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CULTIVATION STRATEGIES OF NORMAL STUDENTS IN PHYSICS FROM THE PERSPECTIVE OF “EXCELLENT TEACHERS” TRAINING

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Abstract—Teacher education has played a leading role in educating competent teachers. Excellent physics teachers are a representative of the teacher group. They are beyond the ordinary teachers in the professional development, and have good capability of sustainable development. Based on the program of “Excellent Teachers” Training, we discussed the strategies of training normal students in physics.

Keywords—excellent physics teacher, normal student, teacher professional development

I. INTRODUCTION

On March 2012, Chinese Ministry of Education announced *the Opinions of the Ministry of Education on Improving the Quality of Higher Education in an All-round Way*. The Opinions point out that implementing the program for training excellent teachers and exploring the training model of primary and middle schools, especially for the schools in rural areas. It promotes adjusting measures to the school's condition, exploring the talents' training model integrated with scientific basis, practical ability and humanistic quality. At present, many normal universities have carried out the pilot of the program for training excellent teacher. The implementation of the program can better achieve the value pursuit of higher normal education [1, 2].

Teacher education is of paramount importance in educating competent teachers for society's educational system and for developing the kind of professional quality in its teachers that ensures a lifelong teaching career [3]. Teacher education has played a leading and decisive role in improving their quality and strengthening the construction of teachers' group. In the new era, higher normal universities shoulder the important tasks of cultivating high-quality teachers, participating in the training of in-service teachers, and training outstanding teachers for the basic education. In view of this, the higher

normal universities have to explore the reform of teachers' education model fundamentally, and combine with teachers' pre-service and post-vocational education to improve the overall level of teachers' education and the teachers' comprehensive quality and professional level [4-6].

Under the background of the implementation of the excellent teacher training program, the higher normal physics education needs to carry out the education and teaching reform so as to cultivate the high quality physics teaching team. This thesis focus on the teaching status quo and teaching practice of pedagogic specialty of physics in normal universities to discuss the connotation of excellent physics teacher and the strategies of cultivating the physics teachers.

II. CHARACTERISTICS OF EXCELLENT PHYSICS TEACHERS

The concept of excellent teachers is derived from the study of teachers' professionalization, which is the improvement of teachers' professional level. Excellent teacher is a representative in the teacher group and is the decisive force to boost innovation and development of education and teaching. The teachers are not only beyond the ordinary teachers in the professional knowledge, skills and moral qualities, but also able to expand and enhance their professional development, possessing good capability of sustainable development. In short, excellent physics teachers have the following characteristics:

Perfect and rational knowledge structure. Excellent physics teachers have a perfect knowledge structure than other physics teacher. Excellent physics teachers accumulate all kinds of knowledge which is concerned to the teaching and learning in the professional development process, while ordinary physics teachers mainly use scientific and cultural knowledge. Excellent physics teachers not only have a solid professional knowledge of physics, but also master enough education management knowledge and humanity knowledge. They have good scientific and humanistic literacy, and international vision. The more important thing is that they are able to



update and enrich their own knowledge all the time, thus, they can play a leading role in the physics teaching field.

Good teaching skill and capability. Teaching skills help teachers to organize classroom teaching, complete teaching tasks, achieve specified teaching objectives. Teaching skills can better reflect teachers' ability, which is accumulated in the teaching process. For excellent physics teachers, their teaching skill and ability have developed to a teaching art that can bring out vivid and interesting teaching and learning so as to improve students' enthusiasm. Good teaching abilities are mainly embodied in the language expression, blackboard writing and drawing, the implementation and innovation of experiment, the organization of teaching materials, the teaching methods and the interaction with students. Meanwhile, using the teaching resources in the class efficiently that the teachers play a demonstration and role model.

Good educational teaching and research ability. Excellent physics teachers carry out regular educational scientific research according to teaching activities. The teacher puts himself as a researcher to examine, analyze and rethink various problems in the practice of physics teaching, and makes scientific analysis and evaluation on his own teaching behavior and student's learning to make a conclusion and form a certain level of regular understanding of the studying object. Excellent physics teachers will use the daily teaching work to select the research topic and collect important information, diligent observation. They are good at discovering, constantly accumulate first-hand information of educational research, and adhere to the theory with practice, paying attention to application and practice.

Good information literacy. Information literacy is highly important not only for physics teachers' teaching and lifelong learning but also fundamental for their own subject disciplines. Information literacy enables teachers to master content and extend their investigations, become more self-directed, and assume greater control over their own teaching and learning. Information literacy encompasses knowledge of one's information concerns and needs, and the ability to identify, locate, evaluate, organize and effectively create, use and communicate information to address issues or problems at hand; it is a prerequisite for participating effectively in the Information Society, and is part of the basic human right of life long learning [7]. Excellent physics who has good information literacy has the ability to use information technology tools; keen sense of information and the capability to take the initiative to obtain, collection, collation, assessment, utilization, transmission and exchange of information; a better information collaboration awareness and cooperation ability; information ethics and moral cultivation; the ability to solve problem from obtained information, and to begin creative thinking activities for the development.

Excellent experimental skill and ability. The acquisition of experimental skills is regarded as an important part of science education. Physics is a science based on experiments. The instruments, methods, scheme, operation of physics experiment have great significance in helping teachers' education. Excellent physics teachers have good experimental abilities, such as experiment awareness; innovation consciousness to experiments; extract physics image and meaning from daily life and experimental phenomenon. Excellent physics teachers' experimental skills can be classified as follows: Experiment designing and planning; Experimental apparatus designing, formation, examination; Development of an experimental procedure; Data collection and presentation in appropriate format (observation, reading instruments and presentation of results with appropriate accuracy, replication of observations and significant figures); Analysis of experimental results [8,9].

Good educational wisdom. The professional wisdom of teachers is the crystallization of the accumulation of long-term education and teaching experience, which is characterized by language expression ability; multidimensional organization and management ability; the communication ability between teachers and students is one of the basic ability; ability to regulate and control during teaching; the educational wit to deal with the contradictions. With the educational wisdom, physics teachers can make more scientific and rational teaching design, and can deeply feel the challenges from education on teachers and enjoy the charm of education and teaching.

Good personal qualities. Good personality is of great significance for students' learning and development. Good personality of teachers can help to create and maintain good teacher-student interactive activities with indelible influence on improving teaching quality. Excellent physics teachers have noble moral characters, healthy physique and psychological quality, high sense of responsibility and strong sense of achievement motivation, to set good example in education and exert a subtle influence on education for students.

III. THE CULTIVATION STRATEGY OF NORMAL STUDENTS IN PHYSICS

Based on the teachers' professional development theory and higher normal education in physics, we explore the effective strategies for the cultivation of normal students in physics and the reform on physics teacher education.

A. Optimization of the training program on physics talents

According to the characteristics of local undergraduate colleges, and the excellent teachers' education training program, we have developed the four-year physics talents training scheme in combination with the excellent teachers'



model, established the application-oriented talents training model with thick foundation, wide caliber, opened personality, seeking innovation and cherishing quality [10]. By strengthening the education on ideal and belief, professional emotion and vocational training, the goal of talent training can be continuously enhanced. According to the students' learning will, ability level, professional emotion and development orientation, the students are classified for training. These students, who have firm teaching ideal and faith, solid professional foundation, outstanding education and teaching capability, and good self-development awareness, will be cultivated to excellent physics teachers.

B. Constructing the Physics Teacher's Education Platform in the Big Data Age

The emergence of big data provides a new perspective for the cultivation of excellent physics teachers. Based on big data technology, the network teaching platform is established by integrating of physics education resources, the curriculum system is optimized. The platform meets the requirements of excellent teachers' education and training. Through the construction of an integrated platform and standardized database, the professional development process of teachers can be effectively opened up, and the lifelong physics teacher education is achieved. Based on big data analysis, the teaching rules can be tapped in the process of physics teachers' training, provides more scientific education decision-making, more reasonable management system and more personalized curriculum system for school education, so that students master all kinds of teaching methods, such as multimedia, MOOC, Micro-Course Online Video, and Flipped Classroom.

C. Innovation on the Talents Training Model of Physics Teacher

In order to cultivate excellent physics teachers, we have promoted and deepened the reform of teaching content with curriculum reform as the core, strengthened the openness and practice of teaching, enhanced the teaching practice, education and scientific research and other aspects of training, and explored the hierarchical teaching, inquiry teaching and tutor system.

Based on the concept of collaborative innovation, normal universities should establish a cooperative community with primary and middle schools, and build a training base for physics students. Primary and middle schools are important bases for normal students' teaching practice, so the universities should strengthen the ties with the schools and establish teachers' educational cooperation committees to seek the development of physics teachers' education. In practice teaching, the normal physics students pay regular visit to primary and middle school and practice there to achieve in-depth cooperation between higher education and basic education. Through the solid and effective practice teaching,

the normal students consolidated the professional theory and educational theory possess the initial education and teaching capability to increase pre-teaching practice experience, which lay a sound foundation for them becoming excellent teachers with knowledge, capability and personality [11].

Teaching skill competitions play an important role in developing the basic teaching skills, education and teaching capability of students. Teaching skill competition is an effective way to stimulate students' interests in learning and exercise students' learning skills. We have integrated different levels of teaching skills competitions together to form a systematic and complete competition system, and mobilized students in physics specialty to participate in the race. Through the competitions, students can cultivate interest in learning, stimulate learning initiative, and improve their teaching skills and experimental skills. After practicing and taking part in competitions, the normal physics students can make a further understanding of education and teaching skills and improve their professional quality and educational capability.

IV. CONCLUSION

The fundamental task of teachers is to teach and educate students, which requires the excellent physics teacher with solid and profound theoretical knowledge. On this basis, excellent physics teachers should be able to apply the theory to the teaching practice, and such akin of ability should be the core indicators of excellence physics teachers. An excellent physics teacher should not simply copy the dogma, but flexibly use knowledge that require the combination of teaching capability, comprehensive ability and innovative ability. Therefore, during the process of cultivating excellent physics teacher, the ability training is the core work.

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