A Design of Operability-based College PE Evaluation System

Qiyi Du

Wuhan Institute of Physical Education, Wuhan430079, China

Abstract

Athletic training courses in colleges and universities are a significant approach to improve students’ physical quality, sports skills, exercise habits, sports consciousness and sports spirit. However, at present, in terms of the evaluation scope of teaching effects, there exists a certain gap between the teaching evaluation system proposed by all the study and athletic training courses. This study identifies the operability of the physical education (PE) mode based on the scope definition of the operability, designs an operability model for the college PE evaluation system, and aims at providing a theoretical basis for the planning of college PE through this teaching evaluation system model. In this way, the quality of college PE is further elevated and a more operational training model is created for college students.

Keywords: Operability, Athletic Training, Evaluation System.

1. RESEARCH BACKGROUND

1.1 Literature review

PE courses in colleges are under the restrictions of individual differences in students, and the direction of teaching planning can not fully adapt to each student. Also, targeted training methods need the appropriate teaching evaluation system to further evaluate the operability of the training courses. When the training courses have a high operability, student feedback presents a higher form of achievement (Yu, 2011). On the contrary, training courses also reflect the opposition of student acceptance, which generates a greater constraint for teaching results (Yu, 2014). To this end, to further study the scientificity and rationality of college athletic trainings, we first need to clarify whether such training courses have a high operability (Huang, 2014). The corresponding teaching evaluation system is a targeted scheme that effectively identifies the training projects and the adaptability of teaching subjects (Xu, 2014). In particular, we need to fully understand the feedback information of students, to improve the teaching evaluation system, to adequately measure the fitting degree between teaching content and learning individuals, and to further balance the feasibility operation mode of training content and teaching mode.

1.2 Research objective

College PE should cultivate students’ technical ability, physical quality, sports habits, sports knowledge, sports hobbies, etc., and gradually complete the multiple teaching objectives by means of the athletic training mode, which is also the teaching significance of the existence of training courses (Wang, 2014). However, in the teaching process, the first consideration should be the feasibility of training courses. In case of a low feasibility, students’ acceptance would relatively drop, and the final teaching objectives could not be gradually completed in the staged training. This feasibility can be regarded as the operability between training projects and teaching subjects. A high operability indicates an obvious teaching effect, and conversely, the guidance effect and the goal achievement degree of PE are under influence (Zhang and Chen, 2013). Therefore, the design and measurement of the operability evaluation system for college PE training are an key method and an channel to evaluate teaching achievements. This paper builds on the corresponding teaching evaluation system design and defines the measurement index of the operability that is further applied to guide the assessment and adjustment of the operability of college PE, so as to provide college PE with the appropriate theoretic basis and reference for the staged planning and adjustment of training courses.
2. THE SCOPE OF OPERABILITY IN COLLEGE ATHLETIC TRAINING

2.1 The definition direction of operability

The definition of operability in college athletic training can be distinguished from the narrow angle and the broad sense. On the one hand, in the athletic training program, operability refers specifically to the basicskills related to sports equipment. When a student participates in a sport event, the control degreeof body movement can be considered as a defining category of operability (Xie, 2013), such as the control level of ball passing, dribbling, ball grabbing, interception, throwing and other technical actions in the athletic training program of large ball games. If students are familiar with and have a clever mastery of the athletic skills, their level of sports skills would be relatively high, which is an objective index that evaluates the level of PE training. On the other hand, in the training courses of college PE, on account of the different situation of colleges and universities and the evident differences in physical quality of students, the planning of their athletic training content also needs to fully consider students’ adaptability. Therefore, from the perspective of a broad sense, the definition of the operability of college athletic trainings can be regarded as the operability of training content and the acceptance degree of students, especially the operability index of training projects in case of learning subjects.

2.2 The significance of operability teaching evaluation

Teaching evaluation is to measure the feasibility of teaching content, methods, planning, lesson plans, guidance direction and other aspects. The measurement index of physical education is different from that of general knowledge education to some extent. It is difficult to measure the effectiveness, teaching quality and teaching outcomes of PE through the traditional evaluation methods (Gao, 2013). General knowledge courses can measure the completion of curriculum indexes through examination scores, student participation and teaching progress. However, the measurement indexes of sports activities in PE are disturbed by a number of factors, so the conventional evaluation system is not fully applicable to the teaching evaluation of athletic training. Operability is based on the promoted range of students’ athletic abilities after teachers’ instruction as well as a comprehensive review of training courses and students’ acceptance degree, which consequently fits the nature of PE more appropriately from the viewpoint of measurement standard. The operability analysis of athletic training courses can make an objective evaluation of the reference variables such as fitness degree, completion degree, feasibility and effectiveness of PE teaching, thereby improving the PE evaluation system (Wang and Wei, 2012). In the multiple-dimensional consideration category, training courses are constrained and controlled by operability, which reflects the practicality of teaching evaluation and the comprehensive assessment on college PE teachers.

3. REFERENCE VARIABLE DIMENSION OF OPERABILITY MEASUREMENT INDEX

The operability measurement indexes need to be studied from three dimensions, namely, student thought acceptance, student physical performance acceptance and student skill acceptance, as indicated in Table 1.

<table>
<thead>
<tr>
<th>Primary index</th>
<th>Secondary index</th>
<th>Student thinking acceptance</th>
<th>Student physical acceptability</th>
<th>Student skills acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The training content</td>
<td>The training content</td>
<td>Physiological indexes</td>
<td>Technical index</td>
<td></td>
</tr>
<tr>
<td>Training techniques</td>
<td>Training techniques</td>
<td>Motor function</td>
<td>Action indicators</td>
<td></td>
</tr>
<tr>
<td>Training skills</td>
<td>Training skills</td>
<td>Physical coordination</td>
<td>Cooperate with indicators</td>
<td></td>
</tr>
<tr>
<td>Training methods</td>
<td>Training methods</td>
<td>Gender or age</td>
<td>The target</td>
<td></td>
</tr>
</tbody>
</table>

3.1 Student thought acceptance

Students serve as the teaching subject of college PE, and their thought acceptance is a main index influencing the operability. When students adequately understand the training techniques, training content, training methods and training skills in the training courses, students can improve the appropriate sports skills by means of trainings. In this process, the degree of understanding determines the operability of the training courses (Qiu, 2014). It is assumed that the training skills provided by PE teachers are fairly difficult and that students have misunderstandings or deviations of the actions, the training content itself would show low operability, or PE teachers make an overly generalized explanation on the training content and lack an effective arrangement of
content details. This proves that whether students can fully understand the training content is an important measurement criterion of the operability of the training course itself.

### 3.2 Student physical performance acceptance

Related research indicates that exercise intensity, physical fitness degree, exercise time and other reference variables in the athletic training courses directly affect the steady improvement of athletic performance. Two key factors are involved. First, students show a major difference in their physiological indexes, sports function, physical coordination and other basic conditions in the trainings (Tang and Jin, 2015). When training courses are at a higher exercise intensity, students’ physical acceptance is bound to be overloaded. Even without an accidental training injury, greater physical recovery pressure would ensue. This situation shows that training courses have lost the operability of exercise intensity in a general sense. Secondly, in the implementation process of the training courses, students’ physical performance is negatively impacted in different stages. The differences in physical fitness are from gender, age, physical fitness, exercise habits, endurance, balance, speed, explosive power, subjective compression ability and other aspects. If the training projects are less operable, students’ fitness degree would also produce opposite teaching expectations. Then in the end, teaching objectives including the improvement of students’ sports ability or physical fitness are unable to be realized through training courses. When the training intensity is overly high, the acceptance degree of most students would go beyond the line, even showing a more intense psychological inversion, further resulting in the relative weakening enthusiasm of training courses and ultimately a complete loss of the operability of the training projects.

### 3.3 Student skills acceptance

Four aspects of training course operability concern student skills acceptance: technical index, movement index, coordination index and ability index. First, technical index is to identify whether students have a high technical level. In the athletic training courses, the movement mode determines the identification range and space of the technical index. When students are able to achieve higher levels of athletic skills through repetitive exercises based on the guidance of PE teachers, technical indexes can be regarded to reach the teaching objectives (Zheng, 2015), such as students’ completeness degree in swimming trainings in terms of butterfly stroke, backstroke, freestyle, treading water, suspending breathe, underwater swimming and other basic training techniques. Secondly, the movement index requirements in the training courses specifically refer to students’ completeness degree of movements in this sports event. Especially in rhythmic gymnastics, fighting dance, tai chi and other training courses, student skill acceptance is identified by the effective feasibility of the standardization, normalization and routinization of specific movements. Besides, coordination indexes are reflected in teamwork-oriented sporting events, such as basketball, volleyball, football and other large ball sports. The reference of training courses for skills indexes depends on students’ overall teamwork capabilities in matches or conventional trainings. Assuming that the team has a high degree of coordination, each student would give full play to his or her sports skills. On the contrary, when the individual skill level is relatively high but with a low overall completion degree, the operability of training courses must have been limited (Li, 2015). The last aspect involves the ability index that mainly targets the individual training ability of students. As far as skills are concerned, individual ability of students are impacted by numerous factors such as psychology, habits, subjective consciousness and objective condition. The operability of training courses is to break through the limitations of a variety of interference factors, to create a more adaptable method for students to enhance sports skills, and to further guide students to steadily improve sports skills. For this purpose, in terms of the ability index, sports skills are limited or controlled by individual abilities, which ultimately affects the implementation degree of operability. Thus, the corresponding secondary reference variables are selected as the ability index.

### 4. OPERABILITY MODEL DESIGN OF COLLEGE PE EVALUATION SYSTEM

#### 4.1 Judgment basis of teaching evaluation system matrix

In the design of the operability model of college PE evaluation system, first, it is necessary to design the corresponding scores for the teaching evaluation content and to apply the reference variables of the corresponding scores as the evaluation index. The method of judging the calculation results can be conducted by the analysis on the matrix value of the fuzzy datamodel, the optimization of the corresponding calculation method, and the evaluation on the completion degree of the operability. In this study, \( i \) is assumed to be the first-grade index parameter and \( j \) is the secondary index parameter. The reference scores are illustrated in Table 2.
**Table 2** The Evaluation Indexes (i and j)

<table>
<thead>
<tr>
<th>Score</th>
<th>0-25</th>
<th>25-50</th>
<th>50-75</th>
<th>75-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>The evaluation index</td>
<td>i less than j</td>
<td>i approaching j</td>
<td>i exceed j</td>
<td>i outdistance j</td>
</tr>
<tr>
<td>Element attributes</td>
<td>A little bit</td>
<td>intensity</td>
<td>strong</td>
<td>The maximum</td>
</tr>
<tr>
<td>Operability</td>
<td>low</td>
<td>height</td>
<td>high</td>
<td>The highest</td>
</tr>
</tbody>
</table>

### 4.2 Mathematical function calculation method of teaching evaluation system

In the range of approaching and maximum, the sequence matrixes of 2, 4, 6, and 8 were selected from each two grades for quantification. The change space of 1, 2, ..., 9 was obtained, and the corresponding reciprocal value was derived. Sequentially, a reciprocal matrix of relative judgments was formed, which could be regarded as a theoretical value for judging operability. In accord with the fundamental analysis, the significance of the pairwise indexes, its first-grade index is set as $U$, and its structural judgment matrix is $U=[U1, U2, U3, U4]$. The specific first-grade measurement index could be judged by the operability, $C$, and its mathematical fuzzy model is calculated as:

$$ S = \frac{\varphi \ m \ a \ x \ -c \ n}{c \ n^{-1}} $$  \hspace{1cm} (1)

where, when $Sc=0$, the relative judgment matrix has consistency, indicating that the first-grade index of the athletic training mode has a higher degree of inconsistency. Besides, $R$ is quoted as the judgment proportion of the secondary index:

$$ CR = \frac{C}{R} < 0.1 $$  \hspace{1cm} (2)

The operability of $U$ at this time is still relatively constrained. Ultimately, a small range of teaching adjustments should be made so as to improve the operability of the athletic training courses.

### 4.3 Computational results of random samples

The secondary index, $R$, can randomly select the hypothesis value space or the corresponding teaching evaluation variable in the value space, which is substituted into the design formula by the presentation mode of subset. The maximum eigenvector $\varphi max$ can be calculated by the approximate value method. The reference range of the first-grade index in its eigenvector can identify the relevant indexes of operability. Assuming that $S=R(0.12, 0.56, 0.23, 0.16)$, the values of its parameters are substituted into the formula:

$$ \varphi max = \sum_{i=1}^{4} \frac{(UW)i}{\pi(1)} $$  \hspace{1cm} (3)

The corresponding variable value of its operability indexes is analyzed by the matrix function to derive:

$$ S = \frac{\varphi \ m \ a \ x \ -c \ n}{c \ n^{-1}} = \frac{4.02-4}{4-1} = 0.0067 $$  \hspace{1cm} (4)

The numerical calculation result of the secondary index judgment result is less than 0.1, which can be regarded as a teaching planning operability of college PE courses.

### 5. IMPLEMENTATION STRATEGY THAT ENHANCES THE OPERABILITY OF COLLEGE PE COURSES

#### 5.1 Adjust reference variables of the evaluation system model

This study is a theoretical design. The index selection of reference variables are all based on the theoretical analysis, without the foundation of empirical analysis. Because of the different teaching environment in various colleges and universities, factors such as the teaching ability of PE teachers and the physical quality of students
are all individual disturbance terms (Yang and Jiang, 2015). For this purpose, in the application of the teaching evaluation system designed in this study, the conditions of colleges and universities should be considered to optimize the matching ratio and to adjust the corresponding secondary variables in accord with the teaching and training direction at the same time. In particular, there exist major differences in the training courses, and the secondary variables must be adjusted according to the basic conditions such as intensity, time, exercise amount and participation mode of the training content. The proportion of weight should be properly changed by PE teachers based on how schools carry out athletic trainings. Especially after an extended period of training, student feedback is poor, physical agility declines, or athletic injury occurs. Thus, PE teachers need to re-examine the fitness degree of the teaching evaluation system in the operability.

5.2 Adjust the training volume according to the phased implementation effect

The original intention of designing a teaching evaluation system is to optimize the configuration of the corresponding teaching mode. Based on the practical direction of operability, when training methods, patterns, skills and other subjects are designed, optimal configuration must be conducted based on objective student feedback. Even when the results of the optimization proposal were obtained on account of the evaluation system in this study, it does not indicate that PE teachers have a high objectivity and reliability for the empirical data selected by the parameters (Zhang, 2013). Therefore, in the application of the teaching evaluation system, college PE teachers should timely adjust the relevant contents of the secondary parameters in accord with the feedback information of students in the university and further obtain a more practical operability analysis conclusion, so as to achieve a reasonable planning for training courses, to guide students to complete the appropriate training content, and to improve their physical and athletic skills at the same time.

6. CONCLUSION

In summary, it is a must to carry out PE courses in the college sports curriculum, but the operability of its teaching planning is also of particular significance. The related indexes of the operability of PE can be analyzed from three dimensions, including student thought acceptance, student physical performance acceptance and student skill acceptance. Furthermore, in the operability model for the college PE evaluation system designed in this study, the relevant contents of the secondary parameters are appropriately adjusted according to the actual situation of various colleges and universities, and the applicability of the teaching evaluation system is further realized. Training plan should be conducted after a systematic evaluation. Based on student feedback, a comprehensive assessment is made on the operability of training methods, training patterns, training content and other aspects.

REFERENCES

Gao Q. (2013). The teaching mode of development and development of college sports, Contemporary sports technology, 3(13), 87-89.
Li Y. (2015). The implementation of college sports teaching evaluation under the new teaching concept, Science and education guide (late), (08), 97-98.


Zhang H., Chen Z.F. (2013). Research on physical education evaluation system of independent college, Contemporary sports technology, 3(04), 57-58.