

Inclusive physical culture for university students with disabilities: a systematic review

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Abstract

Background and Study Aim Inclusive physical culture in higher education is essential for ensuring equal access, participation, and well-being among students with disabilities. Despite increasing international initiatives to promote inclusion, universities still face pedagogical, infrastructural, and organizational barriers that limit full engagement in physical activity. This study aimed to examine the theoretical foundations, recent developments, and practical strategies that support inclusive physical culture for university students with disabilities.

Material and Methods A systematic review was conducted following PRISMA guidelines. Peer-reviewed articles indexed in Web of Science, Scopus, and MedLine between 2000 and 2025 were analyzed. The reviewed literature was grouped into three categories: theoretical, contemporary, and applied studies. Descriptive statistics, thematic content analysis, and bibliometric mapping were used to identify major concepts, program models, and implementation trends.

Results The review showed growing academic interest in inclusive physical activity in higher education, with a clear movement toward integrated approaches that combine adaptive instruction, accessible environments, and psychosocial support. Teacher competence, peer mentoring, and structured adapted physical activity programs were consistently associated with improved motivation, participation, and social inclusion of students with disabilities.

Conclusions Inclusive physical culture serves as both an educational and rehabilitative framework that promotes autonomy, competence, and belonging among students with disabilities. Strengthening teacher preparation, improving infrastructure accessibility, and expanding inclusive program design can further enhance equitable participation and health outcomes in university settings.

Keywords: inclusive physical education, adaptive physical activity, university students with disabilities, accessibility, social inclusion, higher education, rehabilitation

Introduction

Inclusive physical culture is an essential element of modern higher education, integrating the principles of equality, accessibility, and personal development into physical education. In the university setting, inclusive practices allow students with disabilities to participate fully in physical activities, supporting not only their physical health but also their social integration and psychological well-being. This issue involves pedagogical, social, and environmental factors that shape the effectiveness of inclusion. As universities continue to adopt inclusive initiatives, the creation of effective physical culture models becomes critical for promoting diversity, active participation, and comprehensive student development.

Foundational research defines inclusive physical culture as a pedagogical and social process shaped by instructional adaptation, environmental conditions, and interpersonal relationships. Block and Obrusnikova's state-of-the-field review identified key determinants such as teacher competence,

curriculum adaptation, peer interaction, and contextual support, emphasizing that effective inclusion depends on systematic instructional design rather than isolated accommodations [1].

At the experiential level, Goodwin and Watkinson highlighted students' perspectives, revealing ongoing tension between enabling and limiting aspects of physical education. They identified belonging, perceived competence, and meaningful participation as core indicators of genuine inclusion. Their qualitative findings underscored the importance of classroom climate and teacher behavior as primary factors influencing engagement and psychosocial outcomes [2].

Conceptually, the WHO's International Classification of Functioning, Disability and Health (ICF) provides a comprehensive framework linking these educational determinants to human functioning. It interprets disability as the interaction among body functions, activities, participation, and environmental factors, guiding universities to address structural, policy, and attitudinal barriers alongside individual abilities when developing inclusive physical culture [3].

Recent studies in higher education show that campus-based adapted physical activity (APA) programs can significantly increase leisure-time physical activity and enhance self-determination among students with disabilities. In the evaluation of “Fitness Access McGill,” Liska et al. reported moderate to large pre–post improvements in total physical activity and in autonomy, competence, and relatedness, emphasizing the effectiveness of need-supportive program design and supervised, individualized exercise on university campuses [4].

Large-scale cross-sectional research highlights the extent of inactivity within this population. In a national Spanish sample of 1,103 university students with disabilities, Úbeda-Colomer et al. found that most participants did not meet WHO recommendations for vigorous or moderate activity. Lower adherence was especially evident among women, older students, those with multiple or acquired disabilities, and individuals with obesity, identifying key groups for targeted interventions [5].

Analyses of perceived barriers reveal a consistent multilevel pattern: intrapersonal factors such as fatigue, pain, and low motivation are most common, followed by organizational barriers like limited adapted programs and cost, and interpersonal or environmental obstacles including inactive peers and restricted accessibility. These results support the need for integrated approaches that combine behavioral support with structural and environmental improvements within universities [6].

Implementation success in higher education also depends on faculty attitudes and readiness. A 2025 survey reported generally positive attitudes among university teachers toward inclusion and academic accommodations, with differences by gender and academic field. The authors identified professional training and adequate resources as key factors in turning inclusive intentions into consistent practice – conditions essential for advancing inclusive physical culture in universities [7].

Applied research shows that inclusive physical culture can be effectively implemented through peer support, environmental assessment, and structured behavior-change strategies. In a 10-week campus program, Todd et al. demonstrated that peer-mentored physical activity for autistic college students is both feasible and effective in promoting self-determined participation. The program enhanced autonomy, competence, and relatedness through individualized activities and near-peer coaching, an approach that universities can expand through structured student-mentor initiatives within recreation services [8].

At the infrastructural level, AIMFREE-based evaluations of university recreation centers identified specific, modifiable barriers related to facilities, equipment, programs, and staff practices. Administrators and staff emphasized

that policy adjustments and targeted training can drive improvement, including better equipment spacing, signage, reservation systems, and inclusive service protocols. These findings support practical campus plans that connect facility management, programming, and disability services [9].

Beyond the campus environment, randomized trials involving wheelchair users have shown that multi-component, home-based exercise interventions combining remote coaching, individualized goals, and accessible equipment support long-term engagement over 12 months. Universities can adapt these elements for hybrid or home programs through tele-coaching, equipment loan schemes, and partner-supported routines, extending inclusive physical culture to students who face mobility, scheduling, or transportation barriers [10].

Analysis of research findings shows that inclusive physical culture for university students with disabilities is a dynamic field where theoretical models, institutional strategies, and practical interventions intersect. Scholars emphasize that successful inclusion depends on the coordinated interaction of pedagogical design, accessible infrastructure, and psychosocial support systems. Although the evidence base and inclusive policies continue to expand, many universities still encounter difficulties in translating conceptual frameworks into sustainable practice, particularly in achieving equal participation and maintaining long-term engagement in physical activity. The integration of theoretical and applied perspectives remains essential for strengthening inclusivity in higher education and for guiding evidence-based policy development.

The aim of this study is to examine the theoretical foundations, current developments, and practical applications of inclusive physical culture for university students with disabilities.

Materials and Methods

Information Sources and Search Strategy

The literature search covered the period from 2000 to 2025 and was limited to peer-reviewed, English-language, full-text articles. The databases Web of Science, Scopus, and MedLine were selected for their comprehensive coverage of education, rehabilitation, and sport sciences. Controlled keywords and Boolean operators ensured conceptual and contextual relevance, including “inclusive physical education,” “adaptive physical activity,” “university students with disabilities,” “higher education inclusion,” “accessibility,” and “teacher attitudes.”

The inclusion criteria were as follows: (1) studies focusing on inclusive physical education or physical culture among students with disabilities in higher

education; (2) research employing quantitative, qualitative, or mixed methods; and (3) articles presenting clear methodological grounding and relevant outcomes. The exclusion criteria were: (1) publications unrelated to higher education or from non-academic sources and (2) studies lacking methodological transparency or empirical data.

After the initial search, 214 records were identified, and 34 duplicates were removed. The remaining 180 records were screened by title and abstract. Following full-text evaluation of 68 articles, 15 studies met all inclusion criteria.

Study Design and Framework

This study employed a systematic review design in accordance with the PRISMA 2020 guidelines to ensure methodological rigor, transparency, and replicability. The review process included three main phases: identification, screening and eligibility, and synthesis. Eligible publications were classified into three analytical categories:

1. Fundamental sources referring to theoretical frameworks of inclusive physical education and disability studies;
2. Contemporary sources consisting of empirical research, including surveys and intervention studies;
3. Applied sources focusing on program implementation, evaluation, and policy analysis.

A thematic synthesis was conducted to identify recurring constructs such as teacher competence, accessibility, peer interaction, and self-determination.

The selection process is presented in Figure 1 (PRISMA Flow Diagram).

Data Extraction and Coding

Data extraction and coding were carried out independently by two reviewers using predefined templates to ensure accuracy, transparency, and consistency. The extracted information was verified through cross-checking and consensus discussions. Each study was summarized in a structured analytical table with the following columns: Authors (Year) – bibliographic details; Participants (Country) – sample type and geographical context; Data Source – study design or data collection method (survey, interview, intervention, review); Outcome Measure – indicators related to inclusion and physical activity; Findings Q1–Q3 – summarized evidence corresponding to attitudes toward inclusion, positive experiences, and barriers; Themes; Summary. All entries were verified for completeness and accuracy against full-text sources. Only English-language publications were included.

Quality Assessment

The methodological quality of the included studies was evaluated according to the PRISMA 2020 framework, emphasizing transparency, methodological rigor, and completeness of reporting. Two independent reviewers assessed each study using a 10-item checklist covering reporting clarity, methodological soundness, and analytical validity. Each item was rated on a three-point scale (0 = not addressed, 1 = partially addressed,

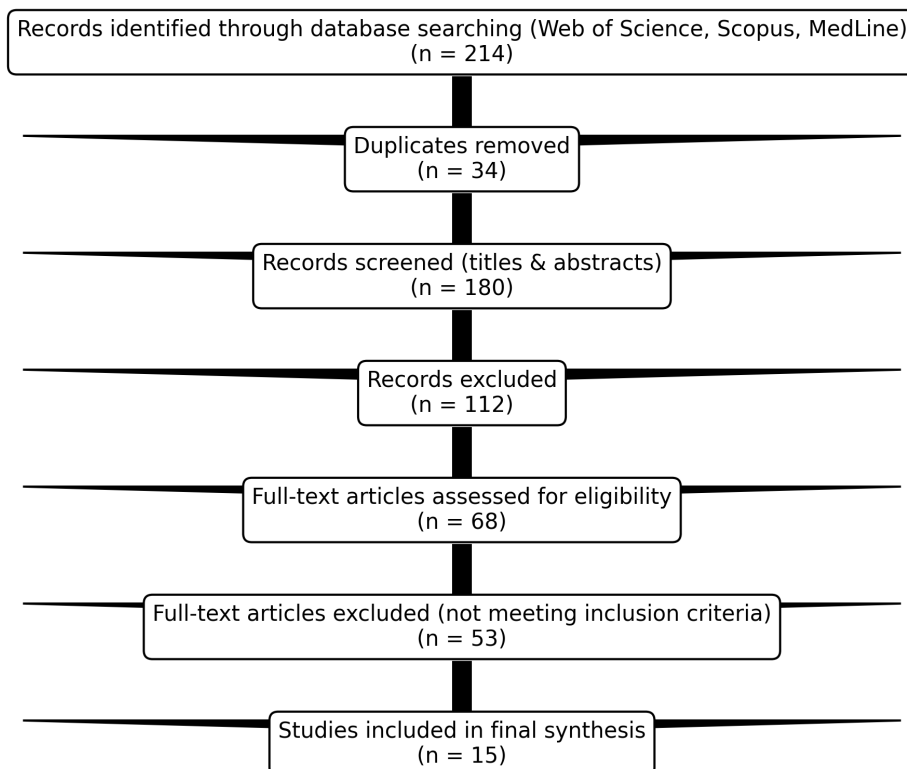


Figure 1. PRISMA Flow Diagram

Table 1. Summary of Studies Included in the Systematic Review (n = 15)

Authors	Year	Participants (country)	Data source	Outcome measure	Findings Q1 – Attitude to inclusion	Findings Q2 – Positive experiences	Findings Q3 – Negative experiences	Themes	Summary
[2]	2000	Not specified (students with physical disabilities)	Qualitative interviews/phenomenology	Lived experience of inclusion/participation in PE	Teacher behaviors perceived as supportive or exclusionary; attitudes inferred from student reports	Belonging, perceived competence, meaningful participation when teachers adapt tasks and peers are supportive	Social stigma, low expectations, and environmental barriers limiting participation	['Teacher attitudes/competence', 'Wheelchair/exercise RCTs/behavior change', 'Students' perspectives/qualitative experience']	Phenomenological study detailing how students with physical disabilities experience PE; highlights belonging, competence, and teacher behavior as participation levers.
[1]	2007	Various (narrative review, 1995–2005 literature)	Narrative literature review	Synthesis of determinants of inclusion in PE	Teacher competence and positive attitudes are central to effective inclusion	Adaptive instruction and peer interaction linked to improved participation	Lack of training/resources and inflexible curricula hinder inclusion	['Teacher attitudes/competence', 'Campus APA programs/interventions']	State-of-the-field review (1995–2005) synthesizing determinants of inclusion in PE: teacher competence, curricular adaptations, peer interaction, and contextual supports.
[3]	2001	N/A (conceptual framework)	ICF framework document	Conceptualization of functioning/participation and environmental factors	Not directly assessed	Not directly assessed	Not directly assessed	['Accessibility/facilities (AIMFREE)', 'Campus APA programs/interventions', 'Frameworks/conceptual']	Introduces the ICF framework conceptualizing disability as interaction and between functioning and environment; foundational for inclusive program design.
[5]	2019	Spain (university students with disabilities)	Crosssectional survey	PA guideline adherence and subgroup differences	Not directly assessed	Not directly assessed	Low PA adherence prevalent; disparities by sex, age, disability, and weight status	['Physical activity levels/surveillance']	Public Health study showing most university students with disabilities do not meet PA guidelines, with disparities by sex, age, disability, and weight status.
[6]	2019	Spain (university students with disabilities)	Crosssectional survey	Selfreported barriers to physical activity	Not directly assessed	Not directly assessed	Predominant intrapersonal and organizational barriers; accessibility constraints	['Barriers/facilitators (ecological)']	Journal analysis identifying multilevel PA barriers among university students with disabilities (intrapersonal, organizational, interpersonal, community).

Table 1. Continued

Authors	Year	Participants (country)	Data source	Outcome measure	Findings Q1 – Attitude to inclusion	Findings Q2 – Positive experiences	Findings Q3 – Negative experiences	Themes	Summary
[4]	2024	Canada (university students/staff with disability or chronic condition)	Program evaluation (pre-post)	Leisuretime PA; autonomy, competence, relatedness	Not directly assessed; program framed with supportive, inclusive approach	Improved motivation and engagement within a needsupportive campus APA program	Not directly assessed	['Campus APA programs/interventions']	Mixed-method evaluation of a campus adapted physical activity program (Fitness Access McGill) reporting gains in leisure-time PA and self-determination needs.
[8]	2019	Not specified (autistic college students)	Campus intervention (peermentored PA)	Feasibility; engagement indicators	Not directly assessed	Enhanced confidence, routine formation, and peer support	Not directly assessed	['Campus APA programs/interventions']	Autism in Adulthood paper describing a 10-week peermentored PA program for autistic college students; demonstrates feasibility and engagement benefits.
[10]	2013	USA (adults who use wheelchairs)	Randomized controlled trial	Exercise adoption and adherence over 12 months	Not directly assessed	Structured, tailored supports facilitated longterm participation	Not directly assessed	['Campus APA programs/interventions', 'Wheelchair/exercise RCTs/behavior change']	RCT among wheelchair users testing multi-component, home-based exercise behavior interventions with sustained adoption over 12 months.
[11]	2017	Not specified (college students with/without disabilities)	Comparative survey	Physical activity indicators	Not directly assessed	Not directly assessed	Lower PA on several indicators among students with disabilities	['Physical activity levels/surveillance', 'Campus APA programs/interventions']	Comparative study analyzing physical activity levels among college students with ADHD/LD vs. peers without disabilities.
[12]	2011	Canada (fitness/recreation facilities)	Facility accessibility audit (AIMFREE)	Accessibility scores across domains	Not directly assessed	Improvements possible through targeted environmental changes	Many 'accessible' facilities failed across multiple domains	['Accessibility/facilities (AIMFREE)', 'Campus APA programs/interventions']	Facility audit using modified AIMFREE showing many 'accessible' fitness/recreation centers fall short on multiple domains; informs campus recreation improvements. Development and psychometric validation of AIMFREE instruments for assessing fitness and recreation environment accessibility.
[13]	2004	USA (fitness/recreation environments)	Measurement development/validation (AIMFREE)	Reliability and validity of accessibility instrument	Not directly assessed	Standardized tools enable systematic improvements in access	Not directly assessed	['Accessibility/facilities (AIMFREE)']	Development and psychometric validation of AIMFREE instruments for assessing fitness and recreation environment accessibility.

Table 1. Continued

Authors	Year	Participants (country)	Data source	Outcome measure	Findings Q1 – Attitude to inclusion	Findings Q2 – Positive experiences	Findings Q3 – Negative experiences	Themes	Summary
[14]	2022	Not specified (physical education teachers)	Teacher attitude survey	Attitude scale scores by demographic variables	Generally positive attitudes with demographic differences	Not directly assessed	Barriers implied via resource and training needs	['Teacher attitudes/competence', 'Physical activity levels/surveillance']	Frontiers in Psychology survey of PE teachers' attitudes toward inclusion, noting generally moderate positivity with gender-related differences.
[15]	2024	Various (scoping review)	Scoping review	Mapping of teachers' perceptions and practices	Positive intentions constrained by implementation challenges	Targeted training associated with improved practices	Policy-practice gaps; limited resources and workload pressures	['Teacher attitudes/competence']	Scoping review on teachers' perceptions and practices related to inclusion in PE; maps persistent implementation challenges and training needs.
[16]	2019	Various (systematic review)	Systematic review	Synthesis of teacher attitudes and student experiences	Attitudes moderate inclusion quality alongside resources and context	Supportive climate and resources linked to better participation	Insufficient support and negative peer dynamics reduce inclusion	['Teacher attitudes/competence', 'Students' perspectives/qualitative experience']	Systematic review combining teacher attitudes and student experiences of inclusion in PE; identifies attitudes, resources, and context as key moderators.
[17]	2023	Not specified (college students with intellectual disabilities)	Qualitative interviews/focus groups	Narratives of PA engagement and social integration	Not directly assessed	Supportive relationships and accessible contexts enable sustained engagement	Environmental and social barriers hinder consistent participation	['Barriers/facilitators (ecological)', 'Students' perspectives/qualitative experience']	Qualitative study of college students with intellectual disabilities detailing lived PA engagement experiences and ecological barriers/facilitators.

2 = fully addressed), with a maximum score of 20 points. Studies scoring 16–20 were classified as high quality, 12–15 as moderate quality, and below 12 as low quality. Discrepancies between reviewers were resolved through discussion, and consensus forms were archived to ensure transparency. All scoring sheets and methodological documentation are available as supplementary materials upon request.

Data Analysis and Synthesis

A qualitative thematic synthesis was applied to integrate findings from studies with diverse designs. The studies were grouped according to conceptual constructs such as teacher attitudes, accessibility, and psychosocial engagement, as well as participant characteristics, study design, and contextual outcomes related to inclusion and motivation. A comparative descriptive approach guided the synthesis, highlighting areas of convergence and divergence across findings. Consistent trends were interpreted as indicators of stable theoretical constructs, whereas discrepancies were viewed as reflections of contextual or methodological differences.

The interpretation was structured around three analytical questions: (1) What are the dominant attitudes toward inclusion? (2) What positive experiences of inclusion are reported? (3) What barriers or negative experiences limit participation? The synthesized findings connected micro-level experiences of students and teachers with macro-level determinants such as institutional policies and accessibility frameworks. The dataset ensured transparency and reproducibility throughout the analysis. All selection decisions were recorded, and any disagreements between reviewers were resolved through discussion and consensus.

Results

A total of 15 studies met all inclusion criteria and were included in the final synthesis. These publications represent diverse methodological approaches and geographical contexts, reflecting theoretical, empirical, and applied perspectives on inclusive physical culture in higher education. The analyzed studies addressed key dimensions such as teacher attitudes, accessibility, psychosocial engagement, and institutional practices. Table 1 summarizes the core characteristics and findings of the included studies, highlighting the main analytical constructs (Q1–Q3) related to attitudes toward inclusion, positive experiences, and barriers to participation.

The temporal and thematic distribution of the analyzed studies provides additional insight into the development of research on inclusive physical culture in higher education. Table 2 presents the number of publications grouped by five-year

periods, illustrating the steady growth of scholarly attention from early conceptual works in the 2000s to a marked increase after 2016. Table 3 summarizes the thematic structure of the dataset, showing how research emphasis has evolved from theoretical and teacher-centered perspectives toward applied interventions, campus-based programs, and accessibility studies.

Table 2. Counts by Time Period

Period	Count
2000–2005	3
2006–2010	1
2011–2015	2
2016–2020	5
2021–2025	4

Table 3. Theme Counts

Theme	Count
Campus APA programs/interventions	7
Teacher attitudes/competence	5
Students' perspectives/qualitative experience	3
Accessibility/facilities (AIMFREE)	3
Physical activity levels/surveillance	3
Wheelchair/exercise RCTs/behavior change	2
Barriers/facilitators (ecological)	2
Frameworks/conceptual	1

The dataset included 15 publications from 2000 to 2024, covering a wide range of methodological approaches and participant groups relevant to inclusive physical culture in higher education. The materials comprised qualitative studies, cross-sectional surveys, campus intervention evaluations, facility audits, one randomized controlled trial, several scoping and systematic reviews, and one conceptual framework. The analyzed populations included university students with disabilities (Spain and other multi-context qualitative samples), autistic college students (campus intervention), adults who use wheelchairs (behavior-change trial adaptable to university contexts), physical education teachers (attitude surveys), and fitness or recreation facilities (accessibility audits).

The thematic synthesis integrated results from different study types and data sources to identify patterns related to attitudes, positive experiences, and barriers in inclusive physical culture. Attitudes toward inclusion were primarily examined in teacher-focused studies [14, 15, 16] and inferred from student reports on teacher behavior [2] as well as narrative syntheses addressing pedagogical determinants [1]. Positive experiences were reported in qualitative and intervention-based studies emphasizing peer support, autonomy, and

belonging [2, 4, 8, 17], while negative experiences reflected multi-level barriers, including limited accessibility, low program diversity, and persistent stigma [5, 6, 11, 12].

Across research designs, qualitative studies consistently highlighted belonging and supportive relationships as indicators of meaningful inclusion, whereas surveys and surveillance data revealed uneven adherence to physical activity guidelines and variability in teacher attitudes. Intervention programs demonstrated feasibility and psychosocial benefits of personalized, need-supportive approaches, while facility audits using AIMFREE identified correctable accessibility issues. Reviews and frameworks contributed an ecological understanding of inclusion, linking pedagogical, organizational, and environmental determinants [1, 3, 16].

The Social Ecological Model (SEM) was applied to illustrate the multilevel factors influencing inclusion in physical culture and physical activity among university students with disabilities (Table 4, Figure 2). The model integrates individual, interpersonal, organizational, community, and societal dimensions, showing how each level contributes to enabling or constraining participation.

Table 4. Factors Influencing Inclusion in Physical Culture and Physical Activity among University Students with Disabilities

SEM Level	Examples of Positive (+) Factors	Examples of Negative (-) Factors
Individual	Motivation, confidence, self-efficacy, perceived competence, autonomy, engagement	Low physical activity adherence, health limitations
Interpersonal	Teacher support, peer mentoring, social belonging, friendships	Negative peer dynamics, low teacher expectations
Organizational	Adapted programs, inclusive curriculum, facility accessibility, campus APA programs	Lack of training and resources, inflexible curricula, limited staff
Community	Local recreation facilities, inclusive clubs, community events	Accessibility gaps, inadequate infrastructure
Societal	Policy support, public awareness, cultural acceptance	Policy–practice gaps, social stigma, lack of governmental coordination

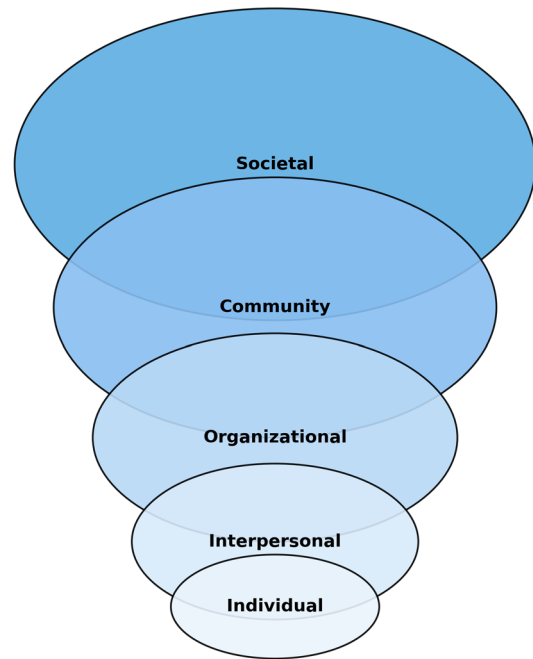


Figure 2. Levels of Factors Influencing Inclusion in Physical Culture, Sport, and Physical Activity within the Social Ecological Model (SEM)

Figure 2 illustrates the interconnected levels of the Social Ecological Model, each represented by an oval denoting a distinct yet interdependent layer of influence on inclusion.

At the Individual level, inclusion is supported by motivation, confidence, self-efficacy, and perceived competence, while barriers involve low adherence to physical activity and health limitations.

At the Interpersonal level, teacher support, peer mentoring, and social belonging encourage participation, whereas negative peer dynamics and low teacher expectations hinder it.

At the Organizational level, adapted programs, inclusive curricula, accessible facilities, and campus-based APA programs promote inclusion, while limited training, inflexible curricula, and staff shortages remain obstacles.

At the Community level, access to recreation facilities, inclusive clubs, and community events fosters engagement, although inadequate infrastructure and accessibility gaps restrict participation.

At the Societal level, supportive policies, public awareness, and cultural acceptance strengthen inclusion, whereas policy–practice gaps, stigma, and weak intersectoral coordination continue to impede progress.

Taken together, these findings show that inclusive physical culture relies on the dynamic interaction of individual motivation, supportive social relationships, institutional capacity, community resources, and societal commitment to

equality. The results further indicate that successful inclusion in university physical culture depends on teacher readiness, supportive environments, and accessible infrastructure. Positive outcomes occur when these elements align, while exclusion and inactivity persist where institutional capacity and accessibility are insufficient. These findings provide an empirical foundation for the subsequent discussion of pedagogical, environmental, and psychosocial mechanisms shaping inclusion in higher education.

Discussion

The main aim of this study was to synthesize and interpret theoretical, empirical, and applied evidence on inclusive physical culture for university students with disabilities, identifying factors that support or limit meaningful participation in higher education. Analysis of fifteen publications revealed three key dimensions of inclusion: teacher competence and attitudes, environmental accessibility, and psychosocial engagement through supportive programs. The findings show that effective inclusion depends on the integration of pedagogical responsiveness, infrastructural readiness, and a sense of social belonging, which together promote both participation in physical activity and psychological well-being. Although progress has been made through peer-mentored and adaptive activity programs, barriers remain, including limited accessibility, institutional resistance, and uneven teacher preparation. Within the wider context of inclusive education and rehabilitation, the results suggest that physical culture functions not only as a means of developing physical skills but also as a pathway to empowerment, health promotion, and social integration.

The synthesis of theoretical and empirical evidence offers a multidimensional view of inclusive physical culture in higher education. Foundational models such as the International Classification of Functioning, Disability and Health (ICF) [3] describe disability as an interaction between individual functioning and environmental conditions, a principle consistently supported by contemporary inclusion research. This perspective is reflected in Block and Obrusnikova's [1] comprehensive review, which identified teacher competence, curricular flexibility, and social context as essential for equitable participation. Consistent with these theoretical foundations, recent empirical studies have expanded the focus from individual adaptation to systemic and ecological inclusion, where institutional policies, facility accessibility, and interpersonal climate determine opportunities for engagement in physical activity.

A consistent theme across the reviewed literature is the decisive role of teacher attitudes and professional readiness. Studies involving physical

education teachers [14, 15] show that successful inclusion is closely linked to instructors' confidence, prior training, and institutional support. However, positive attitudes alone do not ensure effective practice; without sufficient pedagogical preparation or structural backing, implementation gaps remain [16]. This pattern aligns with theoretical models of inclusive pedagogy [1], which view teacher competence as both a cognitive and relational construct involving empathy, differentiation, and adaptive instruction. The variation observed in teacher attitudes and competence indicates that inclusion is realized through practice rather than declaration, depending on professional culture, administrative commitment, and available resources.

In contrast to teacher-centered factors, student-centered and environmental perspectives reveal complementary dimensions of inclusion. Goodwin and Watkinson [2] and Chen et al. [17] show that for students with disabilities, the sense of inclusion depends less on formal accommodations and more on social belonging, recognition, and emotional security. Likewise, Liska et al. [4] and Todd et al. [8] demonstrate that campus-based adapted physical activity programs grounded in self-determination theory enhance motivation, confidence, and sustained engagement. These findings indicate that a supportive psychological environment, characterized by relatedness and encouragement, can mitigate material constraints and transform physical culture into a means of empowerment. However, large-scale surveys [5, 11] reveal that despite local successes, participation inequalities remain significant, with many university students with disabilities failing to meet physical activity recommendations. This imbalance points to persistent structural and systemic barriers, including inaccessible infrastructure [12] and limited institutional coordination, which continue to restrict full participation.

From a broader theoretical perspective, these findings support an ecological model of inclusion that connects micro-level pedagogical interactions with macro-level institutional structures. The positive effects of tailored, peer-mentored, and need-supportive interventions [4, 8] illustrate how enabling environments, supportive social networks, and adaptive teaching can bring the ICF's concept of functional participation into practice. In contrast, persistent environmental constraints [12, 13] highlight the partial implementation of accessibility standards, showing that formal compliance does not necessarily ensure meaningful inclusion. The gap between institutional policies and students' lived experiences therefore remains a defining challenge in contemporary higher education.

The pedagogical implications of these findings are noteworthy. Teacher education programs should

include structured training in adaptive methods, disability awareness, and inclusive design. Evidence from both empirical and theoretical studies shows that developing competence in these areas strengthens teacher self-efficacy and positively affects student motivation and participation. From a social perspective, inclusive physical culture extends beyond physical activity as a health outcome; it functions as a process of identity development, empowerment, and community integration. As demonstrated in qualitative and intervention research [2, 8, 17], inclusive participation shapes students' perceptions of their abilities, reduces stigma, and fosters mutual understanding among peers.

In summary, the convergence of theoretical and empirical evidence indicates that inclusive physical culture is most effective when grounded in an interactionist and ecological framework that integrates teacher competence, accessible infrastructure, and psychosocial empowerment. Variations among studies, particularly between structured institutional programs and low-resource contexts, reflect contextual differences rather than conceptual inconsistency. These findings emphasize the need for collaboration among educators, health professionals, and administrators to close the ongoing gap between the principles of inclusion and their implementation in higher education.

The present synthesis shows that inclusive physical culture for university students with disabilities is a multidimensional construct that integrates pedagogical, environmental, and psychosocial domains. The reviewed studies confirm that the quality of inclusion depends on the interaction between teacher competence, accessible institutional settings, and student motivation and belonging. Theoretical frameworks such as the ecological and interactionist perspectives [1, 3] offer a consistent basis for understanding these relationships, while current evidence highlights the need for systemic integration across educational and rehabilitative contexts. In practical terms, the findings indicate that inclusive physical culture supports not only physical development but also emotional well-being, autonomy, and social cohesion within academic environments. The study examines the relationship between theoretical approaches and practical implementation, highlighting how inclusive environments support participation and well-being of university students with disabilities.

Building upon this conceptual framework, the empirical evidence from recent studies further illustrates how inclusive educational models, physical activity interventions, and teacher training initiatives contribute to these multidimensional outcomes across different institutional and cultural contexts.

Building on this conceptual framework, recent

empirical evidence demonstrates how inclusive educational models, physical activity interventions, and teacher training initiatives contribute to multidimensional outcomes across institutional and cultural contexts. Systematic reviews indicate that participation in physical activity promotes inclusion and social interaction among people with disabilities across a variety of settings [18, 19, 20].

The findings of this review confirm that inclusive physical culture in higher education supports both physical and psychosocial development among students with disabilities. Experimental implementations of inclusive elective physical education courses produced significant improvements in physical fitness, social adaptation, and motivation, confirming the effectiveness of adapted curricula [21, 22]. Similar results were reported in community-based and blended learning programs, which emphasized the importance of individualized instruction and accessible educational technologies for sustaining participation in physical activity [23].

At the same time, studies from the United States revealed ongoing disparities in access to physical activity opportunities for university students with disabilities, despite the recognized health and social benefits of participation [24, 25]. These results highlight the need for strong institutional commitment and targeted policy initiatives to ensure equal opportunities for engagement in physical culture and sport.

Psychological well-being and social inclusion are integral aspects of inclusive education. Physical activity-based learning models have been shown to enhance emotional balance and self-esteem among students with disabilities [26, 27]. Additional research indicates that teachers' readiness for inclusive practice depends largely on access to specialized training and professional support, including digital tools for inclusive education [28, 29]. These findings correspond with international evidence showing that teachers' attitudes and competence are decisive factors in achieving effective inclusion in physical education [19].

Cross-cultural research demonstrates that the effectiveness of inclusive approaches varies with local socio-economic conditions. Studies from Romania and other countries suggest that social and economic vulnerability exacerbates barriers to inclusion, whereas digital and extracurricular programs can help to mitigate them [30, 31]. Moreover, studies on peer interaction in inclusive physical education settings reveal generally positive attitudes of able-bodied students toward peers with disabilities, particularly among girls, emphasizing the importance of early socialization in inclusive environments [32].

Overall, the reviewed literature supports the view that inclusive physical culture should be

understood as an interdisciplinary and multi-level construct encompassing pedagogical, psychological, and institutional dimensions. Its success depends on coordinated efforts combining teacher competence, accessible infrastructure, and continuous social engagement of students with disabilities [18, 21, 23, 24, 28].

Ensuring continued progress in inclusion requires systematic evaluation of teacher training, accessibility policies, and institutional practices. Evidence from different research approaches contributes to the refinement of inclusion models that emphasize contextual adaptation, participation, and equity.

Limitations and Future Directions

This synthesis of literature on inclusive physical culture for university students with disabilities has several methodological and contextual limitations. First, it relied on secondary data from previously published studies, most of which used cross-sectional, descriptive, or qualitative designs. As a result, causal relationships and long-term effects of inclusive practices cannot be determined. Second, the geographical distribution of research is uneven, with most studies conducted in high-income regions (Europe and North America) and limited representation from developing or transitional countries, where infrastructural and policy conditions may differ substantially. Third, the conceptual diversity of “inclusion” across disciplines complicates synthesis, as terminologies and operational definitions often reflect educational, rehabilitative, or policy frameworks rather than a unified theoretical model. In addition, variation in instruments used to assess physical activity, accessibility, and psychosocial outcomes restricts comparability and generalization. Finally, the absence of quantitative meta-analytical data limits the ability to assess the magnitude of effects across studies.

Future research should focus on methodological improvement and diversification. Large-scale, longitudinal, and experimental designs are needed to examine the long-term impacts of inclusive physical culture programs on physical, psychological, and academic outcomes. Cross-cultural research would enhance current understanding by showing how sociocultural norms, economic conditions, and policy systems influence inclusion. Standardized evaluation tools are also needed to measure constructs such as teacher competence, environmental accessibility, and student engagement, enabling consistent comparison across studies. Interdisciplinary collaboration among education, rehabilitation, psychology, and health promotion specialists can help develop comprehensive intervention models. Innovation through digital technologies, including

virtual adaptive physical education platforms and wearable devices for monitoring participation, may expand access and personalization. Partnerships between universities, disability organizations, and policymakers should work toward embedding inclusive practices into campus culture as a core component rather than a supplementary initiative.

Addressing these methodological, theoretical, and practical limitations will strengthen the evidence base and improve the translation of inclusive physical culture principles into sustainable educational and rehabilitative practice. Continued research in diverse contexts will ensure that inclusion in higher education evolves as a dynamic and equitable process that promotes health, empowerment, and social participation for all students.

Conclusions

This study synthesized theoretical foundations and empirical evidence to examine the structure, determinants, and outcomes of inclusive physical culture for university students with disabilities. The findings indicate that effective inclusion in higher education depends on the interaction of pedagogical competence, accessible environments, and psychosocial engagement, each contributing to the creation of equitable and empowering activity settings. The integration of ecological and self-determination perspectives shows that inclusion in physical culture is not merely a pedagogical responsibility but a transformative process that fosters autonomy, confidence, and social belonging among students with diverse abilities.

Theoretically, the study reinforces the ecological and interactionist interpretation of inclusion as a multi-level construct shaped by personal, social, and institutional factors. Practically, it highlights the importance of teacher training, peer-supported adaptive programs, and ongoing accessibility evaluation to ensure sustained participation. Socially, inclusive physical culture serves as a mechanism for rehabilitation and community development, promoting health equity, educational justice, and social cohesion.

In essence, inclusive physical culture represents a key element of modern higher education, linking physical activity with human development, empathy, and collective well-being. By embedding inclusive practices within educational and institutional systems, universities can move beyond accommodation toward genuine participation, ensuring that every student experiences physical culture as a source of empowerment and shared growth.

Conflict of interests

The authors declare that there is no conflict of interests.

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