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THE ROLE OF INNOVATIVE AND INTERACTIVE EDUCATIONAL APPROACHES IN FORMING PROFESSIONAL KNOWLEDGE AND A HEALTHY LIFESTYLE FOR THE PREVENTION OF CARDIOVASCULAR DISEASES AMONG STUDENTS

This article explores the critical role of innovative and interactive educational approaches in promoting professional knowledge and fostering healthy lifestyle habits among university students to prevent cardiovascular diseases (CVDs). Recognizing that cardiovascular diseases are increasingly affecting younger populations due to sedentary lifestyles, poor nutrition, and stress, the study emphasizes early preventive education during student years.

The research presents a structured methodology that combines digital tools such as 3D visualizations, mobile applications, and virtual simulations with active learning techniques like gamification, interactive seminars, and simulation-based training. An experimental study involving 60 students—divided into experimental and control groups—demonstrated that the use of interactive methods significantly improved students' theoretical understanding, practical skills, and health-related behaviors compared to traditional teaching.

The experimental group's average knowledge scores increased by 29%, while the control group saw only a 6% improvement. Furthermore, students reported greater awareness of cardiovascular health, adoption of healthier eating habits, and the application of stress-reduction strategies.

The findings suggest that integrating interactive and innovative approaches into medical education not only enhances cognitive and professional competencies but also instills a stronger sense of personal responsibility toward health. The study recommends broader application of these methodologies across healthcare disciplines to foster a culture of prevention and healthy living among future healthcare professionals.

Keywords: *cardiovascular diseases, healthy lifestyle, professional knowledge, interactive education, gamification, simulation, student health, prevention, virtual training, health education.*

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СТУДЕНТТЕР АРАСЫНДА ЖҮРӨК-КАН ТАМЫР ООРУЛАРЫНЫН АЛДЫН АЛУУ ҮЧҮН КЕСИПТИК БИЛИМДЕРДИ ЖАНА ДЕНИ САК ЖАШОО ОБРАЗЫН КАЛЫПТАНДЫРУУДА ИННОВАЦИЯЛЫК ЖАНА ИНТЕРАКТИВДҮҮ БИЛИМ БЕРҮҮ ЫК-АМАЛДАРЫНЫН РОЛУ

Макалада студенттер арасында кесиптик билимди өркүндөтүү жана ден соолукка пайдалуу жашоо образын калыптандырууда инновациялык жана интерактивдүү билим берүү ык-амалдарынын маанилүү ролу каралат. Жаштар арасында отурукташкан жашоо, туура эмес тамактануу жана стресстин көбөйүшүнө байланыштуу жүрөк-кан тамыр оорулары

көбөйүп жаткандыктан, макалада алдын алуу чараларын студенттик куракта баштоонун маанизи белгиленет.

Изилдөөнүн жүрүшүндө 3D визуалдаштыруулар, мобилдик тиркемелер жана виртуалдык симуляциялар сыяктуу санариптик каражаттарды геймификация, интерактивдүү семинарлар жана симуляциялык тренингдер менен айкалыштырган ыкма сунушталат. 60 студент катышкан эксперименттик изилдөөдө интерактивдүү ыкмаларды колдонуу теориялык билимди, практикалык көндүмдөрдү жана саламаттыкты сактоого болгон мамилени жакшыртканын көрсөттү.

Эксперименттик топто орточо билим баллы 29% га жогорулаган, ал эми көзөмөлдүк топто бул көрсөткүч 6% гана түзгөн. Ошондой эле студенттер жүрөк-кан тамыр саламаттыгы тууралуу маалымдуулук жогорулаганын, туура тамактануу адаттарын жана стрессти башкаруу ыкмаларын өздөштүргөнүн билдиришти.

Бул изилдөө медициналык билим берүүгө инновациялык жана интерактивдүү ыкмаларды киргизүү студенттердин когнитивдик жана кесиптик жөндөмдөрүн өнүктүрүп гана тим болбостон, алардын жеке ден соолугуна жоопкерчилик сезимин да жаратат деген тыянак чыгарууга негиз берет. Автор бул ыкмаларды башка медициналык багыттарда да кеңири колдонуу керектигин сунуштайт.

Түйүндүү сөздөр: *жүрөк-кан тамыр оорулары, ден соолукту чыңдоо, кесиптик билим, интерактивдүү билим берүү, геймификация, симуляция, студенттердин ден соолугу, алдын алуу, виртуалдык окутуу, медициналык билим берүү.*

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РОЛЬ ИННОВАЦИОННЫХ И ИНТЕРАКТИВНЫХ ОБРАЗОВАТЕЛЬНЫХ ПОДХОДОВ В ФОРМИРОВАНИИ ПРОФЕССИОНАЛЬНЫХ ЗНАНИЙ И ЗДОРОВОГО ОБРАЗА ЖИЗНИ ДЛЯ ПРОФИЛАКТИКИ СЕРДЕЧНО-СОСУДИСТЫХ ЗАБОЛЕВАНИЙ СРЕДИ СТУДЕНТОВ

В данной статье рассматривается важная роль инновационных и интерактивных образовательных подходов в продвижении профессиональных знаний и формировании здорового образа жизни среди студентов с целью профилактики сердечно-сосудистых заболеваний (ССЗ). Учитывая, что заболевания сердца и сосудов все чаще затрагивают молодое поколение из-за малоподвижного образа жизни, нерационального питания и стрессов, автор подчеркивает важность ранней профилактической подготовки в период студенчества.

В исследовании предложена структурированная методология, сочетающая цифровые инструменты, такие как 3D-визуализации, мобильные приложения и виртуальные симуляции, с активными методами обучения, включая геймификацию, интерактивные семинары и тренинги на основе симуляций. В эксперименте приняли участие 60 студентов, разделенных на экспериментальную и контрольную группы. Результаты показали, что использование интерактивных методов значительно улучшило как теоретические знания, так и практические навыки студентов, а также способствовало формированию позитивного отношения к здоровью.

Средний балл знаний в экспериментальной группе вырос на 29%, в то время как в контрольной группе улучшение составило лишь 6%. Студенты также отметили рост осведомленности о сердечно-сосудистом здоровье, улучшение питания и применение стратегий снижения стресса.

Результаты исследования свидетельствуют о том, что интеграция инновационных и интерактивных методов в медицинское образование способствует не только развитию когнитивных и профессиональных компетенций, но и формированию личной ответственности за собственное здоровье. Авторы рекомендуют более широкое внедрение данных подходов в образовательный процесс по всем направлениям подготовки медицинских кадров.

Ключевые слова: *сердечно-сосудистые заболевания, здоровый образ жизни, профессиональные знания, интерактивное обучение, геймификация, симуляция, здоровье студентов, профилактика, виртуальное обучение, медицинское образование.*

Introduction. Cardiovascular diseases (CVDs) have emerged as a major public health concern, affecting millions of people worldwide and increasingly impacting younger populations. According to the World Health Organization (WHO), CVDs are responsible for nearly one-third of global deaths, highlighting the urgent need for effective preventive strategies. Among youth, particularly university students, unhealthy lifestyles characterized by physical inactivity, poor nutrition, and high stress levels contribute significantly to the early onset of heart diseases.

Educational institutions, therefore, bear a critical responsibility in promoting health awareness and fostering behaviors that prevent the development of chronic diseases. In this context, integrating innovative and interactive educational methods into academic curricula represents a highly effective approach. By actively engaging students in the learning process, such methods not only improve theoretical knowledge but also contribute to the development of practical skills and a conscious attitude toward health maintenance.

The purpose of this article is to examine how innovative educational strategies—such as gamification, simulation-based training, and the use of digital technologies—can enhance students' professional knowledge about cardiovascular health while simultaneously promoting a healthy lifestyle. Unlike traditional lecture-based instruction, these interactive approaches emphasize experiential learning, critical thinking, and behavior change.

Through the implementation of interactive methods, students are better equipped to understand the structure and function of the cardiovascular system, recognize risk factors, and apply preventive measures in both personal and professional contexts. The article also presents empirical data from an experimental study conducted among university students, demonstrating the positive impact of these approaches on knowledge acquisition, behavioral change, and professional readiness.

Ultimately, by fostering early health consciousness and strengthening preventive competencies, interactive education contributes not only to students' personal well-being but also prepares them to assume proactive roles in healthcare settings. Promoting a culture of prevention within the educational environment is thus a crucial step toward addressing the global burden of cardiovascular diseases.

Methodology. Although the methodology for developing students' professional knowledge and healthy lifestyle skills regarding cardiovascular diseases is based on step-by-step progression, it can also be viewed as a holistic system. This approach integrates innovative and interactive methods, with each stage aimed at actively engaging students, deepening their professional knowledge, and fostering a conscious attitude toward a healthy lifestyle. Initially, students' health status and existing knowledge levels are assessed. Through the use of specialized tests, surveys, and self-assessment forms, information is gathered on their understanding of heart health, physical activity levels, dietary habits, susceptibility to harmful behaviors, and stress levels. Based on this data, individual and group-based educational strategies are developed.

At the final stage, interactive trainings and presentations are organized. During these sessions, students are introduced to the structure and functions of the cardiovascular system, the causes of diseases, and preventive measures using 3D graphics, video lessons, and visual models. Methods such as clustering, brainstorming, and role-playing games are employed during seminars. These strategies stimulate students' thinking processes and support active knowledge acquisition.

Acquired knowledge is reinforced through gamification methods. Using mobile applications, interactive quizzes, and scenario-based games, students link their knowledge to real-life situations and, in doing so, develop professional skills. Students who achieve high results are rewarded with various incentives such as points, certificates, or nominations.

In addition, practical sessions are conducted through virtual simulations aimed at studying heart function. These include reading ECGs, identifying heart rhythm disorders, and providing first aid. Activities such as designing healthy meal plans and selecting and performing heart-friendly physical exercises help students establish a healthy lifestyle.

At the end of the training, students draw conclusions about their own knowledge and health. They create personal plans and begin to approach their health with greater awareness. Through group discussions, they exchange experiences with one another. This demonstrates the truly reflective nature of the methodology. Overall, the approach fosters a culture of health, enhances students' professional and life potential, and establishes an effective educational system aimed at the prevention of cardiovascular diseases.

Theoretical Foundations. Cardiovascular diseases (CVDs) are universally acknowledged as one of the most pressing public health concerns of the 21st century. Not only do they represent the leading cause of mortality in industrialized nations, but they are increasingly prevalent in low- and middle-income countries due to globalization, urbanization, and lifestyle shifts. According to the World Health Organization (WHO), CVDs account for nearly 32% of all global deaths, a staggering figure that underscores the severity of the issue [6]. In Uzbekistan, official statistics provided by the Ministry of Health of the Republic of Uzbekistan echo global trends, identifying cardiovascular conditions as the most widespread and chronically burdensome diseases nationwide [4].

The rise of CVDs among young people, particularly students, is an alarming trend. The modern lifestyle, characterized by prolonged sedentary behavior, unhealthy dietary choices, excessive screen time, and escalating stress levels, exacerbates this health crisis. Students, as future professionals and contributors to society, must be equipped not only with professional competencies but also with an awareness of personal health and well-being. This dual focus is essential to mitigate the early onset of chronic diseases and to promote long-term societal health.

In this context, the education system emerges as a vital arena for preventive intervention. Integrating health education into academic curricula is increasingly recognized as a strategic measure for promoting sustainable behavioral change. Educators are encouraged to go beyond the mere transmission of knowledge and instead foster personal engagement and responsibility. Interactive and student-centered teaching methodologies are particularly suited to this goal, as they activate higher cognitive functions and promote deeper learning.

From a pedagogical standpoint, several established learning theories support the implementation of interactive methods. Kolb's Experiential Learning Cycle suggests that learners retain knowledge more effectively when they engage in a four-stage cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. This cycle underscores the value of hands-on activities, simulations, and real-life scenarios in facilitating retention and comprehension.

Moreover, Vygotsky's sociocultural theory emphasizes the role of social interaction in cognitive development. According to Vygotsky, the Zone of Proximal Development (ZPD) can be most effectively accessed when learners collaborate with more capable peers or facilitators, making collaborative learning and peer discussions key strategies in health education [3].

In tandem, Bloom's Taxonomy offers a hierarchical framework for developing educational objectives that progress from basic knowledge acquisition to higher-order thinking skills, such as evaluation and creation [1]. Through this taxonomy, educators can design lesson plans that progressively build students' understanding, application, and critical evaluation of health-related information.

Gamification—the use of game elements in non-game contexts—has emerged as a powerful tool to motivate learners. It increases engagement, provides instant feedback, and fosters healthy competition. Coupled with interactive visualizations, such as infographics and animations, and virtual simulations that mimic real-world healthcare scenarios, these tools allow students to experience the consequences of health decisions in a risk-free environment.

These methodologies are not just instrumental in developing professional knowledge but are also critical for cultivating long-term healthy behaviors. Students exposed to such educational interventions are more likely to integrate health-conscious practices into their daily lives, which in turn enhances their readiness to function as future health advocates within the medical system. The goal is not merely to educate but to empower students to take ownership of their health and serve as role models for the wider community [2].

Results. The research design involved a controlled experimental study with a total of 60 medical students, randomly divided into two equal groups: experimental (n=30) and control (n=30). The duration of the study was one month. During this period, the experimental group was taught using interactive and innovative educational approaches, while the control group received conventional, lecture-based instruction without the use of any digital or interactive tools. To evaluate the effectiveness of the interventions, both groups underwent pre- and post-assessment tests measuring their knowledge of cardiovascular health and disease prevention.

At the outset, both groups demonstrated similar baseline knowledge: the experimental group averaged 58%, and the control group 56%. Upon completion of the training, the experimental group showed a substantial increase in performance, reaching an average post-test score of 87%, signifying a 29% gain in knowledge and comprehension. In contrast, the control group's post-test average rose only to 62%, reflecting a mere 6% improvement.

Beyond quantitative assessments, the study also incorporated qualitative feedback through a structured student survey, aimed at measuring the perceived practical benefits of the intervention. The results of the survey further validated the success of the interactive methodology:

- 91% of the students from the experimental group reported that the interactive training sessions were beneficial and engaging;
- 85% stated that their awareness of cardiovascular health and its risk factors significantly increased;
- 78% of respondents noted that they had begun implementing healthy eating principles in their daily routines;
- 72% found that the stress-reduction activities taught during the sessions were useful and applicable in managing academic and personal pressures.

These findings demonstrate that the applied teaching strategy contributed not only to enhanced cognitive outcomes, such as improved theoretical understanding and retention, but also to behavioral transformation. Students reported tangible changes in lifestyle habits, indicating that the learning process had successfully translated into real-world application.

Moreover, the feedback points to the development of a stronger sense of personal and professional responsibility toward maintaining health — an essential trait for future healthcare providers. By actively engaging with the learning material through simulations, gamified elements, and group collaboration, students internalized the importance of preventative health measures, not just as a subject of study, but as a component of their own daily behavior and professional identity.

Taken together, both the empirical test data and the student-reported outcomes affirm that interactive and innovative teaching methodologies are significantly more effective than traditional approaches in cultivating knowledge, skills, habits, and attitudes essential for promoting cardiovascular health.

Table 1. Table of changes in the level of knowledge

Group	Initial Test (Average Score)	Final Test (Average Score)
Experimental	58%	87%
Control	56%	62%

Chart Description: These data clearly show that the experimental group, which was taught using an interactive approach, achieved significantly better results. This methodology not only improved knowledge but also enhanced students' engagement and motivation toward health preservation.

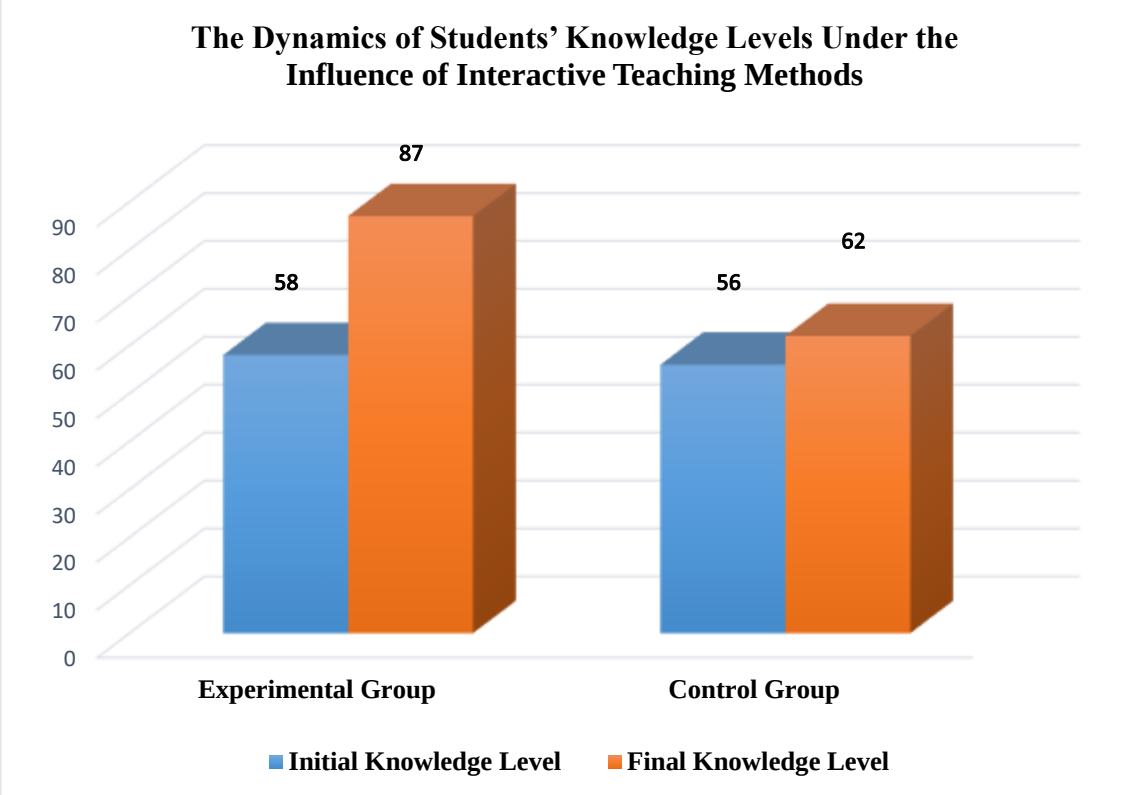

Chart Explanation: In your chart, compare the initial and final test results for each group using bar columns. A significant increase is observed in the experimental group, clearly demonstrating the effectiveness of interactive methods (gamification, simulation, virtual training) in education. In contrast, the control group showed almost no change in results due to conventional theoretical instruction.

Table 2. Evaluation Based on Students' Feedback:

Indicators	Yes (%)
Trainings were useful	91%
Started thinking more about their health	85%
Began adopting healthy eating habits	78%
Started trying to reduce stress	72%

Conclusion. The findings of this study reaffirm that preventive health education, especially during the student years, plays a pivotal role in reducing the long-term risks associated with cardiovascular diseases (CVDs). Early intervention through education enables students to develop not only medical and theoretical knowledge but also practical health-conscious behaviors, which are essential for both personal well-being and professional practice in the healthcare sector.

The use of interactive and innovative pedagogical strategies—including gamification, simulation-based learning, and visual training tools—demonstrated clear advantages over traditional didactic instruction. These methods significantly improved students' knowledge acquisition, stimulated active participation, and fostered a higher degree of internal motivation toward health-related topics. The experimental group showed measurable academic progress, but more importantly, qualitative feedback revealed shifts in behavior: adoption of healthy eating habits, increased stress-awareness, and a proactive attitude toward lifestyle management.

Such holistic learning experiences go beyond cognitive development. They contribute to the formation of values, attitudes, and social responsibility, which are key components of professional identity in the field of medicine. As future physicians and healthcare providers, students must internalize the principles of preventive care not just as theoretical knowledge but as a lived experience, which they can model and promote in their communities.

Furthermore, the inclusion of interactive tools in the learning process provided an engaging environment where abstract medical concepts were visualized and contextualized in everyday life. Simulations allowed students to navigate realistic clinical situations, reinforcing decision-making and empathy. Gamification elements introduced an element of competitive learning and self-assessment, while structured group activities encouraged collaboration and peer support—skills vital in professional healthcare environments.

This integrated approach confirms that education is not only a transmission of information, but also a transformation of mindset and behavior. The students did not merely memorize facts about cardiovascular health; they experienced a shift in perception, developing a sense of ownership over their health, as well as an understanding of their future responsibility to guide patients through similar changes.

In summary, the study validates the effectiveness of using interactive and innovative educational methodologies as a transformative tool for both health education and behavior modification. These methods foster a culture of prevention, embed healthy lifestyle principles, and enhance the development of essential professional competencies among medical students. Their implementation is strongly recommended not only for cardiology-related instruction, but also as a general pedagogical model adaptable to various disciplines within healthcare education, including nutrition, mental health, endocrinology, and public health.

By bridging theory with practice, and knowledge with responsibility, this methodological framework lays the foundation for a new generation of healthcare professionals—well-informed, engaged, and committed to the values of lifelong health promotion and disease prevention.

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