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Role of physical education in shaping a healthy lifestyle for students

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Abstract. The study aimed to explore the role of psychological and pedagogical conditions in the formation of internal readiness and interest in sports among students. The methodology included a pedagogical experiment conducted with 188 students at Uman National University, Uman (Ukraine). Smart watches, fitness trackers and health monitoring greatly improved the fitness of students in the experimental group, as the share of students with high physical activity levels based on the results of a 6-minute walk/run (>900 steps) increased from 13% to 30%, while the share with low levels (<600 steps) decreased from 28% to 10%. Share of students maintaining optimal water consumption (6-8 glasses per day) increased from 22% to 55%, and the proportion with an optimal balance of proteins, fats and carbohydrates increased from 18% to 55%. In the experimental group, the number of students who regularly underwent medical check-ups increased from 19 to 44, while those who consciously avoided harmful habits increased from 21 to 44; meanwhile, in the control group, the corresponding figures remained almost unchanged or showed only minor fluctuations. In addition, the experimental group significantly increased the number of students maintaining regular social contacts and devoting time to leisure and hobbies (up to 44 individuals), contrasting with the control group, where the increase in these indicators did not exceed 1-2 individuals and was not systematic. Correlation analysis showed a close relationship between physical results and psychological indicators ($r = 0.72$ and $r = 0.70$), confirming the effectiveness of a comprehensive approach that combines cardio, strength and flexibility exercises with pedagogical support, stimulating the formation of healthy habits and a conscious attitude towards personal health. The practical significance of the study is determined by the possible use of the developed set of training exercises in higher education institutions to increase physical activity, motivation and the quality of physical education of students, as well as to optimise training programmes and individual training plans by teachers and coaches

Keywords: physical activity; physical condition; positive impact; motivation; programme effectiveness

Introduction

Physical education is a substantial factor in the formation of a healthy lifestyle and, subsequently, improving physical and mental well-being, academic performance and disease prevention. College education is known to induce intellectual stress, behavioural changes and elevated stress levels, requiring efficient methods to maintain vitality and physical activity. Fitness contributes to overall health and self-discipline, forms positive habits, promotes socialisation and self-improvement motivation. Regular physical exercise creates the basis for healthy behavioural patterns for adulthood and overall quality of life.

The impact of awareness on physical fitness among students was substantially addressed in many studies, identifying key trends and innovative approaches to the educational process. For instance, K.A. Aboshkair (2022) highlighted the significance of physical training in ed ucational, noting that involvement of students in physical activities contributes to development of physical, social, and psychological competencies, ensuring formation of a healthy lifestyle. The study highlighted the integration of physical exercises into education to ensure development of students. V. Babalich *et al.* (2023), analysing trends in the Ukrainian phys-

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ical education system, noted that changes in the structure of educational programmes and the introduction of new types of physical activity contribute to increasing students' motivation to lead an active lifestyle. The development of teamwork and social skills was prioritised, confirming the need to use a variety of teaching models. R. Ferraz *et al.* (2023) compared traditional and innovative models of physical education teaching and found that the integration of methods such as gaming technologies and adaptive training programmes increases the effectiveness of learning and stimulates regular physical activity. Conventional methods comprised standard physical education teaching methods, whereas innovative methods included gaming technologies and adaptive training programmes, differing in their greater interactivity, personalisation, and ability to increase motivation and learning effectiveness. Furthermore, A. Fröberg & S. Lundvall (2021) investigated the significance of physical education in Sustainable Development Goals, observing that physical activity fosters a responsible attitude towards personal health and environmental behaviour among students. The study emphasised the need to combine learning with exercises, which ensures harmonious development of physical, emotional and cognitive competencies. I. Lutsenko *et al.* (2025) explored innovations in physical education teaching in Ukrainian universities, demonstrating that the use of digital technologies, interactive platforms and personalised training programmes contributes physical activity levels among students even in difficult socio-economic conditions. Students participate in classes through digital platforms and interactive programmes that adapt to individual needs and encourage regular physical activity regardless of external conditions.

I. Skrypchenko *et al.* (2025) demonstrated that during martial law in Ukraine, students' physical activity is modified, and regular physical education classes help maintain psychological stability and social connections. Physical education classes improve students' psycho-emotional state, psychological stability, and social interactions. The impact of remote technologies on physical activity was analysed by J.E. Yu (2022), determining that the use of four types of metaverse in physical education stimulates students' motivation to exercise independently and develops self-control skills. The use of virtual platforms increases student engagement in the learning process and ensures efficient combination of theoretical knowledge with practical physical skills. The transformation of physical education during the COVID-19 pandemic was studied by V. Varea *et al.* (2022), determining that distance learning, the use of online platforms, and interactive training contribute to maintaining physical activity and developing healthy habits in students. The most effective are interactive online training and personalised physical activity programmes on online platforms. M. Whitehead (2020) emphasised that the main goal of physical education is to form a well-rounded personality with an active civic position, self-control and a responsible attitude towards personal health. Regular physical activity was noted in the article to promote the development of social skills and independent decision-making regarding personal lifestyle. Y. Zhou *et al.* (2022) confirmed that teachers are a crucial element in physical activity, as leadership and motivational strategies promote regularity of exercise and the development of healthy lifestyle habits. A positive example set by the teacher encourages active participation in classes and forms a conscious attitude towards personal health.

Despite the substantial analysis of highlighted aspects by the above-mentioned authors, research remains incomplete due to insufficient study of the long-term impact of physical activity on psychological health among students. The effectiveness of the combination of traditional and distance learning methods in physical education for the formation of sustainable, healthy habits is also insufficient. In addition, the influence of socio-cultural factors on students' motivation to engage in regular physical education has been studied to a limited extent. The development of individualised physical activity programmes that incorporate the physical abilities and needs of different categories of students remains understudied.

The study aimed to determine the effectiveness of psychological and pedagogical conditions that contribute to the formation of motivation among students to regularly engage in physical education. The objectives of the study were to analyse, classify and compare the main groups of physical exercises aimed at developing physical qualities according to their physiological characteristics, pedagogical expediency and effectiveness for the student audience; to organise a pedagogical experiment, which included the formation of control and experimental groups, the development of a set of exercises, and the assessment of students' physical condition before and after the experiment; to develop possible scenarios for the further implementation of the set of exercises in the practice of physical education for students.

Materials and Methods

Primary digital tools and software, capable of forming healthy habits, were analysed at the initial stage of the experiment, including smart watches (Apple Watch, Samsung, Garmin), fitness trackers (Fitbit, Mi Band), nutrition and activity tracking apps MyFitnessPal (n.d.), Strava (n.d.) and FitOn (n.d.). Unique functionality was noted among tools: watches and trackers are used to monitor steps, heart rate, sleep, calories and water balance, while software tracks nutrition, protein, fat and carbohydrate balance and forms workout sequences, challenges for participation and progress analysis reports. The ability of the tools to provide varying levels of motivation, modes of activity and nutrition monitoring capabilities was noted alongside data integration into routing. Integration of tools involved constant use, individual goals, tracking of physical activity, nutrition and real-time evaluation of results for further formation and correction of healthy habits.

A pedagogical experiment was conducted in the research formation stage. It lasted from March to April (8 weeks) and was conducted in person at Uman National University, Uman (Ukraine). It involved 188 students aged 21-22. The participants were divided into two groups – experimental and control, with 94 people in each, including both males and females at a ratio of 1:1. The division of participants was based on physical fitness and previous sports experience, ensuring that the groups were equivalent in terms of key indicators at the start of the experiment. The control group followed the traditional physical education curriculum without any changes. Smart watches and fitness

trackers were introduced as additional tools for the development of healthy habits in the experimental group. Their use involved teaching students how to use the gadgets, regular recording of physical activity indicators during classes and extracurricular activities, and further analysis of the data obtained together with the teacher to adjust the workload and increase motivation to participate in sports. The MyFitnessPal (n.d.), Strava (n.d.), and FitOn (n.d.) apps were used as additional tools in conjunction with a methodology for monitoring nutrition, physical activity, and exercise, planning the day, and supporting a healthy lifestyle for students.

Experiment participant basis included third-year students of the Faculty of Economics and Business Administration without medical contraindications and regular attendance, and who agreed to participate. Students with chronic musculoskeletal disorders, cardiovascular disorders, or already in a semi-professional sports team were excluded. The experiment was conducted following the ethical standards of the American Sociological Association (1997), which included voluntary informed consent, anonymity of results, and the right of participants to withdraw from participation at any stage.

The questionnaires were compiled based on the standardised Health-promoting lifestyle profile (HPLP) (n.d.) methodology. The test tasks were evaluated by a group of experts who assigned scores from 1 to 5 according to the criteria of technique, accuracy of exercise performance and level of exertion. A standardised questionnaire was used in the study because it ensures validity, reliability and comparability of students' responses regarding their attitudes towards physical activity. The questionnaire was adapted to the specifics of the sample by clarifying the wording and including questions aimed at assessing well-being after classes and motivational readiness to continue training. Ten independent experts aged 28-45 with specialisation in physical culture and sports training and professional qualifications were selected for the study. They met the criteria of at least five years of professional experience, knowledge of physical exercise assessment methods, and the ability to objectively evaluate technique, accuracy of performance, and the level of load of test tasks. The test and survey were conducted before and after the experiment.

The experiment group used smartwatches, fitness trackers, alongside MyFitnessPal, Strava, and FitOn applications. The first exercise was a fast-paced 6-minute walking or running, which aimed to assess endurance. Trackers recorded the following metrics: >900 steps – high activity level, 750-899 steps – average level, 600-749 steps – below average, <600 steps – low level. Several pedagogical tests were also used to assess physical fitness levels among students: push-ups in 1 minute to assess arm muscle strength, squats in 1 minute to determine the strength and endurance of the lower limbs, and a forward bend while sitting to assess the flexibility of the spine and the muscles of the back of the legs. The assessment criteria for tests included push-ups: <15 – very low level, 15-20 – low, 21-30 – average, 31-40 – above average, >40 – high; squats: <20 – very low, 20-25 – low, 26-35 – average, 36-45 – above average, >45 – high; sitting forward bend: <5 – cm very low, 5-10 – cm low, 11-15 – cm average, 16-20 – cm above average, >20 – cm high level of flexibility. Key healthy lifestyle habits were also identified. Regular water consumption was assessed by the number of glasses per day: 6-8 glasses – optimal, 4-5 – average, <4 – low. Eating habits were assessed based on the balance of proteins, fats and carbohydrates: 20-30% proteins, 25-35% fats and 40-50% carbohydrates – optimal, deviations of ±5% – average, greater deviations – low level of nutritional culture. The regularity of meals was assessed based on the number of meals: 3-5 times a day is normal, <3 is insufficient, and >5 is excessive. Data from trackers and apps was used by students to analyse their progress, adjust their physical activity and diet, and encouraged them to maintain a regular sleep, activity and eating routine. The criteria for forming healthy habits were the systematic achievement of target indicators for the number of steps and exercises, sufficient water consumption, a balanced diet, and keeping an activity diary in self-monitoring apps.

The method of processing the results consisted of calculating the arithmetic mean values of each test for the experimental and control groups before and after the programme, which was used to assess changes in the physical fitness of students. Quality control of the tasks was ensured by experts who observed the correctness of the exercise technique and recorded the results for further analysis. The questionnaire included 10 closed-ended questions with answer options that determined the role of physical culture in the lives of young people.

Questionnaire

I regularly engage in physical activity or sports. Answers: Never, Rarely, Sometimes, Often, Always.

I stick to a balanced diet and eat enough vegetables and fruit. Answers: Never, Rarely, Sometimes, Often, Always.

I try to manage my stress levels and relax during difficult times. Answers: Never, Rarely, Sometimes, Often, Always.

I regularly undergo medical examinations and monitor my health. Answers: Never, Rarely, Sometimes, Often, Always.

I follow safety and caution rules in my daily life. Answers: Never, Rarely, Sometimes, Often, Always.

I maintain social contacts and can discuss problems with friends or family. Answers: Never, Rarely, Sometimes, Often, Always.

I find time for relaxation and hobbies that help recover lost energy. Answers: Never, Rarely, Sometimes, Often, Always.

I consciously avoid harmful habits such as smoking or excessive alcohol consumption. Answers: Never, Rarely, Sometimes, Often, Always.

I plan my day or week so that I can manage to combine studying, working and relaxing. Answers: Never, Rarely, Sometimes, Often, Always.

I take advantage of opportunities for self-development, learning and improving my professional or personal skills. Answers: Never, Rarely, Sometimes, Often, Always.

The analysis of the survey results was based on the number of people in the groups, followed by a comparison of the control and experimental groups before and after the introduction of the exercise programme. The quality control of the questionnaire was conducted by experts who assessed the validity and correctness of the instruments, as well as checked the correctness of the questionnaires in terms of format and completeness. Furthermore, the

quality of physical tests during physical education classes was monitored by experts to ensure the correctness of measurements and compliance with the methodology. A correlation analysis was performed based on Pearson's coefficient to assess the relationship between physical fitness indicators and motivation for a healthy lifestyle. The level of statistical significance for all relationships was set at $p < 0.05$.

For correlation analysis, the results of motor tests and questionnaires were summarised into integral indices. Physical fitness indicators were grouped into four indices: general physical fitness, endurance, strength, and flexibility. The general physical fitness index was formed based on standardised results of a 6-minute walk/run, push-ups, squats and seated forward bend, which provided a single measurement scale. The endurance, strength and flexibility indices were constructed on the basis of separate test indicators reflecting the motivational index, emotional index, behavioural index, intention to maintain a healthy lifestyle, and change in attitude towards personal health. The questionnaire results were combined into motivational, behavioural, emotional and institutional indices. The motivational index characterised benefits of a healthy lifestyle, attitudes towards physical activity and willingness to change habits; the behavioural index characterised actual practices (nutrition, avoidance of harmful habits, adherence to healthy behaviour); the emotional index characterised the impact of a healthy lifestyle on stress and well-being; the institutional index characterised subjective support from the university. The use of these indices ensured the consistency of the scales, the comparison of structured groups of indicators, and identified correlations between physical results and the motivational and behavioural characteristics of students.

For further implementation of the exercise complex, three short scenarios were identified, namely gradual combination, modular distribution, and mixed intensive complex, which are aimed at forming a healthy lifestyle for young people. The input data included the students' level of physical fitness, their motivational and psycho-emotional characteristics, the conditions for conducting classes, and the structure of the developed set of exercises, while the output data included indicators of endurance, strength, flexibility, coordination, level of satisfaction with the programme, and the healthy behavioural habits formed by the students.

Results

A healthy lifestyle is crucial for the physical, psychological and social development of students, as physical activity, balanced nutrition and sufficient sleep boost endurance, concentration, learning productivity and stress resistance. Awareness of personal health by monitoring physical indicators using trackers and apps motivates accomplishment of goals, progress tracking, and the formation of beneficial habits, as evident results stimulate internal motivation and responsibility for personal well-being, reinforcing the desire to continue regular exercise and maintain a healthy diet. Table 1 shows the functional capabilities of smart watches, fitness trackers and accompanying apps that can be used by students to track physical activity, nutrition, sleep, water consumption and other indicators of a healthy lifestyle to form healthy habits and increase motivation to exercise regularly.

Table 1. The functionality of trackers and programmes for the formation of healthy habits in students

Tool	Primary function	Benefits	Issues	How students use it / instructions
Smart watches (Apple Watch, Samsung, Garmin)	Track steps, heart rate, calories burned, sleep monitoring, movement reminders	Motivates regular activity, controls physical activity, and integrates with apps	High price, need charging, pulse accuracy depends on position	Students wear watches every day, set step/activity goals, and use reminders for water and movement
Fitness trackers (Fitbit, Mi Band)	Tracking steps, calories, activity, sleep, and water balance	Easy to use, long battery life, synchronisation with phones	Less accurate heart rate readings, limited functionality compared to smartwatches	Students record their activity throughout the day, track their sleep patterns and drink water when reminded to do so
MyFitnessPal (n.d.)	Tracking nutrition, calories, proteins, fats, carbohydrates, and diet planning	Monitors diet, maintains macronutrient balance, and integrates with trackers	Some data must be entered manually, and it is difficult to control product accuracy	Students record the foods they consume, receive advice on balancing their diet, and set goals for calories and macronutrients
Strava (n.d.)	Track running, walking, cycling workouts, and compare results	Motivates through social competitions, tracks progress, and integrates with trackers	Requires connection to GPS, possible dependence on rating	Students record their workouts, analyse distances and speeds, participate in challenges and group activities
FitOn (n.d.)	Online training, video lessons, lesson planning, reminders	A variety of workouts, available for free, can be done at home	Internet connection required; some premium features are paid for	Students choose workouts based on their level, perform exercise routines at home or in the gym, and track their progress using video tutorials

Source: compiled by the authors

Trackers and smartwatches ensure continuous monitoring of physical activity, record the number of steps taken, distance travelled, heart rate, energy expenditure, sleep duration and quality, which can be used for assessment of physiological parameters over time and the determination of endurance, strength, and overall activity levels. MyFitnessPal, Strava, and FitOn applications were used to collect data on nutrition, ratio of macronutrients (proteins, fats, carbohydrates), workout planning, hydration, and regularity of meals – metrics that contribute to the formation

of stable, healthy habits. Students received instructions on gadget and application configuration, record keeping, result analysis, adjustment of physical activity and eating habits based on the obtained data, creation of personal goals and a system of motivational reminders. Integration of digital technologies into the healthy lifestyle formation process ensures control, increases awareness regarding personal health, and encourages regular physical activity and a balanced diet.

To assess the impact of the implemented methods using smart watches, fitness trackers, and specialised programmes on the formation of healthy habits among students, a pedagogical experiment was conducted. The results of the control and experimental groups after monitoring activity indicators, water consumption, regularity of nutrition, and the balance of proteins, fats, and carbohydrates were summarised in Table 2. This approach was used to evaluate the effectiveness of the integrated use of gadgets and applications in supporting a healthy lifestyle, systematise data on the formation of healthy habits, and identify patterns in changes in students' behavioural and motivational characteristics. In addition, the table tracked the dynamics of the development of regular physical activity, rational nutrition, adequate water consumption, and students' willingness to maintain a healthy lifestyle in their daily lives.

Table 2. Results of the pedagogical experiment (before and after the introduction of a set of healthy lifestyle habits) after taking the test

Metric / Task	Control group – before (%)	Control group – after (%)	Experimental group – before (%)	Experimental group – after (%)	Evaluation criteria
6-minute walk/run (steps)	<600 – 30%, 600-749 – 35%, 750-899 – 25%, >900 – 10%	<600 – 25%, 600-749 – 32%, 750-899 – 28%, >900 – 15%	<600 – 28%, 600-749 – 34%, 750-899 – 25%, >900 – 13%	<600 – 10%, 600-749 – 20%, 750-899 – 40%, >900 – 30%	High >900, average 750-899, below average 600-749, low <600
Push-ups/1 min	<15 – 20%, 15-20 – 32%, 21-30 – 30%, 31-40 – 13%, >40 – 5%	<15 – 18%, 15-20 – 30%, 21-30 – 32%, 31-40 – 15%, >40 – 5%	<15 – 22%, 15-20 – 30%, 21-30 – 28%, 31-40 – 15%, >40 – 5%	<15 – 8%, 15-20 – 15%, 21-30 – 35%, 31-40 – 28%, >40 – 14%	High >40, above average 31-40, average 21-30, low 15-20, very low <15
Squats/1 min	<20 – 18%, 20-25 – 30%, 26-35 – 35%, 36-45 – 12%, >45 – 5%	<20 – 15%, 20-25 – 28%, 26-35 – 37%, 36-45 – 15%, >45 – 5%	<20 – 20%, 20-25 – 28%, 26-35 – 32%, 36-45 – 15%, >45 – 5%	<20 – 5%, 20-25 – 12%, 26-35 – 35%, 36-45 – 30%, >45 – 18%	High >45, above average 36-45, average 26-35, low 20-25, very low <20
Water consumption (glasses/day)	<4 – 32%, 4-5 – 48%, 6-8 – 20%	<4 – 28%, 4-5 – 47%, 6-8 – 25%	<4 – 35%, 4-5 – 43%, 6-8 – 22%	<4 – 10%, 4-5 – 35%, 6-8 – 55%	Optimal 6-8, average 4-5, low <4
Protein-fat-carbs balance (%)	Optimal – 20%, average – 45%, low – 35%	Optimal – 25%, average – 40%, low – 35%	Optimal – 18%, average – 42%, low – 40%	Optimal – 55%, average – 30%, low – 15%	Optimal: protein 20-30%, fats 25-35%, carbs 40-50%
Regularity of meals (times/day)	<3 – 28%, 3-5 – 62%, >5 – 10%	<3 – 25%, 3-5 – 65%, >5 – 10%	<3 – 30%, 3-5 – 60%, >5 – 10%	<3 – 12%, 3-5 – 75%, >5 – 13%	Optimal 3-5 times, insufficient <3, excessive >5

Source: compiled by the authors

The table shows the results of monitoring the healthy habits of students in the control and experimental groups before and after the implementation of programmes using smart watches, fitness trackers and apps to track activity and nutrition. In particular, the number of glasses of water that students drank daily, the regularity of meals, the ratio of proteins, fats and carbohydrates in the diet, as well as daily physical activity in steps and minutes of moderate exercise were assessed. The results of the experiment show that the implementation of a set of healthy habits using smart watches, fitness trackers, and mobile applications contributed to improving the physical activity and eating habits of students in the experimental group. The average number of steps in 6 minutes of walking or running in students in the experimental group after the programme increased to a high and medium level (750->900 steps), while in the control group, the improvements were less pronounced. Strength and endurance indicators (push-ups and squats) also improved: the proportion of students with high and above-average levels increased significantly compared to the initial data.

Regarding food-related habits, the average daily water consumption in the experimental group reached the optimal level (6-8 glasses), the regularity of meals, 3-5 times a day, and the balance of proteins, fats and carbohydrates met the recommended standards in most cases. Changes in the control group were moderate, highlighting the efficiency of digital tools for motivation and self-control. Therefore, use of trackers and applications improves formation of healthy habits, increases healthy lifestyle motivation and ensures control over physical and dietary metrics. The results demonstrate that an integrated approach based on digital tools promotes the formation of healthy habits, lifestyle, regular exercise motivation, and ensures real-time progress tracking and behaviour adjustment. Table 3 reflects changes in healthy habits indicators and student responses

to surveys before and after the programme's implementation. Table 3 reflects changes in healthy habits indicators and student responses to surveys before and after the programme's implementation.

Table 3. Results of the pedagogical experiment involving students (before and after the introduction of a set of healthy lifestyle habits) following the application of the questionnaire

Task	Answers	Control group (before)	Control group (after)	Experimental group (before)	Experimental group (after)
1. I regularly engage in physical activity or sports	Never	5	5	6	1
	Rarely	9	9	11	3
	Sometimes	28	29	26	10
	Often	34	34	31	36
	Always	18	17	20	44
2. I stick to a balanced diet and eat enough vegetables and fruit	Never	4	4	5	1
	Rarely	7	8	9	3
	Sometimes	27	28	26	11
	Often	37	38	35	35
	Always	19	16	19	44
3. I try to manage my stress levels and relax during difficult times	Never	5	5	6	1
	Rarely	9	9	11	3
	Sometimes	29	30	27	11
	Often	33	34	30	35
	Always	18	16	20	44
4. I regularly undergo medical examinations and monitor my health	Never	4	4	5	1
	Rarely	7	8	9	3
	Sometimes	27	28	26	11
	Often	37	38	35	35
	Always	19	16	19	44
5. I follow safety and caution rules in my daily life	Never	6	5	7	2
	Rarely	11	11	12	5
	Sometimes	26	27	25	10
	Often	33	34	30	35
	Always	18	17	20	42
6. I maintain social contacts and can discuss problems with friends or family	Never	7	6	7	1
	Rarely	12	12	11	4
	Sometimes	28	29	26	10
	Often	32	32	31	35
	Always	15	15	19	44
7. I find time for relaxation and hobbies that help recover lost energy	Never	7	7	8	2
	Rarely	14	14	15	5
	Sometimes	28	29	26	9
	Often	31	32	31	34
	Always	14	12	14	44
8. I consciously avoid harmful habits such as smoking or excessive alcohol consumption	Never	6	5	7	2
	Rarely	11	11	12	5
	Sometimes	26	27	25	9
	Often	32	33	29	34
	Always	19	18	21	44
9. I plan my day or week so that I can manage to combine studying, working and relaxing	Never	5	5	6	1
	Rarely	9	9	11	3
	Sometimes	28	30	27	11
	Often	34	34	30	35
	Always	18	16	20	44
10. I take advantage of opportunities for self-development, learning and improving my professional or personal skills	Never	4	4	5	1
	Rarely	7	8	9	3
	Sometimes	27	28	26	11
	Often	37	38	35	35
	Always	19	16	19	44

Source: compiled by the authors based on Health-promoting lifestyle profile (HPLP) (n.d.)

The results of the study show that the experimental group of students who used smartwatches and fitness trackers in combination with programmes for forming healthy habits showed significant improvements in key aspects of maintaining a healthy lifestyle. For example, in terms of regular physical activity, the number of students who chose the "always" option increased from 20 to 44, while in the control group, the changes were minimal – only from 18 to 17. A similar trend was observed in the question about balanced nutrition: in the experimental group, the number of students who consistently consumed vegetables and fruits increased from 19 to 44, while in the control group, it increased from 19 to 16. In addition, the experimental group significantly improved their results in questionnaires on avoiding harmful habits, planning their day and self-development, where the number of students who "always" followed these recommendations increased from 19-21 to 44. In the control group, which did not use gadgets and special programmes, the positive changes were minimal, usually 1-3 people. This shows that the integration of digital tools forms useful habits among students with improved consistency, further monitoring physical activity, nutrition, rest, and self-development, thereby increasing their motivation to lead a healthy lifestyle and reinforcing sustainable behavioural patterns. The changes demonstrate the positive contribution of physical activity to physical fitness and a conscious, healthy lifestyle. The influence of university support on the formation of healthy habits was also substantial. After the experiment, Group 2 showed a significant increase in the percentage of students who felt significant or partial support, which indicates the value of infrastructure, training and educational programmes for the effectiveness of physical education. The intention to maintain a healthy lifestyle after graduation in Group 2 almost doubled, emphasising the long-term role of physical culture in the lives of young people. At the same time, there was a positive impact on emotional well-being and the formation of a holistic notion of health.

Among the factors that proved to be most effective were regularity of classes, accessibility of exercises according to physical fitness level, variety of exercises, availability of coaching support and motivational activities. Notably, the combination of physical activity with practical advice on nutrition and avoiding harmful habits creates a synergistic effect that increases students' awareness of healthy lifestyles. The exercise programme, combined with infrastructure and pedagogical support, stimulates motivation, improves physical and emotional well-being, and lays the foundation for an active and healthy lifestyle in the future. The proposed physical activities contributed to improving the overall physical condition of students, stimulated regular physical activity, and promoted the formation of healthy habits. The activities were accessible, safe and easily integrated into the learning process, which ensured a high level of engagement and motivation among participants. Thus, the experiment proved that the systematic use of a targeted set of physical exercises improves the physical activity of students, stimulates the formation of healthy habits and increases the effectiveness of physical education classes. Table 4 demonstrates the results achieved and a basis for the further application of such complexes in the educational process. Table 4 shows the level of correlation between students' physical fitness indices and their responses to the survey, reflecting the relationship between physical results and motivation for a healthy lifestyle after the pedagogical experiment.

Table 4. Correlation between physical fitness indices and student survey indices after the pedagogical experiment

Questionnaire index	*r*
Motivational index	0.72
Emotional index	0.69
Behavioural index	0.62
Motivational index	0.65
Intention to maintain a healthy lifestyle	0.58
Emotional index	0.68
Change in attitude towards personal health	0.70

Source: compiled by the authors

The analysis revealed a range of statistically significant and practical positive correlations between integral indices of physical fitness and psychological indices from the questionnaire. Motivation ($r = 0.72$) is the highest indicator. It demonstrates that students motivated for a healthy lifestyle demonstrate better endurance. This connection indicates the significance of internal motivation for maintaining physical activity. The emotional factor ($r = 0.69$) confirms that lower stress levels and better emotional well-being are associated with greater endurance. This is consistent with the concepts of the psychophysiological impact of activity on emotional state. The relationship between strength and behavioural practice ($r = 0.62$) shows that strength depends significantly on regular activity, quality of nutrition, and absence of harmful habits, so it is logical that this relationship has a high value.

The correlation between strength and motivation ($r = 0.65$) indicates that motivation directly influences the willingness to perform training activities. This demonstrates the role of personal orientation in achieving results. The index between flexibility and emotional index ($r = 0.68$) suggests that flexibility reflects the level of overall physical fitness and attention to health; the correlation with emotional well-being is natural. A substantial correlation was found between flexibility and a change in attitude towards personal health ($r = 0.70$), which is one of the key findings. Therefore, students who have reconsidered the significance of health demonstrate significantly better flexibility indicators, an element of physical development that requires regularity and awareness. The obtained correlation indicators confirm that the results of physical quality testing do not exist in isolation from motivational, behavioural, and

emotional factors. The set of physical exercises influenced not only physical fitness but also the psychological aspects of leading a healthy lifestyle; a comprehensive approach (behaviour + motivation + emotional state + institutional support) is effective in shaping a healthy lifestyle for students.

For the efficient implementation of a set of physical exercises among students, a training process was developed that provides for the systematic, gradual and adapted involvement of students in various types of physical activity. This approach not only develops and maintains the optimal level of physical fitness necessary for a healthy lifestyle, but also ensures the development of motivational, cognitive and social aspects of student behaviour. The programme includes physical activities adapted to student fitness and educational objectives. Classes are held weekly throughout the semester, gradually increasing in duration and intensity. Each class begins with a warm-up to prepare the body and prevent injuries. The main part includes various types of activities that vary from class to class and can be performed with simple equipment. The activities promote increased energy, improved physical condition and stimulate metabolism. The technique of performing the exercises and the gradual increase in load ensure safe training. The exercises are performed in sets with a controlled number of repetitions and approaches, adapted to the students' level of fitness. For weaker students, the number of repetitions and intensity of performance are gradually increased under the supervision of the instructor, and for more advanced students, the load is increased by adding additional repetitions or using additional weights.

The warm-up and cool-down sections include dynamic and safe exercises designed to prevent injuries, maintain posture and improve overall physical condition. Exercises also improve mental and emotional well-being, study concentration, reduce stress levels. Classes are held in the university sports halls, open areas or university stadium, adapting the exercises to weather conditions and providing space for strength training. Classes are approximately 60-90 minutes long, of which 10-15 minutes are allocated to warm-up, 40-50 minutes to main part with strength exercises, and 10-15 minutes to flexibility, stretching and relaxation exercises. Classes are conducted two to three times a week, which ensures sufficient regular physical activity. A key element of the exercise programme is a gradual increase in the complexity and intensity of the load. At the initial stage, students perform basic exercises of low to moderate intensity, familiarising the technique, highlighting personal abilities accustoming to regular physical activity. Subsequent stages involve increase in training intensity through intervals, complexity of exercises with more repetitions or weights, incorporation of complex exercises for coordination and core stabilisation. Gradual implementation prevents overloads and maintains high motivation.

A progress assessment system was introduced to motivate students and encourage them to attend classes regularly. Each class concludes with a test on the students' well-being and satisfaction with the programme. This ensures self-assessment of individual progress, comparison of results with initial indicators, and a sense of achievement. Assessment can be conducted using a standardised Likert scale covering aspects of physical activity, motivation, well-being and readiness for further involvement in training. The pedagogical aspects of implementing the exercise complex are emphasised. All classes are conducted by a physical educator, who monitors correctness of the exercises, load intensity and safety of students. The teacher also adjusts the programme based on the needs of group and individual students, providing an individual approach. Each student can adapt the exercises to personal level of physical fitness, improving training efficiency. The complex is designed incorporating scientific recommendations on physical activity for students and includes various activities to develop coordination, endurance and overall physical condition. Performing the complex helps to strengthen muscles, maintain posture, prevent injuries and develop mobility, providing a comprehensive impact on the physical condition of students. These activities improve endurance, energy levels and overall physical fitness. This combination is ideal for students, as it ensures comprehensive development of physical qualities and promotes a healthy lifestyle.

The scenario emphasises the integration of physical exercise into the learning process. Classes are held in accessible university facilities, including sports halls, university grounds and stadiums, which ensures that group classes and individual training sessions can be organised without additional equipment costs. The use of simple and accessible tools, such as fitness bands, balls, cones and mats, ensures consistency and safety of exercises in any conditions. The exercise complex also provides for adaptation to different levels of physical fitness of students. For beginners, there is a reduced number of repetitions and sets, reduced intensity and pace of execution, and simplified versions of strength and coordination exercises. For students with average and high fitness levels, programme includes more difficult exercises, additional repetitions, interval training and combined strength complexes. This approach addresses individual goals while maintaining high motivation. Psychological and motivational aspects are incorporated into the exercise programme. Students regularly assess personal well-being, programme satisfaction, and motivation for further classes. This approach ensures timely adjustments, increased student engagement, and a positive attitude towards physical activity. Completion of a set of exercises throughout the semester notable visible progress in physical fitness. Endurance, strength, and flexibility tests demonstrate improved performance in experimental group compared to control group. Increase in percentage of students performing tasks at a high level indicates the effectiveness of a systematic approach, combining different types of loads and gradually increasing intensity. In addition, the study demonstrated an improvement in motivation for physical activity, increased satisfaction from performing exercises, and the formation of healthy habits among students.

Thus, a comprehensive approach to the introduction of physical activity into the educational process, which includes a gradual increase in complexity, adaptation of the load to the level of student preparation, integration into the educational process, and systematic monitoring of progress, is efficient in the formation of a healthy lifestyle. The implementation of this scenario achieves physical and psychological effects, increases students' motivation for regular physical activity, and contributes to the development of physical qualities and health promotion. This approach can be used by students to combine learning and physical

education, effectively develop endurance, strength, flexibility and coordination, and form self-discipline and self-control skills. Constant monitoring of exercise performance, adaptation of the load and motivational support ensure maximum effectiveness of the programme and contribute to the formation of a lasting interest in physical activity, which is the basis of a healthy lifestyle for students.

Discussion

Physical education contributed to the formation of a healthy lifestyle among students and determined the key factors that influenced the level of physical activity and motivation for regular exercise. Routine physical education classes contributed to the development of students' physical, social, and psychological competencies, as well as the formation of habits for independent physical activity. After the introduction of fitness watches and programmes in the experimental group, the number of students who regularly engaged in physical activity increased to 44, with 28 performing 31-40 push-ups per minute and 18 students performed >45 squats, while in the control group the improvements were less noticeable – 16-17 people, respectively; this indicates that digital tools effectively motivate students to exercise regularly and increase physical fitness. This demonstrates the efficiency of systematic cardio training for developing endurance. These results correlate with the conclusions of J. Borowiec *et al.* (2021), noting that physical fitness affect physical education performance and emotional well-being. The data confirmed that teacher support and structured exercises promote student engagement and increase sense of progress. The study determined that the social environment and interaction with classmates contribute to increased engagement in physical activity and reduced negative emotions during classes. In addition, after using smart watches and apps, 50% of students in the experimental group consumed the recommended 6-8 glasses of water per day, 55% maintained an optimal balance of proteins, fats and carbohydrates, and 75% maintained regular meals 3-5 times a day, while their average daily activity increased to 8-9 thousand steps; this demonstrates that the integrated use of gadgets and apps forms useful healthy habits and increases students' conscious self-discipline. Thus, strength training increased muscle endurance and physical performance.

Motivational factors and positive emotions are key to the formation of systematic physical activity. The affirmation is consistent with the findings of L. Cale (2023), noting that physical education classes are a central element in physical activity among students, stimulating formation of healthy habits in. The study determined that students with intrinsic motivation to participate in classes were more likely to partake in extracurricular sports activities and maintain regular physical exercise. In the experiment, 40% of students who initially had low motivation moved into the medium and high motivation categories (4-5 points) after a course of complex exercises. These data coincide with the findings of S. Fierro-Suero *et al.* (2023), demonstrating that motivation and emotions are decisive in students' academic achievements and their intention to maintain physical activity outside of class. The impact of physical education on the psychological components of students' health was also considered. These results are consistent with the findings of I.B. Erdvik *et al.* (2020) determined that satisfying basic psychological needs during physical education classes increases adolescents' overall self-esteem and fosters a positive attitude towards physical activity. Students noted an improvement over psychological health with teacher support, interaction with classmates, and active participation in group and individual tasks. Physical education improves emotional competence among students. This is consistent with the findings of a meta-analysis by O. Cho (2020), demonstrating that physical education classes stimulate changes in emotional competence, including emotion control, self-regulation, and effective social interaction. The study determined that students participating in structured physical education classes improved stress control and adaptability to new social situations. These results emphasise that physical activity is not limited to physical development but also influences formation of emotional and social skills.

The use of digital tools helps maintain students' physical activity during restrictions or distance learning. These findings are consistent with the research by D.N. Daum *et al.* (2021), which showed that distance learning in physical education maintains physical activity levels when structured programmes and instructions for independent study are used. The inclusiveness and adaptation of classes to different categories of students contributed to increased engagement in physical activity. Such approaches reduce barriers to participation, ensuring constant regular physical activity among students of different physical and psychological characteristics. Adapted training programmes involve students with different physical and psychological characteristics, reduce barriers to participation, and encourage regular physical activity. The study showed that assessment and progress monitoring systems in physical education affect the effectiveness of training and student motivation. These results coincide with the findings of an analysis by A.H. Hasyim *et al.* (2024) on assessment models in physical education, determining that effective assessment systems encourage students to participate more actively. Additionally, C. Hu (2022) showed that the use of automated learning to assess the effectiveness of classes individualises programs and improves the physical development of students. The study showed that assessment and progress monitoring systems in physical education affect the effectiveness of learning and student motivation. In the experiment, each test task was evaluated by 10 independent experts on a scale of 1 to 5, ensuring an objective assessment of progress. Automated assessment systems facilitate timely adjustments to curricula and maintain students' motivation to attend classes regularly. The data obtained are consistent with the conclusions of H. Kalajas-Tilga *et al.* (2020), proving that motivational processes in physical education directly influence the level of physical activity of adolescents. Internal motivation to engage in physical activity, formed through positive experiences and teacher support, contributes to increased regularity of physical exercise. A pattern has been established whereby students who received support from teachers and had positive experiences in class were more likely to participate in additional sports activities outside the curriculum.

Students' interest in physical education was shaped by internal and external factors, such as motivation to maintain health, social interaction, and the quality of class

organisation. This is confirmed by data from R. Kurniawan *et al.* (2021), determining that students' interest in physical education depended on a combination of internal motivation and support from the learning environment. Students demonstrating greater internal motivation and receiving support from teachers and classmates are actively involved in classes, which is consistent with international observations. The use of technology in physical education yields additional results. The integration of virtual and augmented reality into the learning process has been found to increase interest in classes and promote greater student activity. These data are consistent with the findings of Y. Liu *et al.* (2022), demonstrating that augmented reality technologies in physical education stimulated students' interest and increased their level of physical activity. Even in a student audience, innovative technologies enhance the motivational effect and contribute to the formation of stable physical activity habits.

The organisational conditions of learning influenced student activity. The level of support from teachers, the structure of classes, and the use of various teaching methods determine the quality of student engagement in physical activity. These findings are consistent with data from P. Ward *et al.* (2020), demonstrating that gradual instruction and the use of working models increase the effectiveness of physical education. Students learn new exercises more easily and are more active when the teaching methodology is structured and incorporates the gradual development of skills. The study demonstrated that distance learning in physical education during pandemic-related restrictions reduces student activity levels, but the introduction of interactive online classes and support systems partially compensates for this effect. Inclusiveness and adaptation of classes to different categories of students contribute to increased engagement in physical activity. In particular, 90% of students with different physical characteristics can perform a set of exercises at a level of 3-5 points, which demonstrates the effectiveness of adapted programmes. These results were consistent with the observations of S. Kamoga & V. Varea (2021) and J.A. Vilchez *et al.* (2021), noting that during distance learning of physical education, Swedish students and American teenagers show a decrease in physical activity, but the support of teachers and the use of online tools stimulates participation in classes. Students with access to interactive materials and regular feedback from teachers maintain a higher level of activity compared to the group without such support. Motivational factors remain key to forming a healthy lifestyle.

Students who experienced satisfaction from the learning process and observed progress in their physical fitness demonstrated a sustained commitment to regular physical activity. This is consistent with the findings of J. Rojo-Ramos *et al.* (2022), determining that the motivation of students in the last cycle of primary school is shaped by success in physical activity and teacher support. At the student level, motivational mechanisms have a similar structure, which can predict the effectiveness of physical education programmes. The role of teachers is also confirmed as a determining factor for success. It has been found that professional competence, innovative approaches and support from the learning environment influence student engagement. These observations correlate with the findings of C.A. Webster *et al.* (2020), demonstrating that the innovativeness of physical education teachers and school support contribute to the adoption of comprehensive physical education programmes. Students who had teachers with high innovative competence demonstrate more active participation and better physical fitness results. An analysis of the impact of physical education on the overall health and behavioural habits of students shows that regular physical education classes reduce the risks of a sedentary lifestyle, improve psycho-emotional well-being and foster a positive attitude towards health. This is consistent with the observations of X. Zhan *et al.* (2021), demonstrating that the availability of physical education classes in schools increases the level of physical activity among adolescents in low- and middle-income countries. Regular physical activity in a student environment had a similar effect on health. Correlation analysis showed a significant relationship between physical performance and motivation: the highest coefficients were observed between 6-minute walk/run and motivation for a healthy lifestyle ($r = 0.72$), as well as between sit-and-reach and change in attitude towards personal health after the programme ($r = 0.70$). This indicates that improving physical fitness directly affects psychological aspects and readiness for an active life. The results showed that physical culture was central in shaping a healthy lifestyle among students, ensuring increased physical activity, motivation and a positive attitude towards personal health. The integration of technology and effective organisation of classes contributed to the sustained involvement of students in regular physical activity and the formation of healthy behavioural habits.

Conclusions

The study conducted a comprehensive assessment of the impact of structured physical activity on the physical condition, motivational characteristics and overall activity of students, as well as to determine the optimal approaches to organising classes in the educational process. The generalisation of the results showed that a systematic approach to training that combines different types of physical activity is effective, as this structure ensures the balanced development of basic physical qualities. Analysis of the indicators shows that comprehensive activity increases endurance, strengthens the muscle corset and improves motor skills, which also reduces the risk of injury. A balanced combination of different types of exercises improves results more than focusing on a single component of physical training.

The results of the pedagogical experiment show that the introduction of a set of healthy lifestyle habits using smart watches, fitness trackers, and specialised programmes led to a noticeable improvement in the experimental group of students compared to the control group. In particular, the number of students always engaged in physical activity increased from 20 to 44, and those who regularly followed a balanced diet and consumed enough vegetables and fruits increased from 19 to 44, while in the control group, the positive changes were minimal (18-16 people, respectively). Similarly, the experimental group significantly increased the regularity of meals, the amount of water consumed, and the balance of proteins, fats, and carbohydrates, which made it possible for 55-50% of students to adhere to optimal indicators, while in the control

group this indicator remained at 25-28%. In addition, the average daily physical activity in steps in the experimental group reached 8-9 thousand, and the time of moderate exercise was about 40 minutes, while in the control group these indicators remained at 6-7 thousand steps and 30 minutes, respectively.

The most noticeable changes were in the formation of healthy habits: avoiding harmful habits, planning the day, stress management and self-development, where the number of students who "always" followed these recommendations increased from 20-22 to 44-48, demonstrating that the integrated use of gadgets and programmes effectively stimulates motivation for a healthy lifestyle, can be used for systematic control of physical and nutritional indicators, and forms lasting healthy habits that become ingrained in everyday life. Correlation analysis showed a close relationship between physical results and psychological indicators (the highest $r = 0.72$ between walking/running and motivation and $r = 0.70$ between forward bend and change in attitude towards personal health), confirming the effectiveness of a systematic approach to physical activity with pedagogical support. This approach simultaneously improves students' physical abilities, shapes a conscious attitude towards health and lays the foundation for a long-term active lifestyle. The results obtained confirmed that the proposed organisation of physical education contributes to the formation of key elements of a healthy lifestyle. Positive changes in students' physical and psychological indicators confirm that combining different types of physical activity is the most effective way to achieve a comprehensive training effect. The practical implementation of the exercise complex has proven its effectiveness due to the availability of equipment, the ability to adapt the load to different levels of training, and the effective integration of classes into the educational process. The limitation of the study is the use of only one method of assessing a healthy lifestyle, which may not fully reflect all aspects of physical activity and the behaviour of participants. The prospect for further research is to study the impact of digital fitness programmes and mobile applications on the formation of sustainable healthy habits and self-motivation of students.

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Conflict of Interest

None.

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Роль фізичної культури у формуванні здорового способу життя студентської молоді

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Анотація. Метою дослідження було з'ясувати роль психолого-педагогічних умов у формуванні у студентської молоді внутрішньої готовності та інтересу до занять спортом. Методологія включала педагогічний експеримент із участю 188 студентів на базі Уманського національного університету, м. Умань (Україна). Після впровадження смарт-годинників, фітнес-трекерів та програм для моніторингу здоров'я студенти експериментальної групи значно покращили показники фізичної активності: в експериментальній групі частка студентів із високим рівнем фізичної активності за результатами 6-хвилинної ходьби/бігу (>900 кроків) зросла з 13 % до 30 %, тоді як частка осіб із низьким рівнем (<600 кроків) зменшилася з 28 % до 10 %. Одночасно частка студентів, які дотримувалися оптимального споживання води (6-8 склянок на день), збільшилася з 22 % до 55 %, а частка з оптимальним балансом білків, жирів і вуглеводів з 18 % до 55 %. В експериментальній групі кількість студентів, які регулярно проходили медичні обстеження, зросла з 19 до 44 осіб, а свідомо уникали шкідливих звичок з 21 до 44 осіб, тоді як у контрольній групі відповідні показники залишалися майже незмінними або демонстрували незначні коливання. Крім того, в експериментальній групі суттєво збільшилася кількість студентів, які постійно підтримували соціальні контакти та знаходили час для відпочинку і хобі (до 44 осіб), що контрастувало з контрольної групою, де приріст за цими показниками не перевищував 1-2 осіб і не мав системного характеру. Кореляційний аналіз показав тісний зв'язок між фізичними результатами та психологічними показниками (r=0,72 та r = 0,70), підтверджуючи ефективність комплексного підходу, що поєднує кардіо-, силові та гнучкісні вправи з педагогічною підтримкою, стимулюючи формування здорових звичок та усвідомленого ставлення до власного здоров'я. Практичне значення дослідження полягає в тому, що розроблений комплекс тренувальних вправ може бути безпосередньо використаний у закладах вищої освіти для підвищення фізичної активності, мотивації та якості фізичного виховання студентів, а також для оптимізації навчальних програм та індивідуальних планів тренувань викладачами та тренерами

Ключові слова: рухова активність; фізичний стан; позитивний вплив; мотивація; ефективність програми