The transformation of youth sport education in Ukraine under war. Perspectives on recovery

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abstract

This study systematizes the transformative impacts of the full-scale military invasion on Ukraine's youth sport education systems and substantiates multilevel recovery strategies within the Long-Term Athlete Development (LTAD) framework. The analysis focuses on how macrosystemic disruptions affect the pedagogical continuity and developmental pathways of young learners. A qualitative analytical approach was employed and Bronfenbrenner's ecological systems theory provides the theoretical lens. The findings reveal a critical disintegration of the "talent pipeline" due to the destruction of educational infrastructure, the forced migration of the pedagogical core (coaching staff), and the militarization of sports-based learning in occupied territories. The results extend LTAD theory by demonstrating its structural vulnerability under prolonged crises and identifying primary pathways of institutional and educational erosion. Recovery requires a transition from emergency management to a resilient educational model that integrates psychosocial support into athletic training.

KEYWORDS: Youth sport education, ecological systems analysis, LTAD, pedagogical continuity, psychosocial rehabilitation, sportswashing.

The full-scale military aggression against Ukraine has triggered a systemic disintegration across all sectors of public life. The sphere of physical culture and sport education – specifically youth sport training environments, which serve as the institutional pipeline for athletic reserves and a decisive mechanism for socialization – has faced multifaceted, cumulative challenges.[1] These challenges form a cascading effect ranging from the physical destruction of educational and athletic facilities to long-term human capital deficits and a critical decline in the psychosocial well-being of young learners.[2] Consequently, the functioning of youth sport education under conflict conditions has emerged as a paramount concern, necessitating a systematized investigation of its structural transformation.

In sports sociology and pedagogy, youth sport is traditionally analyzed through the Long-Term Athlete Development (LTAD) framework.[3] This concept posits physical activity as a tool for primary socialization and pedagogical skill acquisition. However, military aggression acts as a decisive exogenous shock that radically disrupts this developmental and educational trajectory. The theoretical conceptualization of this impact is grounded in Urie Bronfenbrenner's Ecological Systems Theory (1979),[4] which suggests that macrosystemic crises – specifically war – radically transform all levels of a child's developmental environment. Conflict deforms micro- and mesosystems (family, sports schools, and the instructional training process), leading to prolonged psychosocial consequences. Available studies



Infrastructure devastation: The destroyed "Polytechnic" Sports Complex in Kharkiv. PHOTO: CAROL GUZY/ZUMA PRESS WIRE/ALAMY

suggest that physical activity among children in conflict zones declines within a range of 40 to 60%, directly correlating with an increased risk of somatic and anxiety disorders.[5]

THE ONGOING MILITARY aggression acts not merely as an external disruptive factor but as a structural social rupture that alters the very logic of educational sport systems. As argued in recent conceptual frameworks, sport systems must navigate a "changing world" where global crises redefine the social value, pedagogical integrity, and institutional sustainability of athletic activity.[6] In Ukraine, this macrosystemic shock is triggering a cascading failure across all levels of youth development pathways.

A decisive feature of the Ukrainian case is the presence of multilayered hybrid threats. In temporarily occupied territories, sport education is instrumentalized for the militarization and indoctrination of youth, representing a direct violation of Olympic principles and educational ethics.[7] Concurrently, the sector is targeted by "sportswashing" strategies on the international stage. Scholarly assessments indicate that state-linked "sportswashing" is utilized to manufacture political legitimacy and mitigate international criticism following the invasion.[8] The participation of athletes associated with the aggression in global competitions creates profound ethical dissonance and complicates the efficacy of sanctioning mechanisms intended to protect the integrity of the international pedagogical and sporting movement.[9]

Beyond its immediate practical relevance, this study contributes to the educational and sports science literature by conceptualizing the fragility of pedagogical pipelines in state-centralized systems during protracted conflict. By synthesizing the Ukrainian experience through an ecological lens, the paper offers a replicable theoretical model for assessing sectoral resilience, thereby bridging the gap between emergency crisis management and long-term educational recovery in global sports sociology and pedagogy.

The primary aim of this study is to provide a systemic assessment of the structural transformation within Ukraine's youth sport education (YSE) environment under war-induced macrosystemic shock and to formulate a theoretical framework for its pedagogical recovery based on the LTAD model. To address this objective and the identified research gap, the present study focuses on the following two research questions: 1) How has war-induced macrosystemic shock structurally transformed the institutional foundations and "pedagogical pipelines" of youth sport education systems in Ukraine? 2) How can Long-Term Athlete Development (LTAD) frameworks be recalibrated within an ecological systems perspective to ensure pedagogical continuity and recovery under conditions of systemic disintegration?

Methodology

The study constitutes a qualitative policy-analytical and theoretical synthesis rather than an empirical intervention study. A qualitative analytical design is prioritized over quantitative approaches due to the extreme volatility of the research environment

and the necessity to capture complex, non-linear institutional and educational transformations that standardized statistical metrics alone may fail to reflect. Critically, this analysis does not seek to establish direct causal inference; instead, it focuses on identifying and modeling structural patterns of systemic disintegration and pedagogical resilience under conflict conditions. This framework is specifically chosen to capture the complexity of educational transformation under conditions of macrosystemic shock, and to model the disintegration of developmental pathways through a multilayered synthesis of institutional data and scholarly evidence.

Data selection and source synthesis

To ensure the validity of the qualitative synthesis and avoid ad hoc compilation, the document selection was guided by three rigorous criteria:

- *Institutional Authority:* Priority was given to reports and regulatory frameworks from recognized national (MMS, NOC, Office of the General Prosecutor) and international bodies (UNDP, IOC, UNICEF).
- *Chronological Relevance:* Focus on data covering the 2022–2025 period to capture the longitudinal trajectory of the conflict.
- *Theoretical Alignment:* Documents were selected based on their capacity to provide evidence for the micro-, meso-, or macrosystemic levels of transformation within the pedagogical LTAD framework.

THE METHODOLOGY consists of three integrated components:

- *Documentary and Policy Analysis:* A systematic review of official reports and regulatory frameworks from the Ministry of Youth and Sports of Ukraine (MMS), the Office of the General Prosecutor, the National Olympic Committee (NOC), and the Cabinet of Ministers of Ukraine. This was supplemented by strategic evaluations from international organizations, including the UNDP, IOC, and UNICEF, focusing on the continuity of sport education.
- *Secondary Quantitative Assessment:* Synthesis of statistical datasets from open-access sources, including economic damage reports,[10] state infrastructure recovery programs (Platforma vidnovlennia Ukraïny, n.d.), and analytical status reports on educational athletic infrastructure.[11]
- *Systematic Literature Review:* An evaluation of peer-reviewed research[12] and specialized analytical platforms utilized for theoretical and pedagogical interpretation within the LTAD framework.[13]

TO ENSURE THE ROBUSTNESS of the findings, the study employs data triangulation. This involved the cross-comparison of official government statistics on destruction, empirical publications on socio-psychological and pedagogical consequences, and international monitoring data regarding geopolitical challenges. This multi-perspective validation mitigates the risks associated with the use of secondary data in active conflict zones and ensures the integrity of the analytical model.



The "Angels of Sport" memorial honoring the legacy of fallen sports professionals and coaches. PHOTO: KYIV CITY STATE ADMINISTRATION

The study is limited by its reliance on secondary data sources and the constraints of conducting primary fieldwork in active conflict zones. However, triangulation across institutional, academic, and international datasets mitigates these limitations, ensuring the analytical robustness of the findings and their applicability to the broader discourse on educational resilience.

The analysis of empirical data identified several systemic clusters documenting the impact of military aggression on Ukraine's youth sport education (YSE) environment.

Infrastructure and educational-economic impact

As of February 2025, reports document damage or destruction to over 600 athletic facilities, including more than 200 youth sports schools (YSS). Examples are shown in Figures 1 and 2. These findings are corroborated by both official data on destroyed educational sports infrastructure[14] and independent analytical assessments.[15] Economic assessments indicate aggregate losses within the combined education and sports sectors (2022–2024) of approximately USD 5.5 billion, a figure validated through the KSE-led damage assessment framework.[16]

At the regional level, 100 percent of YSS in Kharkiv and 80 percent in the Dnipropetrovsk region transitioned to remote or hybrid instructional operations.[17] Current data suggest a significant decline in educational engagement; for instance, preliminary survey-based evidence indicates that 66.6 percent of youth are identified as non-active.[18] Furthermore, analytical extrapolations under a pessimistic scenario suggest a projected 50 percent decrease in the national athletic reserve by 2030, assuming the persistence of current migration and educational-infrastructural deficits.[19]

Human capital and the pedagogical pipeline

Casualties include over 500 athletes and educators (coaches).[20] The memorial to fallen sports professionals and coaches is shown in the image of *Angels of Sport*. Migration and mobilization have

resulted in the displacement of approximately 2 million young people and a decisive portion of the YSS pedagogical staff.[21] Enrollment in YSS decreased from 434,000 students in 2020 to an 8 percent coverage rate among the youth population in 2024.[22] In temporarily occupied territories, sport education programs (e.g. "Zarnitsa 2.0") are instrumentalized for the militarization and ideological indoctrination of youth, representing a substantial violation of educational ethics.[23]

Psychosocial and developmental indicators

Systematic data record PTSD symptoms in approximately 40 percent of children.[24] Furthermore, 60 percent of youth in frontline and de-occupied territories lack stable access to structured sports-based learning.[25] Monitoring of middle-school students shows a regression of motor-learning indicators in remote training formats compared to traditional offline sessions.[26] Frequent air raid alerts result in the interruption of training cycles, affecting the pedagogical continuity of instructional loads.[27]

Organizational and geopolitical factors

Competitive activity has been restricted due to the restructuring of national championships and safety requirements.[28] On the international stage, tensions persist regarding the participation of Individual Neutral Athletes.[29] Analytical platforms document the use of sports for propaganda purposes and as a way of bypassing sanctions, which creates decisive ethical challenges for the international educational sport movement.[30]

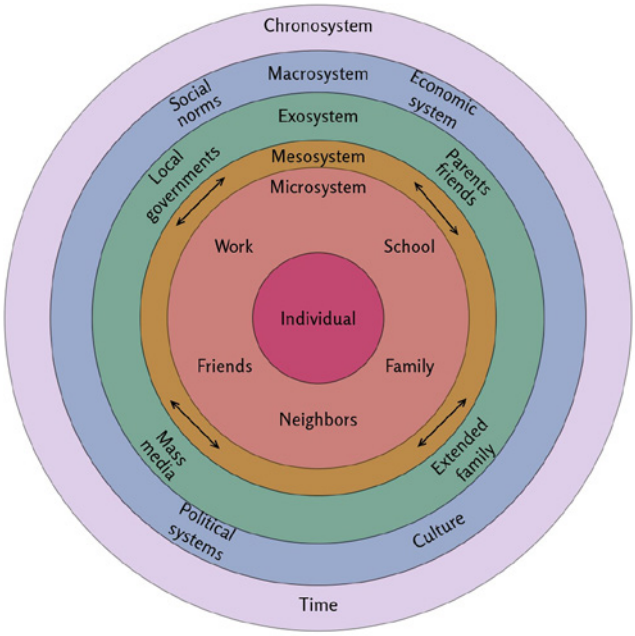
Institutional response and educational resilience

Adaptive management strategies have been implemented to maintain basic pedagogical functionality.[31] National initiatives, including the presidential program for the reconstruction of 100 YSS and 18 sports boarding schools, are primary components of the recovery strategy, currently in the planning or early implementation phases (Platforma vidnovlennia Ukrainy, n.d.).

Discussion

Macrosystemic Shock and Ecological Disintegration

The disintegration of Ukraine's youth sport education (YSE) environment demonstrates that institutional destruction creates a structural bottleneck, rendering traditional developmental models non-functional. Consequently, Ukraine serves as a critical case for assessing how prolonged military aggression acts as a decisive macrosystemic shock, radically altering the social, legal, and economic parameters of societal operation.[32] Analyzing this critical case provides essential insights into the structural limits of educational athletic systems under extreme pressure.



Urie Bronfenbrenner's Ecological Systems Theory model.

SOURCE: SIMPLYPSYCHOLOGY.ORG

The war acts not merely as an external factor but as a structural social rupture that alters the very logic of the sport education system. Recent conceptual frameworks suggest that educational sport systems must navigate a "changing world" where global crises redefine the social value, pedagogical integrity, and institutional sustainability of athletic activity.[33] In Ukraine, the impact propagates through lower hierarchical levels, where the collapse of the mesosystem – driven by infrastructure devastation – undermines the decisive links between sports schools and local communities. Urie Bronfenbrenner's Ecological Systems Theory model is shown in the image.

Consequently, a profound dysfunction of the microsystem emerges: Chronic stress and PTSD symptoms in young learners[34] signify a microsystemic overload. To our knowledge, the Ukrainian case represents one of the most extensive instances of institutional disruption of pedagogical sport networks documented in recent literature, where the systematic targeting of the centralized YSE network indicates a deliberate undermining of the institutional base for human capital reproduction.

Deformation of the pedagogical LTAD framework

Current conflict conditions precipitate a systemic deformation of the LTAD framework, as the primary principles of continuity and progressive pedagogical cyclicity become untenable under martial law. This deformation challenges the foundational pillars of successful sport education policies; according to the SPLISS 2.0 framework, the effectiveness of an educational athletic system is contingent upon the synergy between financial support, integrated developmental pathways, and institutional stability.[35]

"THE WAR ACTS NOT MERELY AS AN EXTERNAL FACTOR BUT AS A STRUCTURAL SOCIAL RUPTURE THAT ALTERS THE VERY LOGIC OF THE SPORT EDUCATION SYSTEM."



Infrastructure devastation: The destroyed "Desna" Stadium in Chernihiv. PHOTO: COURTESY OF DESNA

In the Ukrainian context, this manifests through three substantial disruptions:

- *Instructional Transitions:* The loss of qualified pedagogical personnel and reduced training volumes impede the qualitative transition between the "Learning to Train" and "Training to Train" stages, effectively disrupting specialization and learning mechanisms.
- *Competitive Practice as Learning:* Logistical barriers limit the essential competitive practice required for the "Training to Compete" stage, creating decisive risks of "lost generations" in national sport education.[36]
- *Remote Learning Limitations:* Evidence confirms that while digital programs offer a temporary logistical bridge, they cannot fully compensate for in-person instructional training in ensuring motor and pedagogical development.[37]

Institutional resilience versus resource scarcity

The national sport education system demonstrates significant institutional resilience through adaptive management, yet a widening discrepancy persists between localized viability and total resource needs. The resilience demonstrated by Ukrainian sports schools aligns with theoretical models of organizational adaptation in the "Sport for Development and Peace" (SDP) sector. External systemic factors force organizations to abandon traditional instructional trajectories and adopt flexible, survival-oriented strategies to maintain their social and pedagogical impact.[38]

Evidence of this resilience is found in the 2030 State Targeted Social Program[39] and regional initiatives.[40] However, the volume of aggregate economic losses (USD 5.5 billion) significantly exceeds current internal recovery potential.[41] This suggests that while local pedagogical adaptations are crucial, structural stabilization necessitates a strategic shift toward global financial intervention.

Geopolitical dimensions and educational ethics

The instrumentalization of youth sport education in occupied territories for indoctrination and the persistence of "sportswashing" strategies represent a direct threat to the ethical integrity of the international pedagogical and sports movement.[42] In the European context, this substantiates the necessity of consistent international sanctioning policies to prevent the use of sports as a tool for legitimizing aggression, thereby ensuring the ethical and educational stability of the global athletic community.

Conclusions

The systemic analysis of the multifactorial impact of military aggression on Ukraine's youth sport education (YSE) environment leads to the following conclusions:

- *Theoretical Implication: Macrosystemic Regression.* Military aggression functions as a decisive shock triggering a cumula-

"EXTERNAL SYSTEMIC FACTORS FORCE ORGANIZATIONS TO ABANDON TRADITIONAL INSTRUCTIONAL TRAJECTORIES AND ADOPT FLEXIBLE, SURVIVAL-ORIENTED STRATEGIES TO MAINTAIN THEIR SOCIAL AND PEDAGOGICAL IMPACT."

tive regression of the pedagogical sector. The destruction of educational athletic infrastructure and substantial economic losses have resulted in a profound structural dysfunction of the athletic ecosystem. This regression confirms that macrosystemic instability directly correlates with the erosion of the foundational structures required for youth development and pedagogical stability.

- *Impact on LTAD: Educational Pipeline Disruption*. Destructive factors have distorted the Long-Term Athlete Development framework, transforming it from a progressive trajectory into a fragmented process. Reduced training volumes and the limited efficacy of remote formats impede the transition between stages of specialization, undermining motor-learning continuity. At the microsystemic level, widespread psychosocial traumatization serves as a primary barrier to the continuity of the national pedagogical pipeline, necessitating new resilience-based approaches to sport education.
- *Institutional Viability and Resource Gaps*. While the system demonstrates resilience through state-led strategic programs and adaptive pedagogical management, the scale of damage significantly exceeds domestic capacity. The recovery process requires a strategic transition toward sustained international financial support and targeted global investment to bridge the widening resource gap and ensure the long-term sustainability of the educational athletic network.
- *Geopolitical and Ethical Frameworks*. The crisis in YSE is inextricably linked to hybrid warfare, including the ideological indoctrination of youth in occupied territories and "sportswashing" strategies on the international stage. Protecting the integrity of the national pedagogical space requires a transition from sectoral administration to a robust framework of security and ethical governance. This is decisive for ensuring that sport remains a tool for positive development rather than a mechanism for political instrumentalization.

Recommendations

These recommendations are derived from the analytical synthesis and theoretical interpretation presented above. They are intended to inform evidence-based policy discussions regarding the structural recovery of the youth sport education sector. The scale of the macrosystemic shock necessitates multilevel strategic interventions to ensure pedagogical resilience:

Strategic interventions at the macro- and exosystemic levels

- *Targeted financial intervention:* The establishment of a specialized fund for educational sports infrastructure recovery should be considered in order to mobilize international donor support. Investment volumes require alignment with the documented USD 5.5 billion in damages to ensure the restoration of institutional pedagogical capacity.[43]
- *Geopolitical resilience and ethical governance:* It is recommended to adapt sports diplomacy strategies to minimize the "sportswashing" effect. Strengthening international sanctioning frameworks requires a consistent, principle-based approach to protect the ethical integrity of the global educational sports movement and prevent the instrumentalization of young learners.[44]

Restoring mesosystem integrity and LTAD continuity

- *Development of secure educational hubs:* The establishment of regional secure sports-education hubs in stable areas should be considered a priority to restore the decisive links between sports schools and local communities.
- *Ensuring instructional continuity:* These hubs require the provision of uninterrupted access to specialized infrastructure and competitive practice. Such measures are essential to prevent the further degradation of pedagogical specialization stages and to sustain the continuity of the national talent pipeline.[45]

Interventions at the microsystemic level and human capital

- *Integrated psychosocial and pedagogical rehabilitation:* The implementation of psychological rehabilitation programs within sports schools is recommended in order to restore the developmental readiness of young athletes. This process requires the adoption of trauma-informed pedagogical practices to address the widespread psychosocial consequences of the conflict.[46]
- *Preservation of the pedagogical core:* A robust system of grant support and professional incentives for coaching and teaching staff, particularly in de-occupied and frontline regions, should be considered. Preserving this professional core is decisive for the reproduction of athletic potential and organizational adaptation under external systemic factors.[47]

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