

The problems and solutions of employment for normal students majoring in physics in local colleges and universities

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Abstract: China's higher education has entered the stage of popularization from "elitism". Due to the influence of the original family planning policy and the current high cost of raising children, the source of basic education students in China has been continuously shrinking in recent years. This will lead to a gradual saturation of the number of primary and secondary school teachers nationwide, ultimately resulting in an excess. In this context, the problem of employment difficulties for undergraduate physics students in local universities is becoming increasingly prominent. This article takes local physics normal students as an example to explore the employment problems and solutions. In depth research on the employment issues of undergraduate physics students in local universities can provide theoretical reference for the government, which is conducive to formulating employment policies, alleviating employment pressure, and solving employment problems; On the other hand, it can provide reference for the enrollment and employment departments of local normal universities, which is beneficial for universities to optimize talent cultivation and enhance the employment competitiveness of local normal undergraduate students.

1. Introduction

Local normal colleges or universities are important talent training bases for serving local economic development in China. With the rapid development of higher education, local normal colleges are currently facing the task of transforming into applied undergraduate programs.^[1] However, due to subjective and objective limitations such as geographical location, development level of the school itself, and different national policy tendencies, local colleges and universities have varying degrees of low-quality students from "entrance" to "exit".^[2]

Compared with provincial and ministerial level normal universities, local schools have relatively weak teaching staff and relatively backward educational conditions. These universities have also been unable to make breakthroughs in brand building and social awareness. The employment competitiveness of graduates from local normal universities is relatively inferior to that of key universities of the same type. Especially for local colleges and universities located in third - and fourth tier cities like Tai'an, due to the constraints of the economic development of the region where the

school is located, graduates have limited resources available for employment opportunities, internship practices, and other aspects. In addition, the majority of students from local normal universities come from surrounding rural areas with ordinary family backgrounds, and they receive relatively less social resource support from their families during the employment process.^[3] Furthermore, some rural students often develop a fear mentality in the rapidly changing employment environment due to their own shortcomings in personality, learning ability, social interaction ability, and other aspects.

This article outlines the current employment problems of physics teacher trainees in local universities and proposes some solutions to address these issues. We hope to provide suggestions for the enrollment and employment of physics teacher trainees in local universities.

2. The problems in the employment of physics normal students

2.1 Primary and secondary school teacher positions tend to be saturated

According to the latest data, the research team of Beijing Normal University predicts that by 2035, there will be an excess of approximately 1.5 million primary school teachers and 370000 junior high school teachers nationwide. This trend indicates that there is a significant demand surplus for primary school teachers, while junior high school teachers will go through a process of first shortage and then gradually surplus.

According to the trend of birth population, by 2035, the population born in 2023 will reach the age of 12, which is the sixth grade of primary school. The population born in 2029 will reach the age of 6, which is about to enter the first grade of primary school. The number of permanent residents born in China in 2023 is 9.02 million, which is decreasing year by year. It can be expected that if there are no better adjustments to the birth policy in the future, the birth rate is likely to be less than 8 million, or even lower. We calculate based on an average annual birth population of 8 million, which means 48 million people over a period of 6 years. According to a 1:19 ratio of faculty to students, the number of faculty members is 2.5263 million. According to the current national standard for student teacher ratio, there will be a maximum of over 3 million faculty members. However, according to data released by the Ministry of Education in 2023, there are currently 6.6563 million full-time primary school teachers in China. Therefore, according to this data, there will be more than 1.5 million surplus primary school teachers by 2035. Of course, junior high school also has more than 370000 surplus. The decrease in birth population will inevitably lead to a shrinkage in enrollment scale. It is obvious that we do not need such a large number of teachers now, and we are unable to effectively digest so many talents within the system. This change has brought unprecedented challenges to the teacher training profession.

On the contrary, in recent years, the number of applicants for teacher qualifications has been increasing year by year. As early as the press conference in September 2022, education officials revealed that the number of applicants for the teacher qualification exam had skyrocketed from 172000 ten years ago to 11.442 million that year. In the past decade, the number of applicants for teacher qualification certificates has increased by more than 65 times. In the first half of 2023, the enthusiasm of normal university students for taking the teacher qualification exam remained undiminished, with 4.273 million people registering to take the exam.

In recent years, in addition to the large number of graduates, there have been other factors that have had an impact. For example, the impact of the double reduction policy. After the government proposed the "double reduction" policy, many educational and training teachers came out to participate in the teacher recruitment exam, and the number of people competing for teacher positions was rapidly increasing. Every year, there are some teacher training graduates who have not been able to enter the teaching establishment, and they continue to compete internally.^[4] However, as the national primary and secondary school teacher positions tend to be saturated or even surplus, the

employment problem of local normal students is even worse.

2.2 Diversified sources of teachers

We need to recruit outstanding graduates from non-normal universities with teaching qualifications from the society to teach in primary and secondary schools, and improve the structure of the teaching staff. This regulation was introduced in 1999. Since the Ministry of Education issued the Action Plan for Revitalizing Education in the 21st Century, the source of primary and secondary school teachers in China has changed from just being normal students to being diverse.^[5] The teaching position is also aimed at non normal graduates from all over society. Since 2004, China has implemented a teacher qualification certification system aimed at the society. Due to the stability of the teaching profession compared to other industries, as well as the advantages of holidays, winter and summer vacations, more and more non normal graduates are entering the teaching industry. In addition, since 2015, China has implemented a policy of unified examination for teacher qualification certificates. The previous exemption policy for teacher training graduates has been abolished, and teacher training graduates also need to obtain a teacher qualification certificate. This has increased the employment pressure on graduates of teacher training programs, and once again weakened their employment advantages.

2.3 Weak competitiveness

The competitiveness of graduates from local universities is not strong. Take Taishan University as an example. The predecessor of Taishan University is Tai'an Teachers College, which was founded from junior college to undergraduate. Compared to the old normal universities in Shandong, such as Shandong Normal University, Qufu Normal University, Liaocheng University, Ludong University, etc., the strength of Taishan University is relatively weak. Not to mention compared to some well-known normal universities or 985, 211, and Double First Class comprehensive universities. There is still a certain gap in social awareness, recognition, and influence among local normal universities, and the employment advantages of the students they cultivate are not very significant. Especially now, the requirements for professional qualifications in teaching positions are increasing, and the threshold for the teaching profession is getting higher and higher. Some places require that high school teachers recruited must be graduates of prestigious universities or have a graduate degree, which is also a trend in the future. Most local colleges and universities such as Taishan University have not yet applied for master's degree programs. In addition, newly graduated undergraduate students have limited teaching experience and do not have an advantage in job competition, which is also an important reason for the difficulty of employment for normal university students.

2.4 Graduates with low willingness to teach

With the rapid development of modern technology, more and more emerging professions have emerged. In addition, the entry threshold for teachers is getting higher and higher, and normal students do not want to settle for the status quo. Their ideological concepts have undergone significant changes, and their enthusiasm for teaching is decreasing. The survey of the graduates of Taishan University shows that the number of normal students choosing the teaching profession is declining, while the number of non-normal students choosing the teaching profession is increasing. In addition, for local normal universities, the number of students choosing to take the postgraduate entrance examination is relatively high, and many students have left the teacher education profession through the examination. And these students who take the postgraduate entrance examination are often those with good grades and high comprehensive qualities. They have a higher chance of getting into the teacher's

program, but it is precisely this group of students who choose to pursue further education instead of entering the teaching staff. This also leads to a lower number of fresh undergraduate students from local universities being admitted to the teaching staff.

2.5 Inaccurate positioning of oneself

Graduates have inaccurate self-positioning. Some economically developed cities have higher requirements for physics teachers, requiring undergraduate or graduate students from Double First Class universities, while the requirements for township schools are relatively low. Many graduates feel that the conditions for being a teacher in a township are relatively difficult, and they are unwilling to stay in the township, preferring to stay in the city and work in other professions. Even if they go to a rural high school, they don't want to stay there for a long time, but they want to gradually develop towards the city and big cities. In addition, although the physics graduates of Taishan University will practice in local primary and secondary schools for one semester during their junior year, many students have not adjusted their mentality well. They are perfunctory about the practice and cannot devote themselves to their work. Some students never think about how to make up for their shortcomings and become qualified and excellent teachers, and their enthusiasm for engaging in the education industry gradually weakens.

3. Solutions

Based on the analysis of the employment problem of physics majors in local universities, we believe that in order to solve the current problem of difficult employment for physics majors, both schools and students need to work together to promote the employment of graduates.

3.1 Schools should deepen the reform of talent cultivation

Schools should clarify the direction of education and strengthen the characteristics of teacher education. Deeply studying and implementing the spirit of the "Professional Standards for Middle School Teachers (Trial)" document not only cultivates students' professional knowledge and abilities, but also cultivates their educational sentiments. Schools should strengthen students' sense of belonging and identification with the teaching profession by carrying out various educational and teaching activities. Although local teacher training colleges have all developed into comprehensive universities, they must seize their own teacher training characteristics and strengths. For example, the physics major of Taishan University was formerly the physics education major. The school should consider its own industry background, take the training of comprehensively developed physics teachers as the main training task, and provide qualified and excellent applied professionals for basic education and other industries. Encourage gifted and passionate students to engage in the education for life. Encourage students with scientific research talents or positive enthusiasm for research to take the postgraduate entrance examination and engage in physics research.

Schools should optimize training objectives based on the needs of employers. For physics teacher education majors, efforts should be made to cultivate students' professional qualities as teachers and basic abilities to engage in physics teaching. At the same time, it is necessary to adjust the course structure in line with the times. For example, in today's information age, educational technology is advancing rapidly, so it is necessary to master the latest modern educational technology. Schools should strengthen courses related to educational technology. Furthermore, mathematics and physics are inseparable, and physical problems require the application of mathematics to solve them. Therefore, learning to apply mathematical methods to solve physical problems and mastering mathematical and physical methods proficiently is also a key focus of curriculum reform. In addition

to mastering professional courses, students should also have an understanding of the forefront and latest developments in physics and physics teaching, pay attention to the relationship between theoretical knowledge and scientific innovation, and better understand the importance of basic science.

Strengthen the cultivation of teacher training skills and improve core competitiveness. Based on our understanding of the current employment situation of physics graduates from local universities, there is a common problem of weak competitiveness among graduates. The core of the problem is that teachers have overall poor basic skills and cannot quickly adapt to educational and teaching work. In addition to strengthening educational practice courses, schools should organize targeted teaching competitions to promote students' enthusiasm for learning. Teachers should help students find the joy of education and teaching work, and enhance their longing for the teaching industry. For example, by organizing a Chalk Character Competition, students can improve their ability to write and draw on the board, laying a foundation for the teaching profession. By organizing speech and debate competitions, students can improve their Mandarin proficiency, enhance their expression skills, and enhance their language arts. Especially, we should attach great importance to organizing students to participate in various teaching skills competitions, university physics experiment competitions, physics innovation competitions, etc. These competitions are very effective in cultivating students' basic teaching skills, improving their hands-on ability and innovative consciousness. At the same time, it also realizes the application of what has been learned, putting the theoretical knowledge learned into practice.

The main training goal of local colleges is to cultivate high school physics teachers who serve the local community. Therefore, it is particularly important to strengthen communication with local high schools and understand the current teaching situation of local high schools. On the one hand, schools should attach importance to the internship work of students in local schools. Teachers should help students understand the demand for physics teachers in secondary schools, understand the current teaching status of physics in secondary schools, and cultivate their sense of professional identity. On the other hand, schools should establish close and long-term cooperative relationships with secondary schools. We often hire experienced frontline teachers to undertake undergraduate education and teaching courses in middle schools. To impart their rich teaching experience to students majoring in physics, so that graduates can better familiarize themselves with and adapt to the post employment environment.

Finally, local universities should learn to use various emerging media to promote teacher education majors. The school can use Tiktok, video account, WeChat official account and other publicity. Universities should improve their marketing skills and find ways to increase their visibility, so that students and people from all walks of life can feel the charm of physics and education. Universities in Shandong should also use local resources such as Mount Taishan and the hometown of Confucius and Mencius to publicize their own school running characteristics.

3.2 Students should break through fixed thinking patterns and enhance their competitiveness in employment

Local college students should have a deep understanding of the current employment situation and give themselves an accurate positioning. Every student should learn to analyze their strengths and weaknesses, and not blindly follow the trend. We should abandon the mindset of blindly wanting to develop in cities and not wanting to work in townships. Towns are the places where excellent teachers are most needed, and township education is also an important lever for rural revitalization. The country has policies that favor township teachers in terms of salary benefits, promotion of professional titles, and evaluation of outstanding teachers. There is great potential for the development of township education.

Again, employment should not be limited to public schools. Private schools, western volunteer teaching, and social training and education institutions are also good choices. Physics teacher students should start from their own interests, have a clear positioning for themselves, make future career plans as early as possible, and actively prepare towards this direction during their university years. Students who choose to take the postgraduate entrance examination should study their professional courses seriously and prepare well for engaging in scientific research. Students preparing for the postgraduate entrance examination should take each early research training seriously and accumulate a certain amount of research experience. In addition, they also need to learn more about the research direction of the supervisor they hope to apply for, make necessary preparations for the postgraduate entrance examination interview, and improve their success rate in the postgraduate entrance examination.

Students who choose to teach should strengthen the accumulation and summary of teaching skills and experience, take every lecture, internship, and other practical activities seriously, and continuously lay a foundation for the following teaching work. Students should pay attention to the cultivation of good professional ethics and conduct, continuously improve their comprehensive qualities and basic teaching skills, proficiently master various educational technologies, enhance their personal charm, and enhance their core competitiveness.

Students who choose to work in other industries should carefully understand the prospects of the industry and go on internships in relevant enterprises to understand the current industry situation and the knowledge they need to learn, and purposefully cultivate their professional skills. At the same time, graduates from local universities should also keep up with the pace of local socio-economic development, update their employment concepts, and improve their work awareness in serving the local area.

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