

# ***Exploration and Practice of Stratified Teaching in Elementary Courses in Agricultural and Forestry Colleges and Universities***

—A Case Study of Beijing University of Agriculture

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**Abstract**—Illustrated by the case of Beijing University of Agriculture, this paper explores the necessity and feasibility of stratified teaching in elementary courses in agricultural and forestry colleges and universities. And combining with implementation process and effect analysis of stratified teaching in elementary courses, the problems that should be paid attention to in stratified teaching in elementary courses are put forward. Widespread propaganda can lead to students' correct understanding of stratified teaching. Two-way selection between teachers and students can allocate teachers in a rational manner. The implementation of rolling system can deepen stratified teaching. Innovations on teaching management and students' management can guarantee stratified teaching.

**Keywords**—agricultural and forestry colleges and universities, elementary courses, stratified teaching, exploration, practice

## I. INTRODUCTION

Since the increasing expansion of enrollment in our country's institutions of higher learning in 1999, institutions of higher learning has transformed from elite education into mass education. The aptitude of students differs due to the increased enrollment, different background of students, regional differences and differences between urban and rural areas. Therefore, in the past elementary courses teaching, the teaching mode which divides students into several classes at random or imparts knowledge into students without considering their aptitudes is not appropriate, because many problems appear in this mode, for example, knowledge imparted by teachers in classes cannot satisfy those students with high aptitudes, those students with low aptitudes cannot digest knowledge they obtain in classes, and it is hard to control teaching progress. <sup>[1]</sup>Under such situation, Beijing University of Agriculture has begun to carry out the mode of stratified teaching in elementary courses teaching since 2013 and has achieved good performance.

## II. THE CONNOTATION OF STRATIFIED TEACHING

Stratified teaching refers to the one which divides students into class A, B, C and so on and so forth with different levels

in which different teaching objectives, teaching contents, teaching methods and examinations and evaluation are used in accordance with students' academic performance, cognitive ability, learning ability, development ability, etc. Such stratified teaching can make students at different levels obtain optimal development, thus meeting the requirements of social development goals of different levels.<sup>[2]</sup>

## III. THE NECESSITY AND FEASIBILITY OF STRATIFIED TEACHING IN ELEMENTARY COURSES

### A. Theoretical foundation of stratified teaching in elementary courses

#### 1) Confucius' idea on education of "teaching students according to their aptitude"

Confucius, a great thinker and educator in ancient time, proposed the idea on education of "teaching students according to their aptitude", which emphasizes that teachers should adopt different teaching methods in accordance with students' character and personality in order to educate them individually, thus giving full play to students' potential and obtaining development and progress. Such idea of teaching students according to their aptitude is the essence of Chinese educational idea, which has been following over the past two thousand years. What stratified teaching in elementary courses does is to carry out targeted teaching in accordance with students' individual differences to stimulate their initiative and enthusiasm, cultivate their study interests and promote their all-round development and growth. Therefore, the nature of stratified teaching is the same with the one of teaching students according to their aptitude.<sup>[3]</sup>

#### 2) Lev Semyonovich Vygostky's theory of "zone of proximal development"

Lev Semyonovich Vygostky, a famous Soviet educator and psychologist, introduced the theory of "zone of proximal development", which holds that there are two levels of development for students: one is the level of actual development at which students are capable of analyzing and solving problems independently, one is the level of possible

development at which students can improve and develop their abilities and potential assisted by teaching. The difference between these two levels is the zone of proximal development. Teaching should base on the zone of proximal development of students to fully mobilize students' enthusiasm for learning and develop their potential, thus going beyond "zone of proximal development" and entering into next "zone of proximal development". What "zone of proximal development" is reflected in the stratified teaching of elementary courses is to take students' individual difference and development potential into consideration, set up different teaching objectives, adopt different teaching content and methods and guide students to go beyond "zone of proximal development".<sup>[4]</sup>

### 3) Benjamin Bloom's theory of "mastery learning"

American famous educator and psychologist Benjamin Bloom proposed the theory of "mastery learning", which holds that in teaching, nearly every students can master the contents of study only by giving them adequate time to study and adopting appropriate teaching methods. Therefore, on the basis of collective teaching, teachers should be assisted by frequent and timely feedback and individualized tutoring in order to help students meet the standards set by teaching objectives. Stratified teaching gives full expression to the theory of "mastery of learning", provides corresponding tutoring and assistance for students at different levels and makes them meet the standard of related teaching objectives, thus improving overall teaching quality.<sup>[5]</sup>

## B. Practical foundation of stratified teaching in elementary courses

### 1) The actual situation in institutions of higher learning featuring mass and popularization requires implementing stratified teaching

American scholar Martin Trow divides higher education into three stages: "elite, mass and popularization". He believes that with 15% gross rate of enrollment, higher education can be considered as mass education. In 2010, national gross rate of enrollment in institutions of higher learning reached 26.5% while this figure reached 59% in Beijing which is the first city to enter into the stage of mass education in institutions of higher learning. Before the mass education, the higher education in our country was at elite stage where most of college students were the excellent among peers and there was no difference in their academic performance and cognitive ability. Therefore, by using the method of collective teaching, most students can meet teaching objectives. After mass education, students can continue their studies in colleges only with normal academic performance. Beijing University of Agriculture is an urban-type agricultural and forestry colleges and universities, the students of which are mainly from Beijing. And the higher education in Beijing has already entered into the stage of popularization and the academic level and ability of its students have decreased significantly. There is huge difference among students from other cities and provinces. It is not suited anymore to arrange students with different academic levels in the same class by adopting the same teaching contents and methods. The teaching method that focuses on "the majority of students with intermediate

academic performance" and "treating students without considering their aptitude" will make those students who have excellent academic performance lose study enthusiasm due to simple contents of study and discourage those students with poor academic performance due to difficulties in study. Therefore, the actual situation in institutions of higher learning featuring mass and popularization requires implementing stratified teaching.

### 2) Stratified teaching is conducive to save teaching resources and create favorable atmosphere for study

The reasons to implement stratified teaching is that teaching students with the same academic level can facilitate teachers to save the time of knowing students' learning level and change teaching difficulties and progress without adjusting teaching objectives repeatedly, which is helpful for teachers to save more time to research teaching, organize teaching in a scientific and reasonable way and guarantee teaching quality. It is easier to see how much progress students with same academic level have achieved in the same class, thus measuring how hard they have studied. Teachers teaching classes in which students have the same academic level can also measure their teaching effect, thus helping them improve teaching methods and teaching quality. Therefore, the implementation of stratified teaching can facilitate to create a favorable atmosphere in which competitions, mutual improvement and enhancement can be formed among teachers and students, stimulate students' enthusiasm and initiative and promote teachers to actively participate in teaching research, reform teaching method and improve educational and teaching quality.

## IV. THE IMPLEMENTATION OF STRATIFIED TEACHING IN ELEMENTARY COURSES

Since September 2013, Beijing University of Agriculture has begun to implement stratified teaching in elementary courses in the whole university which is led by basic teaching department and joined by each school, academic affairs office, students affairs office and other related functional departments.

### A. Stratify students into different classes

When school starts at the beginning of September every year, academic affairs office, students affairs office and each secondary schools will publicize the meaning of stratified teaching in the education for freshman. Joined by academic affairs office, basic teaching department will conduct a comprehensive test to examine students' academic level. Such test designed by basic teaching department and organized by academic affairs office for the time and test room will examine students' academic performance in English, math, chemistry, physics and other basic subjects. Combining with students' performance in college entrance examination, their own character and personal willingness and based on majors but not limited by them, this test divides students within the college into three levels: A, B and C, among which A level represents that students have strong academic foundation and have great interest in study, C level represents that students have poor academic foundation and have lots of difficulties in study, B level is between A level and C level which means that students have some academic foundation with poor

learning motivation. The proportions of these three levels are 20%, 60% and 20% respectively.<sup>[6]</sup>

#### *B. Stratify teaching contents and objectives and adopt corresponding teaching methods*

Because there is huge difference of academic level and cognitive ability for students in A, B and C level, teachers should stratify in the light of actual situation when setting teaching objectives and arranging teaching contents. According to the principle of teaching students according to their aptitude, for students in A level, teachers should mainly cultivate their ability on innovative thinking, practice and self-study. As regards teaching method, heuristic teaching should be mainly adopted. In the aspect of English teaching, the teaching objective for students in A level is to cultivate their English communication ability by strengthening oral training. Teachers should increase experiments in the courses of math, chemistry and physics and add advanced mathematics, advanced chemistry and advanced physics to satisfy students' learning needs. As for students in B level which are the largest number among three levels, diagnostic teaching should be used by teachers to conduct targeted teaching while combining students' weak parts and difficult parts. In English teaching, it should take both CET-4 test and oral practice into consideration. In the teaching of math, physics and chemistry, students can select advanced mathematics, advanced chemistry, advanced physics, etc. as their optional courses to satisfy their learning needs. As for students in C level, the difficulty level of teaching contents should be decrease properly. On the basis of guiding teaching, teachers should mainly cultivate students' study interest, guide them to improve progressively and constantly encourage them to achieve progress. The goal of English teaching is to help students meet the demands of CET-4 and finish the basic requirements of syllabus. While the courses such as math, physics and chemistry is to help students understand basic concepts, strengthen tutoring, get to know their difficulties in study timely and help them meet the basic requirements of teaching objectives as soon as possible.<sup>[7]</sup>

#### *C. Evaluation and test of stratification*

Due to different teaching contents and objectives for students in A, B and C level, examinations and evaluation should also be different for these students. As for the final examination of elementary courses, it should be designed in a stratified manner. It should handle well with the difficulty level of test papers for students in different levels and pay attention to the progress students have made. How much progress students have made compared to original academic performance should be considered as the standard to evaluate whether teaching objectives have been finished. However, the examination performance cannot be considered as quantitative standards when appraising and electing excellent students, because such evaluation will cause serious unfair on students in A and B level and will discourage them. It is more scientific to multiply by certain coefficient in accordance with the difficulty level of examination, which will make evaluation more just, fair and reasonable.

### V. EFFECT ANALYSIS OF STRATIFIED TEACHING IN ELEMENTARY COURSES

#### *A. The teaching quality has been improved significantly*

"Stratified teaching" has a remarkable influence on students' academic performance. In 2014, our college's students made outstanding achievement in chemical competition with ten groups of students winning prizes, which make our college in the second place in this competition in the city. In 2014, our students won national second prize in China Undergraduate Mathematical Contest in Modeling --the best achievement of all time. In 2014, one student won the first prize, six students won the second prize and nine students won the third prize in level C of National English Competition for College Students. In 2014, the CET-4 pass rate of our college for the first attempt increased 10.4% compared with last year, exceeding 50%.

#### *B. Students' learning atmosphere has remarkably improved*

After the implementation of stratified teaching, students' learning atmosphere has remarkably improved in the study of elementary course. In the past, elementary courses were paid less attention to. The phenomenon that students cannot graduate in a normal way every year partly because of failure of elementary courses has been changed. The design of teaching contents and objectives should accord with students' cognitive ability and psychological characteristics. Students' study interest and enthusiasm have been fully mobilized. In various disciplinary contests such as National English Competition for College Students, China Undergraduate Mathematical Contest in Modeling, Chemical Experiment Contest for College Students, Undergraduate Physical Experiment Competition of Beijing organized by our college and Beijing, although students in C level have weak academic foundation, they actively took part in these contests with great confidence and made impressive achievements, some even performing better than students in A and B level.

### VI. PROBLEMS THAT SHOULD BE PAID ATTENTION TO IN STRATIFIED TEACHING IN ELEMENTARY COURSES

#### *A. Widespread propaganda can lead to students' correct understanding of stratified teaching*

It should let students understand that the aim of stratified teaching does not classify student into different levels on purpose but is to make them obtain the most suitable education by various ways of publicity. The differences among each level are neither superior nor inferior to each other. The purpose of stratification is to improve teaching quality. Besides the differences in teaching contents, methods, progress and objectives, students in A, B and C level are equipped with the same teaching hardware and software such as the same teachers allocation and teaching facilities. Students are treated as equal by our college. It should eliminate students' doubt, prevent students in C level from feeling depressed and the sense of inferiority and exhort students in A level not to be complacent and to study hard.

*B. Two-way selection between teachers and students can allocate teachers in a rational manner*

The aim of stratified teaching is to provide the best education for students which is suited to their academic level and cognitive ability. In the aspect of teachers' allocation, what we need to do is to ensure that every student can share the best teaching resources equally. In order to let each teacher know more about students in different levels and guarantee that students can share faculties equally, Beijing University of Agriculture adopts the mode of "two-way selection between teachers and students". The so-called two-way selection between teachers and students is that, on the one hand, students can choose their own satisfying teachers according to teachers' teaching attitude, methods and experience, etc., on the other hand, teachers can choose classes they want to teach according to students' learning attitude, ability, interests and specialties, etc. At the beginning of each term, basic teaching department sends out the form for asking for suggestions on "two-way selection between teachers and students" to students at each level. The ages, title of technical posts, specialty, etc. of teachers who teach elementary course are publicized to students. On the basis of extensively soliciting opinions from students and according to the will of vast majority students, students can choose 1 to 5 teachers suited to their level. Meanwhile, teachers are divided into three levels, that are teachers that students like, teachers that students can accept and teachers that students cannot accept. On the basis of result of choice of teachers by students, teachers in basic teaching department can choose the classes they want to teach in accordance with their own opinions.

*C. The implementation of rolling system can deepen stratified teaching.*

In stratified teaching, rolling system is applied to manage the stratification. At the end of each semester, adjustment will be made for stratified students according to students' academic performance, teachers' reference and students' willingness. Students who make progress in their academic performance can "rise into a higher level" and those who are backwards in their study must "decline into a lower level", which will prevent such situation as excellent students in A level think they are top students forever and slow students in C level consider they are poor at academic level forever from happening. Teachers should encourage students to take positive attitude in stratified teaching. It should make students in C level feel teachers' expectations on them rather than discrimination and make students in A and B level study hard and not proud and complacent. And it should make students at all level believe that as long as they study hard, they can perform well no matter which level they are in. Meanwhile, such teaching mode can create competitive environment for students and build sound study atmosphere.

*D. Innovations on teaching management and students' management can guarantee stratified teaching.*

Stratified teaching brings new problems for the management of teaching and students and breaks settled pattern in which students are managed by each corresponding secondary schools. In teaching students in the same level, members of classes from different schools and majors will often change due to the implementation of rolling system. Therefore, there is little exchange among students and lacks of cohesion and centripetal force in classes. Under such situation, it should innovate the management on teaching and students, establish class committee for the class of stratified teaching, strengthen its sense of responsibility and supervise students' attendance performance. Additionally, the awareness that teachers in such classes are both organizers of classes and managers of teaching should be enhanced. It should strengthen exchange and communication between counselors and the heads of classes of each secondary schools. Students workers should take part in the management of students with concerted effort. Teaching management organization of stratification should be established, the leading group of which consists of principal, vice principal in charge of teaching, academic affairs office, students affairs office and leaders of basic teaching department. They will supervise and guide stratified teaching at any time, conduct surveys among teachers and students at regular and irregular basis solve new situations and problems existing in stratified teaching timely and ensure that stratified teaching goes well.

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