UNIVERSITY SPORT FACILITIES AS EDUCATIONAL AND SOCIAL INFRASTRUCTURE: THE ROLE OF FACILITY SATISFACTION AND SPORT PARTICIPATION IN STUDENT WELL-BEING AND SOCIAL INTEGRATION

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ABSTRACT
Universities are increasingly expected to promote students' health, well-being and social inclusion. This study investigated the associations between sport participation, satisfaction with university sport facilities, social integration and mental well-being among 122 students enrolled at Jagiellonian University (Poland). Mental well-being was assessed using the Short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS). Pearson correlations and multiple regression analyses were performed. Facility satisfaction was positively associated with mental well-being ($r = .28$, $p = .002$), while sport participation was positively associated with social integration ($r = .30$, $p < .001$). Regression analyses showed that facility satisfaction and social integration were independently associated with mental well-being, whereas sport participation was independently associated with social integration. The findings suggest that university sport facilities function not only as places for physical activity but also as educational and social environments that support students' well-being and campus inclusion.

KEYWORDS
University sport facilities; mental well-being; social integration; higher education; campus recreation.

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1. Introduction

European universities are increasingly expected to contribute not only to students' academic achievement but also to their physical health, psychological well-being and social inclusion. This broader educational mission has gained importance in response to rising levels of physical inactivity, growing concerns about students' mental health, and the increasing internationalisation of higher education (Franzoi et al., 2022; Muriago et al., 2026; Pengpid et al., 2015; Podstawski et al., 2021). Universities are therefore called upon to create campus environments that promote healthy lifestyles while supporting students' adaptation, participation and sense of belonging.

Within this context, university sport has become an important component of student life. A growing body of evidence indicates that participation in campus recreation programmes, intramural sport and organised physical activity, is associated with a wide range of positive outcomes, including improved physical and mental health, greater resilience, stronger social connectedness and enhanced academic outcomes (Forrester, 2015; Soria et al., 2022; Zarei & Siavashani, 2013; Winslade & Wright, 2018). A recent systematic review further concluded that campus recreation programmes consistently contribute to students' psychological well-being and overall university experience, while also highlighting important methodological limitations in the available evidence, particularly the predominance of studies conducted in North America and the limited number of investigations carried out in other higher education systems (Sim et al., 2026). Consequently, there is a need for further research conducted within

different cultural and institutional contexts, especially in European universities.

Although previous studies have demonstrated the benefits of participating in university sport, documenting associations between participation in campus recreation activities and outcomes such as well-being, sense of belonging and student retention (Forrester, 2015; Miller, 2011; Soria et al., 2022; Zarei & Siavashani, 2013), considerably less attention has been devoted to the characteristics of the environments in which these activities take place. Most available research has focused on participation itself, rather than how students experience and evaluate the settings in which university sport is delivered. Consequently, it remains unclear whether students' satisfaction with physical and organisational characteristics of university sport facilities such as equipment quality, cleanliness, accessibility, safety, booking procedures and staff support is independently associated with mental well-being and social integration beyond the frequency of sport participation. This distinction is relevant because facilities are more than physical spaces for exercise. They represent institutional environments where students voluntarily meet outside formal teaching, develop interpersonal relationships and participate in shared experiences that contribute to campus life (Eubank & DeVita, 2024; Miller, 2011). In increasingly international universities, these environments may become particularly important because they provide accessible and culturally neutral opportunities for interaction among students from different backgrounds, thereby facilitating integration and reducing social isolation (Leșco et al., 2025; Rosenthal et al., 2007; Trad, 2025).

The present study adopts a broader perspective, viewing university sport facilities as educational and social infrastructure rather than merely recreational amenities. This interpretation is grounded in the Biopsychosocial Model (Engel, 1977), which views health as the result of interactions among biological, psychological and social factors, and in Self-Determination Theory (Ryan & Deci, 2000), according to which the satisfaction of the basic psychological needs for autonomy, competence and relatedness promotes well-being and positive functioning. From this perspective, the contribution of university sport facilities extends beyond encouraging physical activity. Well-designed and well-managed sport environments may promote repeated social interaction, strengthen students' sense of belonging and create conditions that support psychological well-being through meaningful participation in campus life.

The current study explores an under researched area of campus recreation by examining the satisfaction with the facilities as a possible correlate of student well-being and social integration. This approach may help distinguish the role of participation in university sport from the role of the quality of the environment in which the participation occurs particularly within international campuses where opportunities for informal interaction are especially valuable.

Against this background, the present study investigates whether participation in university sport and satisfaction with university sport facilities are associated with students' mental well-being and perceived social integration in an international university setting. In addition, exploratory analyses examine which characteristics of university sport facilities are most strongly associated with students' overall satisfaction,

psychological well-being and social integration. The present study integrates behavioural and environmental dimensions into a single analytical framework and contributes to the discussion on university sport facilities as resources that can support healthier, more inclusive, and socially connected campuses.

Accordingly, the study addresses the following research questions:

RQ1. To what extent are overall satisfaction with university sport facilities, sport participation and perceived social integration associated with students' mental well-being?

RQ2. To what extent are overall satisfaction with university sport facilities and sport participation associated with students' perceived social integration?

RQ3. Which specific physical and organisational characteristics of university sport facilities are most strongly associated with overall facility satisfaction, mental well-being and perceived social integration?

2. Methodology

2.1 Study design and participants

A cross-sectional survey was conducted between March and June 2026 among students enrolled at Jagiellonian University in Kraków (Poland). Participants were recruited through convenience sampling using institutional communication channels and voluntary participation. Eligible participants were undergraduate or postgraduate students aged 18 years or older who were currently enrolled at the university.

A total of 122 students completed the questionnaire, including 76 international students (62.3%) and 46 Polish students (37.7%). The sample comprised students from different faculties and study levels, providing a heterogeneous representation of the university population. Overall, the mean age of participants was 22.6 years (SD = 2.3), and 56.6% were female.

Participation was voluntary, and participants were informed about the purpose of the study before providing informed consent. The questionnaire was administered anonymously, and no directly identifiable personal information was collected. Data were collected and processed in accordance with the principles of the Declaration of Helsinki and the General Data Protection Regulation (EU 2016/679).

2.2 Instrument

Data were collected using a structured online questionnaire comprising four sections aligned with the study aims: demographic characteristics; participation in university sport and satisfaction with university sport facilities; perceived social integration; and mental well-being.

Participation in university sport was assessed using a single item that asked respondents how frequently they participated in sport activities organised by or within the university, to capture engagement. Responses were recorded on an ordinal five-point scale ranging from 1 (Never) to 5 (Daily), with higher scores indicating more frequent participation. This scale was used to capture participation frequency in a simple, single-item format.

Students' perceptions of university sport facilities were assessed using six study-specific items selected to represent both physical characteristics of

the facility (e.g., accessibility, equipment and cleanliness) and organisational/service-related characteristics (e.g., booking procedures, staff support and safety). Item development was conceptually informed by the SERVQUAL framework (Parasuraman et al., 1988), particularly its emphasis on tangible and service-related dimensions of users' experiences, and by previous research examining campus recreation and university sport environments (Eubank & DeVita, 2024; Forrester, 2015; Miller, 2011). The measure was not developed as an adaptation of the full SERVQUAL instrument, so SERVQUAL expectation–perception gap scoring was not used. Rather, the six items were used as a study-specific exploratory measure of students' satisfaction with different aspects of the university sport environment. Responses were recorded on a five-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). An overall facility satisfaction score was calculated as the mean of the six items, with higher values indicating greater satisfaction. Internal consistency of the composite score was assessed using Cronbach's alpha.

Perceived social integration was measured using three items assessing students' sense of belonging, social connectedness, and integration into university life, to examine its relationship with the study outcomes. The items were informed by previous studies investigating sense of belonging among university students (Hoffman et al., 2002) and social connectedness among international students (Rosenthal et al., 2007). The three items were intended to provide a brief assessment of students' perceived integration into the university social environment rather than to reproduce an existing validated scale. Responses were rated on a five-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). This scale was used to reflect agreement with statements about social integration, and a

composite score was calculated as the mean of the three items, with higher scores indicating greater perceived integration. Internal consistency was assessed using Cronbach's alpha.

Mental well-being was assessed using the Short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS) (Stewart-Brown et al., 2009; Tennant et al., 2007) to measure the study outcome. The SWEMWBS consists of seven positively worded items measuring aspects of positive mental functioning, including optimism, feeling useful, relaxation, problem-solving, clear thinking, closeness to others, and autonomy. This scale was used to assess overall well-being. Each item is scored on a five-point Likert scale ranging from 1 ("None of the time") to 5 ("All of the time"). According to the official scoring guidelines, raw scores were converted to metric scores using the published SWEMWBS conversion table (Stewart-Brown et al., 2009). Higher scores indicate better mental well-being.

2.3 Statistical analysis

Descriptive statistics were calculated for all study variables and are presented as means, standard deviations, frequencies and percentages where appropriate. Internal consistency was evaluated using Cronbach's alpha. The facility satisfaction and social integration measures showed modest internal consistency ($\alpha = .57$ and $\alpha = .55$, respectively). These coefficients were considered when interpreting analyses based on the composite scores, particularly because both measures were brief and developed specifically for the present exploratory study. Accordingly, results involving these composite measures were interpreted cautiously and were not considered evidence of fully established psychometric constructs. Pearson correlation coefficients were calculated to examine the

associations among overall facility satisfaction, sport participation, perceived social integration and mental well-being. Additional exploratory correlation analyses investigated the relationships between the individual characteristics of university sport facilities (accessibility, equipment, cleanliness, booking procedures, staff support and safety) and the study outcomes.

To examine the associations between the study variables, two multiple linear regression models were performed. The first model examined the associations of facility satisfaction, sport participation, perceived social integration and gender with mental well-being. The second model examined the associations of facility satisfaction, sport participation and gender with social integration. Statistical significance was set at $p < .05$. All analyses were performed using Stata/SE version 12.0 (StataCorp LP, College Station, TX, USA).

3. Results

3.1 Sample characteristics

The final sample consisted of 122 students enrolled at Jagiellonian University (Poland), including 76 international students (62.3%) and 46 Polish students (37.7%). Participants had a mean age of 22.6 years (SD = 2.3), and 56.6% were female. Most respondents reported participating in university sport activities at least occasionally, although the frequency of participation varied across the sample. Detailed demographic characteristics are presented in Table 1.

Table 1: Demographic characteristics of the study sample (N = 122).

	Freq.	Percent
Gender		
Female	69	56.6
Male	53	43.4
Age	Mean 22.61 (SD ± 2.33)	
Nationality		
Europe	106	86.9
Asia	9	7.4
South America	4	3.3
North America	2	1.6
Africa	1	0.8
Student Status		
International	76	62.3
Local	46	37.7
Length of stay		
Less than 6 months	56	45.9
1 year	45	36.9
2+ years	21	17.2
Level of study		
Bachelor	72	59
Master	46	37.7
Phd	4	3.3
Faculty		
Business, Management & Law	42	34.4
Social Sciences & Humanities	48	39.3
STEM	23	18.9
Health Sciences	8	6.6
Campus Sport Facility Usage		
Daily	2	1.6
2-3 Times a week	19	15.6
Weekly	59	48.4
Monthly	19	15.6
Never	23	18.9
Type of sport facility used		
Gym	63	51.64
Swimming Pool	24	19.67

3.2 Descriptive statistics and correlations

The mean metric score on the Short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS) was 24 (SD = 3.5), indicating a generally moderate level of positive mental well-being within the sample. Descriptive statistics and internal consistency coefficients for the study variables are reported in Table 2.

Table 2: Descriptive statistics and internal consistency of the study variables.

	No.items	Mean	SD	Cronbach's α
Facility satisfaction	6	3.4	.43	.57
Social Integration	3	3.4	.58	.55
Mental Well-Being (SWEMWBS)	7	24	3.5	.67

Pearson correlation analyses revealed significant positive associations among all principal study variables (Table 3). Overall satisfaction with university sport facilities was positively associated with mental well-being ($r = .278$, $p = .0019$) and perceived social integration ($r = .279$, $p = .0018$). Sport participation frequency was positively associated with both facility satisfaction ($r = .294$, $p = .0010$) and social integration ($r = .302$, $p = .0007$), while mental well-being was positively associated with both social integration ($r = .298$, $p = .0009$) and sport participation ($r = .239$, $p = .0082$).

No statistically significant differences were observed between local and international students in overall facility satisfaction, perceived social integration or mental well-being.

Table 3: Pearson correlations among facility satisfaction, sport participation, social integration and mental well-being.

	Facility satisfaction	**Social integration**	**Sport participation frequency**	**Mental well-being**
Facility satisfaction	1			
Social integration	0.28 p=.0018	1		
Sport participation frequency	0.29 p = .0010	0.30 p = .0007	1	
Mental well-being	0.28 p = .0019	0.30 p = .0009	0.24 p = .0082	1

3.3 Associations between individual facility characteristics and study outcomes

To better understand which aspects of university sport facilities were associated with students' experiences, exploratory analyses were conducted at the item level. Overall facility satisfaction was most strongly associated with staff support and professionalism (r = .66), followed by booking procedures (r = .62), cleanliness (r = .61) and perceived safety (r = .60). Equipment quality showed a moderate association with overall satisfaction (r = .52), whereas location and accessibility displayed the weakest relationship (r = .39).

When examining associations with the study outcomes, staff support (r = .30, p = .001) and perceived safety (r = .29, p = .001) showed the strongest positive relationships with mental well-being, followed by booking procedures (r = .22, p = .017). Social integration was positively associated with equipment quality (r = .19, p = .034), cleanliness (r = .21, p = .020), booking procedures (r = .19, p = .034) and perceived safety (r = .21, p = .018), whereas location and accessibility were not significantly associated with either mental well-being or social integration.

Table 4: Pearson correlations between individual characteristics of university sport facilities and study outcomes.

Facility characteristic	Overall facility satisfaction	Social integration	Mental well-being
Location / Accessibility	**0.39** (< .001)	0.01 (.887)	−0.12 (.176)
Equipment quality	**0.52** (< .001)	**0.19** (.034)	0.14 (.127)
Cleanliness	**0.61** (< .001)	**0.21** (.020)	0.13 (.148)
Booking procedures	**0.62** (< .001)	**0.19** (.034)	**0.22** (.017)
Staff support and professionalism	**0.66** (< .001)	0.14 (.135)	**0.30** (.001)
Perceived safety	**0.60** (< .001)	**0.21** (.018)	**0.29** (.001)

3.4 Multiple regression analysis

Two multiple linear regression analyses were performed to examine the independent contribution of facility satisfaction, sport participation and social integration to students' well-being.

The first model examined factors associated with mental well-being, was statistically significant (F(4,117) = 4.88, p = .001) and explained 14.3% of the

variance (R^2 = .143; Adjusted R^2 = .114). After controlling for sport participation and gender, both facility satisfaction (B = 1.50, p = .046) and social integration (B = 1.27, p = .024) remained significant positive predictors of mental well-being, whereas sport participation frequency (p = .231) and gender (p = .780) were not statistically significant.

A second regression model examined predictors of social integration. The model was statistically significant (F(3,118) = 5.99, p = .001) and explained 13.2% of the variance (R^2 = .132; Adjusted R^2 = .110). Both facility satisfaction (B = 0.278, p = .023) and sport participation frequency (B = 0.143, p = .008) were independently associated with higher levels of social integration, while gender was not a significant predictor (p = .701).

Table 5. Multiple linear regression analyses predicting mental well-being and social integration.

Predictor	**Mental well-being (SWEMWBS)**				**Social integration**			
	B	**SE**	**β**	**p**	**B**	**SE**	**β**	**p**
Facility satisfaction	1.497	0.741	0.185	.046	0.278	0.121	0.207	.023
Social integration	1.267	0.552	0.211	.024	—	—	—	—
Sport participation frequency	0.395	0.328	0.115	.231	0.143	0.053	0.249	.008
Gender (Male vs Female)*	0.173	0.618	0.025	.780	−0.040	0.103	−0.034	.701
Constant	13.444	2.672	—	< .001	2.097	0.401	—	< .001
Model F	**4.88**			**.001**	**5.99**			**< .001**
R^2	**0.143**				**0.132**			
Adjusted R^2	**0.114**				**0.110**			

Note. *B* = unstandardized regression coefficient; *SE* = standard error; **β** = standardized regression coefficient. Gender was entered as a dichotomous variable (reference category = Female).

4. Discussion

The present study examined the relationships between participation in university sport, students' satisfaction with sport facilities, perceived social integration and mental well-being within an international university context. The main finding was that facility satisfaction and social integration were independently associated with mental well-being, while sport participation was independently associated with social integration. These findings suggest that students' experiences of university sport may be related not only to their level of participation but also to their perceptions of the environments in which participation takes place. However, given the cross-sectional design, the direction of these relationships cannot be established.

The positive association between sport participation and social integration is consistent with previous studies showing that campus recreation promotes social connectedness, strengthens students' sense of belonging and facilitates adaptation to university life (Forrester, 2015; Soria et al., 2022). More recently, Önal and Biricik (2025) reported that recreational sport plays a significant role in facilitating sociocultural adaptation by creating opportunities for intercultural interaction and informal social learning. Our findings extend this evidence by suggesting that participation in university sport was associated with greater perceived social integration, which was itself positively associated with mental well-being. This

relationship may be particularly relevant within increasingly international universities, where sport provides opportunities for informal interaction outside academic settings. Earlier studies have shown that participation in recreational and leisure activities helps international students develop friendships, improve sociocultural adjustment and reduce feelings of isolation (Rosenthal et al., 2007; Leșco et al., 2025). The present findings reinforce this perspective by suggesting that more frequent participation in university sport is associated with greater perceived integration into the university community.

A significant finding concerns students' perceptions of university sport facilities. Beyond the overall association between facility satisfaction and mental well-being, the exploratory analyses revealed that staff support, perceived safety and booking procedures were more strongly associated with students' outcomes than physical characteristics such as location or equipment. Furthermore, despite the limited internal consistency of the study-specific facility satisfaction measure, the composite score remained positively associated with both social integration and mental well-being when sport participation was included in the regression models. This finding should therefore be considered preliminary and requires confirmation using a psychometrically validated measure of facility satisfaction. These findings extend the existing literature, which has traditionally focused on the benefits of physical activity or campus recreation programmes (Miller, 2011; Sim et al., 2026), by drawing attention to students' perceptions of the environment in which university sport takes place. Importantly, when sport participation was included in the regression models, facility satisfaction overall was related to both mental well-being and social integration. Thus, the frequency of participation might not be the only factor determining the

contribution of university sport to students' experiences; how facilities are organized, managed and perceived might also be relevant.

These findings can be interpreted through the theoretical framework adopted in this study. According to the Biopsychosocial Model (Engel, 1977), health and well-being emerge from the interaction of biological, psychological and social dimensions rather than from physical activity alone. Similarly, Self-Determination Theory (Ryan & Deci, 2000) argues that supportive environments promote well-being by satisfying individuals' basic psychological needs, especially the need for relatedness. From this perspective, university sport facilities should be viewed not simply as places where students exercise, but as educational settings that facilitate interpersonal relationships, encourage participation and create opportunities for repeated social interaction. The stronger associations observed between staff support and perceived safety are consistent with this interpretation, suggesting that the facility's social climate is central to students' experiences.

The practical implications of these findings are relevant to universities seeking to promote healthier, more inclusive campuses. Investments in university sport should not be limited to the construction or renovation of facilities but should also prioritise organisational quality, including staff training, efficient management, accessible booking systems and safe, welcoming environments. Most importantly, such investments may strengthen students' engagement with campus life while simultaneously supporting psychological well-being and social integration. This perspective aligns with the broader Healthy Universities approach, which considers the campus environment as a strategic setting for promoting health, inclusion

and student success rather than simply providing recreational services (Dooris et al., 2017).

5. Limitations and future research

Several limitations should be considered when interpreting the findings. First, the cross-sectional design does not permit causal inferences. Reverse causality cannot be excluded; for example, students with higher levels of mental well-being may participate more frequently in university sport or evaluate their university environment more positively. Similarly, unmeasured individual, social or contextual factors may influence both students' perceptions of sport facilities and their well-being. Longitudinal and, where feasible, intervention-based studies are therefore needed to clarify the direction and mechanisms of these associations. Second, the study was conducted within a single university using a convenience sample, which may limit the generalizability of the results to other institutional contexts. Third, although mental well-being was assessed using the validated SWEMWBS, facility satisfaction and perceived social integration were assessed using brief study-specific measures. The facility satisfaction items were conceptually informed by the SERVQUAL framework (Parasuraman et al., 1988) and previous campus recreation research, while the social integration items were informed by previous research on university belonging and social connectedness. Neither measure has undergone formal psychometric validation in its present form. Moreover, internal consistency was modest for both facility satisfaction ($\alpha = .57$) and

social integration (α = .55), which may partly reflect the small number of items and, particularly for facility satisfaction, the inclusion of conceptually distinct physical and organisational characteristics. Consequently, results involving these composite scores should be considered exploratory. Future studies should evaluate their content and construct validity, examine their factorial structure, assess reliability in larger and independent samples before their use as established measurement scales and test their applicability across different university contexts. The on-going extension of the project to an Italian university will also provide an opportunity to compare the relationships observed in different European higher education systems.

6. Conclusions

The present study contributes to the growing discussion on healthy and inclusive universities by suggesting that students' perceptions of university sport facilities may be associated with their well-being and social integration, beyond their level of sport participation. Our findings support considering university sport facilities not only as places for physical activity but also as potential educational and social environments within campus life.

From a practical perspective, the results indicate that universities should view sport facilities as strategic resources for student development and campus inclusion. Investments should therefore extend beyond physical infrastructure to organisational aspects such as qualified and supportive staff, safe and welcoming environments, efficient booking systems and accessible services. These elements appear to shape students' experiences

and may strengthen belonging, encourage continued participation and support positive mental health.

The increasing internationalisation of higher education further reinforces the importance of these findings. For many students, particularly those from diverse cultural backgrounds, university sport facilities are among the few informal settings where meaningful social relationships can develop outside the classroom. Inclusive and well-managed sport environments may therefore support healthier lifestyles and more cohesive and supportive university communities.

However, the findings should be interpreted in light of the study's methodological limitations and the results should therefore be considered preliminary and should not be interpreted as evidence of causal relationships or assumed to be generalizable to other university populations. Future research should examine these relationships in larger and more diverse samples across multiple universities and countries, using validated measures and longitudinal designs.

Although further longitudinal and multi-centre studies are needed, the present findings provide preliminary evidence that the organisational quality of university sport environments deserves greater attention within university health promotion policies. Future research should continue to investigate how different models of sport provision influence students' well-being across diverse higher education contexts and to inform evidence-based strategies for healthier, more inclusive campuses.

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