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ABSTRACT

Doping in sport requires clear, long-term educational strategies. Physical education teachers and coaches have distinct but complementary roles in shaping ethical values in athletes. The World Anti-Doping Agency (WADA) promotes clean sport through digital tools like the Sport Values in Every Classroom toolkit and ADEL, which support teachers and coaches in delivering accessible, value-based learning to help athletes make informed decisions from an early stage of their development.

Il doping nello sport richiede strategie educative chiare e durature. Insegnanti di educazione fisica e allenatori svolgono ruoli distinti ma complementari nella trasmissione di valori etici. La World Anti-Doping Agency (WADA) sostiene lo sport pulito tramite strumenti digitali come il kit didattico Sport Values in Every Classroom e ADEL, che aiutano insegnanti e tecnici a promuovere un'educazione accessibile e consapevole sin dalle prime fasi del percorso sportivo.

KEYWORDS

Anti-doping education, sports ethics, physical education teachers, coaches, WADA.

Educazione antidoping, etica sportiva, insegnanti di educazione fisica, allenatori, WADA.

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Introduction

The idea of improving performance through the use of exogenous substances dates back to the ancient Olympic Games of 668 BC, during which athletes experimented with special diets. The ancient Greeks and Romans began to use natural stimulants during training to overcome fatigue and injuries. With the development of pharmacology and modern medicine in the second half of the 19th century, the number and types of substances used by athletes also increased. Given the regulatory void at the time, substances such as strychnine, brandy mixtures, cocaine, morphine, belladonna, ether, and even very high doses of caffeine were used. The abuse of these compounds began to cause the first deaths. In the 20th century, testosterone, anabolic steroids, amphetamines, erythropoietin, blood transfusions, and growth hormone were introduced to enhance performance. In the 1970s and 1980s, there were suspicions that some States were sponsoring doping among athletes. With the introduction of the first anti-doping regulations, substance use did not decrease but instead became more concealed. In fact, there are several cases of athletes being disqualified during the Olympic Games of the 20th century (Holt et al., 2009).

To counter doping, the World Anti-Doping Agency (WADA) was established in 1999, and in 2003 the World Anti-Doping Code (WADC) was introduced to harmonize anti-doping rules and align global efforts to prevent doping in sport. In the latest version of the WADC, published in 2021 (WADA, 2021a), as in previous editions, Article 18 focuses on education and requires international sports federations and national anti-doping agencies to provide anti-doping education to athletes and athlete support personnel. In this latest version, WADA introduced for the first time an International Standard for Education (ISE) to develop uniform education and training programs in the fight against doping (WADA, 2021b). The ISE represents a significant innovation in the global prevention strategy, introducing the obligation for all National Anti-Doping Organizations, International Federations, and major sports institutions to develop and implement systematic educational programs, based on evidence and adapted to the specific context. Among the central aspects of the ISE is the requirement for each body to develop an anti-doping education plan that includes:

- Informative programs aimed at spreading knowledge about rights, duties, and anti-doping regulations.
- Value-based educational interventions to support the development of critical thinking, sports ethics, and athletes' decision-making skills.

- Tailored content for at-risk groups, including youth, elite athletes, technical and medical staff.
- Periodic monitoring and updating of educational content, based on regulatory changes and effectiveness evaluations.

The document emphasizes that all individuals involved in sport have an educational responsibility. Physical education teachers, coaches, parents, managers, and sports physicians must actively contribute to promoting a healthy and rule-abiding sports culture. Another innovative element is the principle of progressive education: anti-doping education must begin before the athlete is subject to testing, accompanying them throughout their sporting journey. The goal is not only to inform about the consequences of doping but to train aware sports citizens capable of making ethical choices even under pressure or in ambiguous situations (International Standard for Education).

Another education-related initiative was the publication of guidelines for educational programs which, together with the WADC and educational standards, represent the main elements of the World Anti-Doping Program (Woolf, 2020). These innovations address past criticisms of WADA, which was previously accused of paying little attention to education compared to other anti-doping strategies. During the WADA Foundation Board meeting held in Riyadh on December 5, 2024, the priorities for the 2025–2029 five-year strategic plan were outlined:

1. Harmonized standards: Improving and standardizing anti-doping rules across all sports and countries.
2. Impact growth: Maximizing the effectiveness of clean sport programs.
3. Athlete-centered approach: Placing athletes at the center of policies.
4. Global collaboration: Strengthening partnerships among sport, governments, and law enforcement.
5. Operational efficiency: Optimizing internal processes and the anti-doping system.

The main initiatives will therefore focus on:

- Advancing science and innovation to keep pace with new doping substances.
- Improving educational programs for athletes and support personnel.
- Supporting anti-doping organizations in developing countries.
- Better use of data and digital resources.
- Strengthening athlete engagement through the Athlete Council (WADA,2025).

Below are the key chronological events in the fight against doping, with particular focus on educational initiatives promoted by the World Anti-Doping Agency (WADA). The table outlines the regulatory evolution, educational tools for athletes and coaches, and key platforms developed between 1999 and 2024 (Table 1).

Date	Event
November 10, 1999	Establishment of the World Anti-Doping Agency (WADA) in Lausanne, Switzerland, following the Lausanne Declaration, to coordinate the global fight against doping in sports.
January 1, 2004	Entry into force of the first version of the World Anti-Doping Code (WADC), harmonizing anti-doping rules globally.
2005	Launch of the Coach’s Tool Kit, WADA’s first dedicated resource for coach education.
January 1, 2009	Implementation of the revised WADC, introducing stricter sanctions and greater emphasis on education.
June 23, 2010	Development of CoachTrue, an online platform for anti-doping education targeting elite and amateur coaches.
January 1, 2015	Major revision of the WADC; increased focus on the educational roles of coaches and support personnel.
January 22, 2018	Creation of ADeL (Anti-Doping eLearning platform), WADA’s centralized hub for online courses targeting athletes, coaches, doctors, and parents.
October 30, 2019	Official launch of the "Sport Values in Every Classroom" toolkit during the 7th UNESCO Conference of Parties (COP7) in Paris.
January 1, 2021	Latest version of the WADC published. Introduction of the International Standard for Education (ISE), mandating anti-doping education for all WADC signatories.
January 6, 2021	Release of an updated ADeL platform aligned with the ISE, rebranded as ADEL (Anti-Doping Education and Learning).
December 4-5, 2024	WADA Conference in Riyadh: Strengthened strategy for 2025–2029, focusing on education, technological innovation, and athlete-centric approaches.

Table 1. Regulatory and Educational Anti-Doping Landmarks (1999-2024).

It is clear that in recent years WADA has decided to invest in the prevention of doping substance use and in anti-doping education to prevent unsportsmanlike behavior.

Initial contact between individuals and doping may occur at a very young age. Therefore, anti-doping values and principles should be taught starting from school. In particular, the role of the physical education teacher should be central, because in addition to teaching sport disciplines from a technical point of view, they are also responsible for educating future athletes in anti-doping principles. When young people decide to practice sport at an amateur or competitive level outside the school environment, the role model should be represented by the coach. Among the main difficulties is the limited dissemination and understanding of anti-doping content, which makes it difficult to convey clear messages to students or athletes. To address these knowledge gaps, WADA and some national anti-doping agencies have developed digital platforms to support these figures in promoting anti-doping values.

The purpose of this article is to analyze the role that physical education teachers and coaches can play in anti-doping education, identifying tools, challenges, and opportunities related to the use of technology in teaching and training.

The role of physical education teachers in anti-doping education

According to the ISE, previously described, all individuals involved in sport have an educational responsibility. Anti-doping education should begin from early childhood. Therefore, the school must represent the first educational point of reference for future sports figures. In fact, in addition to training new athletes, it can also contribute to the development of other figures such as coaches or managers. In the school setting, the topics to be addressed to encourage positive behaviors toward sport should include:

- nutrition education.
- promotion of physical activity.
- prevention of addictions (smoking, alcohol, drugs).
- awareness of doping (Mazzeo et al., 2020).

Therefore, physical education teachers play a crucial role in promoting a clean and conscious sports culture, especially because they operate in an accessible, structured, and transversal educational environment. The teaching of Physical Education at school allows children and adolescents to socialize and acquire social rules and values, also through the discussion of Olympic values. Some authors have

highlighted that media literacy interventions can help modify students' perception of doping substances by promoting a critical attitude toward media messages (Lucidi et al., 2017). The teaching of these values could be an opportunity to reaffirm the role that physical education should occupy within school and social culture. Even students who do not practice sports can benefit from these teachings by learning the principles of fair play (Ludwiczak & Bronikowska, 2022).

However, anti-doping education in schools presents several challenges. First of all, there are economic and logistical issues, which could be addressed with the help and coordination of local anti-doping organizations. In addition, these topics are not easy to deal with, and often even the teachers involved do not feel adequately prepared to address the subject. These difficulties can generate confused and inconsistent messages for students. Although the concepts of anti-doping are very clear, they are therefore more difficult to teach (Woolf, 2020).

To promote anti-doping education in schools, UNESCO in collaboration with WADA created *Sport Values in Every Classroom*, a free and interdisciplinary educational resource for primary and secondary school teachers aimed at students aged 8 to 12. Its goal is to integrate sports education values into school activities, regardless of the students' level of sports participation.

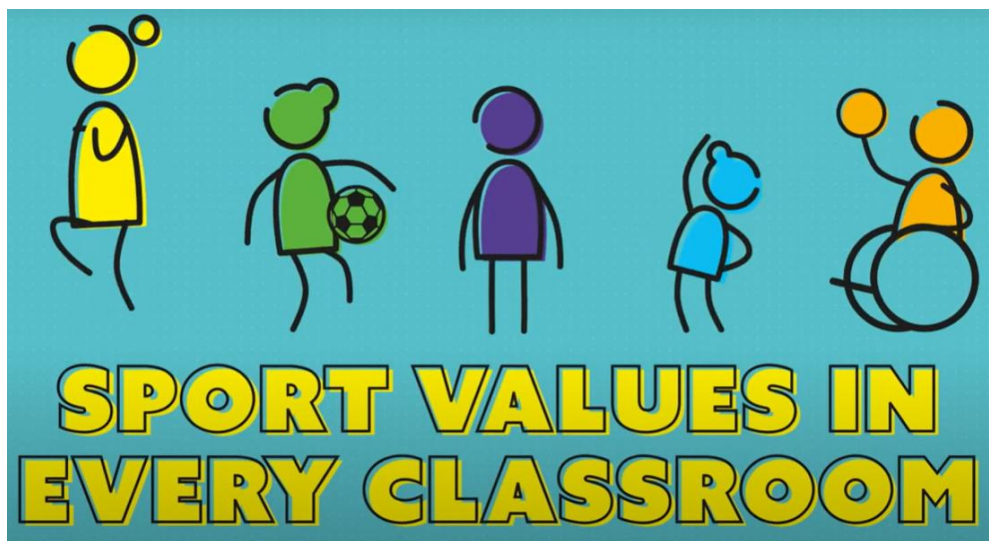


Figure 1. Sport values in every classroom (source: WADA, 2020).

The school is identified as a privileged environment to transmit to young people fundamental values such as respect, equity, honesty, and inclusion. Teachers,

particularly physical education teachers, are identified as role models and key agents in the moral education of students in relation to sport. The document promotes a preventive and values-based approach, in contrast with a purely sanctioning vision, including in relation to doping. To support physical education teachers, the document provides interdisciplinary educational activities that can be integrated into school programs. Among the suggested actions, teachers are encouraged to:

- Stimulate critical thinking on ethical behavior and moral choices in sport.
- Promote awareness of rules and fair play.
- Counter the idea of winning at all costs, instead encouraging learning, collaboration, and well-being.
- Promote inclusion and respect for gender, cultural, and physical differences.

The program also aims to prepare students to recognize external pressures and risky behaviors, such as the use of prohibited substances, supporting a proactive approach to doping prevention (WADA, 2020).

The role of coaches in anti-doping education

Coaches can have a significant influence on athletes' attitudes and behaviors. Athletes trust their coaches and consider them a reliable source of information. As a result, coaches may also influence athletes' decisions regarding the use of doping substances. For this reason, the WADC assigns coaches specific roles and responsibilities, and they are bound by anti-doping rules. In the event of a violation of these rules, the coach may be subject to an Anti-Doping Rule Violation (ADRV) and subsequent sanctions, such as exclusion from any competitive participation in their sport, for up to four years. The definition of the anti-doping role of coaches has evolved since the revision of the WADC in 2015, where Article 21 expanded the roles and responsibilities of athlete support personnel, emphasizing the importance of organizational collaboration in anti-doping activities and the disclosure of any prior ADRVs.

In some cases, it is the coaches themselves who recommend doping to young athletes. Possible explanations for this phenomenon include the lack of coach engagement in doping prevention or insufficient preparation in anti-doping matters. Therefore, providing coaches with training in education for sports integrity can help reduce doping. The lack of resources can represent a barrier to improving coaches' knowledge. This occurs because training courses primarily focus on

pedagogical and technical skills, neglecting anti-doping culture. This is more evident among coaches with lower or no qualifications. Basic-level coaching courses are generally short and may not allow coaches to acquire new skills or techniques. As a result, coaches are often left to rely on their own professional development to improve the quality of their work. Both athletes and coaches appreciate anti-doping training sessions that include open discussions. Studies show that involving coaches and family members in educational programs can strengthen the preventive message and reduce the likelihood of substance use in sport (Sipavičiūtė et al., 2020).

Educational programs must be structured not only to provide information on anti-doping rules but also to develop athletes' critical thinking regarding unfair practices and to support informed decision-making. To assist in coach training and thus the transmission of the anti-doping message, several multimedia programs have been developed. In 2007, WADA created the Coach's Tool Kit to assist anti-doping organizations, sports federations, coaching associations, and universities in facilitating anti-doping training for coaches. In 2010, the Coach's Tool Kit evolved into an online program, CoachTrue, designed to suit different learning styles and the time constraints of coaches, with separate platforms for elite and recreational levels. It covers a wide range of anti-doping activities and topics to meet the diverse learning needs and busy schedules of coaches. It also provides separate platforms for elite-level and amateur-level coaches. Researchers have shown that educational interventions should be tailored to athletes' age and sport level. Younger athletes benefit from sessions led by sport science professionals, while older athletes respond better to individual counseling on supplement use. Elite athletes, on the other hand, require educational strategies that support informed decision-making regarding performance-enhancing substances (Sipavičiūtė et al., 2020).

In 2018, WADA released a new platform, ADeL (Anti-Doping eLearning), which incorporates all eLearning courses and resources:

1. The Athlete Learning Program about Health and Anti-Doping (ALPHA).
2. Coach True.
3. Sport Physicians Tool Kit.
4. ADO Kickstart (for administrators and new ADO employees).
5. Parents' Guide.

ADeL provides access to all topics related to doping through a personalized area and is also accessible via mobile phones and tablets (Mazzeo et al., 2021). Subsequently, this platform was updated to align with the ISE, changing its name to Anti-Doping Education and Learning (ADEL) (WADA, 2021c).

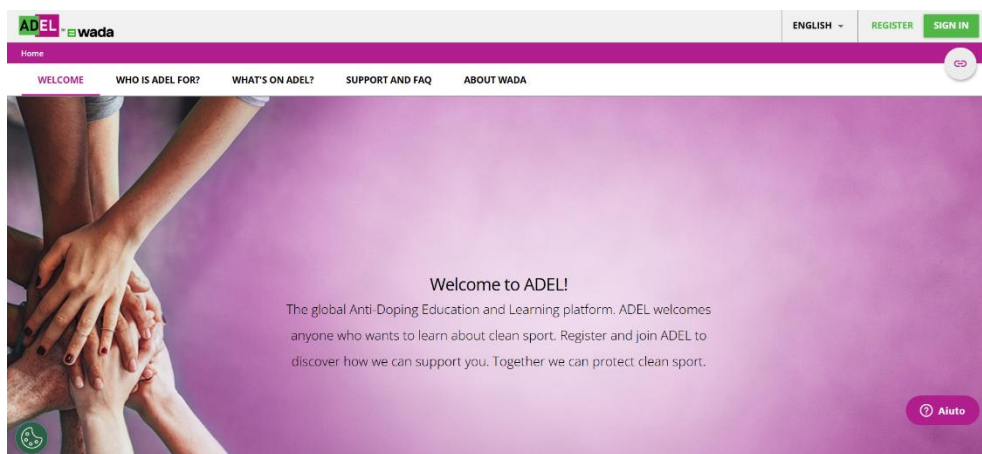


Figure 2. Figure 1. ADEL platform homepage (Source: WADA, 2021c)

The United Kingdom Anti-Doping Agency (UKAD) has also developed an anti-doping training program for coaches: Coach Clean. This program, like CoachTrue, is aimed at coaches who wish to deepen their understanding of clean sport and their responsibilities in relation to anti-doping. After completing the course, a certificate valid for two years is issued. The objectives of the course are:

- to support and promote clean sport.
- to improve understanding of anti-doping and its impact on coaches and athletes.
- to better prepare athletes for testing.
- to explain the broad consequences of an anti-doping rule violation (UKAD, 2025).

According to some studies, the percentage of coaches who have participated in these programs is only 0.2% globally (Patterson et al., 2019). One way to encourage the use of these digital platforms and thereby reach a greater number of coaches is to make these services available free of charge. Not all coaches, especially those who are amateur or volunteers, have the financial means to cover the costs of such programs. Consequently, some coaches may not be motivated to invest in anti-doping training, especially if it is not perceived as an essential part of their role. ADEL, being completely free, represents an accessible and replicable model, while Coach Clean, being a paid program, could limit participation (Nicholls et al., 2014).

Discussion and conclusions

The phenomenon of doping continues to represent a significant threat to athletes' health, the fairness of competitions, and the fundamental values of sport. As emerged from the analysis, education plays a key role in preventing the use of doping substances and must be considered a long-term strategy, complementary and necessary in addition to testing and sanctions. School and the sports environment represent two privileged educational contexts, capable of acting at different yet complementary moments in the athlete's development.

Physical education teachers, as highlighted in the ISE, are among the first figures to interact with children and adolescents and are therefore called upon to introduce the concepts of fair play, respect for rules, and well-being through sport (WADA, 2021b). Schools are not only places of disciplinary instruction but also environments where civic awareness is developed and behaviors and values are consolidated. As emphasized in the document "Sport Values in Every Classroom," introducing sport values into daily teaching also enables non-athlete students to develop ethical and inclusive attitudes (WADA, 2020).

At the same time, coaches play a key role in reinforcing these teachings and guiding athletes in daily practice, also supporting them in managing pressure, competitiveness, and critical decisions. The WADC assigns them clear responsibilities, not only in terms of regulatory compliance but also as educational role models and in reporting potential violations (WADC 2021). However, as data show, the number of coaches who participate in anti-doping training programs remains extremely low (Patterson et al., 2019).

Studies have shown that athletes who regularly use dietary supplements are more likely to consider or engage in doping. This may be due to the belief that if legal supplements enhance performance, banned substances might be even more effective. Moreover, inadequate labeling and misinformation increase the risk of contamination, which may lead to unintentional doping. This highlights the need for anti-doping education to also address practical knowledge on supplement use and athlete health management (Barkoukis et al., 2011).

The difficulties encountered are numerous: from a lack of financial resources and adequate tools to the absence of accessible and updated content. In many cases, coaches are not required to follow training on these topics or do not perceive it as useful, especially in amateur or youth settings (Nicholls et al., 2014). Basic-level courses, often too short or general, do not address the topic of clean sport culture

in depth. As a result, sports educators are unprepared to address the topic of doping in a structured way and often convey contradictory or partial messages.

WADA, through digital tools such as the ADEL platform, has made free and accessible resources available, but their use remains limited, partly due to insufficient promotion and the lack of formal incentives (F. Mazzeo et al., 2021). The issuance of certifications could encourage coaches to follow courses covering specific topics such as responsibilities, test management, and the risks of violations. However, the cost of certified courses limits their accessibility. Additionally, since they are optional, many coaches prefer to invest their time in practical sport activities (Nicholls et al., 2014).

In light of the above, it is necessary to strengthen educational policies in the field of anti-doping by not only updating the content but also ensuring greater integration with existing school and sports programs. Some studies have found that preventive programs focusing exclusively on health risks associated with illegal drugs in sport tend to have limited impact. Simply informing athletes is not sufficient; prevention must also address personal motivations and the athlete's environment (Peters et al., 2009). Education on sports values and doping prevention should be permanently embedded in the mandatory school curriculum through interdisciplinary activities capable of engaging students of all ages and backgrounds. At the same time, coach training can no longer be left to the discretion of individual organizations; it should become a mandatory requirement with periodic updates, especially in youth sports. It is also essential to expand access to free digital resources such as ADEL, in order to guarantee equal training opportunities even for those working in less structured sports settings. The creation of stable partnerships among schools, sports federations, and national anti-doping agencies could support a more homogeneous and continuous dissemination of these messages, contributing to the development of a shared educational language. In Germany, the National Doping Prevention Plan (NDPP) was developed to structurally transform anti-doping prevention and establish standardized training for young athletes. While the initiative succeeded in redefining prevention content, it had limited impact on organizational change (Sipavičiūtė et al., 2020). A qualitative study by Hallward and Duncan (2019) interviewed young athletes, revealing that most participants reported a lack of comprehensive doping education. Doping topics were often mentioned briefly, and programs were perceived as infrequent. Respondents preferred shorter but more frequent sessions and suggested involving not only athletes but also coaches, parents, and

medical staff. The authors also noted the importance of tailoring education to existing knowledge, since doping awareness evolves over an athlete's lifetime.

Finally, increased investment in research on the effectiveness of anti-doping educational programs is highly desirable. To make prevention truly effective, it is necessary to integrate evidence-based approaches, systematically evaluate the programs implemented, and actively engage educational communities. Only in this way will it be possible to build a sports culture that recognizes respect, legality, and health as its foundational and shared values.

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