

# Fostering self-regulation skills among high school students through martial arts training



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**Abstract** The problem of researching the self-regulation skills of high school students in the process of practicing martial arts is to study the impact of martial arts on the development of personal competencies among teenagers. The article analyzes both theoretical and practical aspects of the integration of martial arts into the educational process, with a special focus on the development of self-regulation - the ability of an individual to effectively manage his own emotions, behavior and motivation. Considering martial arts as a physical activity and as a means of psychological and social development, the study includes an analysis of scientific literature, statistical data on the development of martial arts in different countries, as well as recommendations for the introduction of these practices into the school curriculum. The main focus is on the positive impact of martial arts on self-control, strategic thinking, development of emotional intelligence, social adaptation and cognitive functions of students. A practical study was conducted on the key components of self-regulation based on martial arts classes for high school students. The programs take into account the age characteristics of students and the specifics of various types of martial arts, balancing between physical exercises and the development of personal skills. The results of the study indicate the need to integrate martial arts into the general educational environment, which requires cooperation with teachers, psychologists and coaches, who must reach a single consensus.

**Keywords:** social adaptation, physical education, sports competitions, self-control, cognitive functions

## 1. Introduction

Self-regulation is interpreted as an individual's ability to manage his or her own emotions, behavior, and motivation in response to external circumstances and internal goals and is fundamental to adaptive behavior in social and educational environments. In the educational process, especially for high school students, the development of self-regulation skills is crucial for successful learning, social integration, and personality formation in the future. According to (Motoike, 2020), martial arts are an effective tool for the development of self-regulation, as this type of sports activity covers physical aspects and affects the psychological and social development of students.

Martial arts require discipline, focus, strategic planning, and emotional control, which are key components of self-regulation. A recent study (Sari, 2023) emphasized that active sports strengthen one's own effectiveness and teach the value of purposefulness and endurance, which are important for the development of one's personality in adolescence. One article (Xie, 2022) confirmed that in addition to psychological aspects, martial arts also contribute to the socialization of students. Group classes require participants to interact, develop communication skills, cooperate and respect others. This is important for the formation of self-regulation skills in a social context, as it allows students to learn how to resolve conflicts, work in a team and understand the meaning of social responsibility. These skills are necessary for successful adaptation in the complex social world that awaits them after graduation. Research (Lafuente) indicates that the main task of martial arts is to teach techniques and techniques from an applied point of view; in general, they include the development of self-control, self-organization, responsibility and interaction. others, which becomes a key factor in the formation of a healthy and adaptive personality. Author (Penglin, 2023) determined that the study and implementation of martial arts in the school curriculum should be based on a deep understanding of their impact on the development of students. This approach includes the study of relevant scientific literature, the analysis of the experience of other countries and schools, and the development of modern teaching methods that consider the age characteristics and individual needs of students.

A comprehensive approach can ensure the effective implementation of martial arts as a means of forming self-regulation skills in high school students. Scientists pay attention to the problem of the self-regulation skills of high school students from the standpoint of effective management of cognitive and verbal development. According to Wiecha (2022),



martial arts have a positive effect on the development of emotional stability in teenagers. They noted that regular training helps young people better manage their emotions. One scientist (Alnedral, 2023) described martial arts as a means of developing students' social skills. He noted that joint training and competitions contribute to better socialization and communication. Hypothesis (Harwood-Gross, 2021) indicates that martial arts can be used as a tool to reduce the level of stress during schooling and has a positive effect on academic results. This is confirmed, in particular, by the decrease in cases of aggression among students who regularly practice martial arts. One scientist (Hamdan, 2022) determined that martial arts contribute to the improvement of self-control and concentration of attention in children and adolescents. He emphasized the importance of these skills for academic success. According to Staite (2021), martial arts can be effectively used to form leadership qualities among young people. His research shows that students who practice martial arts are more likely to take initiative and responsibility in various life situations. Research (Sugden, 2022) indicates that systematic training contributes to the development of physical coordination and endurance. He emphasized that this is important not only for sports but also for the general physical development of young people. According to Xie (2022), martial arts can be an important tool in the fight against childhood and adolescent stress during preparation for entrance exams. His work showed that regular exercise helps maintain a high level of attention and promotes an active lifestyle. One scientist (Hryban, 2022) emphasized the importance of martial arts as a means of cultural integration. Classes in different types of martial arts contribute to a better understanding of and respect for different cultural traditions. According to the data presented (Morgachev, 2020), active involvement in martial arts contributes to the development of better self-expression and self-esteem among high school students. The researcher points to the significant impact of regular training on increasing self-confidence and improving the general well-being of students. With respect to psychological aspects, (Barros, 2019) concluded that sports competitions significantly improve the level of concentration and memory in young people. His research emphasized that the development of these cognitive skills has a positive effect on academic performance.

According to estimates (Mickelsson, 2020), martial arts can serve as a factor in the development of endurance and physical strength. Training increases the physical capabilities of students and improves their ability to work under pressure and in stressful situations. Studying social aspects, (Lafuente, 2021) found that martial arts competitions contribute to the formation of strong social ties and the development of communication skills. Joint training and competitions help students interact better with each other and develop a sense of team spirit. His research (Holt, 2023) focused on the role of martial arts in the formation of leadership qualities. Pupils who are actively involved in active sports more often show initiative and responsibility in various aspects of life. By analyzing the impact on emotional development, Moore (2023) concluded that practising martial arts contributes to better management of emotions and stress. Their research showed that students who practice martial arts regularly demonstrate higher levels of emotional resilience. In their work (Johnstone, 2018), the influence of the martial arts on the development of strategic thinking was considered. It was found that classes increase physical fitness and develop students' ability for critical analysis, planning and operational decision-making. A review of the scientific literature emphasized the importance of the martial arts as an important tool in the formation of self-regulation skills among high school students. Scholars have found a significant impact of martial arts, from physical development to psychological stability and social adaptation, which highlights the need for further research for a deeper understanding and effective use of martial arts in the educational process.

The purpose of the article is to study the influence of martial arts on the formation of self-regulation skills in high school students, with an emphasis on understanding the physical and psychological aspects of this process. The main task of the study was to analyze the impact of systematic martial arts training on the development of self-control, emotional intelligence, stress resistance and social interaction among high school students. The issues of the research include the study of the influence of martial arts on the individual development of students, consideration of the possibilities of integrating these sports into the general educational program and the level of its popularization in the global environment. The practical significance of this study lies in the development of recommendations for educational institutes with the aim of further developing training programs that will help to use martial arts as an effective tool to support the comprehensive development of individuals in the context of modern school education.

## 2. Materials and methods

During the research, the main method of data collection was the analysis of statistical information related to the level of development of martial arts in different countries and their integration into school programs. For this purpose, data from various national and international sources, including statistics from sports federations, educational institutions and government reports, have been systematized. This approach made it possible to analyze trends and compare the level of popularity of martial arts and their impact on school education in different countries. General indicators, such as the number of sports clubs, their annual income and average number of members, as well as specific aspects, such as the presence of martial arts programs in school curricula, were studied.

The use of statistical analysis was also accompanied by a research approach, which included a thorough review of the scientific literature related to the topic of self-regulation of students and the influence of martial arts on this process. A wide range of sources were reviewed, including scientific articles, monographs, and reviews that explore the psychological,

pedagogical, and social aspects of martial arts. Special attention was given to works that studied the influence of martial arts on the development of self-control, stress resistance, emotional intelligence and other aspects of self-regulation among high school students. The study of these materials made it possible to form well-founded conclusions and determine the main directions that indicate the benefit of including martial arts in the development programs of high school students.

Based on the collected information and literature analysis, recommendations were developed for the integration of martial arts classes into school programs as a means of developing self-regulation skills. Emphasis is placed on the need for an individual approach, taking into account the age characteristics of students and the variety of martial arts. It is also recommended that specialized programs that combine physical exercise with psychological training and social activities be developed. Such programs are aimed at physical development and the formation of skills necessary for effective self-regulation, adaptation to stressful situations and improvement of social interaction, especially in the modern conditions of global challenges.

### 3. Results

The growing popularity of martial arts throughout the world reflects the increasing interest in this sport and the recognition of its importance for the development of personal qualities, especially among young people. This trend is the result of awareness of the importance of physical and psychological health in the formation of a mature personality. Martial arts classes contribute to physical development and the development of self-regulation skills, which are critically important for high school students during their psychosocial and emotional development. In today's world, where stress and emotional tension are becoming increasingly urgent problems, practicing martial arts can serve as an effective means of overcoming them. Regular exercise helps young people learn to manage stress, improves concentration and promotes stress resistance.

The approach to training and development helps to form stronger, more confident and emotionally stable youth. Participating in martial arts helps individuals develop important social skills. Through group training and interaction with peers and coaches, students learn to work as a team, resolve conflicts, and develop interpersonal relationships. This helps them better adapt to the social environment and provides a basis for future successful interactions with other people. Martial arts classes contribute to the development of endurance and purposefulness. In the process of regular training, young people learn to set goals and achieve them while developing self-discipline and responsibility. Social skills are key to successful self-regulation and goal achievement in various aspects of life. Inclusion in educational programs for high school students can be a significant step in the development of healthy, balanced and confident youth who are capable of self-regulation and adaptation to the challenges of the modern world. The statistical data on the development and functioning of martial arts in the world are shown in Table 1.

**Table 1** Martial Arts School Averages by Country, 2022.

Country	Avg. Annual Revenue (Local Currency)	USD Normalized	Avg. Membership
USA	\$114,657	\$114,657	112
Canada	\$143,313 CAD	\$109,842	136
Australia	\$75,767 AUD	\$52,108	114
UK	£66,529	\$78,276	143
EU	€70,967	\$70,557	159

Source: Gymdesk, (2022)

According to the data presented in Table 1, several important conclusions can be drawn regarding the economic status and popularity of martial arts in different countries. The situation in the European Union has attracted attention, as the average annual income of martial arts sports clubs in the EU is €70,967, which in dollar terms equals \$70,557. Additionally, the average number of members in sports clubs in the EU is 159, which is greater than that in other countries. Such results indicate high popularity and involvement in martial arts among the population in European Union countries. Comparing the data on the average annual income and the average number of club members, the difference in approaches to the development of martial arts in different countries becomes obvious. For example, the UK has a greater average annual income than does the EU (\$78,276 vs \$70,557), while the number of club members is also greater, which may indicate a greater commercial value of martial arts in the UK. However, in EU countries, the large number of club members may indicate more widespread involvement in martial arts, a focus on accessibility and social integration through sport.

In Europe, the educational system is increasingly implementing the practice of martial arts as a means of forming self-regulation skills among high school students. This is due to the recognition that martial arts contribute not only to the physical but also to the emotional and social development of adolescents. European schools, encouraging such sports, emphasize the importance of a balance between physical and mental health. This approach helps students better understand and control their emotions and help them learn to calmly respond to stressful situations. In the process of practicing hand-to-hand combat and

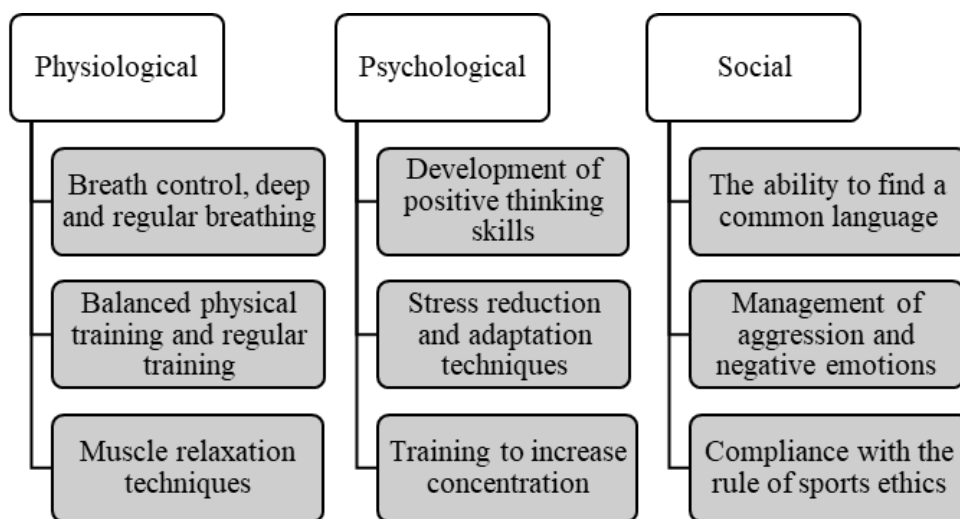


other types of martial arts, it becomes important to develop one's own strategy and tactics, which contributes to the development of critical thinking.

Students not only learn physical techniques but also analyze the opponent's behavior, learn to predict his actions and react adequately. In the process of class, they develop the ability for strategic planning and decision-making, which are key elements of self-regulation. Martial arts classes also contribute to the socialization of students. During training, they interact with peers and coaches, learn to work on a team, and develop communication and empathy skills. Interaction is extremely important for forming lasting social bonds and understanding the importance of cooperation and respect for others. Martial arts help students develop endurance and overcome physical challenges. Classes foster perseverance and purposefulness and help students understand that hard work and self-improvement are the keys to success. These qualities are necessary for effective self-regulation in various life situations. European educational institutions consider martial arts not only as a physical activity but also as a means of developing the personal qualities of students. The inclusion of such classes in the educational process contributes to the formation of healthy, emotionally stable and socially active youth who are capable of self-regulation and effective problem solving.

The popularity of martial arts in Europe has grown significantly in recent years, which is reflected in the high average number of members of sports clubs, which reaches 159 people. This trend shows the widespread recognition of martial arts as an effective tool for physical and psychological development, as well as a platform for social integration and strengthening of communities. Martial arts classes in European Union countries are becoming increasingly accessible to broad segments of the population, including young people, which contributes to the formation of healthy life skills and the psychosocial development of young people. The high popularity of this sport in Europe also emphasizes its importance in the modern sociocultural context, where the harmonious development of the individual is important.

Self-regulation skills in high school students through martial arts can be divided into three components: physiological, psychological and social. Each of these aspects has a unique impact on the development of self-regulation, and their integration into the educational process can ensure comprehensive personality development, which is characterized in more detail in Figure 1.



**Figure 1** Physiological, psychological and social self-regulation skills of high school students.

Martial arts require students to have a high level of physical fitness, which includes the development of endurance, strength, agility and flexibility. Regular physical exercise contributes to the optimization of cardiovascular and respiratory system function, increasing the general tone of the body. This activity stimulates the production of endorphins, which are natural antidepressants, improving the emotional state and reducing the impact of stress. In addition, martial arts require students to understand and control their bodies, which develops motor skills and coordination. Regular exercise also promotes healthy habits, such as regular exercise and a balanced diet, which is an important aspect of self-regulation.

In the process of training, students learn to manage their emotions and develop emotional intelligence and stress resistance. An important part is the development of self-discipline and self-control, as athletes learn to set and achieve goals by regularly training and improving their skills. Martial arts also teach responsibility for one's actions and consequences, developing the ability for introspection and self-improvement. Physical classes require a high concentration of attention, an understanding of strategies and tactics, and quick decision-making in stressful situations. It helps individuals develop cognitive abilities such as memory, reaction speed and analytical thinking (Strikha et al., 2021; Popovych et al., 2021).

Martial arts classes provide an important social context for students to interact with peers and coaches. They contribute to the development of communication skills, mutual assistance and teamwork. Students learn to respect their opponents and



coaches and understand the importance of fair competition and sportsmanship, which helps them understand and appreciate diversity, as martial arts often bring together participants from different social and cultural backgrounds. Participation in competitions and sporting events can strengthen a sense of belonging to a group and form a positive social identity.

#### 4. Discussion

Considering modern educational trends, the integration of martial arts into the educational process of high school students will continue to increase. This trend is emphasized by the results of previous studies (Branco, 2019), which indicate the positive impact of martial arts on self-regulation and social adaptation. With increasing levels of stress and psychological challenges among youth, teaching self-regulation skills through martial arts can be an important tool. This hypothesis is confirmed by a study (Guan, 2022) that revealed a decrease in the level of stress and an improvement in the emotional state among teenagers engaged in martial arts. The importance of martial arts in physical development has been confirmed by numerous scientific studies, but self-regulation is becoming an increasingly important issue due to cognitive influence. As shown by the results of the study (Miyata, 2020), regular martial arts training improves physical fitness and coordination.

There is a need for further research on the long-term impact of martial arts on the psychosocial development of youth. A recent study (Yeromenko, 2022) emphasized the need to evaluate the long-term effects of martial arts training. From the point of view of social integration, martial arts can act as an effective means of strengthening interpersonal ties. Research (Zubiaur, 2021) confirms that joint training contributes to the development of team spirit and empathy. Considering global trends, it can be assumed that the popularity of martial arts will continue to grow, especially among young people. According to Moenig (2023), the European education system will be marked by a growing interest in martial arts. An important characteristic of martial arts is their ability to develop students' skills of responsibility and independence. The results of the theoretical analysis (Chen, 2022; Popovych et al., 2022) revealed that high school students who practice martial arts more often demonstrate a more mature attitude toward personal responsibility and initiative in learning. Such an influence is important in the context of the modern educational process since these qualities are key to successful adaptation in adult life. Learning through martial arts can be included as an important component of personal development programs in schools. One article (Aldani, 2023) confirmed that this approach can effectively influence the self-esteem and social competence of students, contributing to their full development.

Another important and debatable issue is the influence of martial arts on the cognitive development of students. According to Phung (2021), regular classes help increase concentration and improve memory. They are useful for the overall learning process, as better concentration and memory directly affect students' performance in school. Recent studies (Yinhang, 2023) emphasize that the integration of physical exercises and cognitive tasks within the framework of martial arts can significantly improve the cognitive functions of students. This approach to learning can contribute not only to the physical but also to the intellectual development of high school students.

Considering a number of debatable issues, it is worth emphasizing that the integration of martial arts into the educational process of high school students has significant potential for a positive impact on their development. Martial arts classes can become an effective tool for solving modern educational challenges, particularly in preparing young people for successful interaction in social and professional life. To fully reveal the potential of martial arts in education, further research and innovative approaches to the integration of these practices into the school curriculum are needed.

#### 5. Conclusion

The formation of self-regulation skills in high school students through martial arts is becoming an increasingly relevant and effective approach in modern educational practice. This method turned out to be important not only for the physical development of students but also for their psychological and social growth. The martial arts, as a tool for the development of self-regulation, helps students better manage their emotions, understand and control their own behavior in stressful situations, and cultivate endurance and purposefulness. They contribute to the formation of a responsible attitude toward their actions, teaching students the importance of self-discipline and self-improvement. Martial arts training allows you to develop the skills of critical thinking, reaction speed and analytical thinking, which are key to successful self-regulation. Conducting sparring and sports matches are components of the formation of social skills, such as teamwork, respect for others and the ability to cooperate, which are extremely important for the full social development of an individual.

Martial arts in Europe have experienced a significant increase in popularity, which has a positive effect on the development of this sport among young people. The high level of participation and the average number of members of sports clubs in the European Union testify to the effectiveness of these sports as a tool for social integration and personal development. The high popularity of martial arts in EU countries is perhaps related to their ability to offer mass and affordable programs that provide not only physical strengthening but also psychosocial development. This approach demonstrates that martial arts can be used not only as a means of physical education but also as an effective tool for developing important life skills and competencies in young people. Considering the general trend of increasing popularity of martial arts and their importance in the formation of self-regulation skills among high school students, we can conclude about the importance of this

practice in the modern educational process. The inclusion of martial arts in educational programs can contribute not only to the physical but also to the emotional, psychological and social development of students. Prospects for further development are determined by the relevance of the effective ability to self-regulate in the conditions of modern challenges faced by young people, such as stress, psychological tension and the need for effective interaction in the social environment. Thus, martial arts can act not only as a sports discipline but also as an important component of the educational process aimed at forming a harmonious, developed personality.

### Ethical considerations

Not applicable.

### Conflict of interest

The authors declare no conflicts of interest.

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