A level-based teaching model for university sports education

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ABSTRACT: Students are individuals and, therefore, are different from each other. Thus, the traditional teaching mode is not beneficial in enhancing individual students' potential because it regards them as a group. However, the *level-based* teaching model embodies a *people-oriented* educational approach. This teaching model was tested by using experimental and control groups of students majoring in environmental engineering. This model was evaluated by analysing the results; and other methods were also used to stimulate the students' learning initiative and promote the improvement of teaching quality. Results indicate that under the level-based teaching model, performance of the students in the experimental group was superior to that of students in the control group with regard to various evaluation indices. The results show that this is a superior teaching model, and is worthy of further popularisation and use for reference.

INTRODUCTION

The range of differences between students is rarely taken into consideration in the traditional classroom-teaching model; this situation, eventually, generates the phenomenon of polarisation [1][2]. In the so-called *classical* type of teaching model, the individual potential of students is neither taken into account nor cultivated. Furthermore, the learning interest and passion of the students themselves may be inhibited; thus, hindering their positive and healthy development. A favourable learning effect may, therefore, be lost with low teaching efficiency even with the contribution of abundant teaching strength [3]. Therefore, the level-based teaching model is needed as it may resolve these issues.

Teaching in levels involves having an accurate understanding of a student's basic status, including the degree of learning, their learning capacity, and their preferences, before developing teaching tasks. This approach prominently highlights a *people-oriented* educational idea, divides students into several levels (mainly according to comprehensive factors), and determines an appropriate teaching solution to allow students at different levels to obtain a maximum development [4].

This type of a model envisages the individual differences between students and formulates a corresponding teaching solution according to the learning capacity of different students. Thus, this model is more purposeful and pertinent than other teaching models [5]. The level-based model cannot only be exclusively applied to the setting aspect of teaching content, but also to each discipline, and the evaluation criteria of students to sufficiently indicate the teaching and evaluation at different levels [6].

This innovative level-based teaching model may help promote awareness of the individual development of each student. This approach embodies a *people-oriented* teaching philosophy by enabling students to become the main body of the teaching classroom [7].

This approach also creates a relaxed and enjoyable learning atmosphere for students, improves their desire to participate in the classroom and enhances their confidence in learning. Further, such an atmosphere not only improves teaching efficiency, but also motivates students' learning initiative, enhances their inherent potential, and lays a good foundation for a student's future development, which is the paramount objective of teaching [8].

CONSTRUCTION OF THE LEVEL-BASED TEACHING MODEL

The construction of the level-based teaching model consists of the following aspects: 1) implementation of scientific and rational system for recognising credit; 2) setting of a scientific and rational teaching curriculum; 3) adoption of an independent course selection model on the Internet; and 4) taking full advantage of existing school resources.

The teaching in levels for sports can be taken as an example. Research on the advantages and roles of this teaching model with respect to the traditional teaching model has been conducted. On the basis of multiple studies on physical education, academic teachers, site facilities and traditional sports models, the sports curriculum levels model has been created.

Basic Content of the Physical Education Curriculum Level-based Model

The physical education curriculum level-based model can be classified into three types: an elementary course of special items, a technical course of special items and a skills training course. The elementary course is responsible for improving students' physical fitness and basic skills. The primary purposes of the course are to help the students transit their physical qualities from middle school to college, stimulate and cultivate the students' interest in exercise and develop some basic exercise skills. This curriculum is set up with rational and appropriate theoretical course physically, physical fitness and basic skill training.

The technical course focuses on cultivating students' specific skills and concepts of physical education. The curriculum in different levels should be set up according to the individual differences of students to adapt to the learning degree of students at different levels. This curriculum mainly cultivates the basic skills and strategy awareness relating to each exercise.

Skills training courses can promote students' skills improvement and habits cultivation. The main purpose of such a course is to create an educational platform for self-improvement and to inculcate the concept of sports for students, which is based on the *team* as a unit.

Evaluation Model of the Teaching Effects of the Based-on-Level Teaching Model

The scientific and rational evaluation model of the teaching effect is a significant basis for assessing the teaching model. The author of this article has adopted the *fuzzy analytical hierarchy process* to construct an evaluation system for the classroom-teaching quality.

The fuzzy analytical hierarchy process is based on a 0.1-0.9 scale, which can accurately describe the relative importance of any two factors with respect to a certain criterion. Furthermore, transforming a fuzzy consistent matrix from a priority judgment matrix meets the condition of consistency; thus, a consistency check is unnecessary. The fuzzy analytical hierarchy process also resolves the rate of convergence and the issue of accuracy. The detailed steps are as follows:

1. Establish a precedence relation matrix;
2. Transform the precedence relation matrix to an obscure consistent matrix;
3. Calculate the weighted value of each factor;
4. Translate the important weights in each level into a comprehensive weight with regard to the overall objective;
5. Obtain the order of advantage and disadvantage according to the evaluation results.

TEACHING EXPERIMENT OF THE LEVEL-BASED TEACHING MODEL

To understand the effect of the level-based teaching model of the physical curriculum in levels, the author conducted research on the teaching condition of a basketball curriculum, with students majoring in environmental engineering. Two classes (total of 120 students) intending to major in environmental engineering from the public physical education classes were selected as the research object.

One class was set up as an experimental group, and the other as a control group. A random sample in the experimental and control groups was taken. Both classes were uniform in terms of teachers, teaching content, schedule, site and apparatus. To guarantee the reliability of the data used in the experiment, the assessment was conducted by two senior basketball teachers and a blind test was carried out for the experimental results. At the same time, the student sequences of the experimental and control groups were misarranged to ensure the objectivity of the experimental results. The teaching of both groups used the following methods:

Teaching Method in the Experimental Group

The teaching level-based method was adopted for students in the experimental group. Specific operations were that with regard to students with an inadequate foundation, the teacher initially imparts a fundamental theoretical education and works on their physical quality. The teacher, then, conducts a site demonstration of some simple actions, such as ball tapping and ball passing, and requires the students to do the same to gradually improve the students' basic skills.

For average-level students, the teacher guides them in developing their skills, such as in shooting method or ball handling while running, and jumping and shooting, and lets the students communicate and learn from each other to make progress in the course being studied.

For students at higher levels, the teacher focuses on lifting the students' exercise strategy and exercise coordination, and on the practice of difficult actions, such as the shooting at fixed points, and team competition to further perfect the students' skills. Finally, when evaluating the learning effect on the students, the different evaluation systems can be set simultaneously, the evaluation systems arranged from low-to-high for students in the elementary, average and advance levels.

Teaching Method in the Control Group

Dominated by experimental grouping and project design in the learning organisation, the students continuously discover and can raise questions under the direction of teachers to learn about the project, and enhance their learning and knowledge-seeking. Relevant literature is collected through various channels, such as the Internet, books and newspapers, and relevant building characteristics can be surveyed on site to develop design thinking, conduct practical tests, improve defects and summarise the design experience. These steps are conducted to further deepen the knowledge and application ability.

For the students in the control group, the uniform teaching method can be adopted. This method requires that each student learns slowly the foundation of basketball in this teaching method, including the study of theoretical knowledge, ball tapping, ball passing, ball dribbling and ball shooting, to put in place a uniform evaluation standard for assessing the final learning effect. This method also applies the same evaluation examination and the same actions in the examination.

Prior to the commencement of the experiment, the intelligence, basketball basic skills, and physical qualities of the students of the two classes should be evaluated to ensure that the basic consistency of the foundation of both classes do not exhibit obvious differences.

EXPERIMENTAL RESULT AND EFFECT APPRAISAL

Experimental Results

After finishing the one-semester learning course, statistical analysis was conducted for the learning condition of the students' basketball skills in the experimental and control groups. The groups had considerably different performance levels, thus indicating that the performance of the experimental group that employed the based-level teaching model was obviously better than that of the control group, which used the traditional teaching model ($p < 0.05$). The results are shown in Table 1:

Table 1: Comparison table of basic basketball scores after the experiment between experimental and control groups.

Group	No. of people	Reached standard of ball passing	Skill appraisal of ball passing	Reached standard of ball shooting	Skill appraisal of ball shooting
Experimental class	120	42.83 ± 1.78	24.06 ± 0.41	42.78 ± 1.81	24.03 ± 0.44
Control class	120	24.06 ± 0.41	18.69 ± 3.10	24.90 ± 5.64	17.88 ± 2.91
T		2.851	2.867	2.614	2.613
p		0.0413	0.0327	0.0218	0.0314

Appraisal on Teaching Effect

The evaluation index system was determined. The students' comprehensive evaluation levels of learning quality were set as the target levels, and the four fields involved in the evaluation were set as the criterion levels. The recursion order hierarchy structure was, then, established in succession, as shown in Table 2.

Table 2: Teaching quality evaluation index system.

Target level	Criterion level	Index level
Learning quality Comprehensive evaluation A	Learning attitude B_1	Attend class and leave class on time, never be absent from class C_1
		Prepare knowledge satisfactorily and be active in class C_2
		Finish homework earnestly C_3
	Learning method B_2	Speed up the learning of new content of the curriculum C_4
		Capacity to collect and manage new information C_5
		Ability to cooperate and communicate among students C_6
	Learning content B_3	Basically understand or grasp the contents of curriculum C_7
		Be able to conduct divergent learning towards knowledge learned C_8
		Accomplishment condition of the daily teaching task C_9
	Learning effect B_4	Improve test score or class ranking C_{10}
		Improve personal quality or team awareness C_{11}

The precedence relation matrix was constructed and the weighted value of each factor was calculated. On the basis of the level structural table, the precedence relation matrix was established and was, then, transformed into a fuzzy consistent matrix. Thereafter, the weighted value of each factor in the fuzzy matrix was calculated to improve the resolution ratio of the sorting result.

The important weighted value of each level was, then, translated into comprehensive weighted values of the overall target.

Table 3: Comprehensive weights.

Index	B_1	B_2	B_3	B_4	Weight of index
	0.2250	0.2750	0.2500	0.2500	
C_1	0.3333				0.0750
C_2	0.3667				0.0825
C_3	0.3000				0.0675
C_4		0.3000			0.0825
C_5		0.3500			0.0963
C_6		0.3500			0.0963
C_7			0.2833		0.0707
C_8			0.3500		0.0875
C_9			0.3667		0.0917
C_{10}				0.4500	0.1125
C_{11}				0.5500	0.1375

Table 3 shows that the students' capacity and quality in the level-based teaching model were enhanced. This index also has a maximum weight; thus, this index conforms to the requirements of talent cultivation. The comprehensive evaluation of the learning effect of five students in different levels was conducted. The marks of the five students' questionnaire survey are shown in Table 4.

The full score of each index was assumed to be 10. Thereafter, the proportion of each score corresponding to each index was determined (see Table 5).

Table 4: Students' questionnaire.

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
A	8	9	9	8	7	9	9	8	9	9	9
B	9	9	9	9	8	8	8	8	9	9	8
C	9	9	9	9	9	9	6	9	9	9	7
D	9	9	9	9	9	9	9	9	9	7	6
E	9	9	7	9	9	7	9	9	9	9	8

Table 5: Proportion of each score in each index.

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
A	0.8	0.9	0.9	0.8	0.7	0.9	0.9	0.8	0.9	0.9	0.9
B	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.9	0.8
C	0.9	0.9	0.9	0.9	0.9	0.9	0.6	0.9	0.9	0.9	0.7
D	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.7	0.6
E	0.9	0.9	0.7	0.9	0.9	0.7	0.9	0.9	0.9	0.9	0.8

The general sorting of the weight of each appraisal object was confirmed. According to the results, the overall sequence of these five students was A > B > C > D > E. The results obtained by this method correspond to the results achieved by the virtue of teacher evaluation, students' scores and the mutual scoring among students to reflect the size relationship of each evaluation index.

CONCLUSIONS

Table 1 showed that, with respect to the control class, the scores of the experimental group have improved with notable differences ($p < 0.05$) in the aspect of reaching the standard for ball passing, skill appraisal of ball passing, reaching the standard for ball shooting and skill appraisal of ball shooting. Therefore, adopting the level-based teaching mode yields superior results.

The level-based teaching model not only resolves the problems of *time* and *low efficiency* that commonly exist in the current teaching method, but also saves a huge amount of teaching resources. Furthermore, this model sufficiently

brings out students' inherent potential, lays a favourable foundation for their development in the future, and fulfils the goal of the teaching reform.

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