

Effect of the individual approach application during the training of future physical education teachers on the degree of student satisfaction with the learning process in the People's Republic of China

ZHANNETA KOZINA¹, VITALII KOROBENIK², DANIL SAFRONOV³, WANG XIAOFEI⁴

^{1,4}Department of Olympic and Professional Sports, Sports Games and Tourism, H.S. Skovoroda Kharkiv National Pedagogical University, Kharkiv, UKRAINE

²Department of Cyclic Sports, H.S. Skovoroda Kharkiv National Pedagogical University, Kharkiv, UKRAINE

³V. N. Karazin Kharkiv National University disabled, Kharkiv, UKRAINE

⁴Lishui University, CHINA

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Abstract

Purpose: identify the impact of the application of the program with the implementation of individualization on the satisfaction of future physical education teachers in the learning process. **Material and methods.** The study was conducted at Lishui University (China). The study involved students - future physical education teachers who studied in the first year in the 2018-2019 academic year (59 people) and in the first year in the 2019-2020 academic year (186 people). Initially, a survey was conducted on student satisfaction with the learning process in May 2019. All first-year students took part in the survey - future physical education teachers who studied without applying an individual approach to the learning process, the total number - 59 people. In the 2019-2020 academic year, the implementation of an individual approach in the training of future physical education teachers was started: a set of entrants was recruited taking into account the chosen sport, for which students will receive certificates upon graduation. 186 students entered the university. In May 2020, a survey of first-year students was conducted again using an individual approach to the learning process. The survey was conducted anonymously. Students were asked to answer questions aimed at determining the level of their satisfaction with the learning process on a 10 - point scale, in which the value of 0 corresponded to the lowest satisfaction, 10 - the highest. The survey was conducted at the end of the first year of study. Statistical analysis: determining the dependence of the number of points in the answers to each question on the year of the survey of students on the test Chi-square; The prognosis of positive and negative responses using the first (without an individual approach) and the second (with the implementation of an individual approach) learning models was performed using ordinal regression (SPSS, Regression, Ordinal). **Results.** An algorithm for implementing an individual approach to the training of future physical education teachers and a training program for future physical education teachers has been developed. The main feature of the developed program is the introduction of the discipline "Selected sport", which contains the largest share of hours of all practical disciplines. The total amount of hours devoted to the study of theoretical and practical disciplines remained unchanged. A significant effect of the survey year on the number of points in the answers of students to the questionnaire on the results of the test Chi-square ($p < 0,001$), which indicates a positive effect of individual approach on student satisfaction with the learning process. The forecast of positive and negative responses using the first (without individual approach) and the second (with the implementation of individual approach) learning models showed that following the first learning model (survey in 2019) a reliable prognosis was found for answers equal to 2-6 points, was a score below average ($p < 0.001$). Following the second learning model (2020 survey), a plausible prognosis was found for answers equal to 8-10 points, was a score above average ($p < 0.001$). **Conclusions.** The implementation of an individual approach is an effective means of increasing the attractiveness of the specialty of physical education teacher for students in the first year of study. This is evidenced by the increasing attractiveness of the specialty of physical education teacher according to the results of questionnaires of students on the level of their satisfaction with the learning process.

Key words: students, individualization, questionnaire, educational program, level of satisfaction

Introduction

Physical education has a huge educational, health and educational potential (Cale & Harris, 2013; Cale, Harris & Chen, 2014; Czarniecka, 2011). In this regard, many authors (Li, Chen, Zhao, et al., 2019; Meng, Horrell, McMillan, Chai, 2020; Song & Chen, 2012) point to the need to improve the quality of training of future professionals in the field of physical culture and sports, among which a special place is occupied by future teachers of physical culture. In modern society requires the implementation of an individual approach to teaching physical education, which would take into account the benefits of choosing the type of physical activity of each person, and especially - schoolchildren and students (Kozina, Ol'khovij, & Temchenko, 2016; Kozina et al., 2018a, 2018b; Xiaofei, 2019; Xiaofei, 2020). To do this, a physical education teacher must have both basic

theoretical and motor training, and have a perfect command of at least one type of motor activity (sport). In this case, he will be able to ensure the implementation of an individual approach to at least one parameter - in the sport chosen by students (Apple, 2011; Burdett & O'Donnell, 2016; Seah, 2011). In addition, he must be able to think creatively for the selection of means and methods of physical education depending on the level of preparation and individual characteristics of students (Xiaofei, Korobeinik, Kozina, 2021, Yin & Buck, 2015; Zhao, 2019). Higher education institutions that train physical education teachers try to provide students with knowledge that provides fundamental theoretical and practical basic training (Fitzpatrick & Burrows, 2017; Haddad, 2008; Herold, 2020; Yukhymenko, Korobeynikov, et.al, 2018). However, not enough attention is paid to improvement in the chosen sport (Kozina, et.al., 2016). This leads to the fact that the staffing of physical education does not meet the needs of modern society. In the People's Republic of China, the problem of individual approach is particularly relevant in connection with national characteristics, traditions, which provide for the predominance of collective action in all types of work (Andriamampianina, Moussa, 2005; Ward, He, Wang, Weidong, 2018). In addition, in the People's Republic of China, there is resistance from many organizations and professionals to introduce sports in physical education, in which competitions are held instead of traditional Chinese health and combat systems (Andriamampianina & Moussa, 2005). In the training of future physical education teachers in the People's Republic of China, in addition to basic sports, it is necessary to include in-depth study of a particular sport in which he could improve and be a high-level specialist. Training of physical education teachers in the People's Republic of China should be based on modern concepts of individualization, which apply to all stages of training: from choosing a sport in which the student would like to improve and receive a specialty of physical education teacher with professional knowledge of a particular sport. physical education teachers in the study of the chosen sport. The scientific solution to the problem requires finding and substantiating the most effective forms of organizing the process of training future physical education teachers (Andriamampianina & Moussa, 2005).

Purpose: to identify the impact of the application of the program with the implementation of individualization on the satisfaction of future physical education teachers in the learning process.

Material and methods

Participants

The study was conducted at Lishui University (China). The study involved students - future physical education teachers who studied in the first year in the 2018-2019 academic year (59 people) and in the first year in the 2019-2020 academic year (186 people).

Procedure

Initially, a survey was conducted on student satisfaction with the learning process in May 2019. All first-year students took part in the survey - future physical education teachers who studied without applying an individual approach to the learning process, the total number - 59 people.

In the 2019-2020 academic year, the implementation of an individual approach in the training of future physical education teachers was started: a set of entrants was recruited taking into account the chosen sport, for which students will receive certificates upon graduation. 186 students entered the university. In May 2020, a survey of first-year students was conducted again using an individual approach to the learning process.

InterventionMethods

An algorithm for implementing an individual approach to training future physical education teachers has been developed. The algorithm contains the following provisions: 1 - determination for each student of the sport that is most suitable for its improvement on the basis of previous sports experience, motor skills and psychophysiological capabilities; 2 - construction of a program of professional training of students, which includes classes in the leading sport, starting from the first year of study; 3 – housetraining in the chosen sport, taking into account the individual characteristics of students with motor abilities and psychophysiological functions. A training program for future physical education teachers has been developed, which provides for the implementation of an individual approach. In the developed program in comparison with the traditional program it is entered in the section of practical disciplines "The chosen kind of sport", "Practice at school", "Traditional Chinese improving and fighting practices" and "Swimming"; in the section of theoretical disciplines - "Fundamentals of Chinese philosophy and politics." The developed program also increased the share of hours devoted to the study of biological sciences (physiology, anatomy, biomechanics, biochemistry, sports medicine) to bring the program closer to European standards. The main feature of the developed program is the introduction of the discipline "Selected sport", which contains the largest share of hours of all practical disciplines. The total amount of hours devoted to the study of theoretical and practical disciplines remained unchanged.

Questionnaire method

The questionnaire method was used to determine the degree of student satisfaction with the learning process. The survey was conducted anonymously. Students were asked to answer questions aimed at determining the level of their satisfaction with the learning process on a 10 - point scale, in which the value of 0 corresponded to the lowest satisfaction, 10 - the highest. The survey was conducted at the end of the first year of study. The survey was conducted twice: the first time - before the experiment with the developed algorithm of

individualization, in May 2019. This survey was attended by first-year students enrolled in the traditional program, which does not provide an individual approach to the training of future physical education teachers, the number of students - 76. The second survey was conducted in late 2020 with first-year students who studied the algorithm of individualization the process of training future teachers of physical education, the number of students - 186. Students were asked the following questions:

1. Do your expectations of studying after entering the university of the subjects you study come true?
2. Do you enjoy studying in this specialty?
3. To what extent, in your opinion, the teaching staff in practical disciplines corresponds to the professional orientation of physical education teacher training?
4. How would you re-enter the university, would you choose this specialty?
5. How much do you like theoretical disciplines?
6. How much do you like practical disciplines?

Statistical analysis

- The following methods of statistical analysis were used in the mathematical processing of tests:
1. Determining the number of students who answered from 0 to 10 points for each question in the first (2019, without the application of an individual approach) and the second (with the implementation of an individual approach, 2020) survey was conducted using the program SPSS (Crossnabs). The following indicators were determined: Count - the value of the number of students who provided an answer for each number of points; Expected Count - the expected value of the number of students who answered each number of points; % within years - the percentage of answers from the number of students for each year of the survey; % within question - the percentage of answers to a specific question for the value of a specific number of points from the total number of surveyed students. The determination was conducted for each year of the survey separately and for the total number of surveyed students.
 2. Determining the reliability of the survey year on the number of points in students' answers to the questionnaire was conducted in two directions: 1 - determining the dependence of the number of points in the answers to each question on the year of the survey of students on the Chi-square test; 2 - determining the degree of interrelation of the values of the number of points in the answers to each question with the year of the survey.
 3. The forecast of positive and negative answers when using the first (without individual approach) and the second (with the implementation of individual approach) learning models was carried out using ordinal regression (SPSS, Regressin, Ordinal), because as a dependent variable (number of points in the answers), and the impact factor (year of the survey) belong to the ordinal scale.

Results

It was found that the implementation of an individual approach has a positive effect on the attractiveness of the specialty of physical education teacher at the stage of entering the university. This is evidenced by the increase in the number of students who entered the university as a physical education teacher and increase the success of future physical education teachers. At the end of 2019 (at the end of the first year of study before the experiment using an individual approach to the process of training future teachers of physical education) of the 76 who entered the university, 59 remained (76.3%) (17 students (22.3%) was deducted at their own request or due to insufficient academic performance). At the end of 2020 (at the end of the first year of the experiment using an individual approach to the process of training future physical education teachers) of the 186 who entered the university, 186 (100%) remained (no student was expelled at their own request or for insufficient academic performance). It was found that in the assessment of students' satisfaction with the learning process in 2019, grades below average prevail, and in 2020 - above average (Figs. 1, 2).

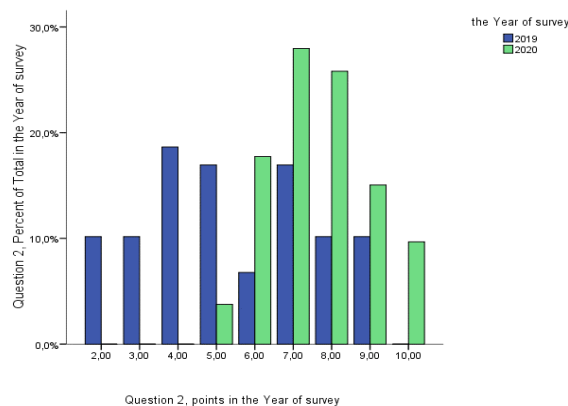


Fig. 1. Percentage of answers for each number of points (question 2 for example) among the number of surveyed students separately in 2019 and 2020

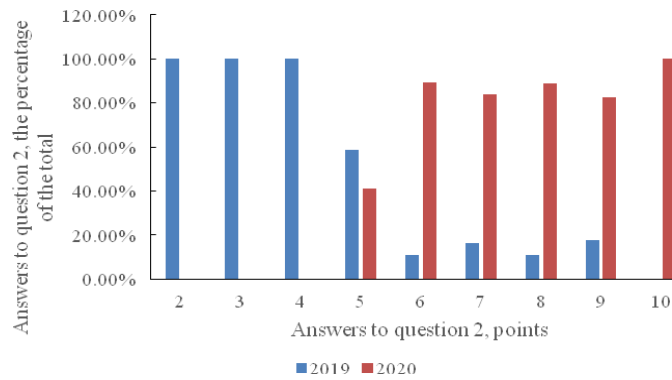


Fig. 2. Percentage of answers for each number of points (question 2 for example) in 2019 and 2020 among the total number of surveyed students

A significant effect of the survey year on the number of points in students' answers to the questionnaire on the results of the Chi-square test ($p < 0.001$) (Table 1), which indicates a positive impact of individual approach on student satisfaction with the learning process.

Table 1. Dependence of answers (question 2 for example) in points on the year of the survey of students on tests Chi-Square (N 2019=59; N 2020=186)

Statistical suppositories	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	100.890a	8	0.000
Likelihood Ratio	97.961	8	0.000
Linear-by-Linear Association	64.457	1	0.000
N of Valid Cases	245		

Notes: a. 6 cells (33,3%) have expected count less than 5. The minimum expected count is 0.72

It is shown that the application of the first model of training (without the use of an individual approach) of future physical education teachers will significantly affect the assessment of their satisfaction with the training process below average. The application of the second model of education (with the implementation of an individual approach) of future physical education teachers will significantly affect the assessment of their satisfaction with the training process above average.

The forecast of positive and negative responses using the first (without individual approach) and the second (with the implementation of individual approach) learning models showed that following the first learning model (survey in 2019) a reliable prognosis was found for answers equal to 2-6 points, ie a score below average ($p < 0.001$). Following the second learning model (2020 survey), a plausible prognosis was found for answers equal to 8-10 points, ie a score above average ($p < 0.001$). The influence of the survey year on the score equal to 7 points was not significant ($p > 0.05$) (Table 2, Fig. 3).

Table 2. Information on the degree of accuracy of the sequential regression model of the answer prediction (question 2 for example) for each number of points in compliance with the first (2019) and second (2020) learning options (N 2019 = 59; N 2020 = 186)

Model	-2 Log Likelihood	Chi-Square	df	P
Intercept Only	146.004			
Final	89.841	56,164	1	0,000
Nagelkerke	0.209			

Notes: Link function: Logit - binding function: Logit; Model - model; Intercept Only - only a permanent component; Final - final value; Nagelkerke - a measure of consistency by the method of Nagelkerke (a measure of certainty that indicates the percentage of variance, which is explained by ordinal regression); -2 Log Likelihood - (-2) logarithmic plausibility; Chi-Square - Chi-square; df - degrees of freedom; P - significance

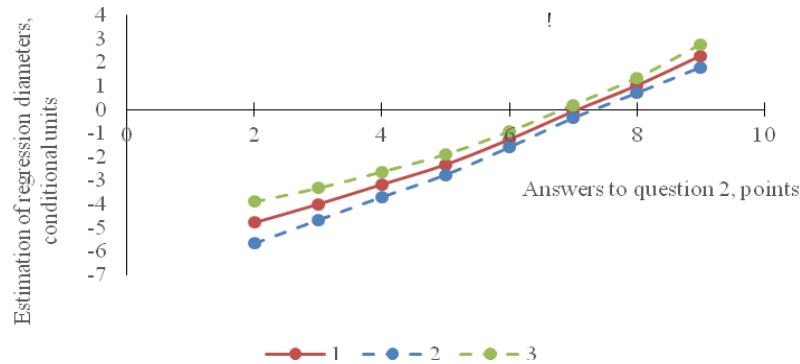


Fig. 3. Model of ordinal regression of the forecast of answers (question 2 for an example) on each quantity of points at observation of the first (2019) and second (2020) training options (N 2019 = 59; N 2020 = 186):

- negative values of regression parameters estimate correspond to a lower value of the survey year (2019);
- positive values of regression parameters estimate correspond to a larger value of the survey year (2020);

1 - the value of the estimate of the parameters of the ordinal regression (um.od.)

2 - lower limit;

3 - the upper limit;

! - differences between the first (2019) and the second (2020) learning options are unlikely ($p > 0.05$) for a given number of points; all other values of differences are probable ($p < 0,001$)

Discussion

It should be noted that the goal set in this study was completely solved. The program of training of future teachers of physical culture, focused on an individual approach to the learning process, is developed and experimentally substantiated in the work.

As far as we know from the analysis of literary sources, our work is the first to implement an individual approach to the training of physical education teachers in the People's Republic of China. Despite the high urgency of the need to implement an individual approach to the process of professional training of physical education teachers, this problem is almost not raised in the modern scientific literature. But a modern physical education teacher at school must have not only basic sports at the primary-secondary level, but also be a perfect specialist in a particular sport (Kozina, et.al., 2016; Ward, et.al., 2018; Yin & Buck, 2015; Zhao, 2019). This is necessary to ensure a strategy of individual approach to the process of physical education of schoolchildren. In order for each student to be able to choose a sport for physical education, the school must have specialists in a large number of sports and physical activity.

It should also be noted that Ward, et.al. (2018) point to the low level of football training of physical education teachers in the People's Republic of China. The authors also note that the low level of training of physical education teachers is also characteristic of basketball, volleyball and other sports. Ward, et.al. (2018) indicate that it is necessary to somehow solve this problem, but do not provide specific ways to solve it. In this regard, we note that our study offers an approach to the training of physical education teachers, which is fundamentally different from that which currently exists in the People's Republic of China. We started from the following provisions: 1 - the teacher of physical culture cannot master perfectly all kinds of sports; he can have only a few basic sports at the level of skills and average level of development of physical qualities; 2 - physical education teacher at the present stage must be a professional in at least one sport; 3 - the combination of the need for professional development in the chosen sport with the possession of basic sports can be done through the implementation of an individual approach to the training of future physical education teachers.

In the People's Republic of China, university and school education is built to minimize individualism. This is due to the peculiarities of the mentality of the people and the traditions of China (Andriamampianina & Moussa, 2005). In addition, the problem of improving the training of physical education teachers rests on the opposition of various professionals to the widespread introduction of sports for which competitions are held, in the physical education of the population. These experts insist on the observance of China's traditions regarding the use of folk health systems and martial arts in physical education of various groups of the population, which is reflected in the training of future physical education teachers. Therefore, there is a problem not only of the need to implement an individual approach in the training of future physical education teachers in the People's Republic of China, but also the need for a harmonious combination of Chinese traditions of health systems and martial arts in physical education with integration into the European space. physical education, which involves changes in the training of physical education teachers.

That is why at this stage the problem of the need to develop an experimental training program for students - future teachers of physical culture, focused on an individual approach. which takes into account: 1 - the combination of Chinese traditions with modern trends in the development of physical education in the world; 2 - a combination of improvement in the chosen sport with the study of basic sports; 3 - reliance on the individual characteristics of students in improving the chosen sport.

To solve these problems at this stage, the problem of the need to develop a training program for students - future teachers of physical education, focused on an individual approach. We have developed an experimental program that takes into account: 1 - a combination of Chinese traditions with modern trends in physical education in the world; 2 - a combination of improvement in the chosen sport with the study of basic sports; 3 - reliance on the individual characteristics of students in improving the chosen sport.

In this regard, an algorithm for the implementation of an individual approach to the training of future physical education teachers was developed. The algorithm contains the following provisions: 1 - determination for each student of the sport that is most suitable for its improvement on the basis of previous sports experience, motor skills and psychophysiological capabilities; 2 - construction of the program of professional training of students which contains classes in the leading sport, starting from the first year of study; 3 - construction of classes in the chosen sport, taking into account the individual characteristics of students with motor abilities and psychophysiological functions. The developed program envisages the introduction of the discipline "Selected sport", which contains the largest share of hours of all practical disciplines. The total amount of hours devoted to the study of theoretical and practical disciplines remained unchanged.

The construction of classes in the chosen sport in the developed program is carried out taking into account the individual characteristics of students with motor abilities and psychophysiological functions (Kozina, et.al., 2016; Kozina et.al., 2018a, 2018b), which are determined by factor analysis. The formation of groups of athletes for individual work is also carried out with the help of hierarchical cluster analysis of testing indicators. On the basis of individual factor values and cluster analysis, individual characteristics of athletes and individual training programs in the selected sport are compiled. The use of interactive and information technologies affects the consciousness, which allows to intensify the active attitude of future physical education teachers to the learning process, and thus provides an individual approach to the training process.

The implementation of an individual approach has a positive effect on the attractiveness of the specialty of physical education teacher at the stage of admission to the university. This is evidenced by the increase in the number of points (student satisfaction with the learning process) in the transition from learning without the use of individual approach (2019) to learning with the implementation of individual approach (2020). In addition, the assessment of students' satisfaction with the learning process in 2019 is dominated by grades below average, and in 2020 - above average. A significant effect of the survey year on the number of points in the answers of students to the questionnaire on the results of the test Chi-square ($p < 0,001$), which indicates a positive effect of individual approach on student satisfaction with the learning process. The forecast of positive and negative responses using the first (without individual approach) and the second (with the implementation of individual approach) learning models showed that following the first learning model (survey in 2019) a reliable prognosis was found for answers equal to 2-6 points, ie a score below average ($p < 0.001$). Following the second learning model (2020 survey), a plausible prognosis was found for answers equal to 8-10 points, ie a score above average ($p < 0.001$). The effect of the survey year on the score equal to 7 points was not significant ($p > 0.05$). In the first survey (in 2019, without the application of an individual approach) there is less consistency of student responses compared to the second survey in 2020 (with the implementation of an individual approach).

It should also be noted that this study is the first to develop an algorithm for individualizing the process of training physical education teachers in the People's Republic of China, taking into account national characteristics and current trends in the country. This study is also the first to develop programs based on an individual approach in the training of future physical education teachers in the People's Republic of China. For the first time, the main provisions of the program of training future teachers of physical education to implement an individual approach to the learning process, taking into account the peculiarities of physical education in the People's Republic of China. The program contains in the theoretical section, along with the generally accepted disciplines of the medical-biological cycle and foreign languages, the study of cultural traditions of physical education in the People's Republic of China (Andriamampianina& Moussa, 2005), in the practical section - along with basic sports, classes in selected sports and classes on traditional Chinese means of physical education. Thus, the analysis of the obtained data in terms of comparing them with the data of modern scientific literature showed that our study has three groups of scientific novelty: data that confirm and supplement the results of research by other scientists (Andriamampianina& Moussa, 2005; Kozina, et.al., 2016; Ward, et.al., 2018); data obtained in the work for the first time.

Conclusions

1. The algorithm of realization of the individual approach of future physical culture teacherspreparation is developed. The algorithm contains the following provisions: 1 - determination for each student of the sport that is most suitable for its improvement on the basis of previous sports experience, motor skills and psychophysiological capabilities; 2 - construction of a program of professional training of students, which

includes classes in the leading sport, starting from the first year of study; 3 - construction of classes in the chosen sport, taking into account the individual characteristics of students with motor abilities and psychophysiological functions.

2. Developed program for training future physical education teachers, which involves the implementation of an individual approach. The main feature of the developed program is the introduction of the discipline "Selected sport", which contains the largest share of hours of all practical disciplines. The total amount of hours devoted to the study of theoretical and practical disciplines remained unchanged.

3. The implementation of an individual approach is an effective means of increasing the attractiveness of the specialty of physical education teacher for students in the first year of study. This is evidenced by the increasing attractiveness of the specialty of physical education teacher according to the results of questionnaires of students on the level of their satisfaction with the learning process.

Conflict of interest

The authors declare that there is no conflict of interest.

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