be achieved, and whether the tasks of the previous stage are achieved or not will directly affect the development of the next stage.

Among them, high school students are roughly in the experimental phase of the exploration phase. In this period, students need to comprehensively consider their interests, hobbies, abilities and professional values, and begin to make tentative choices about their future and career. At the same time, only when the specific development tasks in high school reach a certain level of development, can they enter the next stage of development smoothly and smoothly. Therefore, the importance of major selection for high school students cannot be ignored.

By June 2019, the Ministry of Education of the People's Republic of China had released 2,956 Chinese universities and colleges with 506 majors (Zhu, 2021). If a planned course is not available, students will have to make their choice within a short period of time after the Gaokao.

Different from the American model, where students can receive general education and have professional experience in university before choosing a specific major, in China's university system, students have to define their desired university and major in the application stage after graduation from high school. In addition, the subject selection of the college entrance examination also imposes great restrictions on the choice of majors, and many majors cannot be studied in college if students do not choose relevant subjects in high school (Ran, 2018). Therefore, for Chinese students, when choosing subjects in the college entrance examination, they must be clear about their future majors.

The choice of major directly affects the learning and research direction of students after entering university, and then affects the future career, as well as the formation of students' personality characteristics and ability cultivation. Therefore, it is necessary to study the relevant content of the planning guidance mechanism of major for senior high school students.

2.4 Related Policies in China's Education System

The former National Education Commission of China promulgated *the Outline of Vocational Guidance for Ordinary Middle Schools (Trial)* in 1994 to guide the professional planning of high school students. According to the Ministry of Education of the People's Republic of China, vocational enlightenment education for primary and secondary school students will be carried out (Feng, 2016).

In September 2014, The State Council of China officially issued *the Implementation Opinions on Deepening the Reform of the Examination and Enrollment System*, marking the beginning of the reform of the senior recruitment system. The limited choice of subjects means that students need to determine their desired major earlier (State Council of the People's Republic of China, 2014).

2.5 Chinese Students' Perplexity and Demand Realization Path

The survey revealed that students had varying levels of anxiety about subject choice. The problems focused on the lack of understanding of high school subjects, the relationship between majors, the contradiction between expertise and hobbies, and the unclear direction of interest (Jin, 2017). Students and their parents want guidance because many families are limited by income levels and cannot receive professional guidance of major selection outside of school (Jia, 2015). It can be seen that high school students lack learning plans and future expectations. The autonomy of choosing examinations magnified the lack of professional education and the lack of academic guidance and career planning guidance, and additionally showed that the family income level was undoubtedly a factor in the future major choice of high school students.

According to a survey conducted by the Education Development Research Center of the Ministry of Education of the People's Republic of China, 2.1% of high school seniors know very well about their chosen major, 26.8% know relatively well, 35.5% know little about it, 10.0% know nothing about it, and 25.6% do not understand precisely (Zhang & Li, 2021). After working, it is also common to have different majors. This is a huge waste of resources. In addition, according to the principle of unequal information, due to the significant differences in the income level and resource allocation of different families, the major selection strategies of different families are bound to be different, and some families even do not make reasonable plans and strategies at all (Ren & Liu, 2009).

Society should enrich ways to carry out professional planning education. The model of "government, school, family and society coordinated promotion" applied overseas is worthy of reference (Cui, 2010). The professional planning guidance system of major selection should make students understand themselves from all aspects, and understand the occupation and corresponding professional and social needs, to ensure that students' professional choice conforms to the reality of their family income level and future development planning, to avoid empty talk of ideal, but also to avoid overly utilitarian choice caused by income level (Meng, 2015). The balance needs to be struck.

3. Information of Interviewees and Gaokao System

3.1 Introduction of Interviewees

Table 1. Basic Information of Interviewees (with assumed names)

Name	Identity	Age	Location of Edu or Work	(Potential) Majors	Subject Selected	Income Level
Zayn	High School Student	16	Beijing	Medicine	Phys, Chem, Biol	\$60k+ per year
Weigel	High School Student	16	Beijing	Architecture	Phys, Chem, Biol	\$80k+ per year
Shawn	High School Student	16	Beijing	Artificial Intelligence	Phys, Chem, Biol	\$35k+ per year
Othman	High School Student	16	Hangzhou, Zhejiang	Politics	Polit, Hist, Geog	\$90k+ per year
Khan	High School Student	17	Nanjing, Jiangsu	Physics	Phys, Chem, Biol	\$25k+ per year
Jones	High School Student	17	Chengdu, Sichuan	Economics	Polit, Hist, Phys	\$50k+ per year
Willow	Parent of High School Student	51	Chengdu, Sichuan	Economics	/	\$50k+ per year
Lauri	Undergraduate	20	Beijing	Finance	Phys, Chem, Biol	\$40k+ per year
Yuri	Undergraduate	21	Beijing	Nutrition	Polit, Hist, Geog	\$30k+ per year
Jessie	Undergraduate	21	Harbin, Heilongjiang	Chemical Engineering	Phys, Chem, Biol	\$20k+ per year
Christina	High School Teacher	56	Beijing	Politics	/	/
Tsuei	High School Teacher	36	Beijing	Mathematics	/	/
Lewis	Admission Officer of University	31	Beijing	Education	/	/

3.2 Introduction of Gaokao System

In China's National College Entrance Examination system (Gaokao System), students need to choose six subjects for the examination. Among them, Chinese, Mathematics and Foreign Language are compulsory subjects, and for the other three subjects, there are different choosing modes in different regions (National Education Examinations Authority, 2019).

1) "3+3" system (regions with more developed economy and education, such as Beijing, Shanghai, Tianjin, Shandong, etc.):

Three of the remaining six optional subjects (History, Geography, Politics, Physics, Chemistry and Biology) can be selected as examination subjects freely.

2) "3+1+2" system (regions with medium development level due to the limited educational resources, such as Jiangsu, Chongqing, etc.):

In addition to the three compulsory subjects, physics or history should be selected as "1" at first, and then the remaining four optional subjects (Geography, Politics, Chemistry and Biology) should be filled in as "2" according to the limited major direction.

3) Traditional system (less developed regions, such as Sichuan, Heilongjiang, Xinjiang, Tibet, etc.):

Students there have to choose the liberal arts package or natural science package, which means there are only two options left: [History, Geography and Politics] or [Physics, Chemistry and Biology].

4) Zhejiang reformed system (only used in Zhejiang province, an education demonstration zone):

Zhejiang province has added a new course called Technology (Information Technology + General Technology), where students can choose three out of seven optional subjects (History, Geography, Politics, Physics, Chemistry, Biology and Technology) as exam subjects freely.

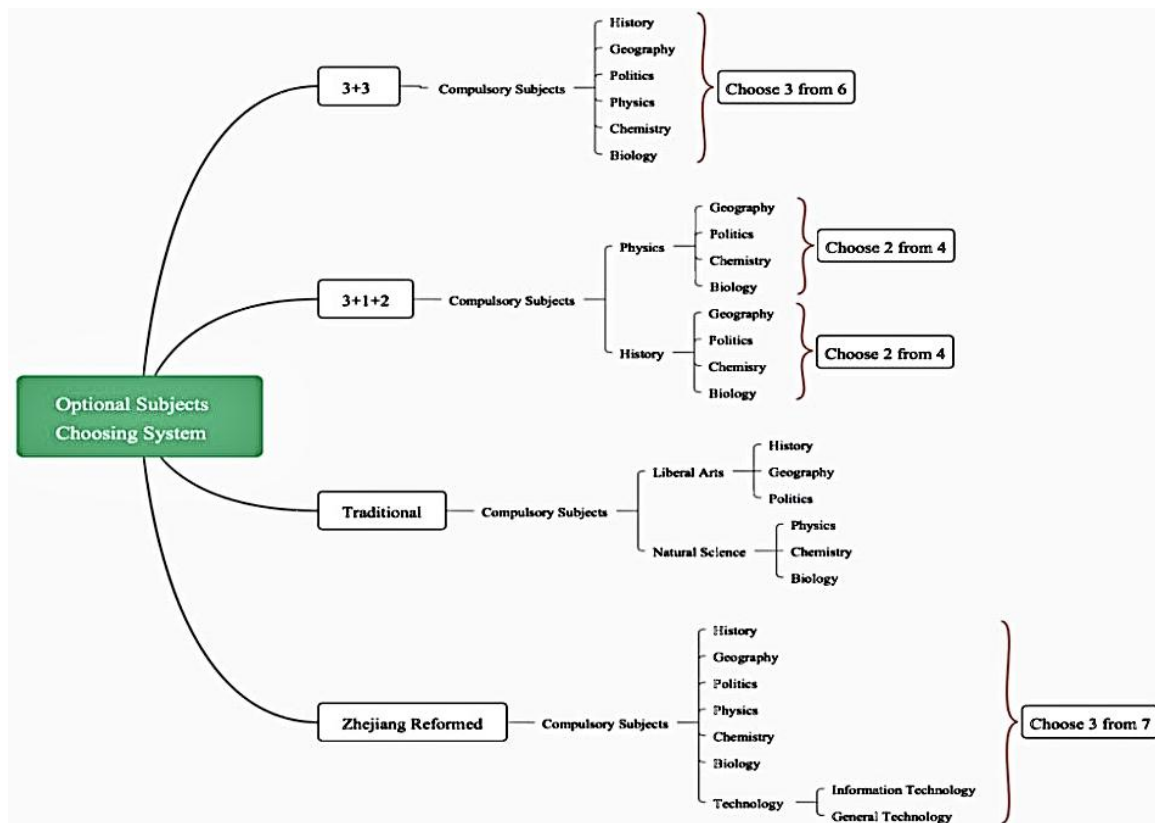


Figure 1. Different Forms in in Gaokao System (National Education Examinations Authority, 2019)

4. Research Design

The researcher chose to use the literature method and interview method to execute the investigation. After reading 24 relevant documents and literature, the researchers designed relevant problem directions for the problem and information asymmetry theory, and studied the existing policies and results. After that, the researchers designed in-depth interviews with high school students, graduates, senior teachers, parents and university admissions office staff to investigate the influence of family income level on the future major choice of Chinese high school students, the needs and concerns of different groups of people, and suggestions for improving the major planning mechanism.

4.1 Question List for High School Students

- 1) What is the general income level of the family? (in years)
- 2) What is the subject selected for the college entrance examination?
- 3) What are your major plans and goals after graduation from high school?
- 4) What is the cause and process of this plan and goal?
- 5) Do you really understand the characteristics and employment prospects of your chosen major?
- 6) Is your family supportive of your professional plans and goals? Intervene or not?
- 7) Does your school incorporate career/major selection related development paths or guidance courses into the teaching system in the curriculum schedule and daily arrangement?
- 8) Other suggestions on the optimization of the campus career/major planning system for high school students?

4.2 Question List for Graduates of High School (Current Undergraduates of Universities)

- 1) What is the general income level of the family? (in years)
- 2) Did you have any major you were interested in in high school? Do you know about this major?
- 3) Is the final choice of major the same as originally expected?
- 4) What factors influence the final choice?
- 5) Is your family supportive of your professional plans and goals? Intervene or not?

- 6) Is the actual situation of the university major consistent with the expectation? Do you regret your decision?
- 7) Does your high school provide information and services to help students choose a major?
- 8) What do you think your high school could do better to help students make clear their choice of course/major?

4.3 Question List for Parent of High School Students

- 1) What is the general income level of the family? (in years)
- 2) Does your child have any plans for his future major/career?
- 3) Will you search for the relevant information and details of your child's university major?
- 4) Does your child's school offer career/major selection or admission guidance courses?

In addition, interviews with senior teachers and university admissions office staff did not preset questions in advance, but took the research topic as the background and conducted chat interviews with the above interviewees.

5. Finding

5.1 Missing Key Opportunity Due to the Lack of Information Integration

The researchers interviewed six high school students from four different provinces with different family income levels (between \$25,000 and \$90,000 a year). To summarize:

Six students thought that family income level for professional selection strategy can implement has a point. The effect of this influence is mainly based on the theory of information asymmetry caused by the market economy under the condition of information asymmetric distribution in different classes is objective existence, characterized by different subject to master information quantity, quality, time, space, asymmetric. At the same time, six students generally believed that it was urgent to improve the existing guidance mechanism based on this phenomenon, and it was of great significance for high school authorities to execute relevant guidance courses. In the process of investigation and interview, the respondents in this study repeatedly mentioned the following practical problems they faced.

Firstly, based on different family income levels, we can summarize the six interviewed students' choices of future majors and subjects into the following categories:

- 1) There is a firm ideal and a clear plan, and the path guidance is carried out by the paid admission guidance from outside school;
- 2) Academic promotion is carried out according to the plan of off-campus tuition guidance without clear goals;
- 3) There is a firm ideal, but they do not know how to work hard because they do not tend to choose the absence of off-campus guidance and on-campus planning;
- 4) There is a firm ideal, but considering the family financial situation, it is considered that the selection of off-campus entrance guidance is low cost performance and the absence of on-campus planning, and it does not know how to make efforts;
- 5) There is no clear goal, but they think that making money is the only principle, which occupation can quickly have high economic income and high income return, they will care about the corresponding major in which direction. This problematic mindset has not been improved by the absence of school planning.
- 6) There is a firm ideal, but due to the poor financial situation of the family, the parents think that the students should choose the major corresponding to the high-yield career (such as science, engineering and information technology research), which is contrary to the original interest of the students. This conflict has not been ameliorated by the absence of school planning.

In essence, the difference between the out-of-school paid admission guidance and the absence of in-school guidance directly leads to the phenomenon of information asymmetry. Families with more wealth have better services and information, so they can make more scientific decisions and plans for students. Families with less wealth experienced a significant lack of information, and student planning was significantly less scientific. There is no doubt that this is a vicious cycle of the social education system and professional planning mechanism.

Differences in wealth, therefore, directly led to the professional options and differences in the way of thinking, and the essence of the difference is based on the information asymmetry theory proposed by "when individuals cannot get all the information or scientific process information, tend to be based on the original thinking and ideas, according to the information of one-sided make decisions from think to yourself", but in fact, These decisions often lead to the opposite of the desired outcome, as reflected in the feedback of high school graduates (college students).

5.2 Lack of Recognition and Forced Compliance

High school graduates often misreport the majors they are not interested in due to their lack of knowledge about the major content in college. One of the most representative is Jessie from Harbin, Heilongjiang Province, and there is no doubt that her relatively low household income level among all respondents is greatly affected by this factor. The details are as follows:

- 1) When she was in high school, she already had her favorite university and major (Chemistry Department of Harbin Institute of Technology). However, her parents advised her to apply for a local college in Beijing for the sake of family income. Finally, she chose Beijing University of Posts and Telecommunications. After entering the university, she learned that there was no chemistry department in the university, so she had no choice but to study artificial intelligence, which she did not like.
- 2) She believes that the reasons for the failure of the application mainly lie in the parents' disregard of their wishes and their own infirmity. She will be far away from her dream. If she insists on crossing her major, she will still be restricted by external factors.
- 3) She believes that the professional guidance mechanism should not only attach importance to professional prospects, but also fully tap the interest of students. On the one hand, society should guide students whose original dream is not too practical to convert their dreams into practical goals. On the other hand, society should help students who have no goals to explore their interests and advantages.

Parents, teachers and college admissions office staff point out that most high schools do not offer career planning and professional guidance courses, and the existing professional planning courses in a few high schools have had an initial effect, but there are still shortcomings and room for improvement: in terms of resources, the amount of class hours is tiny, and the professional teachers are insufficient; in the content, the professional introduction of empty generalization, surface; in terms of pattern, the course starts late and does not last. Therefore, although there are problems such as unreasonable fees and questionable authenticity, extracurricular institutions, the Internet and publications are still the main channels for students and parents to understand information. The differentiation of channels leads to the emergence of asymmetric information. The government departments should make overall planning and implement the specific mechanism for all high schools.

The above cases and opinions are mainly from the feedback of respondents in Harbin and Beijing. In terms of the income level of China as a whole, Harbin ranked 88th in the country in terms of GDP per capita in 2021 (Harbin Bureau of Statistics & Harbin Investigation Team, National Bureau of Statistics of China, 2022). There are 337 urban units at the prefecture level and above in China (Ministry of Civil Affairs of the People's Republic of China, 2021). This means that the vast majority of Chinese students receive far less guidance and feedback based on income than Harbin does. The current situation in Harbin has proved that high school students have a lack of knowledge about the choice of major, so the lack of perception is widespread throughout the country.

5.3 Summary and Reflection

Therefore, there is no doubt that the family income level has a significant impact on the family's professional choice decision and planning, which is specifically reflected in the information asymmetry theory: When individuals can not get all the information or scientific process information, tend to be based on the original thinking and ideas, according to the information of one-sided make decisions from think to yourself, students make a scientific choice frequently require based on for a comprehensive understanding of professional, interest and specialty, but due to lack of the ability of information collection, analysis of the above, the scientific nature of major selections significantly reduced.

These impacts are reflected in the following three aspects:

- 1) The low family income level leads to the lack of cognition of social and future professional approaches, and thus the lack of cognition of dreams and plans.
- 2) Due to the low family income level, students are limited by their parents' requirements or the desire to make money to support their family, so they shackled their nature and interest and blindly chose to conform.
- 3) Differences in family income levels lead to significant differences in the channels of obtaining information and the professional degree of career planning for different students, so students from families with lower income levels are likely to miss key opportunities due to the lack of information integration services.

In conclusion, these impacts are all based on the influences brought by the theory of information asymmetry, which essentially lies in the lack and unfairness of information integration services and career planning courses. Therefore, establishing and improving the planning guidance mechanism of major selection for senior high school students can make improvements.

6. Potential Solutions

This part will point out that the improvement plan to avoid the negative impact of family income level on

students' decision-making of major, which is reflected in the establishment and improvement of the planning guidance mechanism of major selection for high school students, and the core purpose is to avoid the information asymmetry caused by the difference of family income level.

6.1 Ordinary Senior High Schools

- 1) The school should establish a teaching and research group of professional guidance courses, design courses according to the characteristics of their students, establish and improve the professional planning curriculum system, and continuously follow up the teaching effect of the courses. The curriculum for students should include interest exploration, introduction to the academic and development prospects of each major, lectures by experts in various fields, authorities in the education system, graduates and their parents.
- 2) All high schools strengthen the communication between family and school to realize the "joint tracking and planning" of students' career development. High schools can make full use of parents' meetings, social media parent groups, one-on-one interviews and other ways to realize the synchronization of home-school information on the development of students; it can also promote the cognitive convergence of family income level and professional planning between parents and children through the form of "career planning class together".

6.2 University and College

- 1) Organize campus Open Day or summer/winter camp activities in winter and summer holidays, so that high school students of all income levels can experience the classroom organization and campus cultural atmosphere.
- 2) Provide experience guidance for senior high school students should be considered as a voluntary activity and should be included in the grade point or other evaluation system, so as to stimulate the enthusiasm of college students to share their experience and participate in propaganda with senior high school students, so that senior high school students can have more direct understanding of majors.
- 3) Colleges and universities cooperate with high schools to arrange professional consultants to give professional publicity and planning lectures, involving professors of various majors, school admission office workers, and students who are willing to return to their Alma mater for experience sharing.

6.3 Society and Non-Government Organization

- 1) Collaborative perfecting the existing university professional network information integration platform, information and policy documents from the platform, the integration of various universities and professional data in each particular course content, the employment of professional direction, etc., and opened the BBS service, Open online communication way between undergraduates or graduates and high school students, to help high school students to make choices.
- 2) Enterprises and institutions should offer open days and career experience courses for senior high school students in winter and summer holidays to introduce the specific contents and expected abilities of the occupation and explain the corresponding professional needs of the occupation, so that senior high school students can participate in the exit of the intended major and help them determine the direction of their future major.
- 3) Off-campus education and training institutions provide admission guidance, cooperate with colleges and high schools, rely on the support of the government and school authorities, and execute professional planning and guidance courses and consulting services of major selection on the principle of public welfare.

6.4 Government

- 1) Introduce policies to establish and improve the guiding mechanism of future major selection for senior high school students, activate the strength of multiple subjects, mobilize the enthusiasm of senior high schools, colleges and universities, education and training institutions, enterprises and institutions, realize resource complementarity, and form an all-round, multi-level and wide-field coordination mechanism practically and concretely.
- 2) Increase the financial investment in professional planning and guidance mechanism, improve the construction of network platform, and realize resource sharing; strengthen the welfare guarantee of relevant teachers, establish special funds for introducing experts and external cooperation, prevent the loss of excellent talents, and ensure the quality and effectiveness of professional planning and guidance courses.
- 3) Establish a model school incentive mechanism. That is, the schools with more mature professional planning courses will be selected as demonstration schools, and the relevant policies will be implemented first. After achieving results, the experience will be summarized in time to form a complete and feasible improvement plan. Finally, the demonstration schools will be taken as the center to exchange experience and share resources to drive the establishment and improvement of professional planning courses in various schools.

7. Conclusion

The difference in family income level leads to differences in the choice and planning of students' majors by different families, and a large part of families choose less scientific paths, which is fundamentally derived from the phenomenon described in the theory of information asymmetry. When individuals can't get all the information or scientific process information, tend to be based on the original thinking and ideas, according to the information of one-sided make decisions from think to yourself, students make a scientific choice often require based on for a comprehensive understanding of major, interest and specialty, but due to lack of the ability of information collection, analysis of the above, the scientific nature of the major selections significantly reduced. Establishing and improving the planning guidance mechanism of major selection for high school students can improve this phenomenon, which can avoid the information asymmetry caused by the difference of family income level.

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