Analysis on the Evolution of Inner Mongolia College Admission System

Jianing Bai(✉)

RdfzChaoyang Branch School, Taiyanggong North St., CEEB, Beijing 694622, China
baijianing@rdfzcygj.cn

Abstract. The college entrance examination is the most important exam for Chinese high school students. There are many kinds of college entrance examination mechanisms in China, among which Inner Mongolia is the most special, and it adopts the online system to fill in the application form. There are not many researches in this field in China. Therefore, it has some value of research. This article introduces the different college entrance examination admission systems of Inner Mongolia in chronological order. By analyzing each system, find out the advantages and existing problems for each system. In addition, this paper also explains the improvements of system and how the new matching system solves the problems. The greatest meaning of this research is to help students facing the application problem understand how the system work and improved.

Keywords: Inner Mongolia · College admission system · Parallel matching system · Real time interactive mechanism · Multistage

1 Introduction

In recent years, roughly 10 million high school seniors compete for million seats at various universities in China each year [1]. In 2020, 186,592 students were enrolled in colleges and universities in Inner Mongolia, and 197,901 students applied for the college entrance examination in Inner Mongolia in 2020, with a passing rate of 94%. The reason of this high passing rate is the matching system of inner Mongolia.

There are few papers on the domestic websites that explain and analyze the college entrance examination admission mechanism of Inner Mongolia. Most of the students only know that Inner Mongolia implement the online dynamic admission mechanism, which they can modify their application online within the time limits. However, they do not know how this system works or why choosing these types of system and the advantages of this system. Therefore, this paper will introduce the evolution of college admission in inner Mongolia and explain how this system work. The aim of this research is to explain the different system Inner Mongolia has adopted, the existing problems for each system, and how the current system is a better way of matching.

This research is of great significance for the society to better understand the admission mechanism of Inner Mongolia University, which can help more college students understand the admission principle and provide a fairer admission environment.

G. Ali et al. (Eds.): ISEMSS 2022, ASSEHR 687, pp. 2254–2261, 2022.
https://doi.org/10.2991/978-2-494069-31-2_265

2 Analysis on the Mechanism of Inner Mongolia

2.1 Original Mechanism: Immediate Acceptance Mechanism and Its Problem

Two canonical mechanisms in the school choice and college admissions context are the Boston immediate acceptance mechanism (IA) and the student-proposing deferred acceptance (DA) mechanism [2]. In Chinese college admission mechanism, each province implements an independent matching process from sequential to parallel [3]. First of all, the sequential mechanism, which is also known as immediate acceptance (IA) mechanism. Schools accept all the students who apply and are above the cut-off in the first round, and leaves the market as soon as the number of students applied reaches the limit. It will not join in the next round and drops out of the matching market immediately. Even if there are students who apply to the school in the next round and has a higher score than some of the students applied before, the school will not admit new students. The feature of the immediate acceptance system can ensure the number of school admissions and saved time for the universities.

However, it may result in some high-scoring students not being admitted to any school. For example, if a student with a high score tried her first preferred university, and was rejected by the school, and when she moves to her second or third school in the preference list, they were already applied enough number of students, and have closed their admissions. Therefore, the students with a good grade will have to takes another year in high school [4]. This system is not a good matching system for the college admission, because it's not pareto efficiency since there are blocking pairs. Moreover, this mechanism is not strategy proof, since students may be afraid to be rejected by their truly preferred universities, they may tell lies to get a better result. In this situation, the students are not able to try their first choice, as a result, it is not a best matching system to the student.

2.2 The Improvements: Parallel System

Knowing this problem, China has made some improvements on this system, which we called the parallel mechanism. Since 2001, many Chinese provinces have transitioned from a "sequential" to a "parallel" school choice or college admissions mechanism [6]. In the parallel mechanism, students select several "parallel" colleges within each choice band [7]. Parallel application means that you can apply for several parallel colleges and universities each round. For example, if a student has A and B two universities as his first preferred universities, when school A reject his application, school B will still consider this student even if the number of students admitted is enough. School B will put the student in the student ranking list, and compare to the students it temporarily accepted. If that student has a higher position in the preference list, the school will accept him and reject the student who has a lower ranking. And that student will have to applied for the next university in his first choice. The parallel mechanism is widely perceived to improve allocation out- comes for students, since all the students are not afraid of rejection, and they are likely to try their dream universities.

After the adoption of this kind of parallel choice, the fluctuation of the admission rate of China's college entrance examination has gradually decreased. As Fig. 1 shows the

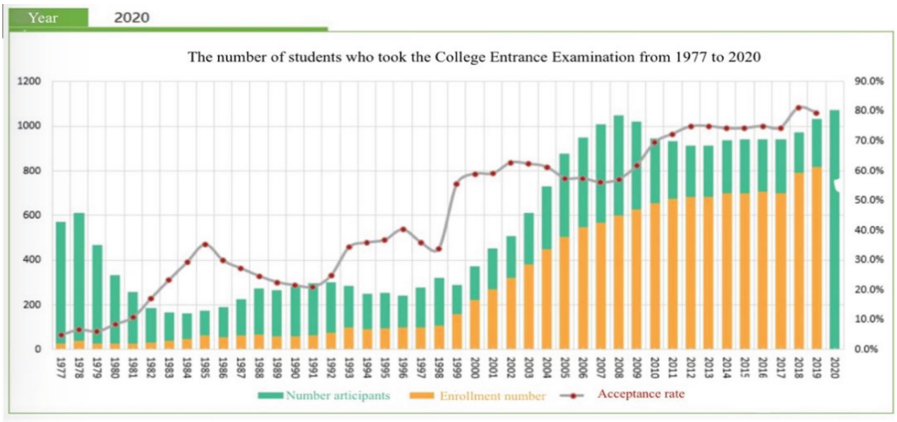

Fig. 1. The total number of students taking the national College entrance examination from 1977 to 2020[8]. *Source: The number of applicants and the admission rate have been climbing [J] College Entrance Examination admission Inquiry center, 2021, permitted by the author.*

total number of students taking the national College entrance examination from 1977 to 2020, the green line shows the total number of students taking the exam, and the orange line shows the number of students that are successfully admitted by universities, and the red line shows the acceptance rate of the student each year. It is obvious that the probability of admission fluctuated a lot before 2001, and it became more stable after 2001. Therefore, parallel choice mechanism is a better choice than before. It solves the problem of immediate acceptance mechanism to some extent. However, the number of universities in a group is a problem that needs to be considered in parallel mechanism, and the problems still exist.

2.3 Real-Time Interactive Mechanism

Inner Mongolia has adopted a novel mechanism called the real-time interactive mechanism (RIM) since 2008, which is expected to alleviate the problem caused by the limited length of the preference list in the parallel choice mechanism [9]. The real-time interactive mechanism is different from other mechanisms, it is an innovation of college matching system. The most special feature about this mechanism is information transparency. It means all the information about the student ranking list for each university and the remain places in each school.

When the admissions process begins, each student needs to log into an online system and select the university they want to apply. When the university revives a new application of a student, the computerized system inserts this student into a list of all students at the same university ranked in descending order of their score, or other comparing method base on each school. Students can see where they stand on the list and have a rough idea of whether they will be accepted immediately after submitting their application. The cut-off score, also means the minimum score for students enrolled by schools, will be updated in real time and announced to the public regularly. This is what we call a real-time interaction mechanism.

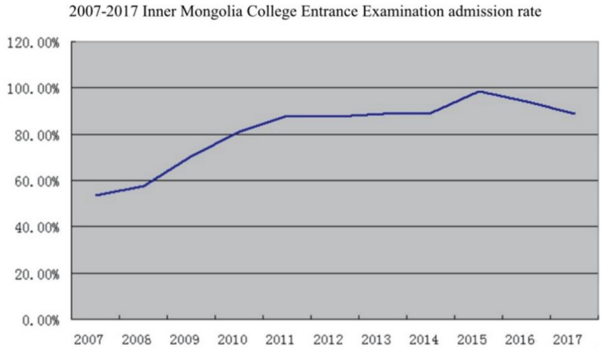

Fig. 2. 2007 to 2017 Inner Mongolia College Entrance Examination admission probability [13]. *Source: The 2017 Inner Mongolia college entrance examination admission rate [J] LIUXUE, 2017, permitted by the author.*

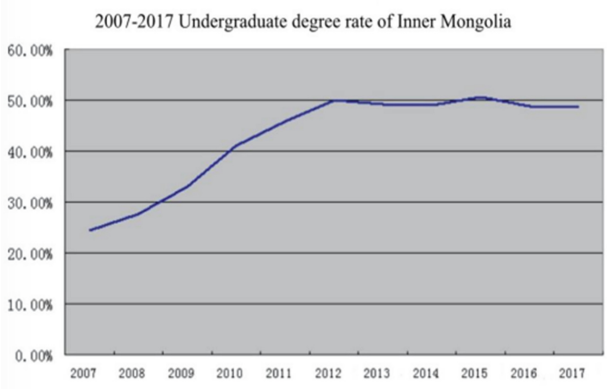

Fig. 3. 2007 to 2017 Inner Mongolia College Entrance Examination undergraduate admission probability [13]. *Source: The 2017 Inner Mongolia college entrance examination admission rate [J] LIUXUE, 2017, permitted by the author.*

This system actually solves the remaining problem left by parallel mechanism. Since student are aware about their rankings in their preferred school, therefore, they will know whether they will be accepted or not and may switch to second preferred universities to avoid being reject. Therefore, the limit length of preference list is solved and pareto efficiency is improved.

2.4 Current Matching System: Multistage RIM

With the evolution of Inner Mongolia university admission system till now. The current system is now a perfect system that both the student and university expected.

Both Figs. 2 and 3 shows a gradual increase in the probability of admission since 2007, which can prove that this system is now a good matching system and the manipulation problem is avoid. Which means under a situation with perfect information, all

the students are able to choose university in a fair matching system. What's more, separate the students in different score group and provide preference list of each university encourage students to try their true first choice. Since student are able to change their choice before the deadline, this system supports the aspirations of students. Universities meet their widening access and recruitment targets since all the students are willing to try different universities under this situation.

3 Existing Problems and Potential Challenges

The real time interactive mechanism is fair, and promote student choice and support their aspirations in the best way. Many students are able to try their dream university since there are perfect information. However, there is a very important existing problem in the current matching system that will block this perfect matching system [10].

Some of the students may cheat in order to improve their utility. There is a type of coordination between students that break this stable matching system. Every student wants to go to a better university, and some of them uses a wrong method to achieve this goal. Therefore, a type of manipulation problem exists. It is the coordination between a high score student and a low score student. Because all the students are allowed to revise their applications under this system at any time before the deadline. The high-scoring students can "take" a place at the university which is the university the low score students want to apply for. And next the high score student "release" the place at the last minute so that low-scoring students can attend. The low-scoring student can go to a better university, so he gets benefit from this action, his utility goes up. And for the high score student, he earns some "reward" from the low score student for the coordination, and will also be admitted to a university he really likes because of his score advantage. As a result, their total utility is improved [11].

However, this coordinated manipulation will have negative effect to the social welfare and equity and on the other hand, it distorted the stable outcome, and make the real-time interaction mechanism not a perfect match for all students, because it is unfair: without manipulation, the other student scores in between the high-score and low-score student can be admitted by the university that admits the low-score student. Moreover, the high-score manipulation student switches to a university at the last minute before the deadline, this action has risk of pushing another student out of the enrolment quota of the applied university without the chance to apply to other universities since the time is not enough. This manipulation changes the result at the last minute, making other students out of time to take actions.

What's more, there is also a potential problem about this university. There are often many transactions at the last minute, both the manipulation student, and those students to has decide at the last minute. This types of action of changing university may cause other students who has a lower ranking being afraid to be refuse by the university changes their decision. And when they are switching universities, this often leads to another group of students push off the ranking list. This not only cause network congestion, but also makes some of the student lack of time to make a new option of universities.

4 Solutions: Multistage Policy

To address this issue, the government has introduced a new policy in real time interactive mechanism system, which is called the multistage policy. After that, the admission process is carried out by multiple stages, which we called the multistage real-time interactive mechanism (MS-RIM) [9]. Students are separate into different group base on their scores are given different deadlines to submit their applications, the deadline for group with higher average scores is earlier than those with lower scores. For example, students whose scores range from 570 to 599 need to submit their applications before 3 pm, and students whose scores range from 540 to 569 submit their applications before 4 pm, and so on [12].

The multistage real time interactive mechanism solves the manipulation problem successfully. Since the time for submission is different, it became difficult for the high score student to hold a seat for low score student. For example, if the high score student hold a set for low score student till the last minute. There are still about an hour for until the deadline for low score student, and under perfect information, the result of the admission and the remaining places for the university will be undated at any time. Other students who have a higher position than the low score student in the preference list of the university is able to take the seat. Therefore, it's an effective solution for the problem.

Furthermore, this policy is also able to solve the potential problem, which is the network congestion. The multistage policy provides students with different scores different deadlines, and this will reduce the number of switches and improves the problem of network congestion, since the deadline are different, each group has fewer student.

5 Conclusion

Overall, this paper offers a deeper understanding of the reform of Inner Mongolia's college entrance examination admission system, and proves that the change in the system—from original deferred acceptance, to parallel matching that encourage student to have more choice; and from deferred acceptance to Multistage RIM matching system that are more pareto efficient, is meaningful and solves the negative externalities and problems of the previous system. It was through continuous improvement that we reached the better current mechanism.

The significance of this paper is to explain the reasons behind the changes of the college entrance examination system in Inner Mongolia and the goals to be achieved by the system, so that college entrance examination students can understand the importance of the mechanism in Inner Mongolia, since there are fewer papers that studies this issue in China. On the other hand, this study still has some deficiencies and needs to be supplemented. Because fewer people are following this topic, there are fewer literature to look up. As a result, cases are not quit poor in this paper. What's more, the range of this topic is very small, it focuses on Inner Mongolia province of China, there is not enough diversities of views from different cultural perspectives.

At last, for future research, this topic can be pursued, and focus on the multistage policy of inner Mongolia college admission system, find out whether there are some potential problems about this policy, and are there any difficulties when applying it to

practice. After that, though experiment if available, find out whether other proviences in China can adopt this type of matching system since it's a better matching, and improve the overall level of the matching system in China.

Acknowledgements. I would like to express my special thanks to the professor, the tutor who helped me write the paper, and my parents for giving me a great opportunity to study and complete the project, which also helped me to do a lot of research and learn a lot of new things. I am really thankful to them.

Authors' Contributions. This paper is independently completed by Jianing Bai.

References

1. Yan Chen, Chinese College Admissions and School Choice Reforms: A Theoretical Analysis [J] Journal of Political Economy, 2016, pp. 99-138.
2. D. Gale and L. S. Shapley, College Admissions and the Stability of Marriage [J] Mathematical Association of America, 1962, pp. 9-15.
3. Yan Chen, Ming Jiang, and Our Kesten, An empirical evaluation of Chinese college admissions reforms through a natural experiment [C] The Proceedings of the National Academy of Sciences (PNAS), 2020, pp. 31696–31705.
4. Flip Klijn, Marc Vorsatz, Constrained School Choice under the Immediate Acceptance Mechanism: An Experimental QRE Analysis [J] Barcelona GSE Working Paper Series, 2021, pp. 1-30.
5. Sanders Michael, The problem with Pareto[N] The News Center, 2021.
6. Yan Pu, College admissions in three Chinese provinces: Boston mechanism vs. deferred acceptance mechanism [c] Science Direct, 2021.
7. Xiaohan Zhong and Lin Zhu, The medium-run efficiency consequences of unfair school matching: Evidence from Chinese college admissions[C] Science Direct, 2017.
8. The number of applicants and the admission rate have been climbing [J] College Entrance Examination admission Inquiry center, 2021.
9. Zeng Meng, Research on China's Interactive Mechanism between Higher Education of Law and Senior High School Education [J], International Journal of Sciences, 2021, pp. 4-9.
10. P'eter Bir'o, College admissions with stable score-limits [C] Hungarian Academy of Sciences under its Momemtum Programme, 2012.
11. Morteza Honavar, Behrang Kamali Shahdadi, Stability and immunity to capacity manipulation in large matching markets [J] Science Direct, 2021.
12. Bó, Inácio Guerberoff Lanari, Hakimov, Rustamdjan The iterative deferred acceptance mechanism [J] WZB Berlin Social Science Center, 2016.
13. The 2017 Inner Mongolia college entrance examination admission rate [J] LIUXUE, 2017.