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Change of psychophysiological indices in female students of creative occupations

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Abstract

Purpose: studying the dynamics of psychophysiological indices of creative occupation female students.

Material: the study involved 120 female students. Reactive qualities, level of static and dynamic equilibrium, orientational qualities, speed of operative thinking, volume of rote memorization, attention distribution, level of accuracy, attention speed and switching, accuracy of task performance were assessed.

Results: a decrease in the indices of the accuracy of reproducing motion amplitude and a given value of effort, those of response to vertically falling object and those of static and dynamic equilibrium was revealed. An improvement in the dynamics of nervous processes and the ability to constructive praxis was noted. The decrease in the level of development of motor qualities, professional skills, physical fitness, and health is observed already in the 1st year of study. The authors believe that the pedagogical influences should be started from the 1st course and continued until the end of the study. In the process of physical education classes, the physical exercises aimed at improving the professionally significant psychophysiological properties of students should be used. It is they that restrain the negative effect of increasing the intensity of educational classes simultaneously contributing to an increase in the development level of almost all motor qualities and health.

Conclusions: uneven decrease of most psychophysiological indices negatively affects both the level of female student motor preparation and professional abilities of the future designers. The findings give ground for the development of the methods for improving motor qualities and psychophysiological properties professionally significant for students-designers. Taking into account the future profession specifics and the health indices will allow more precise planning of the content of physical education classes.

Keywords: designers, psychophysiological indices, female students, professional abilities

Анотація

Коробейнікова Л.Г., Джаміль М.С.А., Цинарські В.Дж., Улізко В.М. Зміна психофізіологічних показників у студенток творчих професій

Мета - дослідити динаміку психофізіологічних показників студенток творчих професій.

Матеріал і методи: у дослідженні взяло участь 120 студенток у віці 18 до 22 років. Оцінювалися реактивні якості, рівень статичної і динамічної рівноваги, орієнтаційні якості, швидкість оперативного мислення, обсяг механічного запам'ятовування, розподіл уваги, рівень точності, швидкість та перемикання уваги, точність виконання завдання.

Результати: встановлено зниження показників точності відтворення амплітуди руху і заданої величини зусилля, показника реакції на предмет, що вертикально падає, показників статичної і динамічної рівноваги. Відмічено поліпшення показників динамічності нервових процесів і здатності до конструктивного праксису. Динаміка результатів комплексного тесту, який оцінював орієнтаційні, реактивні та диференціальні якості у студенток, вказує на те, що найкращі значення мають місце на I курсі, найгірші - на IV курсі. Нерівномірне зниження більшості психофізіологічних показників негативно відображається не лише на рівні рухової підготовки студенток, але і на професійних здібностях, зокрема, майбутніх дизайнерів.

Висновки: Встановлено зниження більшості показників, які характеризують кінестетичні, орієнтаційні та реактивні якості студенток університету в процесі навчання. Цілеспрямоване вдосконалення кінестетичних, реактивних якостей на заняттях з фізичного виховання за допомогою спеціалізованої методики дає можливість не лише призупинити негативну динаміку психофізіологічних показників молодого організму, але і покращити їх. Зрештою це позитивно відображається на професійній майстерності майбутнього фахівця творчої професії.

Ключові слова: дизайнери, психофізіологічні показники, студентки, професійні здібності

Аннотация

Коробейникова Л.Г., Джамиль М.С.А., Цинарски В.Дж., Улизко В.М. Изменение психофизиологических показателей у студенток творческих профессий

Цель - исследовать динамику психофизиологических показателей студенток творческих профессий.

Материал и методы: в исследовании приняло участие 120 студенток в возрасте 18 до 22 лет. Оценивались реагирующие качества, уровень статического и динамического равновесия, ориентационные качества, быстрота оперативного мышления, объем механического запоминания, распределение внимания, уровень точности, быстрота и переключение внимания, точность выполнения задания.

Результаты: установлено снижение показателей точности воспроизведения амплитуды движения и заданной величины усилия, показателя реакции на вертикально падающий предмет, показателей статического и динамического равновесия. Отмечено улучшение показателей динамичности нервных процессов и способности к конструктивному праксису. Динамика результатов комплексного теста, который оценивал ориентационные, реагирующие и дифференциальные качества у студенток, указывает на то, что наилучшие значения имеют место на I курсе, наихудшие – на IV курсе. Неравномерное снижение большинства психофизиологических показателей негативно отражается не только на уровне двигательной подготовки студенток, но и на профессиональных способностях, в частности, будущих дизайнеров.

Выводы: Установлено снижение большинства показателей, которые характеризуют кинестетические, ориентационные и реагирующие качества студенток университета в процессе обучения. Целенаправленное совершенствование кинестетических, ориентационных и реагирующих качеств на занятиях по физическому воспитанию с помощью специализированной методики позволяет не только приостановить негативную динамику психофизиологических показателей молодого организма, но и улучшить их. В конечном итоге это положительно отражается на профессиональном мастерстве будущего специалиста творческой профессии.

Ключевые слова: дизайнеры, психофизиологические показатели, студентки, профессиональные способности

Introduction

Professional activity is the most important area of human life. The success of professional preparation depends on a number of factors including adequate physical education of future professionals. The successfulness of any professional activity is directly related to the development of these or those motor and psychomotor qualities [1]. The profession of designer requires a number of skills to accurately differentiate, reproduce and measure spatial, strength and temporal parameters of motion, muscular efforts, balance, distribution and intensity of attention as well as sufficient spatial orientation. Market relations have made the competition for a working place among graduates more acute [2]. Priority at the job market is given to those specialists possessing good professional qualities along with a high level of psychophysiological conditions, efficiency, endurance, health, ability to quickly and adequately solve complex professional tasks [3, 4].

Design is a project practice that requires an organic combination of figurative and systemic beginnings from the professional thinking [5]. The dominant types of designers' activities are: the creation of new projects of man of today subject environment; development of artistic design projects of household and industrial products and the like. The main activity types also include the development of new clothing models; development of details of exterior interior design; selection of material for product manufacture; control for the design realization at the stages of projecting, manufacturing, testing; development of technical documentation for the designed products (sketches, drawing designs, drawings, diagrams, models); development of landscaping projects and design of building facades [6].

The designer should have creative, artistic abilities, and be able to convey the intention by means of graphic image; she should have a developed spatial-figurative thinking, steady attention, ability to switch and distribute attention, visual memory, good eyesight and a good eye. The demands placed on the profession force out to pay attention to them during specialist preparation at the university [7].

The profession of a designer is characterized by mental tension, monotony of working posture (most often sitting), extreme restriction of movements, a great load on mental and psychical processes that serve them (perception, memory, attention, etc.). However, at the present stage the

most peculiar feature of the designer's activity is the expansion of the scope of activity (from the idea embodied in paper (drawing) to the study of the properties of finishing materials and the manufacture of individual elements of the design project).

A large percentage of the designer's working time is taken by mental and psychomotor processes related to the solution of the main professional tasks [8]. These are: the ability to use visual memory, the ability to orientate in space and distribute attention, the ability to reproduce the given object parameters schematically, the ability to assess and differentiate strength and spatial motion parameters performed with small amplitude, the accuracy of the actions performed [9]. These psychomotor actions take at the average 37% of working time. During performing these actions, the main coordination and psychomotor manifestations are actions that actively use kinesthetic qualities (reproduction, evaluation, measurement of spatial parameters), orientational qualities, accuracy of the task performance, the ability to constructive praxis, the ability to distribute attention [10].

Today's students studying creative specialties have to spend a lot of time at the computer. Fixed static posture, minimal monotonous movements of the upper extremities as well as constant eyestrain negatively influence human well-being [11]. High level of study load in the face of low motor activity and long-term maintenance of uniform static posture is one of the factors of physical development delay and psychophysiological state of the body [12, 13]. Motor activity restriction has a negative impact on human health [14].

In many papers [15, 16, 17, 18] attention is paid to possible health deviations, decrease of general physical and mental work capacity, initial disorders in the activity of a number of the body functional systems. In particular, K.A. Sydorova et al. [19] investigated the temperament, speed of response of rural and urban female students. In studies of different authors [20, 21] the data of simple and complex visuomotor responses and operative memory were analyzed, whereas. Kostyunin [22] also investigated the functional mobility of nervous processes, the tapping-test, the responses to a moving object. Researchers tend to rather extensively analyze different set of psychophysiological indices of students in the dynamics. Study of Barybina [1] concludes that there exists the relationship between psychophysiological indices and individualization

of physical education at the university. Moreover, none of the researchers was able to analyze the influence of psychophysiological indices dynamics on professional qualities of the future profession and, as a consequence, the expediency of specialized physical education in order to improve these indices.

We assume that the use of a complex of modern methods for studying the functional indices of external respiration, the level of physical health, and the general state of the autonomic nervous system of university students will permit to implement a new approach to solving the issue of programming physical education classes with account for the specialty specifics. Taking into consideration the future profession specifics and the health indices will allow more precise planning of the content of physical education classes.

The purpose of the work is to study the dynamics of psychophysiological indices of female I-IV year students-designers.

Materials and Methods

Participants

120 female students aged 18-22 years were tested. In the research analyzer of motor-coordination reactions ADKR-2 was used.

Organization of study

The level of female students' accuracy was assessed by the following tests: 1) accuracy of reproduction of pre-set value of force was determined with the help of electronic hand dynamometer "EH101"; 2) accuracy of reproduction of pre-set amplitude of arms' movements was measured by kinematometer of Zhukovskiy.

Responsive qualities were assessed by the following tests:

- 1) test for quickness ("Catching of rule");
- 2) determination of reaction to moving object. For this test computer program "Neurosoft NS-PsychoTest" [20] was used;
- 3) test for quickness of vision motor response (simple and complex) ("Neurosoft NS-PsychoTest" [15]);
- 4) test for quickness of reaction ("Catching of stick");
- 5) complex test: determining the accuracy of multidirectional speed-strength motions per a

certain time (computer program "Neurosoft NS-PsychoTest" [20]).

The following tests were used to estimate orientational qualities 1) "Labyrinth" test; 2) "Dribbling" test; 3) "Target hitting" test.

For evaluation of psychophysiological qualities of female students-designers the following tests were utilized: 1) distribution of attention ("Finding of numbers"); 2) volume of rote memorization ("Quantity of men figures"); 3) distribution of attention and quickness of operational thinking ("Assembly of puzzles during certain period of time"); 4) quickness of operational thinking ("Koss's cubes"); 5) on special device we determined: quickness, re-switching and concentration of attention; accuracy of fulfillment of pre-set task.

Romberg's test (posture of "Stork") was used to test static balance; 2) dynamic balance was assessed by "Turns on gymnastic bench" test.

Statistical analysis

While processing the experimental data, we determined the average values of the indices and their errors ($X \pm m$), the degree of difference in the means and the significance of differences (t , p), the dispersion value around the mean (σ , CV), and the degree of interrelation between the studied indices (r).

While conducting complex pedagogical, biomechanical and biological examinations with participation of athletes, we adhered to the legislation of Ukraine on health protection, the Helsinki Declaration of 2000, the Directive No. 86/609 of the European Society on the participation of people in biomedical researches.

Results

In the course of testing the ability to accurately reproduce a given spatial amplitude of hand motion, the dynamics of this index changes on dominant hand has been examined in female I-IV year students without visual control (Table 1). The best values of the accuracy of reproducing hand movement amplitude were observed in the I-II year students, whereas the worst - in the IV year students. The magnitude of error during test performance trended upward to the IV year of study. The measure of decrease of values of the studied index from the I to the IV course constitutes 20%. This indicates the deterioration of this quality in female students-designers by the end of their studies at the university.

Testing the index of accuracy of reproducing a given value of effort demonstrated its increase from the I to the IV course. The magnitude of the error increase and deterioration of this index to the IV year constituted 40%. The worst result according to the studied index takes place at the IV course, since the deviation from the

set value of strength effort constituted almost 3 kg. The best index was noted in the first year students. Thereafter, a negative dynamics in the level of development of the ability to accurately reproduce the given value of effort was observed.

Table 1

Psychophysiological indices of female students-designers during studies at the university

Index	Unit of measurement	Years of study			
		1	2	3	4
Accuracy of movement amplitude reproduction	error, degrees	3.50	3.70	3.80	4.20
Accuracy of reproducing the given value of effort	kg	2.00	2.40	2.60	2.80
Speed of response ("Stick catching" test)	time, ms	240	260	261	266
Speed of response ("Ruler catching" test)	cm	15.70	14.60	16.60	17.10
Accurate responses to moving object	number of times	2.00	2.80	2.90	2.40
Antedating responses to moving object	number of times	9.60	10.40	9.40	8.40
Deferred responses to moving object	number of times	8.10	10.60	9.60	8.80
Speed of simple visuomotor response	time, ms	218	249	255	296
Speed of complex visuomotor response	time, ms	474	451	443	424
Total time of complex visuomotor response	time, ms	467	451	444	423
Static balance	time, s	20.20	17.70	14.80	12.00
Dynamic balance	time, s	12.36	10.16	9.24	8.39

The index of speed of response development in female students was the best in the first year and the worst - in the fourth year. This index dynamics shows a steady tendency to decrease from the I to the IV year. This is indicative of a deterioration in the responsive qualities of students by the end of their studies at the university.

Testing the index of the reaction to vertically falling object ("Ruler catching"), in students-designers indicates that the best results are presented in the II year, whereas the worst - in the IV year. The dynamics of this index has a stable tendency to decrease from the II to the IV year by 17.1%. This indicates deterioration in the responsive qualities of female students by the end of their studies at the university.

Analysis of changes in the index of accurate responses to moving object of female students showed that its best values occur in the II and the III year, whereas the worst – in the I and the IV year. The definitions of "best" and "worst"

are quite arbitrary, given the ratio of accurate responses shown by students in comparison with the total number of responses suggested to them during testing. Of suggested 20 responses, students managed to show only 2-3 accurate ones on the average. This is extremely negative index to characterize one of the most important qualities of a designer. In the dynamics there is a slight improvement of this index from the II to the III year. However, before the 4th year there is a 14.3% decline of the index as compared to the II year. The change of this index indicates a decrease in the students' responsive qualities by the end of their studies at the university.

The study revealed that the highest value of the index of antedating responses in female students-designers is observed in the I year. Of 20 suggested responses the subjects demonstrated 9 antedating ones on the average. The lowest values of this index were revealed in 4 year students, who demonstrated 8 antedating responses of 20

suggested ones. The index decrease from the 1 year to the 4 year constituted 12.5%.

On the whole, the number of deferred responses shown by female students, compared to the total number suggested during testing, is quite high in all years of study. This is extremely negative index to characterize one of the most

significant qualities of future designers – ability to see an object in space, in motion. Absolute speed of response is not the main index in response to a moving object. It is its timeliness closely related to the attention concentration that is significant.

Table 2

Psychophysiological indices of female students-designers during studies at the university

Index	Unit of measurement	Years of study			
		1	2	3	4
Ability to orientate in small space	time, s	44.00	46.30	48.20	52.10
Accuracy of spatial orientation	mm	1.30	1.80	1.60	1.40
Orientalional, responsive and differentiatinal qualities	points	13	19	16	18
Orientalional qualities ("Dribbling" test)	number of times	58	62	55	52
Orientalional qualities ("Shots at target" test)	number of times	8.9	8.70	7.10	6.30
Speed of operative thinking	points	43.70	47.70	51.10	53.20
Attention distribution	c.u.	6.00	6.60	5.60	4.30
Volume of operative memory	number	6.70	5.60	4.30	3.00
Attention distribution and speed of operative thinking	minutes	11.18	13.83	17.12	19.08
Speed of attention switching and focusing	number of errors	0.74	0.82	0.78	0.72
Attention speed	number	11.18	13.83	17.12	19.08
Attention accuracy	number of errors	0.91	1.20	0.83	0.63
Complex test	c.u.	10.10	11.30	11.50	11.70

Changes in the index of the time of simple vision motor response (SVMR) of female students have a negative dynamics as well.

The best value of the index of time of simple vision motor response in female students was revealed in the first year, whereas the worst - in the fourth year. The dynamics of decrease of studied index constituted 35.8%. This indicates deterioration in the responsive qualities of students by the end of their studies at the university.

In contrast to the previous indices reflecting sensory motor reaction, the results of complex vision motor response (CVMR) evaluation indicate a process of improving the indices of this quality from the I to the IV year. The best value of studied index was observed in the four year students, whereas the worst - in the first year ones. The overall improvement of this index constituted 10.5%.

Detected changes in the time of CVMR among students were reflected on the total time of CVMR. The best value of the index of the total time of CVMR was noted in the fourth year students, whereas the worst - in the first year ones. The total time of CVMR decreased from the I to the IV year by 9.4% by the end of the study.

Analysis demonstrated stable negative dynamics of Romberg's test ("Stork" posture) index from the I to the III year of study. This indicates the decrease in the level of development of ability to maintain balance in female students. The index decrease from the I to the IV year of study constituted 40.6%. This is a negative factor.

Studies have demonstrated a stable negative dynamics of the indices of dynamic balance in female students from the I to the IV year of study. This indicates a decrease in the level of development of their ability to maintain dynamic balance. The decrease constituted 32%. This is a negative factor.

Data of the "Labyrinth" test for determining orientation qualities with account for the time and accuracy of task performance indicate that the best time of passing the labyrinth was demonstrated by the first year students, whereas the worst - by the fourth year ones. The time of the labyrinth passing increases by 18.4% (Table 2).

Analysis of the dynamics of accurate spatial orientation indices indicates (Table 2) the lack of significant changes in the ability to accurately perform motor tasks during college years. The best values of spatial orientation

accuracy index were found in the first year students, whereas the worst - in the second year ones.

Spatial orientation abilities, kinesthetic qualities, work of the visual analyzer, sensory experience ("Shots at target" test) are gradually decreased from course to course. The decrease of indices from the I to the IV year constitutes 29.2%.

The dynamics of the complex test results, which evaluated the orientational, responsive, and differentiatinal qualities of female students, indicates that the best values are peculiar for the first year students, whereas the worst - for the fourth year ones. In general, the index decrease from the I to the IV year constituted 15.8%. The deterioration of the complex test index occurred at the expense of increase in the time of task performance. The complex test results characterize general negative change in studied psychophysiological indices of kinesthetic, responsive and orientational qualities of female students in the process of their studies at the university.

After carrying out the correlation analysis, a correlation matrix was built. In this matrix, the information received was analyzed taking into account the nature, number and degree of closeness of the relationships obtained. Only statistically significant indicators were evaluated. It was revealed that all the indicators of professional qualities of future designers studied by us are interrelated with indicators of certain types of motor qualities. The analysis made it possible to reveal the ambiguous nature of the relationships for various types of professional qualities of future designers.

Correlation analysis revealed the dependence of the indicator reflecting the level of attention distribution ("search for numbers" test) among design students with the indicator of the "Labyrinth" test, which characterizes orientational qualities, to perform motor tasks accurately and quickly. In this case, the correlation coefficient is 0.51 and reflects a moderate level of connection between the studied indicators. It should be noted that when performing the "Labyrinth" test, the time and accuracy of the task is evaluated, just like when performing the "search for numbers" test. Activities of a similar nature take place in the professional work of designers (for example, when performing small and precise movements with a brush, when preparing markings and drawings).

Table 4 presents the analysis of the correlation matrix of the parameters of the level of attention development, working memory, the speed

of memorization and the accuracy of reproduction of the information received with the indicators of the "Labyrinth" tests, complex visual-motor reaction, the "Catching the ruler" test, which characterize the response, kinesthetic and orientation qualities. The analysis of the relationship between professional qualities and indicators of the level of development of response and kinesthetic qualities among female designers indicates the possibility of influencing the development of professional skills. The level of connection between the parameters is average, the correlation coefficients vary in the range from 0.51-0.62.

The revealed nature of the interrelationships testifies to the importance of professional qualities among female designers-students for a quick and effective solution of problems associated with the need for accurate perception in the shortest possible time and keeping a large volume of spatial and other information in memory.

One of the most important subjects in training at all departments of the Faculty of Design is the discipline "Painting". Painting is the art of depicting objects with paints. They study this subject from I to IV courses. When giving marks in this discipline, the following are taken into account: the execution of the drawing is naturalistic or proportionally, the figure is shown in the figure, and the correctness of the composition. The analysis of the relationship between the indicator of success among design students in the discipline "Painting" with the indicator of the kinesthetic test revealed an average degree of closeness of parameters (correlation coefficient 0.53).

Drawing is the art of depicting objects with graphic material. During the training, the ability to build objects, simulate volume, quality of shading, and the ability to correctly place a drawing on paper are assessed. The work is done with a pencil and other soft materials such as charcoal. Since this is a very fragile material, you need to feel the pressure on it from the hand. The analysis of interconnection of the indicator of student-designers' success in the discipline of their professional training "Drawing" revealed a relationship with the indicators of the level of kinesthetic qualities of the accuracy of hand movements and the ability to assess orientation in space. The tightness of correlations of the studied parameters is average - from 0.52 to 0.54. This testifies to the importance of improving the kinesthetic and orientation qualities of female students for their future professional activities.

Table 3

Relationships between indicators of attention, speed and accuracy of information reproduction with indicators of kinesthetic qualities of female students

Index	r
Orientation quality ("Labyrinth" test)	0.51
Differential-orientation quality ("Catching of rule" test)	0.55
Responsive quality (CVMR test, right hand)	0.62
Responsive quality (CVMR test)	0.53
Responsive quality ("Catching of stick" test)	0.54
Comprehensive test	0.61
Distribution of attention ("Finding of numbers" test)	0.59
Differential quality (Accuracy of reproduction of the set)	0.63

Table 4

Relationships between indicators of quickness, switching and concentration of attention with indicators of kinesthetic qualities of female students

Index	r
Responsive quality (complex CVMR test)	0,64
Responsive quality ("Catching of stick" test)	0,74
Responsive quality (simple VMR test)	0,68
Responsive quality (rect "Reaction is a	0,71
Distribution of attention ("Finding of	0,62
Memory volume ("Number of men" test)	0,57
Distribution of attention and speed of operational thinking	0,66
Speed of operational thinking	0,58
Differential quality (Accuracy of	0,64
Differential quality (Accuracy of	0,63
Differential-orientation quality ("Hitting the	0,57

Discussion

The correlation analysis of the links between the indicators of development of professionally significant qualities of future designers and the level of development of psychophysiological indicators showed that they are in close interaction. Thus, the hypothesis of our study was confirmed. The goal set in the work was achieved.

A connection was revealed between the indicators of fine motor skills of the working hand with the indicator of the speed of operational thinking. the average correlation is 0.65. The test for the speed of operational thinking is a complex one, which reflects not only the level of development of motor skills, but also shows the component of mental processes. This skill is very important for future designers. Thus, it is necessary to improve the students' ability to speed of

operational thinking in the learning process, the ability to quickly and accurately respond to the task received and perform it in strict accordance with the set goal.

The general level of professionalism of female design students was assessed using the assessment score, the ratio of the accuracy of reproduction of a standard drawing to the time of its execution. Correlation analysis revealed the relationship of this indicator with indicators of the development of kinesthetic and qualities. Analysis of the result obtained indicates the presence of a correlation - 0.63. The connection between the indicators of the professionalism of female students and the level of sensory response is high, the correlation coefficient is 0.71.

Table 4 presents the analysis of the correlation matrix of the relationship between the indicator of the development of speed, switching and concentration of attention with the indicators of other tests. The analysis of the connection

between attention, memory and accuracy of reproduction of the information received with the indicators of tests of the level of development of kinesthetic qualities among female students was carried out. The analysis shows that by developing coordination qualities one can influence the development of professional skills. The level of correlations is average, the correlation coefficients are from 0.57-0.74.

Human creative activity is accompanied by a change in the functional state of the body different organs and systems. The degree of conditioned responses is reduced, the response to different intensity stimuli is smoothed out, the time of response is increased, and the attention span is reduced. Low intensity work increases excitability of the visual analyzer. The systems of direct memorization and concentration of attention are subjected to the greatest load. Creative labor proceeds with low level of motor activity. This leads to conditions for increased fatigue, decreased work capacity and feeling unwell.

Our study expands the data on investigation of the psychophysiological indices of university students. In contrast to the previous studies of a number of authors, we have analyzed rather wide range of psychophysiological indices in the dynamics from the I to the IV year of study, and in the context of the relationship with the future profession [23 – 25].

Analysis of the results of studying psychophysiological indices of university female students-designers showed an ambiguous character from the I to the IV course. A decrease in the accuracy of reproducing motion amplitude, a given amount of effort, response to vertically falling object, and indices of static and dynamic equilibrium was revealed. This compares to data reported by other researchers [26, 27, 28].

An improvement in the dynamics of nervous processes and the ability to constructive praxis should be noted. Similar changes were reported by different authors [29 – 34].

The study confirms the conclusions of specialists [35 – 37] that uneven decrease of most psychophysiological indices negatively affects not only the level of students' motor training, but also professional abilities of future designers, in particular [38].

The impact of physical education at universities on the processes of motor quality development and improvement of professionally important psychophysiological characteristics is becoming extremely topical today.

Our studies have shown for the first time that the design students have low a level of health indices. This indicates that during graduation from the university, these indices will decrease by 2-3 times. Thus, young specialists of Ukraine who are starting to pursue their profession are already sick and feeble. Their immune system is low. They are more susceptible to various diseases (including COVID-19) than other segments of the population.

The results obtained should be taken into account by all university teachers who conduct physical education classes with students.

Conclusions

1. A decrease of most indices characterizing kinesthetic, orientational and responsive qualities of university female students in the learning process has been established. Task-oriented improvement of kinesthetic, orientational and responsive qualities in physical education classes by means of specialized methods allows not only to suspend the negative dynamics of psychophysiological indices of young body, but also to improve them. Ultimately, this has a positive impact on the professional skills of future creative profession specialist. The obtained experimental results give ground for the development of the methods for improving motor qualities and psychophysiological properties professionally significant for students-designers.

2. The decrease in the level of development of motor qualities, professional skills, physical fitness, and health is observed already in the 1st year of study. Pedagogical influences should be started from the 1st course and continued until the end of the study.

3. In the process of physical education classes, the physical exercises aimed at improving the professionally significant psychophysiological properties of students should be used. It is they that restrain the negative effect of increasing the intensity of educational classes simultaneously contributing to an increase in the development level of almost all motor qualities and health. For the successful professional growth of design students, it is necessary to develop kinesthetic, speed, differential and orientation qualities.

Conflicts of interest

The authors declare that there is no conflict of interests.

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