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Experimental Basis of Elective Subjects in the Context of Informatization of Modern Education

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Abstract: *The article deals with the transition of higher education institutions to distance learning, the experience of the field of science and the introduction of special e-courses into practice in the conditions of informatization of modern education. The empirical value of three- category questionnaire responses based on modified Xi square table and formula was compared with the critical value adopted according to the significance level of the study. It has been experimentally investigated that the study, which was conducted on the basis of the dynamic changes observed in the attitude of specially organized elective course students towards the culture of wellness in the subject of “Turon wrestling and its teaching methodology”, has the effectiveness.*

Key words: *Culture of wellness, elective course, critical value, empirical value, criterion, X2 square, zero hypothesis, alternative hypothesis, degree of reliability, diagnostic and prognostic information.*

Introduction. At present, according to the medical-demographic characteristics of the population of Uzbekistan, the level of health of students and youth is considered one of the important social indicators. There is experimental evidence that the global warming period, which is taking place on a global scale, leads to a decrease in the effectiveness of any disease in pandemic conditions - Direct higher education, as well as future professional activity (Y.P.Lisitsin, 1999, 2004; V.A.Medik, 2003; M.Y.Abrosimova 2005, O.A. Naumenko 2005, A.S. Tverdokhlebov, 2005).

It is permissible to admit on the basis of the sources studied in the framework of the problem - the relevance and practical importance of promotion, popularization and modern informatization of the culture of healthy living in educational institutions is increasing. In the scientific research conducted in the countries of the near CIS, the legislation on the level of development of students on the technologies that protect health, the means and methods of formation of a culture of healthy living, the knowledge on the basics of a culture of healthy living have been studied and a specific research methodology has been formed in this direction. Especially at the initial stage of education, the student is the weakest part of the youth, as the learning load under the initial educational conditions, flexibility, low physical activity, social and interpersonalities-will face a number of challenges arising from communicational problems [1,2,3,7,10].

Main part. On the example of separate electoral collections (institution of higher education), there are conclusions of medical control of 37,7% of the total disease recorded during the three-year period of students and 1,5% lower than the number of references in the data of empirical observation, the impact of which is mainly due to the first year of study. Here it concludes that chronic diseases tend to 1.6 times and the sharpening trend of Health in the last stages of Higher Education. In particular, due to the sometimes extreme economic, social, psychological changes in the global environment, the health of students and young people in relation to their resistance to stress is also deteriorating [2,3].

It provides for the arming and improving the content of education in practice with modern technologies through the joint and embodied Organization of the students with the integrated formation of knowledge, skills, qualifications and professional competences aimed at self-preservation of Health in the global environment [4,5,6,8].

From foreign experience it is known that in the conditions of informatization of modern education, science fields, special electronic courses are being applied to a wide range of practice.

Elective course on the subject “Turon wrestling and methods of its teaching” named after the Culture of Healthy Life (CHL) pedagogy as an important component of the comprehensive development of the individual in the field of Education has been applied to the distance learning system of Bukhara State University starting from 2020-2021 academic year and is based on the selection of elective is based on the idea of forming a common vision of healthy thinking and preservation of health through the development of individual abilities of students on the basis of planned and distance electronic system educational resources in the course of the course [9] .

“Physical Culture” is aimed at creating a modern electronic environment of formation of students’ health care and strengthening, healthy thinking and self-preservation mentality through the means of integrating the socio-cultural, practical and valeological values of the main field of science- “Turon wrestling and its teaching methodology” of the students of the direction of education with the name of CHL. For the purpose of this study, the main subjects taught in the direction of “Physical Culture” Education and the in-depth study of these disciplines, as a means of maintaining the health of students, require special approaches to solving problems related to the organization of modern information exchange classes.

Methods of study: in the research process (at the beginning, at the end), a questionnaire method was used to study the relationship of elektiv course students to the formation of self-preservation thinking and to investigate the experimental effectiveness of elektiv course, the results of which were analyzed through the method of Mathematical Statistics.

In order to check the attitude of the students to the basics of Culture of healthy life culture, the following questions were formulated in the questionnaire:

DEAR STUDENT! We would like to thank you for participating in the research.

INSTRUCTIONS FOR FILLING OUT THE QUESTIONNAIRE. There are different categories of answers to a number of questions. To begin with, read carefully and in the queue specify the appropriate answer option (number) in your opinion. Answer categories: -YES, NO, I DON’T KNOW.

1. Health training, which is taught on a facultative basis in the conditions of higher education, do you consider it is necessary?: -YES, NO, I DON’T KNOW.
2. In your future professional activity, do you think that you will need your knowledge of the culture of healthy living?: -YES, NO, I DON’T KNOW.
3. Do you think that the basis of a healthy culture is a means of activity of potential professional importance?: - YES, NO, I DON’T KNOW.

4. By studying the basics of a healthy lifestyle culture, will you have opportunities in your professional field?: -YES, NO, I DON'T KNOW.
5. In all types of tasks (work) of Physical Culture and sports training, do you see a sense?: YES, NO, I DON'T KNOW.
6. In problematic situations in the process of teaching physical training, do you need individual advice from science teachers?: - YES, NO, I DON'T KNOW.
7. As the transition from course to course, do you consider it is necessary to increase the share of an independent task (work) in the exercises of Physical Culture and Sports?: -YES, NO, I DON'T KNOW.
8. To change your healthy lifestyle, do you want to engage in sports activities?: -Yes, No, I do not know.
9. For your health and professional activity, do you consider it is necessary to engage in Sports, Physical Training?: -YES, NO, I DON'T KNOW..
10. What goals do you pursue for yourself in Physical Culture and sports training?:
11. 11 Do you seek to deeply study the new action practices: -ALWAYS, SOMETIMES, NEVER
12. You try to master the knowledge and actions to strengthen health: -ALWAYS, SOMETIMES, NEVER
13. Do you deeply understand the need to follow a healthy lifestyle?: -Yes, No, I do not know.
14. Do you follow the requirements of a healthy culture and independently engage in physical education?: - YES, NO, I DON'T KNOW.
15. Do you have enough volume of knowledge for yourself in terms of Physical Culture and a healthy lifestyle?: - YES, NO, I DON'T KNOW.
16. Do you know and adhere to the importance of proper nutrition for health?: - YES, NO, I DON'T KNOW.
17. Do you know and follow the profilactic actions of infectious (viral) diseases?: - YES, NO, I DON'T KNOW.
18. Do you know the rational organization of mental labor hygiene and agenda?: - YES, NO, I DON'T KNOW.
19. If modern practice "Elective syllabus" is applied for deep mastering of specialty subjects in the conditions of Higher Education, the quality of professional preparation is improved: YES, NO, I DON'T KNOW.

"Zero hypothesis" and χ^2 criterion were applied for statistical analysis of responses to questionnaire [7]. It is noteworthy that in the special literature there is only a table and Formula XI Square, designed for two categories. In order to analyze the questionnaire responses according to the essence of the study, the table and formula of the xi square were modified.

The zero hypothesis is actually considered to be two observed phenomena, that is, a phenomenon that predicts that there is no difference between the results of the questionnaire recorded at the beginning and at the end of the study, but is true until the proof of the inverse relationship (existence of the difference). Scientific proof of the error of the zero hypothesis, that is, two phenomena (Elective course students as an elected sum $n_1=72$ at the beginning of the experiment and $n_2=77$ at the end of the experiment), and phenomena interrelate reliably - is the main task of modern science. Mathematical actions that are carried out in the requirements of science can only be refuted by its specific conditions, the hypothesis (N_0), which is based on the assumption. In most cases, there is an assumption that there is no difference in the

parameters of the distribution between two or more selections, of the interrelationship (difference) between the variable events under study.

The sign N_0 is used to express the zero hypothesis. In the statistical conclusion, the researcher is concerned with the invalidity of the hypothesis N_0 and its inconsistency with the existing empirical data, that is, certain actions are required depending on the rejection of the hypothesis. In other words - an alternative hypothesis N_1 that rejects the hypothesis N_0 must be accepted.

When the results were compared in percentage (%) scale before (after) any pedagogical effect, the criterion χ^2 was used by the researcher to determine if there was any noticeable difference in the superficial view. In the same way, it is necessary to determine the effectiveness of the pedagogical impact of theoretical and practical and methodical training conducted in the Elective syllabus process, as well as the statistical significance of the indicators on the basis of the selection to prove the changes in the attitude of the students of the main experimental group to CHL. In the study of similar pedagogical situations, it is possible to apply the criteria for differentiation of a single set. The criteria χ^2 in the following order are considered.

In the content of the questionnaire there are some categories (for example, “YES”; “NO”, “I DON’T KNOW”). Based on all the answers noted at the beginning and at the end of the experiment, a modified table was formed (see Figure 1).

Figure 2

General calculation chart based on criteria χ^2

Experiment groups	Category №1 “YES”	Category №2 “NO”	Category №2 “NO, I DON’T KNOW”	Aggregate of responses
At the beginning of experience $n_1=72$	345	627	252	345+627+252 = 1224 (n_1)
At the end of the experiment $n_2=77$	1075	82	152	1075+82+152 = 1309 (n_2)
Total:	345+1075	627+82	252+152	$n_1 + n_2 = N$

To verify this statistical hypothesis, we can first determine the degree of significance of the experimental phenomenon in order to compare the empirical value (α) with the critical value. In pedagogical research it is limited to taking that the value of (α) is equal to 0.05. The second is the reliability difference or difference. In this case, $1-0.05=0,95$ (i.e. 95% confidence level).

The critical value of the χ_i^2 is given when $\alpha = 0,05$ (see Figure 2).

Figure 2

The critical value of the χ_i^2 is given when $\alpha = 0,05$

$M \square 1$	1	2	3	4	5
χ_i^2	3,84	5,99	7,81	9,49	11,07

Table indicators “xi square” of the results of the questionnaire were calculated in the program of empirical value in the Excel programme with a probability of 95% based on the following formula.

$$X^2_{emp} = \frac{N(B_{t.b.} \cdot K_{t.o.} - K_{t.b.} \cdot B_{t.o.} - K_{t.b.} \cdot C_{t.o.} - C_{t.b.} \cdot K_{t.o.} - \frac{N}{3})^2}{(n_1 - n_2) \cdot (B_{t.b.} + B_{t.o.}) \cdot (K_{t.b.} + K_{t.o.}) \cdot (C_{t.b.} + C_{t.o.})}$$

Here, the conditional signs : *m* - the number of students at the beginning of the experiment, *n* - the number of students at the end of the experiment, $N=n_1+n_2$ - in total, $B_{t.b.}$ - “Yes” at the beginning of the experiment, $K_{t.b.}$ - “No” at the beginning of the experiment, $C_{t.o.}$ - “I do not know” at the beginning of the experiment, $B_{t.o.}$ - “Yes” at the end of the experiment, $K_{t.o.}$ - “No” at the end of the experiment, $C_{t.o.}$ - “I do not know” at the end of the experiment are formed

Figure 3.

Comparative analysis of the results of the questionnaire

Total	At the beginning of the experiment $n_1=72$			At the end of the $n_2=77$			Total	Difference	
	yes	no	I don't know	yes	no	I don't know		Critical	Empirical
$n_1=1224$	345	627	252	1075	82	152	$n_2=1309$	5,99	6,11

Results of the study. According to the comparative table on the categories of questionnaires: at the beginning and end of the experiment $345 < 1075 = \text{“YES”}$, $627 > 82 = \text{“NO”}$ and $252 > 152 = \text{“I DON'T KNOW”}$ with a predominance in conformity, a tendency consisting of changes in the attitude of students to the basics of a healthy living culture was noted.

The rejection of the hypothesis originally proposed N_0 and the acceptance of the accepted N_1 alternative (alternative) hypothesis, that is, to prove the existence of a true statistical difference between the results of the pre- and Post-survey from the experiment, an empirical value was calculated based on the formula above (see Figure 3).

Since it is $M = 3$ in the experiment, it will be equal from 2nd Figure to $M - 1 = 2$ and we get a critical value $X^2_{0,05} = 5,99$ corresponding to it. $X^2_{emp} \geq X^2_{0,05}$ was reasonable. According to data on the Figure 3, according to all categories of questionnaires, there is a reliable difference between critical and empirical values at the end of the experiment, i.e. $6,11 > 5,99$ (Figure 3).

During the experiment, a percentage change was noted among the response variants of the questionnaire categories (see Figure 4).

Figure 4.

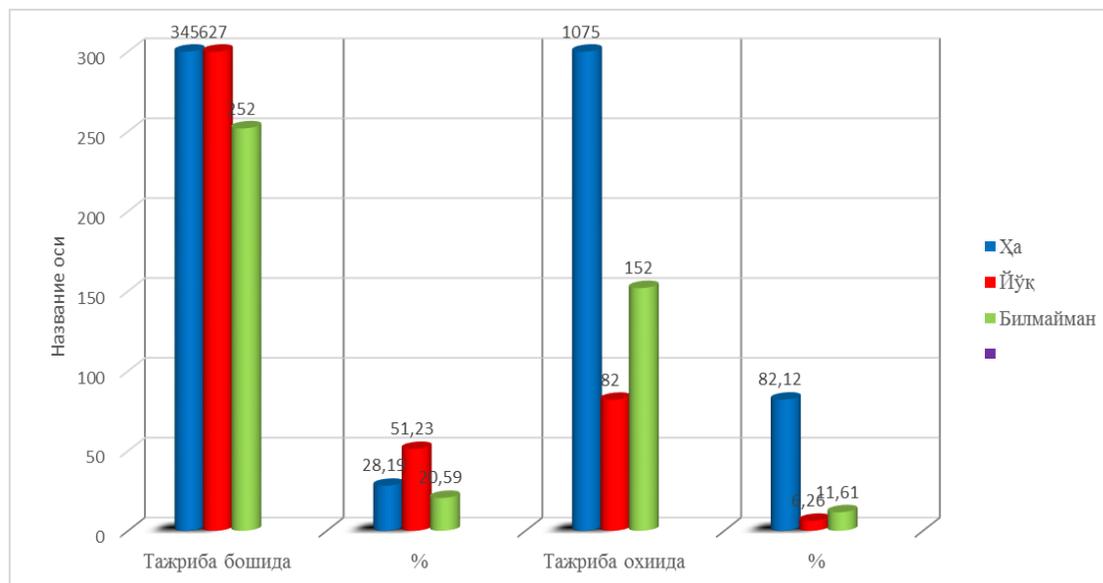
Intercategorical percent change in the questionnaire

№	Categories of questionnaire	At the beginning of the experiment		At the end of the experiment	
		Quantity of responses	% change	Quantity of responses	% change
1	yes	345	28,2	1075	82,1
2	no	627	51,2	82	6,3
3	I don't know	252	20,6	152	11,6
4	Total:	1224		1309	

According to the results of the percentage change in the categories of students questionnaires: at the beginning and at the end of the experiment, $34\% < 84\% = \text{“YES”}$ increased, $43\% > 8\% = \text{“No”}$ decreased and $23\% > 8\% = \text{“I do not know”}$ decreased, with a predominance the ratio of students' attitude to the basics of culture of healthy life culture was formed (see figure 4.1).

Figure 4.1.

Dynamics of positive changes of the ratio to CHL in the students of elective courses



Hence, the electronic resources used in the elective course process: through theoretical and practical and methodical training, positive statistical changes to the foundations of a culture of healthy life in students indicates that hypothesis H_1 can be accepted.

Conclusion

As a result of the statistical analysis conducted on the results of the survey, the experimental value of the response options and the dynamics of positive changes based the “Turkic wrestling and the methodics of its teaching”, on 17 questions on the determination of the students' attitude to the Culture of Healthy life, their empirical value and dynamics of positive changes were confirmed. the questionnaire method of the experimental verification the effectiveness of elective course conducted is considered to be of diagnostic and prognostic information. At the beginning and end of the experiment, the need for revision of the content of the syllabus (electronic resources) was identified as a result of the negative attitude and duplication of the students were observed in the responses under the procedure 13, 14 and 15.

As it can be seen from these tables, the empirical value of the conducted questionnaire results is greater than their accepted critical value. Hence from the hypotheses put forward: (N_0) hypothesis is rejected, (N_1) alternative (alternative) hypothesis that is, the statistical existence of the difference between the parameters before and after the experiment was proved.

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