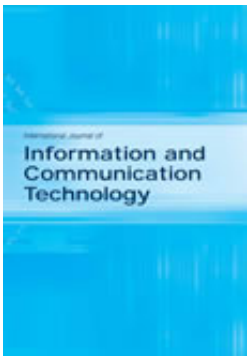
INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research



International Journal of Information and Communication Technology

ISSN online: 1741-8070 - ISSN print: 1466-6642
https://www.inderscience.com/ijict

Based on fuzzy mathematics multi-level comprehensive evaluation of physical education teaching quality and improvement

Yan Liang

DOI: 10.1504/IJICT.2024.10062478

Article History:

Received:	17 November 2023
Last revised:	20 December 2023
Accepted:	21 December 2023
Published online:	03 May 2024

Based on fuzzy mathematics multi-level comprehensive evaluation of physical education teaching quality and improvement

Yan Liang

Department of Physical Education,
Hubei Polytechnic University,
Huangshi, Hubei, 435003, China
Email: m18162923001@163.com

Abstract: At present, in the information work of different colleges and universities, fuzzy mathematics multi-level comprehensive assessment applied to schools, have received good results. At present, when the physical education teaching teachers set up the physical education teaching hall, due to the number of students, location, time, teachers and many other reasons, resulting in the complexity of the physical education teaching. Based on fuzzy mathematics multi-level comprehensive evaluation method, this paper studies the adaptability of intelligent physical education course teaching. In colleges and universities, due to the increase of the number of schools, the arrangement of teaching content is more difficult and complicated. Moreover, once there are problems in the arrangement, it will have a great impact on the whole teaching process, so as to promote the teaching effect of the classroom to a certain extent.

Keywords: fuzzy mathematics; multi-level comprehensive evaluation; physical education curriculum; the quality of teaching.

Reference to this paper should be made as follows: Liang, Y. (2024) 'Based on fuzzy mathematics multi-level comprehensive evaluation of physical education teaching quality and improvement', *Int. J. Information and Communication Technology*, Vol. 24, No. 5, pp.24–35.

Biographical notes: Yan Liang studied in Hainan Normal University from 2009–2012 and received her Master's degree and a graduate degree in 2012. She has been working as a physical education teacher at Hubei Physical University in 2012. She has published several papers in provincial journals, and her major area of study physical education.

1 Introduction

Sports courses in colleges and universities are taught by teachers, taught by teachers, and mastered by students themselves. And sports class, it is necessary to do some sports in a specific place, such as table tennis, basketball and other sports. In the development of the physical education syllabus should be fully paid attention to the characteristics of the school, namely: in the professional venues shall not be set up with a special physical education class, such as in the basketball stadium set up table tennis class; In the same

classroom teaching, at most can accommodate more than the existing teaching places; Some periods are unsuitable for physical activity, such as the first and second periods in the morning and evening; The same teacher tries to identify a particular subject, etc. Therefore, how to make a reasonable teaching plan system suitable for physical education in schools is very necessary.

In recent years, with the increasing enrolment of colleges and universities across the country, teachers, classroom teaching and other aspects of some problems. At present, the teaching system of physical education in China generally uses the heuristic calculus method. However, it is difficult to popularise it because the curriculum arrangement and teaching methods of the school are not consistent (Shen and Hu, 2020; Zhang et al., 2021; Shi, 2020).

Tang Honeying, Zhou min in the teaching process, first has carried on the multi-level Fuzzy mathematics comprehensive evaluation of the investigation and analysis on the problem of teaching plan, and theoretically expounds the 'physical education curriculum teaching', 'many times' and so on the thought and strategy, and 'greedy' and 'physical education curriculum teaching ideas and strategies of organically fuses in together, to achieve the 'physical education curriculum teaching'.

Xu Qian and Deng Jia believe that it is necessary to use the multi-level comprehensive evaluation of Fuzzy mathematics to teach physical education. In view of the complicated physical education problems, this paper gives a kind of teaching method of physical education which is suitable for colleges and universities, and also suitable for single- or double-week teaching, and has carried on the practice verification (Cheng, 2021; Wu et al., 2021; Wa et al., 2021; Wang et al., 2020a).

In the original teaching plan, Xia Zhongli, Liu Yujun, Hou Wenjing and Wang Jinhua constructed a multi-objective 0–1 integer plan by using the least distance and the maximum use of classroom resources, and combined with the filter method to deal with this problem. The experimental results show that the new learning strategy has an obvious effect on solving the problem of classroom teaching arrangement. Wang Haiti constructed a mathematical model of physical education teaching problem by using the method of integer plan, and applied it to the teaching problem of physical education course. When discussing the rational use of teaching resources such as classrooms and teachers, Gu Hucheng and Jiang Yan adopted the FFD algorithm, and optimised it, and carried out the optimisation and optimisation. Factors affecting the quality of physical education are complex and diverse, including teachers' strength, teaching content, teaching methods, teaching tools, teaching organisation and other aspects. There are many difficulties in evaluating the quality of physical education teaching in a comprehensive way. This study intends to utilise fuzzy mathematical methods to establish a multilevel comprehensive evaluation model of physical education quality, to comprehensively assess the factors affecting the quality of teaching, and to provide a new scientific evaluation idea. The objective of this study is to construct a multilevel comprehensive evaluation model based on fuzzy mathematics for assessing the quality of physical education teaching. In view of the complex nonlinear relationship between many factors affecting the quality of physical education teaching, it is often difficult for the traditional single evaluation method to fully reflect the level of teaching quality. This study intends to use fuzzy mathematical methods to establish the evaluation index system, fully consider the correlation between the various influencing factors, to be able to comprehensively and multi-angle evaluation of the various aspects of the physical education teaching process, to achieve a more scientific and accurate measurement of the

quality of teaching and learning, and to innovate the evaluation of the quality of physical education teaching research methods.

2 Research content

2.1 Construction of multi-level comprehensive evaluation curriculum model for fuzzy mathematics

Physical education course teaching is the process of arranging a course under the premise of not hindering the normal work of the school and making full use of all kinds of educational resources. The system transforms the problems in the classroom into the problems that can be dealt with by Fuzzy mathematics multi-level comprehensive evaluation, and deals with them by the existing Fuzzy mathematics multi-level comprehensive evaluation technology. The essence of the physical education curriculum teaching system is to allocate the existing teaching resources appropriately under the specific physical education curriculum teaching system conditions, so that the tasks of various sects will not conflict. That is, under a variety of restrictions, by solving the contradiction of resources, make the relationship between the elements to achieve the best. When compiling physical education course teaching documents, we will combine the class time and classroom number according to the order of class hours and classrooms to form a 2-D matrix. When specifying the specific position of the two-dimensional matrix, we should take into account to get better results (Wang et al., 2020b; Khalilzadeh et al., 2020; Ao and He, 2020; Ma et al., 2020). The specific steps of fuzzy logic assessment of physical education teaching quality include: determining the factors affecting the assessment of physical education teaching quality, such as teacher structure, curriculum, teaching process, etc.; constructing a fuzzy mathematical model of each affecting factor, establishing fuzzy linguistic variables, semantic variables, and affiliation functions; setting up the assessment rules and defining the fuzzy logic relationship between each factor and the quality of physical education teaching; and adopting fuzzy inference methods. The fuzzy inference method is used to derive the degree of influence of each factor on teaching quality according to the model and rules established in the previous stage. Utilising the multilevel comprehensive evaluation method of fuzzy mathematics, the evaluation results of each influential factor are integrated to obtain the overall evaluation value of physical education quality.

2.2 Description of variables in the physical education course teaching plan

The problem of curriculum arrangement in colleges and universities has a great influence, which is discussed from several aspects, such as teachers, curriculum setting, class time, class and available class. The essence of Fuzzy mathematics multilevel comprehensive evaluation is to avoid the contradictions in five aspects, such as classroom, teacher, course, class and class time, and make them achieve the best effect.

In short, in order to make the course arrangement can be smoothly carried out, we must meet the constraints between the classroom, class and time. The time concentration is as follows:

In educational activities, teachers are an indispensable part. Teachers also teach different classes, and the same teacher, he or she can teach for one class or for more than

one class. For example, a teacher who teaches aerobics may teach not only the students in class 01, but also the students in class 02. In the development of the physical education syllabus, the teachers have a certain demand for teaching time, so in the arrangement of teaching, the first thing to determine the teaching order of the physical education course of each teacher, so as to better adapt to the teaching needs of the teacher, so as to achieve the teaching effect. Attention should be paid to the selection of teachers: although a teacher can be a multi-subject at the same time, the same teacher can only teach the same subject in the same time period. The number of teachers is as follows:

In a word, in order to ensure that the arrangement of the curriculum schedule goes on smoothly, it is necessary to meet the constraints between the classroom, class and time. The time set is:

$$D = \{d_1, d_2, \ldots, d_n\} \tag{1}$$

In the physical education curriculum arrangement, related to the classroom are sports fields, gymnasiums, etc. Each class and specific area of the sports field can only be taught by one teacher at a time, and the maximum area that can be accommodated is more than the number of all students in the class. The composition of the classroom is as follows:

This class has its own name as well as its own number. As a matter of fact, there may be several teachers for one type of physical education, and one teacher for each type of physical education, such as the athletic field, the athletic field, the athletic field, the general classroom, etc. The course sets the start and end of the class and the number of classes per week according to its own teaching plan. In the process of teaching planning, class scheduling is a very key problem, because the teaching hours and teaching hours of each class are very different, so in the scheduling process will have a certain impact on the final effect of the teaching plan. Different from different disciplines, the importance of different disciplines can be measured by credits. Moreover, in order to ensure the normal study of students, they must be prepared in advance, because once one class is fixed, it has to wait until another class, so there is no chance to combine classes (Cassie et al., 2021; Kim et al., 2021; Xu, 2020; Sun et al., 2021; Xu and Wang, 2021; Chen, 2021).

$$R = \{r_1, r_2, \ldots, r_n\} \tag{2}$$

Physical education refers to large classes with multiple subjects and only one class per class at a time. The number of people in the classroom is as follows:

$$T = \{t_1, t_2, \ldots, t_n\} \tag{3}$$

After the school has worked out the teaching plan, the ratio of teachers to teachers is combined and expressed by the Cartesian product.

From the above research results, it can be found that the lesson planning problem is to arrange all the teaching activities in the classroom according to a specific position and a specific time interval. So, when a teacher gives a lesson to a class in class, he or she can write it down, if not, he or she can write it down.

$$K = \{k_1, k_2, \ldots, k_n\} \tag{4}$$

A PE class is a large class of students with different majors, and the same class can only accept one subject at a time. The set of classes is:

$$C = \{c_1, c_2, \ldots, c_n\} \tag{5}$$

After the school has developed a lesson plan, the correspondence between teachers and courses is determined, and the time and teachers are combined, denoted by the Cartesian product

$$D \times T = (d_1, t_1), (d_2, t_2), \ldots, (d_n, t_n) \tag{6}$$

From the above analysis, it can be seen that the problem of course scheduling is to arrange all teaching events in the Cartesian product formed by the place of class and the time of class. Therefore, when a teacher teaches a certain course to a class of students in a certain classroom at a certain time, it can be recorded as, otherwise it can be recorded as.

$$t_m d_n r_p c_w k_q = 1 t_m d_n r_p c_w k_q = 0 \tag{7}$$

'Hard principle' is an indispensable part of Fuzzy mathematics multi-level comprehensive evaluation, which is directly related to the success or failure of physical education curriculum teaching plan. This is a procedure that needs to be followed. To make the course schedule sensible, you need to follow the following strict principles:

First year students may not play two sports for a certain period of time. For example, students are not allowed to play badminton or basketball in the morning during three or four classes. Please note that this classroom is composed of students from all disciplines.

The same teacher may not complete two sports at the same time. For example, a teacher cannot play volleyball on a soccer field and a volleyball court at the same time during three or four periods on a Monday morning.

Note that a class here means a group of students from different majors.

$$R_1 : \sum_{n=1}^{N} \sum_{m=1}^{M} \sum_{p=1}^{p} \sum_{q=1}^{Q} \sum_{w=1}^{Q} x_{d_n t_w r_r k_q c_v} \le 1 \tag{8}$$

The same teacher cannot schedule two physical education classes at the same time. For example, on a Monday morning during three or four classes, a certain teacher cannot have both a soccer lesson on the soccer field and a volleyball lesson on the volleyball field. See (2) to (8) for the expression;

$$R_2 : \sum_{n=1}^{N} \sum_{m=1}^{M} \sum_{p=1}^{p} \sum_{q=1}^{Q} \sum_{w=1}^{W} x_{d_n t_m r_p k_q c_w} \le 1 \tag{9}$$

Two PE courses cannot be scheduled at the same time on the same sports field. For example, in the third or fourth period on Wednesday morning, there should not be both aerobics students and waltz students in Room 1 of the gym.

$$R_3 : \sum_{n=1}^{N} \sum_{n=1}^{M} \sum_{p=1}^{p} \sum_{q=1}^{Q} \sum_{w=1}^{W} x_{d_n t_m r_r k_q c_v} \le 1 \tag{10}$$

Soft rules reflect the satisfaction of the classroom on the course arrangement. It not only affects the rationality of the course arrangement, but also affects the scientific nature of the course arrangement. It is the rules set to optimise the course arrangement scheme, and it is the standard to evaluate whether a course arrangement scheme is good or bad. Soft rules should not only take into account the balance between the teacher and the classroom, but also take into account the rationality of teaching time, and more to meet the special requirements of individual teachers.

Fuzzy mathematics multi-level comprehensive evaluation reflects the students' satisfaction degree of curriculum schedule, which can not only affect the design of curriculum schedule, but also affect the science of curriculum schedule, and can make the teaching plan the best, the best, the best. The soft principle should take into account not only the relationship between the teacher and the class, but also the reasonable time, and the specific needs of each teacher.

In different periods of time, the students' learning effect will have a great difference, and in a certain period, the students' learning effect will be expressed in the unit of efficiency, that is, whether the students are willing to listen to the teacher, in a specific period of time, physical education curriculum is not suitable. We set the value of the impact in Table 1.

Table 1 Improvement of physical education curriculum quality based on fuzzy mathematics multi-level comprehensive assessment

	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
1 2 a.m.	0	0	0	0	0
The morning section 3 ~ 4	0.85	0.89	0.87	0.84	0.82
5-6 PM festival	0.35	0.39	0.57	0.51	0.52
7 and 8 p.m.	0.65	0.69	0.67	0.61	0.62
9 and 10 at night	0	0	0	0	0

The value in Table 1 indicates the class efficiency of physical education in this period. Since the physical education course is not suitable to be arranged in one or two classes in the morning and 90 classes in the evening, the class efficiency of each period is 0 if the class efficiency of one or two classes in the morning and 90 classes in the evening is 0.

$$f_1 = \sum_{w=1}^{W} R_w \vartheta_{1d} \tag{11}$$

where is used to represent the teaching effect coefficient of section D. ϑ_{1d}.

The figures in the table show the effectiveness of physical education classes in this period. Since physical education classes cannot be divided into one or two and ninety classes in the morning, the teaching effect of each class is 0, and therefore, the teaching effect of each class is 0. Here, the educational effect factor representing the D class is used.

3 Analysis of results

The reasonableness of Fuzzy mathematics multi-level comprehensive assessment is directly related to the enthusiasm of the teacher's work, and also directly related to the efficiency of the classroom and the level of education. Directing the course is to select the most suitable lesson from a large number of materials, that is, to select the best lesson from a large number of materials. Therefore, the following principles should be followed in the formulation of sports class hours:

3.1 Fuzzy mathematics multi-level comprehensive evaluation will combine theory with practice

Class hour arrangement is the actual needs of the school and the principle of curriculum arrangement organically linked, so as to make the management of physical education curriculum more standardised. The quality of the teaching plan is directly related to the teaching effect of classroom teaching, but also related to the classroom teaching effect. The teaching content of each semester will be arranged according to the teaching syllabus issued by the Ministry of Education. Schools should organise teaching according to the law of development and the needs of reality. According to the planning of the curriculum cannot be changed arbitrarily, to ensure the quality of teaching, and can effectively promote classroom learning.

Through the investigation of the body constitution, we can see that the energy and attention of the human body will have great changes every day. Therefore, when making the teaching plan, we should take into account the changes in the body constitution and sports ability of the students. From the human energy, mental and knowledge of the interrelation, between 9 to 11, that is, three or three in the morning (that is, 45 minutes), three days a week, and sports is based on sports, so as far as possible to give children some knowledge about memory and mental skills.

3.2 Fuzzy mathematics multi-level comprehensive assessment to the students of physical education courses as this

In the design of physical education curriculum, the relationship between teachers and students is the main body, which is the core and driving force of the school physical education curriculum design. In the teaching practice and teaching practice, we should fully understand the specific needs of teachers and the real thoughts of students, and try to stimulate their teaching enthusiasm and active learning consciousness.

The first point is that fuzzy mathematics multi-level comprehensive assessment is people-oriented. The arrangement of physical education teaching content should be conducive to training and strengthening students' physical ability; at the same time, it should also be conducive to students to master the relevant knowledge of sports and carry out repeated sports skills, such as aerobic sports, etc. In physical education teaching, we should ensure that students are reasonably allocated in physical exercise courses. This kind of teaching method can help students better understand and digest sports, and avoid problems such as physical fatigue caused by prolonged exercise.

The second is the teacher-centred education of Fuzzy mathematics multi-level comprehensive assessment. The organisation and arrangement of physical education should be convenient for teachers to teach. In order to balance the teacher's teaching, must pay attention to: a sports teacher, a day, not within a day or two at the same time, not at the same time, a large number of sports training, because PE is a sports discipline, one day, a lot of training, will cause the loss of the body function of the teacher, the teacher's work enthusiasm and reduces, thus affect the classroom learning efficiency; Within a day, or within two days, the same teacher shall not be too much layout of the classroom, in order to improve the teaching effect of the classroom; Teachers' further study, scientific research and other circumstances, reasonable allocation of teaching time; If the teacher has children in, or is far away from the school, we should avoid arranging sports in the morning and at the end of the evening. In addition, since most colleges and

universities have dual campuses, physical education teachers often have to travel to and from each campus. Therefore, when assigning physical education classes to teachers, we should also try to avoid frequent trips to various schools. The first and second periods are in Chang 'an in the morning, and the morning is in Taiba branch school. Due to various reasons, teachers can change the campus at any time, and the school's class change time should be extended as long as possible. Try to do as much as the teacher wants without interfering with the regular curriculum.

3.3 Fuzzy mathematics multi-level comprehensive assessment to promote effective teaching principles

In order to enable students to better absorb physical education knowledge, better memorise physical skills and enhance their physical abilities, we must enhance students' knowledge base and allow them to achieve greater learning outcomes and progress in the classroom. An excellent lesson plan will enable students to make the most of their time in the classroom.

One is Fuzzy mathematics multi-level comprehensive assessment of teaching content appropriate arrangement. For example, summer, cannot be arranged at noon and evening students in the morning and evening time for morning run, so as not to lead to fewer students.

The second is to try to balance the weekly teaching time, in order to prevent the teaching time on one day is too long, and the other day there is no teaching plan.

Third, in the same class, we must arrange a certain distance, to avoid the distance between each other is too tight, so that students have enough time to digest and absorb. Physical education class is a student's physical quality as the main content of one, the same curriculum is too tight, will make people tired.

The first thing to do is to change the problem from all problems into a problem that can be solved by genetic methods. The decoding is the exact opposite, that is, the transformation of the problem from a search to a solution. The code of a gene plays an important role in the rate of genetic evolution of a population. The following code methods are commonly used at present.

Traditional genetic algorithms use a binary code, which is a binary code, and its length depends on how accurate the problem is. We set a number in [U, U2], the length of the binary code is 1, and its corresponding relationship in the code is as follows:

The length of Fuzzy mathematics multi-level comprehensive evaluation code is 1, then the corresponding relationship when coding is as follows:

$$\begin{aligned} &000000\ldots0000 = 0 \to U_1 \\ &000000\ldots0001 = 1 \to U_1 + \delta \\ &000000\ldots0010 = 2 \to U_1 + 2\delta \\ &\ldots \\ &111111\ldots1111 = 2^1 - 1 \to U_2 \end{aligned} \tag{12}$$

Among them,

$$\delta = \frac{U_2 - U_1}{2^I - 1}$$

Decoding: Assuming that the encoding of an individual is, the corresponding decoding formula is

$$a_k a_{k-1} a_{k-2} \cdots a_2 a_1$$

$$X = U_1 + \left(\sum_{i=1}^{k} a_i 2^{i-1} \right) \times \frac{U_2 - U_1}{2^k - 1} \tag{13}$$

Binary encoding is very convenient to operate in the process of encoding and decoding, and it is also convenient to realise its genetic operations (crossover, mutation).

The conversion formula from binary code to grey code is as follows.

$$\begin{cases} x_i = y_i \\ x_j = y_j \oplus y_{j+1}, j = i-1, i-2 \cdots, 2, 1 \end{cases} \tag{14}$$

The conversion formula for grey code to binary is:

$$\begin{cases} x_i = y_i \\ x_j = x_j \oplus y_{j+1}, j = 1, i-2 \cdots, 2, 1 \end{cases} \tag{15}$$

The teaching restriction mechanism of physical education course is based on the teaching of physical education course. Therefore, some improvements should be made in setting the teaching restriction of physical education course. Based on the discussion of mathematical operation methods, this paper should also consider the practical needs in physical education.

In the future, an interactive function will be added to give feedback to the user's suggestions and improve them in time. In addition, the rehearsal system of sports courses has been improved, and the friendliness of system functions and interfaces has been continuously honed, so as to bring users a more convenient and perfect operating system. Gymnastics scheduling has been carried out in Xi 'a colleges and universities, and further promoted and applied in other colleges and universities.

The current physical education teaching system is based on the fuzzy mathematics multilevel comprehensive evaluation of physical education. Different classes, different groups of people, the selected sports items are different, and the arranged time, artificial, external environment and other unstable reasons, we must make the corresponding arrangement, generally just opened the class, the teachers will suggest to change the time, or even change a change, which requires the staff to manually. Therefore, if there is a new curriculum arrangement, then when teachers, students, schools and other people change the curriculum arrangement, they can be found in the first time, so that everyone can be the first time to know the curriculum arrangement. The multi-level comprehensive evaluation system using fuzzy mathematics can simultaneously take into account multiple dimensions and factors affecting the quality of physical education teaching and realise a comprehensive quantitative description of teaching quality. Compared with a single evaluation index, this evaluation system takes into account the interactions and interconnections among teachers, curriculum, teaching process and other factors, and the evaluation results are more comprehensive and accurate. The evaluation model established in the study is highly operational and provides a quantitative analytical tool and decision-making basis for tracking and continuously improving the quality of physical education teaching. The method can be generalised to the evaluation of other

teaching quality in schools, and it also provides a new way of thinking for empirical research on various kinds of education quality.

4 Conclusions

Through the existing teaching management system of the multi-level fuzzy mathematics comprehensive evaluation function of physical education curriculum teaching investigation and analysis, considered the current function is not suitable for the teaching of physical education curriculum teaching in the teaching contents of physical education curriculum teaching, and according to the specific circumstances of the campus has carried on the demand analysis to the teaching content, and the optimised. In this paper, the problems and defects in the teaching administrative system adopted by colleges and universities are systematically analysed, and the specific countermeasures are given according to their specific needs. Aiming at the teaching problems of physical education course in Xi ‘a colleges and universities, a method of teaching planning based on chaotic genetic algorithm is proposed. After the study of the method and analysis, found that binary code with low retrieval efficiency and prone to large spacing between numerical (hamming cliff) and unstable, and many other issues, so based on the multi-level Fuzzy mathematics comprehensive evaluation based on real number code using real number code for further search and evolution, and applies chaos method in mixed, It has better scalability and limitation, avoids the crowd blindness caused by random method, and improves the diversity of the crowd. Taking the implementation and application of physical education curriculum arrangement system as an example, the effectiveness of the proposed curriculum arrangement system is demonstrated from three aspects: curriculum arrangement, system running time, user satisfaction and work efficiency. The experimental results show that the method proposed in this paper can solve the problems of teaching physical education courses with a high degree of effectiveness. The use of fuzzy mathematics multi-level comprehensive evaluation method can comprehensively consider the impact of various factors on the quality of physical education teaching, to overcome the limitations of single-factor evaluation, to provide a scientific quantitative analysis of the quality of teaching and learning, is a well-established evaluation method. Although some research results have been achieved, there is still room for further improvement and expansion. Future research can start from the following aspects: collecting more data on physical education quality evaluation, expanding the sample size, and verifying the generalisability of the model. Considering more influencing factors of PE teaching quality, such as teaching methods and content settings, a more comprehensive evaluation index system can be constructed. The model will be optimised and improved in the subsequent research to enhance the scientificity and practicability of PE teaching quality evaluation.

Acknowledgements

1 Research on the construction of a network platform for the integration of school districts in youth sports clubs, Project No.: 21xjr07Q.

2 Study on the open teaching system of 'Trinity' public physical education class, Project No.: 2021C14.

3 Research on the industrialisation path of national fitness in Huangshi City, Project No.: 21xjr07A.

References

Ao, X. and He, A. (2020) 'Research on the comprehensive evaluation method of college students' achievements based on multi-view RSR', *Journal of Physics: Conference Series*, Vol. 1616, No. 1, p.012072, 9pp.

Cassie, H., Mistry, V., Beaton, L. et al. (2021) 'An evaluation of the implementation of quality improvement (QI) in primary care dentistry: a multi-method approach', *BMJ Open Quality*, Vol. 10, No. 2, p.e000839.

Chen, X. (2021) 'Design of a hybrid classroom teaching quality evaluation system based on information technology', *Journal of Physics Conference Series*, Vol. 1852, No. 3, p.032025.

Cheng, J. (2021) 'Evaluation of physical education teaching based on web embedded system and virtual reality', *Microprocessors and Microsystems*, Vol. 83, No. 1, p.103980.

Khalilzadeh, M., Balafshan, R. and Hafezalkotob, A. (2020) 'Multi-objective mathematical model based on fuzzy hybrid multi-criteria decision-making and FMEA approach for the risks of oil and gas projects', *Journal of Engineering Design and Technology*, Vol. 18, No. 6, pp.1997–2016.

Kim, T.W., Han, Y., Lim, J.Y. et al. (2021) 'Evaluation of optimal substitute ratio of fly ash based on adaptive neuro-fuzzy inference system (ANFIS) and sensitivity study', *Materials Science Forum*, Vol. 1029, pp.105–110.

Ma, I., Woo, S., Lonergan, K. et al. (2020) 'Impact of an education and multilevel social comparison–based intervention bundle on use of routine blood tests in hospitalised patients at an academic tertiary care hospital: a controlled pre-intervention post-intervention study', *BMJ Quality and Safety*, Vol. 29, No. 10, pp.1–2.

Shen, C. and Hu, L. (2020) 'Power quality comprehensive evaluation method based on fuzzy mathematics and cloud theory', *Journal of Physics: Conference Series*, Vol. 1684, No. 1, p.012136, 9pp.

Shi, C.K. (2020) 'The improvement of teaching design ability of physical education major based on computer media scene teaching video model under the concept of OBE teaching', *Journal of Physics: Conference Series*, Vol. 1578, No. 1, p.012018, 4pp.

Sun, D., Liu, X., Cao, Y. et al. (2021) 'Determination of cost-effective sand mixing ratio for improvement of high liquid limit soil based on fuzzy comprehensive evaluation', *IOP Conference Series: Materials Science and Engineering*, Vol. 1203, No. 3, p.032060.

Wa, B., Qi, A., Ly, A. et al. (2021) 'A multi-level fuzzy switching control method based on fuzzy multi-model and its application for PWR core power control', *Progress in Nuclear Energy*, Vol. 138, p.103743, ISSN: 0149-1970, https://doi.org/10.1016/j.pnucene.2021.103743.

Wang, M., Zhu, C., Wang, F. et al. (2020a) 'Multi-factor of path planning based on an ant colony optimization algorithm', *Annals of GIS*, No. 18, pp.1–12.

Wang, X., Pang, Y. and Ma, X. (2020b) 'Real distorted images quality assessment based on multi-layer visual perception mechanism and high-level semantics', *Multimedia Tools and Applications*, Vol. 79, No. 35, pp.25905–25920.

Wu, X., Zhou, Y. and Xing, H. (2021) 'Studies on the evaluation of college classroom teaching quality based on SVM multiclass classification algorithm', *Journal of Physics Conference Series*, Vol. 1735, p.012011.

Xu, Q. (2020) 'Perceived quality of parent-child relationships by chinese primary school students: the role of parents' education and parent-child literacy activities', *Child Language Teaching and Therapy*, Vol. 36, No. 2, p.36.

Xu, S. and Wang, S. (2021) 'Research on the classification and selection strategy of physical education teaching model based on modern information technology', *Journal of Physics: Conference Series*, Vol. 1881, No. 4, p.042057.

Zhang, E., Zhou, J., Hou, L. et al. (2021) 'Comprehensive annoyance modeling of forklift sound quality based on rank score comparison and multi-fuzzy analytic hierarchy process', *Applied Acoustics*, Vol. 173, No. 9, p.107705.