Volleyball pass technique teaching effect influence factors SPSS difference test based on AHP

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ABSTRACT

This paper according to volleyball pass success rate affected experimental data, firstly establishes statistics model to research on present influence factors, finds out key factors, and by statistics of volleyball favorable and unfavorable audience and investigating on them, finds out main factors that restrict volleyball development. Then through analytic hierarchy process, analyze affect volleyball pass technique four main elements that are finger flexibility and wrist elastic force, pass teaching method, objective setting, volleyball types, finds out that affect volleyball pass hit rate uppermost factors, and make corresponding suggestions on improving volleyball pass technique.

Key words: Volleyball Pass, Statistics Model, Analytic Hierarchy Process, Difference Test
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INTRODUCTION

With increasing improvement of people's material and cultural life, sports have become a fashion; exercise has become an indispensable part of people daily activity. Volleyball is created by American; it belongs to one confrontational collective ball type event through the net. Since the first men volleyball championship held in 1949, international volleyball has been rapidly developed. Especially after defined it as one of Olympic Games competition event in 1996, world each country attentions on it has been widely improved, further volleyball such technique and tactics development have entered into new stage [1-3]. University education as life most important turning point, how to correct guide and drive students' initiative on volleyball on the premise that meet body building has become uppermost point in volleyball learning [4-6]. Our country presently is still in competitive sports phase to some extent. Single teaching content, teaching without focusing on students interests, initiative and learning enthusiasm. Such current situations are not conforming to volleyball included collective education function, health function, economic and other functions. Therefore, in physical education, except for teaching should be done according to students' fondness and interests, it should also enrich teaching content, improve teaching method, so that further improve students' physical quality, in the meanwhile can improve students' learning efficiency. Due to most of volleyball learners belong to competitor, and volleyball pass is also a kind of very exquisite technique, is also an important factor that decides one volleyball competition whether can get success or not [7].

Evaluate volleyball pass success rate, it should consider volleyball players' finger flexibility and wrists elastic force, coaches' pass teaching method, objective setting and volleyball types as well as other multiple problems. From the perspective of volleyball athlete finger flexibility and wrists' elastic force, generally speaking, volleyball is a kind of motion technique that makes use of whole body coordination strength meeting the ball through finger and wrist elastic force. If fingers are not flexible enough or arms strength is quite small, it will largely reduce pass success rate. From the perspective of coach pass teaching method, in modern society, volleyball teaching methods have important effects on volleyball promotion, and similarly to pass teaching methods that also have important effects on pass success rate.

Therefore, with regard to affect pass factors finger flexibility and wrists' elastic force, pass teaching method,

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objective setting as well as volleyball types these four elements establish model to carry out research, analyze and find out each factor whether is important or not, meanwhile implement difference test on volleyball pass success rate affected decisive factors, and make corresponding suggestions.

STATISTICS MODEL ESTABLISHMENT AND ANALYSIS
This paper utilizes SPSS software, carry out statistical analysis of previous volleyball pass success rate influence factors experiments, and further get each influence factor increasing volleyball techniques aspects.

Fingers flexibility and wrists' elastic force effects on pass technique
According to one university students fingers flexibility and wrists' extension items experimental data, from which two classes are random selected and beginners, also no great remarkable differences in technical levels. Experimental group introduces training aids to classroom teaching and lets passers' fingers flexibility and wrists' elastic force get further strengthen, control group is the class without adding fingers flexibility, wrists' elastic force training in teaching, through statistics handling, then it can get experiment data(detailed experiment data refers to Table 1).

Table 1: Pass technical evaluation performance test

Class	Numbers of people	Technical evaluation(Total score 10 score)
Control class	28	7.6
Experimental class	28	8.3
T		3.56
P		<0.01

From Table 1, it is clear that experimental class compares with control class, technical evaluation performance has very remarkable differences, and control class pass success rate is 7% lower than that of experimental class. Therefore, pass technique through finger flexibility and wrist elastic force training and motions seizing status are helpful for volleyball pass technique and motions' seizing, suggests that it is done in volleyball course.

Coach pass teaching method effects on pass technique
According to the university 2012 grade volleyball general course students about coach pass teaching method affects pass technique influences' data to carry out analysis, from which two classes are random selected and beginners, it also has no significant differences in technical levels. Except for pass teaching method is different, experimental group and control group both adopt same syllabus, same schedule, of course same teachers have same numbers of students. Experimental group adopts representation training method, induction, limit method and transformation method to implement teaching practice; and using volleyball pass teaching steps, method and other teaching ways in teaching are control group adopted main methods [5].By statistics, it handle with experimental data(as Table 2 showed results)

Table 2: Pass four technical linkages' technical evaluation performance test

Group type	Numbers of people	Shift and take location	Hitting point	Hand type	Coordinate to exert
Experimental group	15	4.5	4.1	3.9	4.1
Control group	15	4.3	4.0	3.3	3.7
T		0.85	0.85	4	3.25
P		>0.05	>0.05	<0.01	<0.01

Table 3: Experimental group and control group standard results' test

Group type	Numbers of people	$\bar{x}$	S	S_D	T	P
Experimental group	15	4.5				
Control group	15	3.1	0.24	0.46	3.043	<0.01

Through comparing Table 2 data, make comparison among pass 4 technical linkages, it is clear that experimental group gets relative higher scores than control group, experimental group pass hand type, mutual coordination abilities' differences are quite remarkable, and with regard to shift and take position as well as hitting point, experimental group compares with control group, their differences are not significant. Therefore, in volleyball technique teaching process, applying experimental group adopted teaching method possesses significant propelling effect.

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Objective setting effects on pass technique

According to the premise that the university use regular method teaching in 2012 grade, make statistical analysis of experimental data about objective setting affects pass technique, from which two classes are random selected and beginners, it has no significant differences in technical levels. Except for objective setting is different, both experimental group and control group adopt same syllabus, same schedule, of course same teachers has same teaching quantities. Experimental group concrete flow about objective setting roughly is first, set key objective, make preparation for start transferring positive attitudes. In normal status, hitting position, hand type and other three linkages aspects generate main influences on teaching merits. In future teaching, it can carry out according to operation steps. Control group then carry out regular method teaching according to teaching syllabus. After statistics handling, it can get experiment data (experimental results details can refer to Table 4).

Table 4: Two group students' front overarm pass technique evaluation performance comparison (%)

Item	Hand type			Hitting point			Exertion			Coordination		
	Excellent	Good	Qualified	Excellent	Good	Qualified	Excellent	Good	Qualified	Excellent	Good	Qualified
Experimental group(30 person)	70	20	10	60	25	15	75	15	10	60	25	15
Control group(33 people)	34.8	30.4	34.8	39.2	30.4	30.4	30.4	30.4	29.2	30.4	43.5	26.1

Table 5: Two group students' front overarm pass standard result success rate comparison

Group type	Numbers of people	Teaching time total score	Total times	Success times	Success rate (%)	X^2_{test}	P
Experimental group	30	125	150	107	71	551	< 0.05
Control group	33	150	165	89	54		

Through Table 4 and Table 5 X^2 test, it is clear that $P < 0.05$，therefore，it is known that experimental group standard result success rate is higher than that of control group, experimental group is even more helpful for volleyball pass technique improving, so it suggests that teaching department should focus on objective setting teaching.

Volleyball types effect on pass technique

Carry out analysis of the university 2011 grade volleyball students' volleyball types affect pass techniques' influence data, from which two classes are random selected and beginners, it has also no remarkable differences in technical levels. Except for objective setting is different, both experimental group and control group adopt same syllabus, same schedule, of course same teachers has same teaching quantities. From which experimental group adopts balloon volleyball to carry out teaching, control group adopts hard volleyball to carry out teaching. After handling by statistics, it can get experiment data (experiment results details can refer to Table 6).

Table 6 Experimental class and control class performance comparison table

Group type	Numbers of people	Teaching time total score	Total times	Success times	Success rate (%)	P
Experimental group	30	125	100	87	87	< 0.05
Control group	33	150	95	40	42.1	

From Table 6, it is clear that experimental class technique evaluation performance compares with that of control class $(P < 0.05)$， differences are not remarkable; Control class performance is 44.9 percentages far lower than that of experimental class. Therefore, when teaching, adopt soft volleyball is more helpful for seizing volleyball pass technique and motions.

Investigation that restricts human select volleyball as body building

Restrict human select volleyball as boy building's investigation objects are from the university nearby university students (investigation report refers to Table 7).

Table 7: Restrict human select volleyball as body building investigation report (multiple choice)

Numbers of people	250
School volleyball is hard volleyball	152
Teaching plan is dull	93
Teaching objective is not clear	50
Poor finger flexibility and wrist elastic force, failed in test	140
Course selection conflict	53
Lack of interests	26

By Table 7 human select volleyball body building restricted investigation report, maximum restrict students

volleyball selection numbers of people is that school volleyball is hard volleyball (total 152 people), the next is teaching plan is dull and poor finger flexibility and wrist elastic force as well as failed in test (respectively are 152 people and 140 people), course selection conflict and teaching objective is not clear, lack of interests as constraints are only 26 people. It can see from that, when present university students select sports course, the more care is how to complete learning and body building purposed on the premise of relaxing, or to say is that they care for completing learning plans, to students, they are seriously lack of interests, therefore, teachers should strengthen volleyball advertisement and encouragement in class or daily advertising, make clear teaching plans, if possible, it might as well adopt soft volleyball teaching.

Results analysis: According to Table 1-7, it can know the best method to improve volleyball pass success rate is carrying out finger flexibility, wrist elastic force and other relative training before class, adopt representation training method and other multiple training methods to carry out in class training, and objective setting should be clear, it might as well adopt soft volleyball to teaching.

ANALYTIC HIERARCHY PROCESS (AHP) ESTABLISHMENT AND ANALYSIS
Model establishment
Based on above data, for finger flexibility and wrist elastic force training, adopt multiple methods(representation method, induction method, limit method, transformation method and other pass methods) as well as objective setting method teaching, soft pass these four influence factors to establish hierarchical analysis model, then further define largest factors in volleyball pass success rate influences, refer to Figure 1.
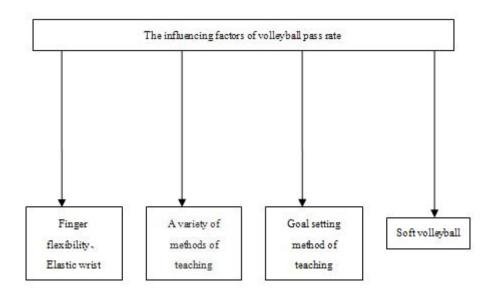

Figure 1: Volleyball pass success rate influence factors hierarchical analysis figure

Considering comparison matrix 1-9 scale, as well as each variable measurement standard are different, it can define weight of each factor got data as {3, 5, 5, 8}，its scale is {1, 2, 2, 5}，we can get following comparison matrix as formula (1):

$$A = \begin{bmatrix} 1 & 2 & 2 & 5 \\ \frac{1}{2} & 1 & 2 & 2 \\ \frac{1}{2} & \frac{1}{2} & 1 & 2 \\ \frac{1}{5} & \frac{1}{2} & \frac{1}{2} & 1 \end{bmatrix}$$

(1)

Carry out solution on model establishment defining criterion layer weights on target layer comparison matrix formula (1), solve feature value from matrix theory as 8.2430 340+1.3315i 0.0340- 1.3315i -0.0451+0.4407i -0.0451-0.4407i, so matrix A maximum feature root is $\lambda = 4.2430$. According to simple type hierarchical analysis method theory, w is criterion layer weights on target layer, the bigger weight is representing the bigger influence factors would be. Therefore, volleyball pass success rate influence ranks from biggest to smallest in successive are

soft volleyball, adopt multiple pass methods (representation training method, induction method, limit method, transformation training method etc.), setting method teaching, finger flexibility and wrist elastic force training.

Consistency judgment

In evaluation process, evaluators is impossible to correct define all value factors, according to existed errors extents differences, further cause different feature value matrix deviation defining. In construct judgment matrix process, it isn't required judgment matrix has very high consistency extent, only requires that judgment matrix roughly be consistent, otherwise analyze cannot be done. Therefore, firstly it should solve maximum feature root λ , then can carry out consistency test [7]. Concrete steps are as following:

Step 1, consistency indicator CI calculation, from which, $CI = \dfrac{\lambda - n}{n-1}$, n is matrix order, here value 4. By calculation, it can get matrix consistency indicator $CI = 0.0347$.

Step 2, table look-up defines corresponding average random consistency indicator RI .According to judgment different orders, looking up Table 8, get average random consistency indicator RI .

Judgment matrix in the paper is 4 orders judgment matrix, look up table can get $RI = 0.89$.

Table 8: Average random consistency indicator RI table(1000 times reciprocal matrix calculation result)

Matrix Orders	1	2	3	4	5	6	7	8
RI	0	0	0.52	0.89	1.12	1.26	1.36	1.41
Matrix Orders	9	10	11	12	13	14	15	
RI	1.46	1.49	1.52	1.54	1.56	1.58	1.59	

Step 3, consistency proportion CR calculation, and carry out judgment $CR = \dfrac{CI}{RI}$.

When $CR < 0.1$, it is thought that judgment matrix consistency can be acceptable, $CR > 0.1$, then it is not conform to consistency requests, it requires to revise the judgment matrix again, keep consistency. And by calculation, it is clear that $CR = \dfrac{CI}{RI} = \dfrac{0.0347}{0.89} = 0.03820 < 0.1$, so feature vector w accordingly be regarded that target layer hierarchical weight is reasonable.

CONCLUSION

Utilize volleyball pass teaching assistant training induction teaching method is effective and easy operating, which plays great roles in improving students' pass process coordinate exertion and finger elastic force improving. Multiple teaching ways provide advanced teaching ways transfer teaching, make up for traditional teaching shortcomings, increase participating students' positivist and sense of liability, and strengthen students understanding on knowledge, reveal things essence, convert abstract into concrete is helpful for teaching process optimization.

In volleyball course, objective setting teaching method is worthy promoting and applying. By investigation, it can know university students' volleyball development restricted factors are mainly volleyball type objective setting, students in learning process have no bigger interest factors, the key is whether can complete learning task or not.

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